

The Impact of Investor Types on Corporate Social Responsibility

Evidence from Europe

JOHANNES LUBICH

JULIAN STEIB

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Abstract:

In this research, we analyse the complex relationship between various investor types and Corporate Social Responsibility (CSR) performance, measured via Environmental, Social, and Governance (ESG) scores. The study leverages a comprehensive dataset of European companies spanning two decades, employing fixed-effect regression models to discern patterns. Our research enriches existing literature by dissecting investor heterogeneity in relation to CSR engagement. Our findings reveal nuanced dynamics: active investment advisors demonstrate a negative correlation with ESG scores, passive investment advisors show a positive relationship, while long-term institutional and government investors exhibit no significant correlation. Individual investors present a negative correlation. This study provides a robust foundation for understanding the interplay between investor types and CSR performance, paving the way for further in-depth analyses.

Keywords:

Investor Types, Ownership Structure, ESG, CSR.

Authors:

Johannes Lubich (42197)

Julian Steib (42212)

Tutors:

Vincent Maurin, Assistant Professor, Department of Finance

Examiner:

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Contents

1.	INTRODUCTION	4
2.	THEORETICAL BACKGROUND AND LITERATURE REVIEW	7
2.1.	Theoretical Background	7
2.1.1.	Institutional Investors	9
2.1.2.	Passive Investment Advisors	9
2.1.3.	Corporations	10
2.1.4.	Governments	11
2.1.5.	Individual Investors	11
2.1.6.	Banks and Brokers.....	12
2.2.	Literature Review	12
2.2.1.	Institutional Investors	12
2.2.2.	Passive Investment Advisors	14
2.2.3.	Corporations	14
2.2.4.	Governments	15
2.2.5.	Individual Investors	15
2.2.6.	Banks and Brokers.....	15
2.3.	Addition to existing literature	16
3.	RESEARCH QUESTION.....	17
4.	DATA DESCRIPTION	19
4.1.	Filter for Data Extraction	19
4.2.	Data Sources & Methodology	19
4.2.1.	Ownership Data	19
4.2.2.	Fundamental and Financial Data	20
4.2.3.	ESG Data	21
4.3.	Data Manipulation	23
4.4.	Descriptive Statistics	25
5.	ANALYSIS.....	30

5.1.	Methodology.....	30
5.2.	Results.....	32
5.2.1.	Model 1: Ownership Levels on ESG Levels	32
5.2.2.	Model 2: Ownership Levels on ESG Changes	33
5.2.3.	Model 3: Ownership Changes on ESG Changes	35
5.3.	Robustness Analysis	37
5.3.1.	Model 4: Lagged Ownership Levels on ESG Changes	37
5.3.2.	Model 5: Lagged Ownership Changes on ESG Changes	38
6.	DISCUSSION.....	40
7.	CONCLUSION	45
8.	REFERENCES	48
9.	APPENDIX	53

1. Introduction

Corporate Social Responsibility (CSR) has gained increasing prominence over recent years as the role of businesses has broadened beyond creating shareholder value. CSR refers to companies' commitments to integrate social, environmental, and ethical considerations into their operations, taking into account potential impactful effects on various stakeholders such as employees, customers, communities (Carroll, 1991). CSR has quickly become a central theme in sustainable development discourse as well as responsible business practices, leading to significant research regarding its determinants and consequences.

Diverse preferences and objectives among various investor types can have a substantial effect on strategic decisions and priorities of firms, including CSR initiatives. Previous studies have focused largely on institutional investors as key determinants of CSR performance with institutional ownership being linked positively with CSR engagement (Dyck et al., 2019; Nofsinger et al., 2019; Wang et al., 2023). However, there is limited research on the influence of other investor types, such as passive investment advisors, governments, corporate owners, and individual investors, on a company's CSR performance.

This study aims to address this research gap by investigating how various investor types affect CSR performance of publicly traded companies in Europe. The primary research question is: How do different investor types influence the CSR performance of publicly traded companies in Europe? Our study contributes to the existing literature in three ways. Firstly, by disaggregating the ownership data into various investor categories, we provide a more nuanced understanding of the relationship between different investor types and CSR performance. Secondly, our dataset covers up to 1,265 companies up to a period ranging from 2002 to 2022, capturing the growing relevance of CSR over the past two decades, a period only partially covered in previous research. And lastly our methodology allows us to draw conclusions not only about the influence of ownership levels on CSR performance, but also how changes in ownership impact the development of CSR scores over time.

The theoretical underpinnings of our study draw upon diverse perspectives from the literature on CSR, corporate governance, and investor behaviour. Investors' interest in a company's Corporate Social Responsibility (CSR) engagement is driven by four primary reasons. These include the potential positive influence of CSR on financial performance, risk mitigation, enhancement of firm reputation, and ethical obligations. However, the focus on CSR varies between investor types due to differences in investment criteria such as return expectations, risk tolerance, and investment horizon. Consequently, their approach to CSR engagement may differ significantly. Investors can influence CSR practices through voting rights, purchasing decisions, and indirect impacts, such as public endorsement or stigmatization. Despite the effectiveness of these mechanisms, the degree to which sustainable investment can affect asset prices and translate into ESG practices remains a subject of ongoing debate. This study seeks to explore these varying perspectives across different investor types.

To empirically investigate the relationship between different investor types and CSR performance, we employ a comprehensive dataset encompassing ownership data, financial information, and ESG scores for companies listed on the Refinitiv Europe price return index from 2002 to 2022. We utilize Refinitiv's ESG data to assess CSR performance, which is based on a wide array of indicators, covering environmental, social, and governance dimensions. Our analysis controls for potential confounding factors that might influence the relationship between ownership structure and CSR performance, such as leverage, company size, and financial performance.

Based on the existing literature and theoretical considerations, we develop seven hypotheses, which posit the potential impact of different investor types on CSR performance. These hypotheses suggest that active investment advisors, long-term institutional investors and passive investment advisors are likely to have a positive influence on CSR performance, while government investors, banks and brokers, corporate owners and individual investors may have a negative or neutral impact, respectively.

We want to test these hypotheses on two different dimensions. First, we want to see, whether high levels of ownership from a specific investor type correlate with an increase or decrease in CSR performance. For this we employ a yearly fixed effects model

with the ownership data in levels and the ESG score as yearly changes. On the second dimension, we want to investigate, whether an increase in ownership within a company leads to positive or negative CSR performance changes. Hence, our second main model employs a yearly fixed effect model with ownership and ESG scores as yearly changes.

Our research sheds light on the complex interplay between different types of investors and ESG performance. Interestingly, we found that Active Investment Advisors, the most substantial investor group, were consistently associated with a decrease in ESG score changes, a finding that stands in contrast to existing literature and might indicate a recent change in these investors' attitudes or practices. Long-term institutional investors did not display any significant correlation with CSR performance, except for a minor negative effect over time in our lagged ownership model, which was contrary to our initial hypothesis. In contrast, Passive Investment Advisors showed a significant and positive correlation with ESG scores, corroborating our hypothesis and suggesting that these investors are indeed engaging positively on CSR matters with the companies in their portfolios. Corporate ownership, however, was negatively correlated with most ESG scores, suggesting a possible lack of commitment towards CSR among corporate shareholders. As for banks and brokers, we noticed a negative correlation between their ownership levels and ESG scores, yet a positive correlation of ownership changes on governance, contradicting our initial assumption of their lack of engagement. Government ownership did not exhibit any substantial correlation, underlining the intricacies associated with the motivations behind governmental investments. Lastly, the effect of individual ownership on ESG performance presented a predominantly negative picture.

2. Theoretical Background and Literature Review

2.1. Theoretical Background

We identify four different reasons, why investors would care about a company's CSR engagement. Firstly, research has suggested CSR can positively influence financial performance of a company. A large meta study by Friede et al. (2015) analysed over 2,000 empirical studies to find that more than 90% of these studies report a non-negative relationship between ESG performance and corporate financial performance, with the large majority of studies finding a positive relationship (Friede et al., 2015). Secondly, CSR can help to mitigate risks as it can prevent reputational damage from social and environmental incidents (Linsley & Shrives, 2006). Research confirms that mutual funds who screen their investments for sustainability and ethical performance are less exposed to market return volatility compared to conventional, non-ethical funds (Bauer et al., 2005). Thirdly, CSR can enhance a firm's reputation and thereby lead to increased customer loyalty and investor confidence (Sen & Bhattacharya, 2001). And fourth some investors find that CSR engagement is necessary as part of their ethical and moral obligations (Clarkson, 1995).

Different investor types have highly heterogenous investment criteria, including factors like expected return, investment horizon, risk aptitude and regulations. Hedge funds for example typically seek to generate above average returns for their investors using high risk strategies like short selling or leveraging, whereas institutional investors often have a long investment horizon and prioritize stability and sustainability of their investments. Subsequently, we expect their stance regarding the CSR activities of the portfolio company varies, as the various reasons for investors' interest in CSR should hold more relevance for certain investors than to others. Additionally, investments in CSR activities do not necessarily have to be NPV positive. There is a cost-benefit trade-off, as positive activities might provide economic benefits, such as higher valuation under certain conditions, but they can be quite costly to implement (Nofsinger et al., 2019). Investors also have to consider the time lag between the investment in the CSR activity and the potential positive outcome on the firm valuation, as it might not be attractive for an investor with a short investment horizon.

Depending on the respective interest in CSR engagement, different investor types have different means of engaging with portfolio companies about increasing/decreasing CSR activities. First, investors with significant voting power, such as institutional investors, can use their voting rights to influence a company's CSR practices. Institutional investors, in particular, have been shown to engage in active ownership, whereby they use their voting rights and other means to influence a company's management and operations (Gillan & Starks, 2007). By engaging with companies on CSR issues, institutional investors can encourage companies to adopt and implement more socially and environmentally responsible practices. In addition to voting on CSR initiatives, institutional and other activist investors can use their influence to pressure companies to adopt more responsible practices. Activist investors typically acquire a significant stake in a company and then use various tactics, such as shareholder proposals or proxy fights, to influence the company's management and strategy. Activist investors may also engage in public campaigns to pressure companies to improve their CSR practices (Clark & Hebb, 2005). Second, investors can influence CSR practices through their purchasing decisions. Retail investors, for example, may choose to invest in companies with strong CSR practices or avoid companies that have poor CSR practices. This can lead to a shift in demand for socially and environmentally responsible products and services, which in turn can encourage companies to adopt more responsible practices. Third, investors can impact companies indirectly. In this case, an investor influences a third party, which then affects company activities (Kölbel et al., 2020). This includes stigmatization, where an investor taints a company's public image, endorsement, where an investor speaks highly of a company's sustainability performance, benchmarking, where rating agencies assign a value to a company's sustainability performance and demonstration, where investors encourage other investors to invest in similar companies (Kölbel et al., 2020). According to Kölbel et al. (2020) and their extensive literature review, the first mechanism of shareholder engagement is very effective to increase CSR performance, with some determinants that influence the outcome of shareholder proposals (cost of reform, investor influence, company's level of ESG experience). For the capital allocation mechanism, they find evidence that sustainable investors can affect asset prices, but there is no agreement on the size of this effect and no evidence if these changes in asset prices

translate into ESG practices. The indirect impact still lacks empirical coverage (Kölbel et al., 2020).

In the following, we will give an overview of the different relevant investor types of our study and juxtapose their general investment criteria and objectives on the relationship of the specific investor type and CSR.

2.1.1. Institutional Investors

Institutional investors are one of the largest shareholder categories in Europe and invest a substantial part of their assets in equities (EFAMA, 2019). They typically invest with a long-term horizon and the overall goal to generate financial returns while also considering the sustainability of their investments. Their engagement in CSR is often influenced by local regulations. For example, in the EU, the Shareholder Rights Directive II requires institutional investors to disclose their engagement policies and activities, which may encourage more active engagement with CSR issues. In our model, institutional investors are divided into two different investor types. Active Investment Advisors comprise all active investment advisors, wealth managers, mutual funds and hedge funds, whereas long-term institutional investors encompass pension funds, insurance companies and other institutional investors. This split seems quite logical, as investment advisors and funds are expected to have a shorter investment horizon, than pension funds or insurance companies, as they are often limited to a 10-year fund period before having to pay back the invested capital. Pension funds, insurance companies and endowment funds usually have an investment horizon of 30 years and more, which makes them more likely to be interested in the long-term sustainability of their investments and engage with companies to drive their sustainability strategy. Both investor types are large groups, aggregating a plethora of different investment strategies with the primary goal of achieving financial returns. Through this heterogeneity we theoretically expect mixed results and counteracting effects in this group.

2.1.2. Passive Investment Advisors

In the category Investment Advisors – Passive, we mainly summarize the passive Exchange Traded Funds (ETF) tracking an index or benchmark, that are offered by

investment advisor companies as well as other investment advisors with passive strategies. Passive ETFs aim at providing investors with exposure to a broad range of companies and investment strategies, and they have become increasingly popular in recent years due to their low fees and transparency. Especially thematic ETFs focusing on sustainability have seen a large increase in demand, with assets under management increasing from 4.7bn USD in 2014 to 449bn USD in 2023 (Zubareva, 2023). Sustainable ETFs integrate ESG factors in different ways, including exclusionary screening (not investing in stocks from specific industries or companies with low ESG scores), a general integration of ESG performance, pursuing a best-in-class strategy (only investing in high performing ESG stocks) or applying thematic strategies (e.g. focusing on only a few Social Development Goals (SDGs) like climate action or gender equality) (UNCTAD, 2021). With this trend towards sustainable ETFs, traditional funds would experience outflows and therefore their holding in the benchmark companies would decrease, whereas the inflow of money towards sustainable ETFs the holdings in sustainable companies would increase. Therefore, there is a theoretical argument for a positive relationship between ownership levels of passive Investment Advisors and CSR performance, assuming capital allocation can have a material impact on ESG scores. Additionally, we would expect sustainable ETFs to also positively use their voting power on CSR issues.

2.1.3. Corporations

There are several explanations why corporations acquire holdings in other companies. Looking at the standard mergers and acquisitions theory, companies have several reasons for investing in or acquiring other companies, including lower cost of capital from diversification, cost or revenue synergies or financial reasons (where the bidder believes that the firm is currently undervalued) (Grinblatt & Titman, 2001). While research has shown that diversified companies indeed usually experience a lower cost of capital than comparable single-segment firms (Hann et al., 2013), mergers are frequently unsuccessful and lead to the destruction of shareholder value. There is also reason from the CSR perspective for a company to invest in another company, because the investor hopes for the good branding of the investee to spill over and have a positive effect on its own reputation. (Delgado-García et al., 2010).

2.1.4. Governments

In the category governments, we classify all investments done by a state directly or indirectly through a sovereign wealth fund. Mazzucato (2013) argues that the underlying economic theory justifies state investments or state intervention if the social return on investment is higher than private return, leading to insufficient funding from the private economy. Hence, we can derive several specific reasons for government investments. Investing in companies can enable governments to address market failures and complement private sector investments (Joseph Stiglitz, 1996), support economic development by fostering innovation, job creation and market stability (Mazzucato, 2013) and help provide public goods, such as infrastructure, healthcare and education (Musgrave, 1959). Additionally, governments often invest in strategic industries to secure long-term access to resources or technology, maintain national security and preserve a country's competitive advantage (Kowalski et al., 2013). Governments also sometimes keep a significant stake in former state-owned businesses that have been privatized. These reasons often go along with the pursuit of Corporate Social Responsibility as both often share common goals, such as economic development, environmental sustainability, and social welfare. By investing in companies that adhere to CSR principles governments can signal their commitment to these objectives. However, potential conflicts of interest may arise due to the different objectives and priorities of governments and private sector actors. For instance, governments may use their investments to exert political influence or protect domestic industries, potentially compromising a company's focus on CSR (Witt & Redding, 2013). Governments might also invest in companies with inferior CSR performance, e.g., oil and gas companies, to ensure a steady supply of resources.

2.1.5. Individual Investors

The individual investors tracked by Refinitiv mainly reflect high net worth individuals and private investors, while non-significant stock holdings from retail investors are disregarded. Individual investors often have a diverse range of investment objectives, risk tolerances, and investment horizons, which may lead to heterogeneous preferences regarding CSR performance (Barber & Odean, 2013). From a theoretical perspective, individual investors may be more inclined to consider CSR factors in their investment

decisions due to personal values or ethical considerations (Becchetti et al., 2013). Furthermore, individual investors may view firms with strong CSR performance as less risky and more likely to generate long-term value (Geczy et al., 2005). This notion aligns with the already established growing trend of socially responsible investing (SRI) seen in the section of passive investment advisors.

2.1.6. Banks and Brokers

The Banks and Brokers category in our model primarily encompasses commercial banks, investment banks, and brokerage firms. They do not include wealth management services, which fall under Investment Advisors. Banks and Brokers often engage in short-term holding of equity to facilitate trades or provide liquidity in the market. Their primary concerns are the immediate execution of trades, market-making activities, and arbitrage opportunities rather than long-term considerations like CSR performance (Admati & Pfleiderer, 1988). This often results in short-term market dynamics such as price fluctuations and liquidity concerns having more of an influence than long term factors like CSR performance (Eccles & Kastropeli, 2018). Trading decisions typically rely on quantitative indicators like price trends and volatility instead of qualitative factors, which would include environmental, social and governance (ESG) practices (Menkhoff & Taylor, 2007). As their business models involve frequent trading with short investment horizons, banks and brokers may find it challenging and are insufficiently incentivized to engage with companies on CSR issues. Engaging with such concerns typically requires long-term investing perspectives and willingness to alter corporate behaviour, something we do not expect from short-term shareholders like Banks and Brokers. In summary, the theoretical expectation is that banks and brokers, given their role as short-term equity holders and facilitators of market transactions, are unlikely to consider CSR performance in their buying decisions or to engage actively with companies on these issues.

2.2. Literature Review

2.2.1. Institutional Investors

Current research on the topic finds a generally positive relationship between institutional ownership and CSR performance. Dyck et al. (2019) examine the relationship between

institutional investors and corporate social responsibility (CSR) across 41 countries. They find that institutional ownership is positively associated with environmental and social performance, even after controlling for other factors such as firm size, industry, and country-level governance. They also report that investors see financial benefits in pushing for E&S performance, as they find that investors increased their portfolio company's E&S performance even stronger after financial shocks. In general they find that investors from countries with a strong community belief have a stronger impact on improving firm's E&S performance. (Dyck et al., 2019)

Nofsinger et al. (2008) focus on the preference of institutional investors within CSR. The study examines the revealed preferences of institutional investors for corporate social responsibility (CSR) activities. The authors use a granular examination of various environmental and social (ES) aspects to avoid the inherent shortcomings of many prior studies that use an aggregated measure of CSR activities. They report that institutional investors appear to not overweight companies with positive ES indicators but underweight stocks with negative ES indicators. They conclude that institutional investors, in general, are interested in the economics and risk characteristics of their investments, as demonstrated by their revealed CSR-related preferences. (Nofsinger et al., 2019).

Dam and Scholtens (2012) examine the relationship between investors and CSR for several investor types. They found institutional investors to be neutral in their impact on CSR policies, meaning increased institutional ownership has neither a positive nor negative influence on CSR performance (Dam & Scholtens, 2012). Their results for other owner types will be reported in the specific literature review sections.

Wang et al. (2023) find that institutional ownership is significantly and positively related to corporate ESG performance. Specifically, they find that long-term non-business-related institutional investors have the strongest positive impact on ESG performance. Short-term non-business-related institutional investors also have a positive impact but to a lesser extent. However, short-term business-related institutional investors have a negative impact on ESG performance. (Wang et al., 2023)

Dimson (2015) focuses on engagement activities by institutional investors. Companies with inferior governance and socially conscious institutional investors are

more likely to be engaged, and success is more probable if the engaged firm has reputational concerns and higher capacity to implement changes. Collaboration among activists is also instrumental in increasing the success rate of environmental or social engagements. After successful engagements, particularly on environmental or social issues, companies experience improved accounting performance and governance and increased institutional ownership (Dimson et al., 2015).

2.2.2. Passive Investment Advisors

The research on the link between passive investment funds is very limited. Appel et al. (2016) for example explore the role of passive institutional investors in influencing corporate governance. Utilizing a comprehensive sample of US public firms from 2000 to 2012, the authors employ a fixed-effects panel regression model to investigate the impact of passive ownership on governance outcomes. The results reveal a positive relationship between the degree of passive ownership and governance quality, proxied for by the number of governance proposals approved at annual general meetings. Furthermore, the study finds that passive investors exercise their influence primarily through their voting power in shareholder meetings rather than through active engagement with firms. These findings suggest that passive institutional investors, despite their ostensibly passive stance, play a significant role in shaping corporate governance practices, which may have indirect implications for firms' CSR performance.

2.2.3. Corporations

Empirical research on the effect of corporate crossholdings / strategic investments on ESG performance is scarce. Rees and Rodionova (2013) examine the impact of strategic shareholdings on different elements of corporate social responsibility (CSR) using a sample of 3,541 companies from 30 countries over the period 2002 to 2010. The study finds that total strategic or closely held equity holdings have an adverse effect on ESG scores. This effect is largely driven by family and corporate crossholdings. Moreover, they find that the negative effect is more pronounced for environmental and social scores than governance scores (Rees & Rodionova, 2013). The aforementioned study by Dam

and Scholtens (2012) finds a negative association between firm ownership and CSR policies, especially on the social dimension.

2.2.4. Governments

Empirically we find mixed results on the relationship between state and government investors and CSR. Van der Zee (2017) finds that most sovereign wealth funds do not use CSR criteria in their investment process with the exception of the Norwegian Petroleum Fund. Rees and Rodionova (2013) report a positive relationship between government holdings and environmental and social scores. Dam and Scholtens (2012) find state and government ownership to have a neutral impact on CSR performance.

2.2.5. Individual Investors

Empirical research on the relationship between individual investors and CSR performance is limited. However, some studies suggest that individual investors are increasingly incorporating CSR criteria into their investment decisions (Becchetti et al., 2013; Nilsson, 2009). For example, the study by Nilsson (2009) find that retail investors in Sweden are more likely to invest in firms with higher CSR performance, while a study by Becchetti et al. (2013) reports similar findings for Italian investors.

In contrast, other research suggests that individual investors may be less focused on CSR performance, either due to a lack of information and awareness or because they prioritize short-term financial performance over long-term value creation (Barber & Odean, 2013; Lourenço et al., 2012). For instance, a study by Lourenço et al. (2012) finds that Portuguese retail investors do not place significant emphasis on CSR information when making investment decisions. Dam and Scholtens (2012) also find a negative relationship between individual ownership and CSR policies, specifically on the environmental dimension and the overall CSR scores.

2.2.6. Banks and Brokers

The body of research investigating the relationship between banks and brokers as equity investors and CSR performance is not as extensive as for other investor types. This is

primarily due to the nature of their operations, which are typically short-term and transactional, serving to facilitate trades in the marketplace rather than engage in the governance of the companies they invest in.

Consistent with this theoretical perspective, empirical research by Bushee (2001) shows that transient investors, which include banks and brokers, exhibit limited interest in the CSR performance of their portfolio firms. Bushee's classification of transient investors, characterized by high portfolio turnover and diversified holdings, effectively describes the typical behaviour of banks and brokers in the equity markets. His findings suggest that these investors are more focused on short-term earnings and are less likely to influence or be influenced by the CSR policies of their portfolio companies. Dam and Scholtens (2012) also find a neutral relationship between bank ownership and CSR performance.

2.3. Addition to existing literature

Our addition to existing literature is threefold. First, existing research has mainly focused on the relationship between institutional investors and CSR performance. We have seen that investors are heterogeneous and have different investment preferences and therefore different attitudes towards CSR engagement. By splitting our data set into more granular investor categories, we can establish a more nuanced picture of investor engagement with portfolio companies regarding CSR. Second, we use a very large dataset covering around more than 1,200 companies for a period of up to 21 years. Most existing research has used datasets that end latest 2012 (see Dyck et al. (2019), Dam and Scholtens (2012), Appel et al. (2016), Dimson et al. (2015)), which thereby fail to capture effects from the large increase of CSR relevance in the last ten years. And third, our methodology allows us to draw conclusions not only about the influence of ownership levels on CSR performance, but also how changes in ownership impacts the development of CSR performance over time. Thereby we can address the bias that some investors might have a tendency to invest in high ESG companies, but do not actually lead to a positive change after they invested.

3. Research Question

After analysing existing literature and establishing the relevant theory for the paper, we can pose our central research question:

Research Question: How do different investor types influence the CSR performance of publicly traded companies in Europe?

Considering the theoretical link and current research findings we can formulate our hypotheses for this paper.

For institutional investors we found a strong theoretical and empirical link to CSR performance. As they are split into two investor groups in our paper, we can pose our first two hypotheses accordingly:

Hypothesis 1: Active investment advisors have a positive correlation with CSR performance.

Hypothesis 2: Long term institutional investors have a positive correlation with CSR performance.

Based on the limited research, but the growing trend towards sustainability within the field of passive investment funds, we pose our second hypothesis:

Hypothesis 3: Passive investment advisors have a positive correlation with CSR performance.

Given that the theoretical reasons for corporate investments usually are motivated strategically and the current research has also found a predominantly negative link to CSR performance, we pose our third hypothesis:

Hypothesis 4: Corporate investors have a negative correlation with CSR performance.

The limited research and conflicting theoretical link between government investment and CSR performance leads to our next hypothesis.

Hypothesis 5: Government investors have no correlation with CSR performance

Given the mixed findings in the literature and the theoretical underpinnings for individual investors to consider CSR factors, we propose our sixth hypothesis:

Hypothesis 6: Individual investors have no correlation with CSR performance.

Banks only act as short-term intermediaries in our model, hence the theoretical and empirical link point towards a neutral relationship:

Hypothesis 7: Banks and Brokers have no correlation with CSR performance.

Table 1 summarizes the results of our literature and theory review and state our main hypothesis in abbreviated form. Positive/Negative here means theory/empirics have found a positive/negative relationship between increased ownership and CSR performance.

Owner Type	Theoretical Link	Empirical Link	Hypothesis
Investment Advisors Active	Neutral	Positive	Positive
Long term institutional	Neutral	Positive	Positive
Investment Advisors passive	Positive	Positive	Positive
Corporate	Negative	Negative	Negative
Government	Neutral	Neutral	Neutral
Individuals	Neutral	Neutral	Neutral
Banks and Brokers	Neutral	Neutral	Neutral

Table 1: Overview of Theory, Empirics, and our Hypotheses

4. Data Description

4.1. Filter for Data Extraction

In constructing our dataset, we selected the companies that are part of the Refinitiv Europe price return index (Ticker: TRXFLDEUPU), a market capitalization weighted index that measures the performance of the biggest and most traded companies of all stock exchanges in East, North, South and West Europe (De la Torre et al., 2022). The inclusion criteria ensure that our analysis incorporates a diverse and representative sample of European companies, spanning a wide array of industries and geographical locations. Our dataset consists of annual data, starting on January 1st, 2002, which marks the inception of Refinitiv's ESG data reporting, and concluding on December 31st, 2022. We obtain a maximum of 21 observations for each company, allowing for a comprehensive examination of long-term trends over a two-decade period.

4.2. Data Sources & Methodology

4.2.1. Ownership Data

Sources

For the dataset and specified time frame, we extract consolidated ownership data for each company using Refinitiv's Eikon tool. This comprehensive data set comprises 26 distinct owner types, encompassing a diverse range of institutional and individual investors. Ownership is reported as percentage value. In addition to these owner types, we further divided the large group of Investment Advisors into a subgroup of Active Investment Advisors and Passive Investment Advisors by performing a separate query and filtering for all investment advisors with the “Investment Style” “Index”. We will discuss, our aggregation process for all investor types in the data manipulation chapter. We will also provide example companies/funds/investors for each investor type.

Refinitiv's ownership data is derived from multiple primary sources, including company filings, stock exchange disclosures, and regulatory filings such as Form 13F and Form 13G in the United States (Refinitiv, 2023). In addition to these sources, Refinitiv

also relies on third-party providers and proprietary research to augment their ownership data, thereby enhancing its coverage, reliability and accuracy.

The ownership data is subject to a rigorous validation process, which includes cross-referencing with other sources, data normalization, and quality assurance measures to ensure consistency and accuracy (Refinitiv, 2023).

Critical Evaluation

Refinitiv does not provide any documentation on their classification methodology, making it difficult to assess, which criteria and parameters are used to come up with the different investor types. We looked at sample investors for each category to better understand the different criteria, but an official documentation would have enhanced our interpretation quality. It is particularly difficult to understand the rationale behind some categories. For example, two categories were *Investment Advisors / Hedge Funds* and *Hedge Funds*. Due to the lack of specification, it is not clear which category would actually report hedge funds or what the reason for the inaccuracy is. Furthermore, there is very little explanation given for values that are above 100%.

4.2.2. Fundamental and Financial Data

For our study, we have incorporated key company fundamentals and annual financial data, which are crucial in formulating control variables. These fundamentals encompass information such as industry classification, sector, headquarter location, and International Securities Identification Number (ISIN), which is need for necessary data manipulations. The financial data includes Market Capitalization, Revenue, Gross Profit, EBITDA, EBIT, Net Income, Assets, Equity, and Liabilities, allowing us to calculate the relevant ratios, to control for potential confounding factors that might influence the association between ESG performance and ownership structure.

The data on company fundamentals and financials provided by Refinitiv is compiled from a diverse range of sources. These sources primarily consist of corporate filings, financial statements, and annual reports, which offer current and reliable insights into each firm's financial health and operational attributes. To further enhance data quality

and coverage, Refinitiv incorporates information from stock exchanges, regulatory filings, and third-party data providers.

4.2.3. ESG Data

CSR and ESG

The literal meaning of the concept “Corporate Social Responsibility” defines how responsible a corporation acts with regards to the whole society. It is difficult to assess though, what kind of actions and dimensions this broad meaning would encompass. Dahlsrud (2008) analysed 37 different definitions of CSR and highlights the difficulty of defining what exactly CSR is. He found though that most of the definitions have a lot in common. The most dominant dimensions of the definitions include the following five dimensions: Stakeholder, Social, Economic, Voluntariness and Environmental. From this analysis it becomes clear that CSR as a concept encompasses more than just the amount of carbon emissions of a company. It reflects how sustainably a company produces its products, treats its stakeholders (e.g. employees, customers, shareholder) and also, if these actions happen on a voluntary basis or if regulation forces a company to act a certain way. Having this broad definition in place leads to the question, how the performance in this topic can be measured objectively. The most used solutions are ESG ratings, namely Environmental, Social and Governance. Several rating agencies e.g. Sustainalytics, MSCI ESG Research, ESGI or Refinitiv assess a company’s performance on different dimensions with varying levels of granularity. There is no regulated or unified way of calculating this measure, which leads to large discrepancies between data providers. In this paper we use Refinitiv’s ESG Scores as a benchmark for Corporate Social Responsibility. In this section, we will give an in-depth overview of Refinitiv’s data collection and methodology for ESG scores.

Data Sources

Refinitiv sources information from various public and private sources such as annual reports, company websites, CSR reports, regulatory filings, news articles, NGO reports, and other third-party sources. The data is then checked for quality by a combination of algorithmic and human processes, before being standardized and normalized to ensure consistency across companies and industries. (Refinitiv, 2022)

Variables

Refinitiv uses a total of 630 variables which are either Boolean or numeric variables. Boolean variables are answered with a “Yes”, “No” or “Null”, while numeric data is aggregated into a percentile ranking. For each variable a polarity is applied to indicate whether the respective outcome is positive or negative (e.g., a high value in carbon emissions would result in a lower percentile ranking). Some of the variables are industry-specific and are therefore excluded of the score calculation for some companies. (Refinitiv, 2022)

Category Scores Calculation

These scores are reported on a scale from 0-100 and are calculated relative to other companies in the same industry for Environmental and Social scores and relative to other companies in the same country for Governance Scores. The specific formula looks like this:

$$score = \frac{\# \text{ companies with a worse value} + \frac{\# \text{ companies with the same value}}{2}}{\# \text{ companies with a value}}$$

These variables are then aggregated to 10 different categories to come up with the 10 different category scores. The different scores are Emissions Score (E), Resource Use Score (E), Innovation Score (E), Workforce Score (S), Human Rights Score (S), Community Score (S), Product Responsibility Score (S), Management Score (G), Shareholders Score (G), CSR Strategy Score (G). The aggregation process involves assigning weights to individual data points based on their relevance and importance within each category. The weights are determined through expert judgment and analysis of industry-specific materiality.

Refinitiv also provides a composite ESG score which represents the overall ESG performance of a company. This score is computed as a weighted average of the ten category scores, with weights reflecting the relative importance of each category. (Refinitiv, 2022)

Critical Evaluation

While Refinitiv's ESG scores offer a comprehensive and systematic approach to evaluating companies' ESG performance, there are certain aspects that warrant further scrutiny. Firstly, the reliance on publicly disclosed and reported information may lead to an incomplete representation of a company's ESG performance, as some firms might not disclose all relevant data, either due to inadequate reporting standards or strategic reasons. Consequently, the scores may not capture the full spectrum of a company's sustainability practices. Secondly, the weighting system employed in the aggregation process is based on expert judgment and industry-specific materiality, which introduces an element of subjectivity into the scoring process. Although this approach is intended to reflect the relative importance of different ESG factors within each industry, it may result in biases and inconsistencies across different sectors and regions. Assuming equality across all companies in an industry is not entirely reflective of the heterogeneity among those companies. Furthermore, diversified corporations that operate in multiple industry are difficult to assess accurately. Lastly, the relative nature of the ESG scores can make it challenging for stakeholders to evaluate a company's absolute performance in terms of sustainability. While the scores are useful for comparing companies within the same industry, they may not provide a clear understanding of a company's ESG performance against universally accepted benchmarks or standards.

4.3. Data Manipulation

Ownership Data

To further enrich the data set, the categories *Investment Advisors* as well as *Investment Advisors / Hedge Funds* were split based on their investment style according to data from Refinitiv Eikon. Consequently, both categories were first divided into an active and passive share of ownership respectively, before both *Active* and *Passive* shares were added up. Hence, we avoid the poorly distinguishable categories Refinitiv initially provided and are able to consider the effect of active and passive strategies separately.

Overall, Refinitiv reports up to 26 different types of owners for a particular security. As this is difficult to interpret due to the overlap among the categories, we decided to aggregate the different owner type into eight owner types as can be seen in Appendix 1.

This ensures a more comprehensible interpretation and better comparability with the existing literature. Changes in ownership were calculated as the percentage point change of an investor's holdings over the period of one year. Furthermore, some categories occasionally reported unrealistic values that were significantly above 100%, e.g. 194%. As Refinitiv does not provide a consistent explanation for such values, we decide to exclude any values above 100%.

For various reasons, companies may have listed multiple type of shares under different ticker symbols. Such companies are, for example, A.P. Møller - Mærsk A/S and Atlas Copco AB. As Refinitiv provides the ownership percentages based on the ticker of the listed security, matching solely the ticker with company fundamentals and ESG data would result in a misleading overrepresentation of the companies with multiple tickers. In order to implement such an aggregation to the company level, the companies with multiple tickers had to be identified first, to extract the monetary value of the holding and the respective market capitalization of the instrument listed under each individual ticker. Afterwards, the absolute ownership values could be summed up for each category before the aggregated total ownership share of each investor type could be calculated at company level.

ESG Data

We also applied some adaptations to the dependent variables. Refinitiv reports ten individual ESG scores and one total score. For each score, the zero values led to an exclusion of the company for the year they were reported. For ease of interpretation, we aggregated the individual scores according to their industry weights (Appendix 2) into the three main pillars of the total ESG score. The industry classification was reported by Refinitiv. If any of the individual scores was not available in a particular year, the aggregated score would be excluded. According to Refinitiv's logic, a zero value corresponds to the score not being reported. Hence, when used as a dependent variable, each score only includes values above zero. Furthermore, some regressions use the annual change of an ESG score. To account for extreme values, we exclude values below the 1st and above the 99th percentile for the differenced variables.

Company Fundamentals

Beyond ownership values, we also controlled for company fundamentals. To reflect the size of the company, we included the Market Capitalization (in billion EUR) at the end date of the financial year at which the ESG scores are updated as well. We incorporated two measures of a securities inexpensiveness. Firstly, the Price-Earnings-Ratio (PE.rat) calculated as the market capitalization divided by the net income for the year. Secondly, the Book-to-Market-Ratio (BM) that reflects the market capitalization as a multiple of the book value of the company's equity. We controlled for the performance of a company by including the profitability (Prof.EBIT) of a particular period measured as the reported EBIT as a percentage value of reported revenue. To proxy for a company's level of distress, we also included leverage (Lev) that reports the total liabilities multiple of the book value of equity. Again, we excluded the values below the 1st and above the 99th percentile of all company fundamentals except for market capitalization.

Data Matching

Some judgement had to be applied when matching the ESG data and the company fundamentals with the ownership data respectively. ESG and company fundamentals were only available annually at the end of the fiscal year while ownership data was available monthly at the end of the month. Overall, two different matching algorithms were employed. Firstly, the ownership values of the date closest to the end the fiscal year was used. Secondly, the ownership data was lagged for the robustness part of our methodology. The same logic was used but with 365 days of lag in the ownership data relative to company fundamentals.

4.4. Descriptive Statistics

The basic data set, which includes ownership values and ESG scores at level, has 10,370 observations and contains observations from 2002 until 2022 (Appendix 3). We start with just below 200 observations in 2002 and continuously increase the coverage until we reach more than 1,000 observations in 2020 and 2021. As we can see in Appendix 4, country representation is not distributed as one might expect. Most observations are from the United Kingdom due to different reporting standards and earlier inclusion in the

Refinitiv data base. Overall, more than 60% percent of all observations are from just five countries.

Table 2 displays various summary statistics for the aggregated ownership types. We measure the ownership values in percentage points. On average, we observe the largest positions by active investment advisors (mean: 28.71) followed by corporations (mean: 13.44) and individuals (mean: 9.97). This changes when looking at the median. While the median holding structure still has active investment advisors as their largest shareholder (median: 24.38), passive investment advisors are the second biggest group (median: 2.93). For all owner types, the mean is higher than the median, indicating a positive skewness. We can derive that in particular corporations and individuals may not be shareholders across most companies, but if they hold a stake, it is frequently of material size. The standard deviation reflects this and varies accordingly across the owner types. Logically, active investment advisors have a higher fluctuation in their holdings than passive investment advisors or long-term investors.

Summary Statistics Ownership Data (Levels)

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
IA.A	10,370	28.71	18.76	0.00	13.93	24.38	40.00	93.24
IA.P	10,370	4.18	4.09	0.00	1.05	2.93	6.26	40.55
Corp	10,370	13.44	20.45	0.00	0.00	2.00	20.07	92.30
LT.Inv	10,370	3.11	4.79	0.00	0.35	1.18	3.97	87.00
Bank	10,370	0.64	1.44	0.00	0.01	0.16	0.78	22.00
Gov	10,370	4.41	10.22	0.00	0.49	1.50	2.83	85.00
Ind	10,370	9.97	17.49	0.00	0.00	0.53	10.43	91.85
Other	10,370	1.05	4.75	0.00	0.00	0.00	0.01	77.13

Table 2: Summary Statistics for different Types of Owners, Values in %

When looking at the changes in ownership, the number of observations decreases due to taking differences. All variables have means and medians at about 0. We observe corresponding leptokurtic distributions as reflected by the small interpercentile ranges (25th to 75th). The largest standard deviations can be found for active investment advisors (6.74) and corporates (6.09) while banks and brokers (0.94) and passive investment advisors (1.89) have the lowest.

Summary Statistics for Changes in Ownership

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
IA.A	8,719	0.24	6.74	-47.00	-2.63	0.11	2.93	58.91
IA.P	8,719	0.36	1.89	-30.72	-0.09	0.21	0.71	25.47
Corp	8,719	-0.14	6.09	-70.60	-0.12	0.00	0.04	86.94
LT.Inv	8,719	0.03	2.26	-87.00	-0.25	0.00	0.34	49.00
Bank	8,719	0.01	0.94	-16.00	-0.04	0.00	0.07	20.00
Gov	8,719	0.11	2.28	-39.57	-0.18	0.00	0.31	64.77
Ind	8,719	-0.04	4.35	-63.57	-0.01	0.00	0.01	73.00
Other	8,719	-0.01	1.99	-35.40	0.00	0.00	0.00	43.70

Table 3: Summary Statistics for the Changes in the Ownership Values of different Investors

Figure 1 visualizes the development of the average ownership structure in our dataset. It is noticeable that the total stake of owners tracked by Refinitiv increases from just about 50% in 2002 to more than 70% in 2022. This significantly enlarges the coverage of various stock market participants and reflects an improvement in data quality. The strongest relative increase can be found for passive investment advisors (IA.P), whose holdings more than quadrupled on average, rising from just 1.4% in 2002 to 6.4% in 2022.

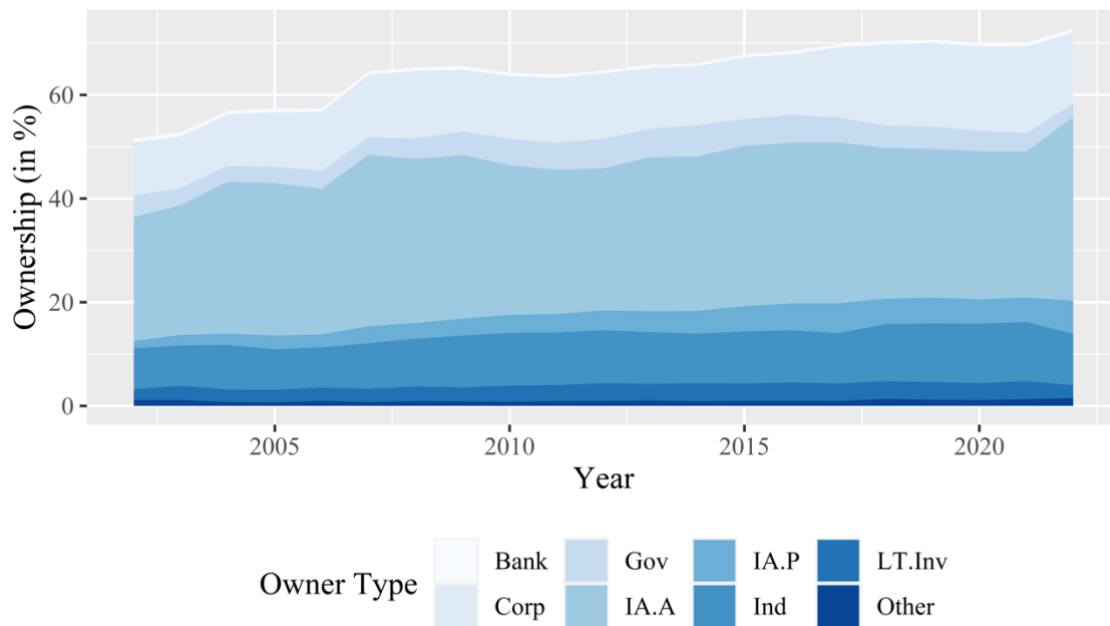


Figure 1: Development of the average Ownership Structure

Similar improvements in data quality can be found for the dependent variables. The observations per ESG score continuously increase throughout the analysed period (Appendix 5). Furthermore, we observe an increase in ESG scores overall as can be seen in Figure 2. The reported total ESG score improves from 36.5 in 2002 to 64.0 in 2022

which equals an annualized growth rate of about 2.8%. This score represents a relative measure between a company and its industry peers, and as such, it should average to 50 over time. The observed divergence may stem from our selection of a subsample from all companies for which Refinitiv provides ESG scores. We conjecture that the European companies of our dataset have consistently outperformed their industry peers in the past two decades, which might account for the discrepancy.

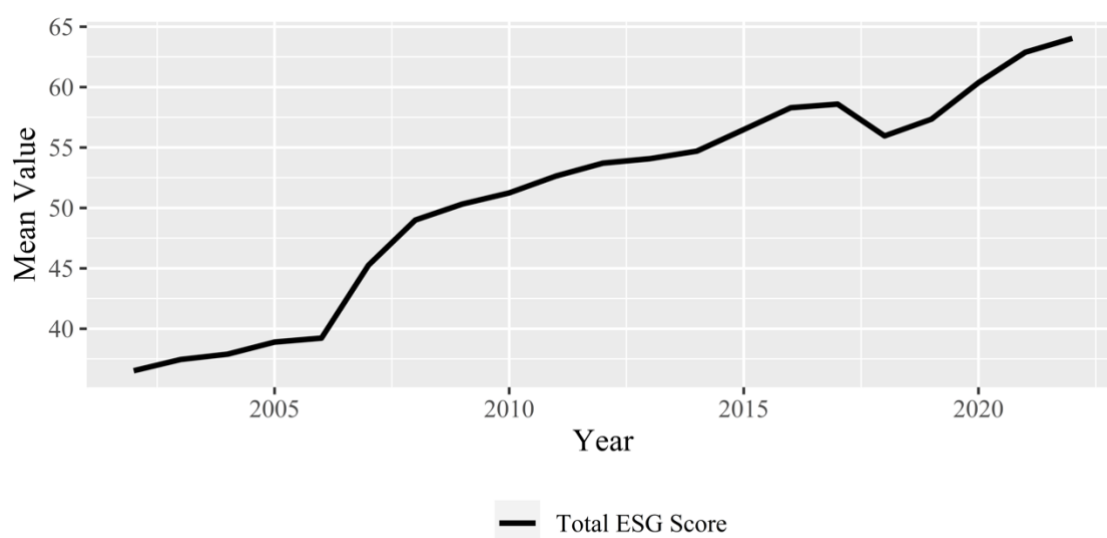


Figure 2: Average Total ESG Score per Year

All ESG scores show rather similar statistical properties. Theoretically, they range from 0 to 100. They show similar standard deviations but have different levels on average. The difference in observations is due the exclusion of zero values.

Summary Statistics ESG Scores

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
Total	10,370	54.32	20.14	0.63	39.59	55.88	70.19	95.41
Environmental	6,103	63.50	19.49	6.27	49.78	65.95	78.89	99.39
Social	7,289	66.99	17.76	11.19	54.56	68.78	81.13	98.97
Governance	9,034	55.90	21.42	1.58	39.39	57.44	73.04	99.09

Table 4: Summary Statistics for ESG Scores

The corresponding summary statistics for other control variables can be found in Appendix 6.

Overall, our dataset encompasses various firm sizes as well, with the majority of firms having between 1 and 20 billion EUR in market capitalization (Appendix 7).

Beyond that, our data covers the European market extraordinarily well. Both smaller companies, with capitalizations of less than 1 billion EUR and large caps with over 100 billion EUR capitalization are equally covered. The total market capitalization included in our data set reaches more than 10 trillion EUR in 2021.

5. Analysis

5.1. Methodology

In this study, we examine the impact of various investor types on CSR performance. The independent variables encompass eight distinct investor categories, including Active Investment Advisors, Passive Investment Advisors, Corporations, Long Term Investors, Governments, Individuals, Banks and Brokers, and Other Investors. Furthermore, we control for five company fundamentals, comprising Profitability, Price-Earnings (PE) ratio, Book-to-Market ratio, Leverage, and Market Capitalization.

Model 1: Ownership Levels on ESG Levels

Our first empirical model employs a panel regression with year and company fixed effects, allowing for better control of the company and year inherent levels, as the ownership and ESG scores are not examined as changes. This model allows us to determine whether higher levels of ownership are generally associated with better CSR performance. However, it is important to note that this model may be susceptible to bias, as certain investors might inherently prefer to invest in companies with superior or inferior ESG performance. Consequently, it is not possible to infer causality whether specific investor types lead to improvements in ESG scores due to their investments. To estimate the coefficients β^s , we specify the regression model as follows, where O_{it}^s represents the holding share of various owner types s and F_{it} the corresponding firm fundamentals of firm i at time t :

$$ESG_{it} = O_{it}^s \beta^s + F_{it} \Gamma + c_i + v_t + \epsilon_{it}$$

Where c_i denotes a time invariant fixed effect variable for company i and v_t controls for the year t with $t \in T = \{2002, \dots, 2022\}$.

Model 2: Ownership Levels on ESG Changes

In order to better comprehend the influence of ownership structure on changes in CSR performance, we report two additional models. The first model examines the association between ownership levels and changes in ESG ratings, which provides insight into whether high levels of ownership by specific investor groups can affect ESG performance

over time. For this purpose, we employ differences in the dependent variable as opposed to levels. Using differences in the ESG score instead of levels enables us to reduce a selection bias due to which some investors may decide to invest in companies with high ESG scores. Hence, differences allow us to relate the ownership structures more directly to the correlation they have with changes in ESG scores. Furthermore, we exclude the company fixed effect as the level of ESG scores is taken care of by the differences and including the company fixed effect would lead to the model being over specified. The yearly fixed effects remain as this mitigates trends in the cross section of ESG scores over time. Let the differences in ESG scores be defined as:

$$\Delta ESG_{it} \equiv ESG_{it} - ESG_{i,t-1}$$

Hence, the regression equation changes to:

$$\Delta ESG_{it} = O_{it}^s \beta^s + F_{it} \Gamma + v_t + \epsilon_{it}$$

Model 3: Ownership Changes on ESG Changes

Subsequently, the second model also incorporates differences in the independent variable – ownership share – to explore whether changes in ownership (either an increase or decrease in the aggregated shareholdings of a particular owner group) have an impact on the development of CSR performance. This model aims at establishing a more cause and effect-oriented regression in which only changes in the dependent and independent variables are taken into consideration. We define the ownership change of owner type s as:

$$\Delta O_{it}^s \equiv O_{it}^s - O_{i,t-1}^s$$

Consequently, the regression model in which both ownership and ESG scores are used in differences can be specified as:

$$\Delta ESG_{it} = \Delta O_{it}^s \beta^s + F_{it} \Gamma + v_t + \epsilon_{it}$$

Model 4 and 5: Robustness

To better evaluate the robustness of our analyses, we repeat the regression with lagged ownership data. Changes in an organization's ESG performance take time to become manifest in a company's operations. Consequently, we also relate the ESG performance

to lagged ownership data. Hence, model 4 analyses whether lagged ownership levels lead to a change of ESG scores while model 5 looks at the changes in ownership with regards to ESG score changes. Accordingly, model 4 can be specified as:

$$\Delta ESG_{it} = O_{i,t-1}^s \beta^s + F_{it} \Gamma + v_t + \epsilon_{it}$$

Model 5 corresponds to:

$$\Delta ESG_{it} = \Delta O_{i,t-1}^s \beta^s + F_{it} \Gamma + v_t + \epsilon_{it}$$

5.2. Results

5.2.1. Model 1: Ownership Levels on ESG Levels

Due to the inherent biased discussed in the methodology part, Model 1 is only supplementary, as it provides comparability to previous research. We will therefore only briefly mention the results and not elaborate on them in the Discussion part of the paper. The results for the regression of the level-on-level model can be found in Appendix 8.

Active Investment Advisors (IA.A) show a positive and significant correlation with the Total ESG score, with a coefficient of 0.068, significant at the 1% level. This positive relationship appears to be driven by both Environmental and Governance factors, as IA.A is also positively and significantly correlated with the Environmental ESG score (coefficient: 0.06, $p < 0.01$) and the Governance ESG score (coefficient: 0.077, $p < 0.01$). However, no significant correlation is observed between IA.A and the Social ESG score.

Passive Investment Advisors (IA.P) exhibit a positive and significant correlation with the Total ESG score, with a coefficient of 0.212, significant at the 1% level. This relationship seems to be largely driven by the Governance ESG score, where IA.P is also positively and significantly correlated (coefficient: 0.295, $p < 0.01$). The correlation between IA.P and the Social ESG scores is weakly significant while the correlation with the Environmental score is not statistically significant.

Corporations (Corp) display mixed results across the ESG scores. They have a positive and significant correlation with the Environmental ESG score (coefficient: 0.101, $p < 0.01$), while being negatively and significantly correlated with the Governance ESG score (coefficient: -0.056, $p < 0.05$), respectively slightly with the Social ESG score

(coefficient: -0.034, $p < 0.1$). Overall, for the Total score there seems to remain a slightly positive and significant correlation (coefficient: 0.022, $p < 0.1$).

Long Term Investors (LT.Inv) show a positive and highly significant correlation with the Social ESG score (coefficient: 0.122, $p < 0.05$) and a weakly significant correlation with the Governance score (coefficient: 0.124, $p < 0.1$). Banks do not exhibit any statistically significant correlations with any of the ESG scores. Governments (Gov) display a positive and significant correlation with the Total ESG score (coefficient: 0.083, $p < 0.01$) and the Governance ESG score (coefficient: 0.109, $p < 0.05$). Individual Investors (Ind) exhibit a negative and significant correlation with the Social ESG score (coefficient: -0.075, $p < 0.01$). However, no significant correlations are observed between Individuals and the Total, Environmental, and Governance ESG scores. Other investors do not show any statistically significant correlations with any of the ESG scores.

5.2.2. Model 2: Ownership Levels on ESG Changes

Table 5 shows the results for our second model, where the ownership shares are kept at levels, but the ESG scores are changed to differences.

In the case of Active Investment Advisors (IA.A), a negative and significant correlation is observed for Total ESG scores (coefficient: -0.035, $p < 0.01$) and Social scores (coefficient: -0.049, $p < 0.01$). This implies that higher shares of Active Investment Advisors ownership are associated with declines in Total ESG and Social scores. No significant correlations are found for Environmental and Governance scores.

For Passive Investment Advisors (IA.P), positive and significant correlations are observed across all three ESG categories - Total (coefficient: 0.359, $p < 0.01$), Environmental (coefficient: 0.226, $p < 0.01$), Social (coefficient: 0.231, $p < 0.01$), and Governance (coefficient: 0.313, $p < 0.01$). This suggests that higher shares of Passive Investment Advisors ownership correlate with improvements in all ESG scores.

Corporations (Corp) display a negative and significant correlation with Total ESG scores (coefficient: -0.038, $p < 0.01$) and Social scores (coefficient: -0.037, $p < 0.01$), indicating that higher shares of corporate ownership result in deteriorating ESG scores in

these categories. No significant correlation is observed for Environmental and Governance scores.

Long Term Investors (LT.Inv) and Governments show no significant correlations across any ESG categories. This suggests that their ownership levels do not exhibit a clear relationship with ESG score changes. For Banks and Brokers (Banks), we observe a negative correlation for the total score (coefficient: -0.199, $p < 0.1$) as well as the social score (coefficient: -0.224, $p < 0.1$).

Individuals (Ind) show a negative and significant correlation with Total ESG scores (coefficient: -0.038, $p < 0.01$) and Social scores (coefficient: -0.026, $p < 0.05$), indicating that higher shares of individual ownership lead to a decline in these scores over time. No significant correlations are found for Environmental and Governance scores.

The variation in the number of observations for each ESG score in the regression analysis can be attributed to the differences in reporting practices, data exclusions, and data availability over time. The Total ESG score has been reported for a longer time period by Refinitiv, resulting in a larger number of observations. On the other hand, the three pillar scores – Environmental, Social, and Governance – are derived from a combination of category scores. However, the availability of data for each category score varies due to their introduction at different points in time and the extent of coverage. If data for one or more category scores is not available (reported as N/A), the corresponding pillar score is also reported as N/A, leading to a smaller number of observations for the Environmental, Social, and Governance ESG scores.

Regression Analysis Results: Ownership Levels on ESG Changes

	Dependent Variable: Type of ESG Score			
	Total (1)	Environmental (2)	Social (3)	Governance (4)
IA.A	-0.035*** (0.012)	-0.025 (0.016)	-0.049*** (0.013)	0.003 (0.016)
IA.P	0.359*** (0.051)	0.226*** (0.065)	0.231*** (0.054)	0.313*** (0.066)
Corp	-0.038*** (0.012)	-0.003 (0.015)	-0.037*** (0.013)	-0.011 (0.015)
LT.Inv	-0.045 (0.037)	-0.002 (0.048)	0.018 (0.040)	-0.015 (0.051)

Bank	-0.199*	0.0004	-0.224*	-0.158
	(0.119)	(0.134)	(0.120)	(0.151)
Gov	0.012	0.008	-0.004	0.035
	(0.018)	(0.022)	(0.018)	(0.023)
Ind	-0.038***	-0.010	-0.026**	-0.0003
	(0.012)	(0.016)	(0.013)	(0.016)
Other	-0.015	-0.004	-0.017	-0.036
	(0.037)	(0.046)	(0.035)	(0.050)
Prof.EBIT	-0.035***	-0.041***	-0.029**	-0.039***
	(0.011)	(0.015)	(0.014)	(0.015)
PE.rat	-0.001	0.001	-0.006	-0.004
	(0.005)	(0.007)	(0.005)	(0.007)
BM	-0.206***	-0.074	-0.042	-0.131*
	(0.054)	(0.076)	(0.055)	(0.072)
Lev	-0.005	-0.011	0.022	-0.050
	(0.080)	(0.102)	(0.081)	(0.105)
Market.Cap	0.035***	0.018**	0.019***	0.027***
	(0.008)	(0.009)	(0.007)	(0.009)
Observations	9,408	4,495	5,149	7,355
R ²	0.238	0.089	0.115	0.101
Adjusted R ²	0.236	0.082	0.109	0.097
Residual Std. Error	15.919 (df = 9374)	13.685 (df = 4461)	11.960 (df = 5115)	18.361 (df = 7321)

Note:

* p<0.1, ** p<0.05, *** p<0.01
Standard errors in parentheses

Table 5: Ownership Levels and ESG Differences, Yearly Fixed Effects

5.2.3. Model 3: Ownership Changes on ESG Changes

In Table 6, we analyse the differences in ESG scores and ownership by examining the change in the shares of specific investor types and their relationship to changes in ESG scores over time. A positive coefficient in this context indicates that an increase in the share of a particular investor type correlates with an increase in the ESG score on average.

For Active Investment Advisors (IA.A), we observe a negative and statistically significant correlation with Total ESG scores (coefficient: -0.078, p<0.01) and Environmental scores (coefficient: -0.08, p<0.05), implying that an increase in the share of IA.A is associated with a decrease in these scores over time. No statistically significant relationship is observed for Social and Governance scores. For Passive Investment

Advisors (IA.P), no statistically significant correlations are found for any of the ESG scores.

For Corporations (Corp), there is a positive and statistically significant correlation with Governance scores (coefficient: 0.111, $p < 0.01$) and the total score (coefficient: 0.081, $p < 0.01$), suggesting that an increased share of corporations is strongly associated with an increase in Governance scores which is also reflected by an increase in the total score. No statistically significant relationships are observed for the other ESG scores. Long Term Investors (LT.Inv) and Governments do not show any statistically significant correlations with ESG scores. We find a positive and slightly significant relationship between Banks and Governance scores (coefficient: 0.475, $p < 0.1$) as well as between individual investors and the total score (coefficient: 0.079, $p < 0.1$). No other significant coefficients are observed.

Other Investors demonstrate a positive and statistically significant correlation with Social scores (coefficient: 0.2, $p < 0.1$). No statistically significant relationships are observed for the other ESG scores. The adjusted R-squared values are in a similar range as for Model 2, in which ownership is used in levels.

Regression Analysis Results: Ownership Changes on ESG Changes

	<i>Dependent Variable: Type of ESG Score</i>			
	Total (1)	Environmental (2)	Social (3)	Governance (4)
IA.A	-0.078*** (0.026)	-0.080** (0.036)	0.030 (0.030)	0.044 (0.036)
IA.P	-0.019 (0.092)	-0.115 (0.111)	-0.152 (0.103)	0.023 (0.117)
Corp	0.081*** (0.029)	0.003 (0.039)	0.041 (0.033)	0.111*** (0.041)
LT.Inv	0.038 (0.076)	-0.016 (0.130)	0.062 (0.088)	0.057 (0.103)
Bank	0.127 (0.183)	0.125 (0.254)	-0.190 (0.207)	0.475* (0.243)
Gov	0.036 (0.075)	-0.019 (0.100)	-0.104 (0.077)	0.046 (0.097)
Ind	0.079* (0.041)	0.062 (0.056)	0.044 (0.050)	-0.016 (0.062)
Other	-0.005	0.012	0.200*	0.149

	(0.088)	(0.122)	(0.102)	(0.137)
Prof.EBIT	-0.025**	-0.027*	-0.019	-0.032**
	(0.011)	(0.015)	(0.014)	(0.015)
PE.rat	0.002	0.002	-0.005	-0.001
	(0.006)	(0.007)	(0.006)	(0.007)
BM	-0.159***	-0.062	-0.028	-0.113
	(0.056)	(0.077)	(0.058)	(0.074)
Lev	0.043	0.035	0.046	-0.006
	(0.084)	(0.105)	(0.084)	(0.108)
Market.Cap	0.042***	0.019**	0.027***	0.029***
	(0.007)	(0.008)	(0.006)	(0.009)
Observations	8,515	4,208	4,773	6,772
R ²	0.227	0.084	0.115	0.103
Adjusted R ²	0.224	0.077	0.109	0.098
Residual Std. Error	15.734 (df = 8482)	13.571 (df = 4175)	11.972 (df = 4740)	18.229 (df = 6739)

Note:

*p<0.1, **p<0.05, ***p<0.01
Standard errors in parentheses

Table 6: Differences in ESG Scores and Changes in Ownership, Yearly Fixed Effects

5.3. Robustness Analysis

5.3.1. Model 4: Lagged Ownership Levels on ESG Changes

To check for robustness and see if ownership may have a delayed effect on ESG changes, we lag the ownership variable by one year.

Appendix 9 reports the results for the lagged ownership levels and ESG differences. Active Institutional Investors (IA.A) exhibit a negative and statistically significant relationship with Total ESG (-0.024, p<0.1) and Social scores (-0.055, p<0.01). This suggests that high levels of active institutional investors may be linked to ESG score downgrades over time. Compared to the non-lagged regression, we find similar results but a decrease in the significance of the coefficient for the Total score.

Passive Institutional Investors (IA.P) demonstrate a positive and significant relationship across all categories: Total ESG (0.227, p<0.01), Environmental (0.134, p<0.05), Social (0.174, p<0.01), and Governance (0.212, p<0.01). This indicates that a higher proportion of passive institutional investors in the previous year may be associated

with improved ESG scores in the following year. Again, the results from Model 2 are confirmed, but we observe a slight reduction in significance for the environmental score.

Corporate ownership (Corp) shows a negative and statistically significant relationship with Total ESG (-0.039, $p < 0.01$), Social (-0.039, $p < 0.01$), and Governance scores (-0.037, $p < 0.05$), which implies that the level of corporate ownership in the prior year could lead to a decrease in ESG scores in the subsequent year. Despite the improvement in significance for the governance score, the changes compared to a non-lagged ownership level are immaterial and confirm the previous findings.

Government ownership (Gov), long-term investors, and other investors do not present any consistent or statistically significant relationships with ESG score changes. The correlations found for Banks and Brokers are reiterated when based on lagged ownership data. Both, total ESG score changes (coefficient: -0.202, $p < 0.1$) and changes in the Governance score (coefficient: -0.278, $p < 0.1$) seem to be negatively associated with banks and brokers as owners in the previous year.

Individual ownership (Ind) reveals a negative and statistically significant relationship with Total ESG (-0.032, $p < 0.01$), Social scores (-0.034, $p < 0.05$), and Governance scores (coefficient: -0.028, $p < 0.1$), which reduces the significance of the coefficient for the social score but shows a more pronounced correlation with changes in the governance score.

Compared to the model without lag, the adjusted R-squared values decrease slightly across all types of ESG scores, which goes together with a reduction in observations due to the lagged ownership.

5.3.2. Model 5: Lagged Ownership Changes on ESG Changes

Appendix 10 applies a one-year lag to the changes in ownership variables based on the differences-on-differences model in Table 6. The results show, if a change in ownership has a delayed correlation with a change in ESG scores.

Active Institutional Investors (IA.A) show a negative and statistically significant relationship with Governance scores (-0.082, $p < 0.05$), suggesting that an increased share of active institutional investors may be associated with a declining Governance score in

the following year. Notably, the results from changes-on-changes regression the total ESG score and Environmental score, which previously had strongly significant and negative correlations, vanish. Passive Institutional Investors (IA.P) do not demonstrate any statistically significant relationships with ESG score changes, which confirms the findings from the model with changes but without lag.

Corporate ownership (Corp) no longer exhibits any positive and statistically significant relationships as opposed to the significant coefficients previously found when using non-lagged changes. This indicates that for corporations a change in a particular ESG score might be associated with a change in ownership more immediately than for other scores.

Long-term Investors (LT.Inv), Governments, and Individuals do not show any consistent or statistically significant relationships with ESG score changes, which support the previous findings in which there had been no significant correlation either when using non-lagged changes. Bank ownership does not present a positive and statistically significant relationship with Governance scores any longer, which corresponds to a reduction in significance compared to the non-lagged regression in Model 3.

Overall, this model provides limited insights due to the elimination of most significances across owner types. This result indicates that reflections of changes in ESG scores due to changes in ownership are rather immediate and more driven by ownership levels over time.

6. Discussion

Active Investment Advisors: The analysis reveals a relatively consistent negative relationship between active institutional investors and ESG score changes. Both the ownership levels and changes appear to exert a negative influence on CSR performance on the total score with varying significances on the individual scores. The lagged models further reinforce these findings, with the economic impact reduced when ownership variables are lagged by one year. The persistently negative relationships across the models highlight the potential negative influence of active institutional investors on ESG scores, considering ownership levels, varies. This hypothesis is enforced by the lag models, especially when using ownership levels. Theoretically, we expected a neutral relationship between the variables, as this is our largest investor group, aggregating lots of investment strategies and therefore varying beliefs in the financial implications about CSR. The relatively low economic significance is not surprising, given our anticipation that the heterogeneity of investors within this category would cancel each other out. Empirically these results contradict findings from previous literature like Dyck et al. (2019), or Nofsinger (2019) who consistently report a positive relationship between institutional investors and ESG. The differences in our findings could lie in the fact that we separate investment advisors from other long term institutional investors, as well as passive investment advisors and therefore see a more granular picture of the category institutional investor. Additionally, the dataset used in previous literature only consists of data up to 2010, so the effect might have changed in recent years. Hence, it could be interesting to split our two-decade long dataset into various subgroups to analyse trends and changes in the effect over time. Even though, we divided the large group of institutional investors in the subgroups “Active investment advisors”, “Passive investment advisors” and “Long term institutional investors”, the active investment advisor group remains the largest investor group in our model, with lots of heterogeneity, so it could be worthwhile for future research to further split up the dataset into subgroups like Hedge Funds, Mutual Funds, Wealth Managers to extract an even more granular view on their stance towards CSR. Overall, our results show that active investment advisors as a group might be slightly opposed to CSR initiatives or do not see financial value in pursuing CSR

investments and therefore might even oppose some initiatives through their voting power. We therefore have to reject hypothesis 1.

Long-term institutional investors were one of the groups we decided to split institutional investors in. We hypothesized a positive correlation but could not find any correlation of statistical significance in our analyses without lagged ownership data. Theoretically, long-term investors could be seen as rather risk averse market participants, that are to some extent comparable to passive investment advisors due to their high degree of diversification and the therewith concomitant lower average ownership level. Hence, long-term investors have a significantly lower variance in their changes than e.g., active investment advisors. Overall, the absence of a conclusive correlation is difficult to explain in particular when considering that institutional investor as a whole had previously been found to have a positive relation (Dyck et al., 2019; Nofsinger et al., 2019). Finding negative to neutral relationships for both active investment advisors and long-term investors is puzzling and should be analysed in future research. At least for long-term institutions, the lack of material changes in their holdings could be related to their low variance in ownership changes. Beyond that, we hypothesize that some of the large institutional investors (e.g. pension funds) may apply a strategy similar to value-weighted market investing and hence, neither have the capacity nor intention to engage with all smaller European listed companies, which represent a significant portion of our sample (Appendix 7), on CSR initiatives. Hence, our results are not able to confirm our hypothesis but are not pronounced enough to confidently reject it. Overall, splitting institutional investors into active investment advisors and long-term investors could not confirm the previous findings in the literature which were largely positive.

High levels of ownership of passive investment advisors demonstrate high statistical and economics significance with ESG score change. We found that a one standard deviation increase of passive investors (4.09 percentage points increase) leads to a total score increase of 1.46 (4.09* coefficient of 0.359), meaning high levels of passive investors have a material positive impact on CSR performance. This effect also persists when lagging the ownership variable by one year accompanied by an overall reduction in economic significance. This indicates a decline in the influence of passive investment advisor ownership over time. We could not find any relationship between incremental ownership of passive investment advisors and CSR performance, which may

be explained due to the low variance in this ownership category. While over time passive investment advisors have seen a large increase in aggregate shares across our dataset, the standard deviation is relatively low compared to other investor types, which is logical, as passive funds usually follow an index and therefore do not change their holdings often. To analyse the effect of ownership changes, we would propose an event study methodology, looking at companies that recently got included into certain well covered indices or fulfilled certain screening criteria, leading to a sudden increase in passive ownership. The overall results are in line with our theoretical link and also the limited existing research (Appel et al., 2016). With the large growth of sustainable passive funds in recent years, we expected these funds to also engage on CSR topics positively with their portfolio companies. We can therefore accept hypothesis 3.

For corporate ownership, our findings are twofold. While they draw a relatively clear picture due to their negative and significant correlation with most ESG scores when applied at levels both with and without lag, the results for changes in corporate ownership are less conclusive and even become positive for both the Total and Governance score. Economically, none of the significant coefficients is particularly large due to the high standard deviation of this group. Hence, we draw the conclusion, that corporate ownership levels themselves could be negatively correlated to changes in ESG scores but detect some emphasis on CSR initiatives if shareholdings increase due to positive correlations with changes in corporate ownership. This positive correlation is no longer detectable after one year. Generally, these findings resonate with the theory, according to which, corporate ownership would largely be strategically motivated. This is in line with existing research from Rees and Rodionova (2013) and Dam and Scholtens (2012) who also found a negative relationship between corporate ownership and CSR performance. As our literature review outlines, the variety of corporate investment occasions provides a sensible explanation why corporates would not view CSR as a priority predominantly. Hence, we can confirm our hypothesis that corporate shareholdings negatively correlate with CSR scores.

For banks and brokers, we find contradicting results. While their ownership level is negatively associated with the total and social ESG score, ownership changes exhibit a positive relationship with governance scores. It is difficult to explain these results given the investor profile, where we expected banks and brokers to only hold stock short term

for liquidity purposes. It seems that our assumptions about the holding period and non-engagement are not entirely correct. High shares of bank/broker ownership seem to lead to a decline in ESG ratings that also persist after one year. A potential reason might lie in the fact that banks are focused on the short-term financial performance like net income and cash flow of their holdings and therefore reject CSR initiatives which only tend to pay off in the long run. The increase in governance performance after an increase of bank and broker ownership might be explained in the high reporting and governance standards banks demand of their portfolio companies, which could lead to a short-term increase. Further research on this investor type is required to clearly identify the reasons for banks and broker to engage with companies on CSR topics. Overall, owing to the mixed results we find for this investor category, we cannot accept hypothesis 7.

For government ownership, no significant correlations were found. Our results suggests that governments do not influence ESG. The variety of reasons for government ownership in public markets could lead to result being quite blurry in aggregate. Additionally, governments do often have rather little variation in the changes of their holdings with standard deviation of just 2.4 (Table 3) which leads to many changes being equal to zero and consequently becoming more difficult to detect in our models. Even though there was reasonable theoretical rational why governments could value ESG in their investment decisions many other reasons, such as bailouts, partial privatization of a former state-owned enterprise or the strategic investment in natural resources, do not emphasize CSR performance. This confirms both the previous findings in the literature from e.g. Dam and Scholtens (2012) as well as our hypothesis. For future research, it could be advisable to subdivide government holdings based on their occasion.

The results for individual ownership to draw a complicated picture. We find negative correlations when applied at levels, both with and without lag, and positive correlations for changes. While the results are rather consistently significant for levels, there is just weak correlations when applied as changes. One potential conclusion could be that individual owners may negatively influence CSR performance if they are part of a firm's shareholder structure, but do not exacerbate their effect if they increase their holdings. The high level of heterogeneity in the group, which includes both high net worth individuals, firm owners, and employees would suggest an inconclusive relationship with CSR due to strongly different investment objectives. We also found similarly

contradicting results in existing research, with some papers suggesting that individual investors increasingly look for sustainable companies (Becchetti et al., 2013; Nilsson, 2009) and others reporting a predominantly negative relationship (Barber & Odean, 2013; Dam & Scholtens, 2012). Similarly, to government, splitting up individual investors, e.g. into business related individuals (founders, employees) and non-related owners (high net worth individuals) could clarify the results. However, our negative results for ownership levels show robustness as they also persist in the lagged regression. Hence, we tend to reject our hypothesis.

Table 7 summarized our results and puts them into perspective with our literature review.

Owner Type	Theoretical Link	Empirical Link	Hypothesis	Results
Investment Advisors Active	Neutral	Positive	Positive	Negative
Long term institutional	Neutral	Positive	Positive	Neutral
Investment Advisors passive	Positive	Positive	Positive	Positive
Corporate	Negative	Negative	Negative	Negative
Government	Neutral	Neutral	Neutral	Neutral
Individuals	Neutral	Neutral	Neutral	Negative
Banks and Brokers	Neutral	Neutral	Neutral	Neutral

Table 7: Summary of Results

7. Conclusion

In our research, we sought to explore the relationship between different investor types and corporate social responsibility (CSR) performance, quantified by Environmental, Social, and Governance (ESG) scores. To carry out this study, we utilized a dataset comprising of companies across Europe and spanning two decades, from 2002 to 2022. The data was segregated into eight distinct investor categories: Active Investment Advisors, Passive Investment Advisors, Corporations, Long Term Investors, Governments, Individuals, Banks and Brokers, and Other Investors. Our methodology encompassed five regression models, controlling for company-specific fundamentals and utilizing both current and lagged ownership data to observe changes in ESG scores.

Our findings revealed a somewhat intricate relationship between investor types and ESG performance. Active Investment Advisors, the largest investor group, surprisingly had a consistently negative relationship with ESG score changes. This finding contradicts previous literature, suggesting a potential shift in the attitudes or behaviour of these investors in recent years. Long-term institutional investors, despite our hypothesis of a negative correlation, showed no significant correlation with CSR performance except for a slightly negative influence over time in our lagged ownership model. Passive Investment Advisors, however, demonstrated a positive and significant relationship with ESG scores, conforming to our hypothesis and supporting the notion that these investors are positively engaging on CSR topics with their portfolio companies. When looking at corporate ownership, our results showed a negative and significant correlation with most ESG scores, providing evidence for a potential lack of CSR focus among corporate shareholders. The results for banks and brokers demonstrated a negative relationship between levels of ownership and ESG scores with a positive effect of ownership changes on governance, refuting our expectations of non-engagement. For government ownership, there was no significant correlation found, highlighting the complexities surrounding governmental investment motivations. Lastly, individual ownership displayed a negative picture especially for ownership levels.

While our research provides new insights, it is not without limitations. One limitation is the high degree of heterogeneity within certain investor categories,

particularly active investment advisors and individual owners, which could potentially obscure our understanding of the nuanced relationships between these investor types and ESG performance. Another limitation is the scarce data coverage of ESG scores before 2015. Refinitiv has improved its coverage tremendously in recent years, leading to underrepresentation of the years before. Our study therefore overemphasizes recent years. Our research also encountered certain limitations stemming from the characteristics of the utilized dataset. Given that Refinitiv's ESG data is primarily sourced from publicly available information, it inevitably raises questions about its comprehensive accuracy and completeness. The extent of ESG disclosure can vary significantly across firms and regions, which might have led to potential biases or inconsistencies within our dataset. Furthermore, the fact that non-disclosed or poorly disclosed ESG practices were not captured might have skewed our results. Another area of concern lies within the ownership database from Refinitiv. The database documentation is very limited, which impeded our ability to further segment investor categories or verify the accuracy of the data. This lack of documentation might potentially conceal underlying biases or errors within the data, and it also limited our ability to fully leverage the information. Additionally, certain values within the dataset appeared unreasonable, for instance, ownership values exceeding 100%, which is logically impossible. These inconsistencies required us to discard certain observations, which could have impacted the breadth and robustness of our findings. Taken together, these limitations underscore the need for more robust, transparent, and standardized data sources when conducting research in this area.

Future research could focus on a more granular categorization of investor types. For instance, the group of active investment advisors could be further segmented into subgroups like Hedge Funds, Mutual Funds, and Wealth Managers to obtain a more detailed picture of their attitudes towards CSR. Similarly, individual owners could be divided into business-related individuals (founders, employees) and non-related owners (high net worth individuals). Additionally, we suggest that an event study methodology could be useful for exploring the impact of significant changes in ownership, such as the inclusion of a company into an index. As for the government ownership, subdividing based on the occasion of holdings could yield more precise results. Splitting the dataset into multiple sub periods could yield a more granular picture as it could help uncover trends that might have changed over the 2-decade period of our dataset. Future studies

would also benefit from databases with a comprehensive explanation of the data collection methodology, as well as rigorous quality control mechanisms to ensure the accuracy and reliability of the data.

Our study opens the door for further research on the relationship between investor types and CSR performance, as well as how this relationship might evolve over time. A deeper understanding of these dynamics could have profound implications for both corporations and investors, informing investment strategies and corporate policies in the years to come.

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9. Appendix

Reported Categories	Var	Refinitiv Categories	Example Company
Bank / Broker	Bank	Brokerage Firms Bank and Trust	Commerzbank, Deutsche Bank, Carnegie Investment Bank AB, BNP Paribas (Suisse) S.A.
Corporation	Corp	Corporation Holding Company	A.P. Møller
Government	Gov	Sovereign Wealth Fund Government Agency	Norges Bank Investment Management (NBIM)
Individual	Ind	Individual Investor Other Insider Investor	Wallenberg (Jacob), Ekholm (Erik Borje)
Investment Advisor - Active	IA.A	Investment Advisor/Hedge Fund Active Investment Advisor Active Hedge Fund Hedge Fund Portfolio Closed-End Fund Mutual Fund	Arrowstreet Capital, Limited Partnership, PGIM Quantitative Solutions LLC
Investment Advisor - Passive	IA.P	Investment Advisor/Hedge Fund Passive Investment Advisor Passive Exchange-Traded Fund	BlackRock Institutional Trust Company, N.A., Vanguard Investments Australia Ltd.
Long Term Investor	LT.Inv	Pension Fund Insurance Company Foundation Endowment Fund Institution Pension Fund Portfolio	Metropolitan Life Insurance Co. (US), California Public Employees' Retirement System
Other	Other	Independent Research Firm Research Firm Private Equity Venture Capital Treasury Shares	Investor AB, MCH Private Equity Investments, SGEIC, S.A.

Appendix 1: Matching of the extracted Investor Owner Categories from Refinitiv to the reported and investigated Categories

Aggregated ESG Score	Environmental			Social				Governance		
Industry Group Name	<i>Emissions</i>	<i>Innovation</i>	<i>Resource Use</i>	<i>Human Rights</i>	<i>Product Responsibility</i>	<i>Social</i>	<i>Community</i>	<i>Management</i>	<i>Shareholder</i>	<i>CSR Strategy</i>
Aerospace & Defense	0.38	0.38	0.25	0.34	0.16	0.25	0.25	0.69	0.19	0.13
Automobiles & Auto Parts	0.29	0.47	0.24	0.36	0.21	0.24	0.19	0.67	0.21	0.13
Banking Services	0.14	0.71	0.14	0.2	0.18	0.38	0.24	0.67	0.19	0.14
Beverages	0.41	0.14	0.45	0.33	0.27	0.22	0.18	0.68	0.2	0.12
Biotechnology & Medical Research	0.35	0.12	0.54	0.08	0.33	0.22	0.36	0.67	0.21	0.13
Chemicals	0.33	0.33	0.33	0.39	0.18	0.24	0.18	0.68	0.18	0.14
Coal	0.49	0.05	0.46	0.21	0.07	0.36	0.36	0.67	0.2	0.13
Collective Investments	0.33	0.33	0.33	0.08	0.22	0.24	0.46	0.67	0.2	0.14
Communications & Networking	0.23	0.45	0.32	0.13	0.36	0.18	0.33	0.67	0.21	0.13
Computers, Phones & Household Electronics	0.25	0.58	0.17	0.37	0.22	0.22	0.18	0.64	0.21	0.14
Construction & Engineering	0.38	0.38	0.24	0.32	0.14	0.3	0.24	0.67	0.19	0.15
Construction Materials	0.36	0.29	0.36	0.32	0.12	0.32	0.24	0.67	0.21	0.13
Consumer Goods	0.3	0.41	0.3	0.38	0.2	0.23	0.2	0.67	0.21	0.13
Conglomerates	0.36	0.25	0.39	0.4	0.18	0.23	0.2	0.67	0.21	0.13
Containers & Packaging	0.21	0.5	0.29	0.43	0.05	0.29	0.24	0.67	0.2	0.13
Diversified Industrial Goods Wholesale	0.43	0.1	0.47	0.14	0.28	0.25	0.33	0.66	0.2	0.14
Diversified Retail	0.37	0.3	0.33	0.21	0.15	0.39	0.24	0.68	0.2	0.12
Electric Utilities & IPPs	0.33	0.28	0.38	0.31	0.13	0.25	0.31	0.67	0.2	0.13
Electronic Equipment & Parts	0.33	0.33	0.33	0.08	0.33	0.2	0.4	0.66	0.2	0.14
Financial Technology (Fintech) & Infrastructure	0.46	0.21	0.33	0.21	0.32	0.26	0.21	0.67	0.2	0.13
Food & Drug Retailing	0.45	0.1	0.45	0.27	0.29	0.24	0.2	0.68	0.2	0.12
Food & Tobacco	0.36	0.33	0.3	0.21	0.21	0.32	0.26	0.66	0.21	0.14
Freight & Logistics Services	0.33	0.33	0.33	0.25	0.25	0.25	0.25	0.33	0.33	0.33
Government Activity										

Healthcare Equipment & Supplies	0.35	0.35	0.29	0.26	0.3	0.19	0.26	0.67	0.19	0.14
Healthcare Providers & Services	0.39	0.11	0.5	0.16	0.34	0.23	0.27	0.68	0.19	0.14
Homebuilding & Construction Supplies	0.27	0.45	0.27	0.34	0.22	0.22	0.22	0.68	0.2	0.12
Hotels & Entertainment Services	0.44	0.07	0.48	0.18	0.4	0.2	0.22	0.67	0.2	0.13
Household Goods	0.29	0.47	0.24	0.31	0.23	0.23	0.23	0.68	0.2	0.12
Institutions, Associations & Organizations	0.33	0.33	0.33	0.25	0.25	0.25	0.25	0.33	0.33	0.33
Insurance	0.21	0.57	0.21	0.17	0.23	0.32	0.28	0.68	0.2	0.13
Integrated Hardware & Software	0.25	0.58	0.17	0.37	0.22	0.22	0.18	0.64	0.21	0.14
Investment Banking & Investment Services	0.21	0.57	0.21	0.08	0.21	0.31	0.41	0.67	0.2	0.13
Investment Holding Companies	0.41	0.1	0.49	0.21	0.08	0.21	0.5	0.67	0.19	0.14
Leisure Products	0.29	0.43	0.29	0.2	0.43	0.14	0.24	0.67	0.19	0.14
Machinery, Tools, Heavy Vehicles, Trains & Ships	0.26	0.51	0.23	0.3	0.24	0.22	0.24	0.66	0.21	0.14
Media & Publishing	0.38	0.31	0.31	0.2	0.3	0.24	0.26	0.66	0.21	0.13
Metals & Mining	0.46	0.09	0.46	0.4	0.1	0.3	0.2	0.67	0.21	0.13
Miscellaneous Educational Service Providers	0.43	0.07	0.5	0.06	0.25	0.31	0.38	0.67	0.19	0.14
Multiline Utilities	0.36	0.31	0.33	0.27	0.18	0.3	0.24	0.67	0.21	0.13
Natural Gas Utilities	0.32	0.32	0.35	0.22	0.22	0.35	0.22	0.68	0.2	0.12
Office Equipment	0.22	0.59	0.19	0.36	0.26	0.19	0.19	0.68	0.2	0.12
Oil & Gas	0.32	0.29	0.38	0.38	0.14	0.29	0.19	0.67	0.21	0.13
Oil & Gas Related Equipment and Services	0.45	0.15	0.39	0.38	0.1	0.28	0.23	0.66	0.21	0.14
Paper & Forest Products	0.33	0.31	0.36	0.32	0.06	0.35	0.26	0.67	0.21	0.13
Passenger Transportation Services	0.39	0.19	0.42	0.23	0.2	0.35	0.23	0.66	0.21	0.14
Personal & Household Products & Services	0.36	0.28	0.36	0.29	0.33	0.22	0.16	0.68	0.2	0.12
Pharmaceuticals	0.41	0.14	0.45	0.3	0.22	0.26	0.22	0.68	0.19	0.13
Professional & Business Education	0.39	0.21	0.39	0.09	0.16	0.31	0.44	0.67	0.19	0.14
Professional & Commercial Services	0.33	0.29	0.38	0.31	0.19	0.24	0.26	0.67	0.21	0.12
Real Estate Operations	0.38	0.25	0.38	0.11	0.11	0.46	0.31	0.67	0.21	0.12
Renewable Energy	0.35	0.33	0.33	0.07	0.26	0.26	0.41	0.66	0.2	0.14

Residential & Commercial REITs	0.43	0.11	0.46	0.07	0.23	0.33	0.37	0.68	0.19	0.13
School, College & University	0.33	0.33	0.33	0.25	0.25	0.25	0.25	0.33	0.33	0.33
Semiconductors & Semiconductor Equipment	0.31	0.38	0.31	0.36	0.2	0.23	0.2	0.68	0.2	0.12
Software & IT Services	0.21	0.43	0.36	0.15	0.28	0.18	0.38	0.67	0.2	0.13
Specialty Retailers	0.42	0.26	0.32	0.19	0.28	0.23	0.3	0.67	0.21	0.13
Telecommunications Services	0.35	0.3	0.35	0.26	0.3	0.26	0.17	0.67	0.19	0.15
Textiles & Apparel	0.26	0.37	0.37	0.28	0.25	0.28	0.19	0.66	0.21	0.14
Transport Infrastructure	0.41	0.14	0.45	0.26	0.14	0.38	0.21	0.66	0.21	0.14
Uranium	0.48	0.05	0.48	0.08	0.27	0.27	0.38	0.68	0.19	0.13
Water & Related Utilities	0.35	0.3	0.35	0.16	0.13	0.42	0.29	0.68	0.2	0.12

Appendix 2: ESG Pillar Score Weight Matrix

Observations by Year

Year	Observations
2002	171
2003	173
2004	240
2005	303
2006	326
2007	343
2008	380
2009	396
2010	432
2011	458
2012	459
2013	477
2014	479
2015	522
2016	537
2017	614
2018	871
2019	940
2020	1,050
2021	1,040
2022	159

Appendix 3: Observations by Year

Observations by Country

Country	Observations
United Kingdom	1,975
France	1,237
Germany	1,180
Sweden	1,058
Switzerland	875
Italy	460
Finland	440
Spain	435
Denmark	359
Netherlands	339
Norway	332
Belgium	328
Turkey	319
Austria	212
Ireland; Republic of	188
Poland	169
Greece	124
Luxembourg	110
Other	230

Appendix 4: Observations by Country

Observations by ESG Score and Year

Year	Total	Environmental	Social	Governance
2002	171	27	21	71
2003	173	30	34	87
2004	240	32	34	113
2005	303	46	58	156
2006	326	51	79	182
2007	343	128	145	239
2008	380	207	195	290
2009	396	241	215	324
2010	432	267	250	370

2011	458	289	290	406
2012	459	310	307	420
2013	477	314	321	438
2014	479	322	342	448
2015	522	344	384	480
2016	537	368	416	503
2017	614	416	518	596
2018	871	548	753	815
2019	940	618	834	903
2020	1050	700	966	1022
2021	1040	725	975	1016
2022	159	120	152	155

Appendix 5: ESG Score Observations by Type and Year

Summary Statistics Other Control Variables

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
Market Capitalization (bn EUR)	10,370	10.07	22.87	0.03	1.29	3.10	8.21	366.96
EBIT (% of Sales)	10,370	15.30	15.95	-39.40	6.09	11.02	19.00	84.18
Price-Earnings-Ratio	10,370	20.90	33.84	-175.6	9.63	17.09	27.09	296.78
Book-to-Market-Ratio	10,370	3.41	3.45	0.02	1.34	2.30	4.11	27.59
Leverage Ratio	10,370	2.09	2.16	0.003	0.93	1.49	2.44	21.18

Appendix 6: Summary Statistics for Company Fundamentals

Observations by Market Capitalization (bn EUR) and Year

Year	[0,0.5]	(0.5,1]	(1,2]	(2,5]	(5,10]	(10,20]	(20,50]	(50,100]	(100,500]	N	Total MCAP
2002	10	27	30	39	30	15	10	9	1	171	1,756
2003	6	20	33	38	33	18	12	9	4	173	2,207
2004	18	30	48	60	38	18	16	9	3	240	2,273
2005	8	29	53	90	51	35	22	7	8	303	3,546
2006	1	21	46	101	66	41	33	9	8	326	4,129
2007	7	13	63	111	61	35	34	11	8	343	4,186
2008	50	55	73	93	42	32	22	10	3	380	2,907
2009	28	44	76	111	59	35	28	9	6	396	3,539
2010	14	43	76	137	63	46	33	15	5	432	4,316

2011	24	58	89	132	61	48	26	14	6	458	4,224
2012	21	43	83	131	82	44	35	13	7	459	4,624
2013	10	36	79	156	90	45	36	18	7	477	5,205
2014	12	35	82	141	90	57	35	20	7	479	5,607
2015	14	40	72	154	101	74	40	18	9	522	6,348
2016	17	38	81	151	108	71	46	15	10	537	6,562
2017	18	34	88	191	118	87	49	17	12	614	7,393
2018	97	147	161	215	110	70	46	16	9	871	6,823
2019	89	166	171	222	123	79	55	21	14	940	8,400
2020	148	183	201	223	133	74	56	20	12	1,050	8,540
2021	109	161	203	231	140	88	66	26	16	1,040	10,522
2022	18	26	26	38	23	8	15	3	2	159	1,328

Appendix 7: Observations by Market Capitalization Bracket (bn EUR) and Year

Regression Analysis Results: Ownership Levels on ESG Levels

	<i>Dependent Variable: Type of ESG Score</i>			
	Total (1)	Environmental (2)	Social (3)	Governance (4)
IA.A	0.068*** (0.013)	0.060*** (0.023)	0.021 (0.019)	0.077*** (0.022)
IA.P	0.212*** (0.045)	-0.067 (0.073)	0.108* (0.065)	0.295*** (0.074)
Corp	0.022* (0.013)	0.101*** (0.022)	-0.034* (0.019)	-0.056** (0.022)
LT.Inv	0.051 (0.038)	0.081 (0.076)	0.122** (0.055)	0.124* (0.066)
Bank	0.112 (0.105)	0.173 (0.181)	-0.066 (0.153)	-0.078 (0.173)
Gov	0.083*** (0.031)	0.102* (0.057)	0.034 (0.044)	0.109** (0.051)
Ind	-0.013 (0.017)	-0.030 (0.030)	-0.075*** (0.027)	-0.018 (0.031)
Other	0.013 (0.037)	0.054 (0.055)	-0.027 (0.050)	-0.025 (0.064)
Prof.EBIT	0.021 (0.015)	0.110*** (0.030)	0.016 (0.022)	0.043* (0.026)
PE.rat	-0.0001 (0.003)	-0.001 (0.004)	0.002 (0.004)	0.001 (0.005)
BM	-0.021 (0.052)	0.307*** (0.097)	0.285*** (0.070)	-0.155* (0.087)

Lev	-0.142*	-0.552***	-0.046	0.027
	(0.076)	(0.122)	(0.097)	(0.124)
Market.Cap	-0.038***	-0.035***	-0.021**	-0.014
	(0.009)	(0.013)	(0.010)	(0.014)
Observations	10,370	6,103	7,289	9,034
R ²	0.835	0.787	0.800	0.692
Adjusted R ²	0.811	0.749	0.761	0.642
Residual Std. Error	8.749 (df = 9076)	9.770 (df = 5174)	8.690 (df = 6083)	12.820 (df = 7774)

Note: *p<0.1, **p<0.05, ***p<0.01
Standard errors in parentheses

Appendix 8: Model 1 Results, Ownership and ESG Scores in Levels, Yearly and Company fixed Effects

Regression Analysis Results: Lagged Ownership Levels on ESG Changes

	Dependent Variable: Type of ESG Score			
	Total (1)	Environmental (2)	Social (3)	Governance (4)
IA.A	-0.024*	0.002	-0.055***	-0.025
	(0.012)	(0.017)	(0.014)	(0.016)
IA.P	0.227***	0.134**	0.174***	0.212***
	(0.053)	(0.068)	(0.056)	(0.069)
Corp	-0.039***	0.006	-0.039***	-0.037**
	(0.012)	(0.016)	(0.013)	(0.016)
LT.Inv	-0.044	0.020	0.012	-0.009
	(0.038)	(0.050)	(0.042)	(0.053)
Bank	-0.202*	-0.109	-0.125	-0.278*
	(0.120)	(0.137)	(0.122)	(0.153)
Gov	0.009	0.014	-0.006	0.008
	(0.019)	(0.023)	(0.018)	(0.024)
Ind	-0.032***	0.003	-0.034**	-0.028*
	(0.013)	(0.016)	(0.013)	(0.017)
Other	-0.017	0.022	-0.018	-0.050
	(0.039)	(0.048)	(0.038)	(0.052)
Prof.EBIT	-0.026**	-0.033**	-0.029**	-0.044***
	(0.011)	(0.015)	(0.015)	(0.015)
PE.rat	0.0003	0.005	-0.004	-0.002
	(0.005)	(0.007)	(0.005)	(0.007)
BM	-0.142**	-0.063	0.031	-0.067
	(0.057)	(0.079)	(0.058)	(0.074)
Lev	0.049	0.058	0.010	-0.013
	(0.084)	(0.109)	(0.086)	(0.109)

Market.Cap	0.031*** (0.008)	0.018** (0.009)	0.018*** (0.007)	0.018* (0.009)
Observations	8,612	4,223	4,786	6,840
R ²	0.232	0.085	0.124	0.099
Adjusted R ²	0.229	0.078	0.118	0.095
Residual Std. Error	15.740 (df = 8578)	13.644 (df = 4190)	11.944 (df = 4753)	18.283 (df = 6806)

Note: *p<0.1, **p<0.05, ***p<0.01
Standard errors in parentheses

Appendix 9: Differences in ESG Scores and Lagged Ownership Levels, Yearly Fixed Effects

Regression Analysis Results: Lagged Ownership Changes on ESG Changes

	<i>Dependent Variable: Type of ESG Score</i>			
	Total (1)	Environmental (2)	Social (3)	Governance (4)
IA.A	-0.024 (0.027)	0.008 (0.037)	-0.047 (0.030)	-0.082** (0.036)
IA.P	0.036 (0.095)	0.081 (0.113)	0.078 (0.101)	0.022 (0.120)
Corp	0.030 (0.031)	0.009 (0.039)	0.017 (0.033)	-0.047 (0.041)
LT.Inv	-0.021 (0.077)	0.173 (0.137)	0.079 (0.092)	0.001 (0.107)
Bank	-0.136 (0.185)	0.231 (0.254)	-0.005 (0.211)	-0.137 (0.252)
Gov	0.071 (0.073)	-0.011 (0.087)	-0.031 (0.068)	0.007 (0.098)
Ind	0.042 (0.042)	-0.027 (0.059)	-0.005 (0.050)	-0.077 (0.060)
Other	-0.069 (0.084)	-0.001 (0.118)	-0.041 (0.094)	-0.147 (0.118)
Prof.EBIT	-0.021* (0.012)	-0.034** (0.015)	-0.024 (0.015)	-0.035** (0.016)
PE.rat	-0.002 (0.006)	0.005 (0.007)	-0.005 (0.006)	-0.004 (0.007)
BM	-0.085 (0.061)	-0.023 (0.081)	0.019 (0.063)	-0.009 (0.080)
Lev	0.063 (0.089)	-0.006 (0.110)	0.020 (0.090)	-0.007 (0.114)
Market.Cap	0.033*** (0.007)	0.014* (0.008)	0.026*** (0.007)	0.023*** (0.009)

Observations	7,641	3,870	4,339	6,160
R ²	0.204	0.083	0.118	0.098
Adjusted R ²	0.201	0.075	0.111	0.094
Residual Std. Error	15.722 (df = 7609)	13.561 (df = 3838)	12.050 (df = 4307)	18.336 (df = 6128)

Note: *p<0.1, **p<0.05, ***p<0.01
Standard errors in parentheses

Appendix 10: Differences in ESG Scores and Lagged Ownership Changes, Yearly Fixed Effects