Consistency or Transformation? Finance in Climate Agreements

Sebastian Rink*[1], Maurice Dumrose[2] and Youri Matheis[1]

[1]Frankfurt School of Finance & Management
[2]University of Kassel

This version: July 2025

Abstract

Using global institutional ownership data, we examine how Responsible Investors contribute to the decarbonization of the real economy. Despite holding a substantial share of global equities, Responsible Investors allocate less capital to high carbon-emitting companies and more to already green companies. Thereby they reduce their leverage for engagement over companies with significant potential for carbon emission reductions. While we observe a significant positive relation between companies ownership by Responsible Investors and the likelihood to commit to carbon emission reduction targets, their ownership does not relate to realized emission reductions. Instead, companies with greater Responsible Investor ownership exhibit significant improvements in ESG ratings, suggesting a focus on perceived sustainability rather than actual carbon emission reductions. Our findings indicate that Responsible Investors prioritize lower-emission portfolios over facilitating real-economy decarbonization, casting doubt on their role in aligning global financial flows with the Paris Agreement's targets. This highlights the need for clearer regulatory guidance on the role of finance in achieving global climate objectives.

Keywords: Climate Finance, Paris Agreement, Institutional Investors, Transformation, ESG

We are grateful for helpful comments from Christina E. Bannier, Sijmen Adrianus Duineveld, Christian Haas, Karol Kempa, Christian Klein, Karsten Löffler, Ulf Moslener, and Bernhard Zwergel as well as participants in the PSE-CEPR Policy Forum 2024, Adam Smith Sustainability Conference and 2nd Annual Conference of the British Accounting Review, the Doctoral Finance Symposium at the ICMA Centre, the Sustainable Finance Research Platform PhD Workshop, and the Sustainable Finance and Climate Protection paper workshop. The authors acknowledge financial support from the Mercator foundation (Rahmenprogramm Sustainable Finance, grant number: 19026202). Errors remains ours.

*Email: s.rink@fs.de

I. Introduction

The world economy needs to decarbonize to achieve the targets of the Paris Agreement. Finance plays a role in this process, explicitly recognized within the Paris Agreement. Article 2.1c of the Agreement calls for making *"financial flows consistent with a pathway toward low greenhouse gas emissions and climate-resilient development"* (United Nations, 2015). However, this statement is ambiguous on two dimensions: (i) the scope of what policy makers meant to cover under "financial flows" and (ii) the economic role of finance in climate action. The scope ranges from compensatory payments for climate damages at the policy level to a complete reorientation of the global financial system to support the Paris Agreement targets. The ambiguities on the economic role of financial flows result from the breadth of interpretations available for the term "consistency". It can range from a (passive) provision of capital to green companies to an active role of the financial system in driving change in the real economy. These ambiguities hamper the stringent and consistent implementation and monitoring of Article 2.1c.

In this paper, we provide empirical evidence for a clearer definition of Article 2.1c by examining the role of responsible institutional investors in aligning financial flows with the Paris Agreement. Despite their self-perception as being within the scope of Article 2.1c, we show that their actual impact on decarbonizing the real economy is limited.

During the past decade, institutional investors have increasingly integrated sustainability into their investment strategies, as evidenced by the growth of initiatives such as the United Nations Principles for Responsible Investment (UN PRI), which had 5,345 signatories as of March 2024 (PRI, 2024). The Paris Agreement further accelerated this momentum, giving rise to climate investor coalitions such as Climate Action 100+, with roughly 700 signatories as of January 2023 (Climate Action 100+, 2023). The establishment of the Glasgow Financial Alliance for Net Zero (GFANZ) before COP26 underscores the financial sector's collective commitment to the Paris targets (GFANZ, 2024). These developments suggest that "Responsible Investors" consider themselves within the purview of Article 2.1c.

Responsible Investors have two primary levers to align financial flows with the Paris climate goals: (i) capital (re)allocation toward greener companies or away from carbon-intensive ones, and (ii) using their influence as shareholders to engage companies on their climate

strategies, pushing for meaningful transition and decarbonization plans.

Capital reallocation by Responsible Investors sends a green preference signal (Pástor et al., 2021) and can affect capital costs (De Angelis et al., 2023), which should prompt companies to adjust their business models (Caldecott et al., 2022). Atta-Darkua et al. (2023) demonstrates that Responsible Investors have indeed begun to tilt their portfolios towards greener companies. However, for these signals to be effective in achieving the Paris targets, they must induce tangible changes in the real economy. The literature remains skeptical about this impact (Kahn et al., 2023; Berk and van Binsbergen, 2025). In addition, divesting from high carbon-emitting companies can raise their cost of capital, potentially hindering their ability to finance transition projects. Simultaneously, (re)allocating capital to already green companies has limited additional climate impact (Hartzmark and Shue, 2023). This suggests that capital (re)allocation reflects a passive interpretation of Article 2.1c, rather serving the reputation of the investor instead of supporting the decarbonization of the real economy.

Alternatively, Responsible Investors can leverage their influence through shareholder voting and engagement with company management. Given their significant share in global equity markets (Bas et al., 2023), this channel could be potent. Engagement has been shown to improve companies' climate performance and transparency (Cohen et al., 2023a; Ilhan et al., 2023) and reduce downside climate risks (Hoepner et al., 2024). If Responsible Investors used this strategy, they could play an active role in aligning financial flows with the Paris climate objectives.

To understand whether Responsible Investors indeed have an aggregate impact through the channels, this paper empirically examines their global equity holdings and their relationship to the decarbonization of real economy companies. We use a global data set of institutional investor company holdings in which we systemically identify Responsible Investors according to their membership in the UN PRI. Using these data, we run our analyses at the company-level to directly estimate the relationship between responsible investor ownership and the decarbonization of real economy business models.

Our data show that Responsible Investors indeed hold a significant share of equity in capital markets. In recent years, they have built up ownership shares, so they are now holding roughly a third of all equity in global capital markets. Given this relevance by size, these

investors could affect companies climate strategy decisions (De Angelis et al., 2023) and thus can be considered within the scope of Article 2.1c. However, their size in capital markets does not necessitate any impact on climate strategies by companies in their portfolios. Therefore, we develop a view on their actual impact by analyzing Responsible Investor's capital allocation decisions and relationship to the intention and realization of company decarbonization.

The analysis of Responsible Investors capital allocation shows lower allocation to brown and higher to already green or low-impact companies. Responsible Investors explicitly shun high carbon-emitting companies more than the average institutional investor and more than non-institutional investors. This finding is in line with previous studies on responsible investor behavior (Atta-Darkua et al., 2023; Heath et al., 2023; Kahn et al., 2023). As a consequence of the result, Responsible Investors have lower leverage over these high carbon-emitting companies than the average investor, as such, reducing their influence on potential transition-related decisions within the company. Combined with the passive interpretation of the capital allocation channel, this leads to doubts about the role of Responsible Investors in making "financial flows consistent" with the targets of the Paris Agreement. In particular, it appears that Responsible Investors shun companies and industries with a large potential for transition finance, which further diminishes their potential leverage for climate action.

If the engagement channel is to work, Responsible Investors drive decarbonization in the companies in which they have higher ownership. However, our analysis shows that companies with higher ownership by Responsible Investors do not decarbonize faster. Despite a significantly positive relation between responsible investor ownership and the likelihood of companies to publicly commit to carbon-emission reduction targets, we do not find any evidence that responsible ownership relates to company decarbonization. This finding strongly indicates a passive interpretation of Responsible Investors in making "financial flows consistent" with the targets of the Paris Agreement. In conjunction with the previous finding, we conclude that Responsible Investors prioritize a lower carbon emission footprint in their portfolio over a Paris-aligned real economy, that is, low carbon-emitting portfolios over tangible change needed for climate action.

Despite the lack of evidence for an active role in decarbonizing the real economy, we find that companies' ESG ratings improve significantly with higher responsible investor owner-

ship. This highlights a focus of Responsible Investors on these widely used ESG metrics (Berg et al., 2022) instead of decarbonization of the real economy. Given the low correlation between ESG ratings and actual decarbonization of companies (Elmalt et al., 2021), this finding further corroborates the interpretation that Responsible Investors prioritize the perceived sustainability performance of their portfolio over physical decarbonization in the real economy.

Our findings remain consistent across a range of robustness tests. Our main analysis is run on Responsible Investors defined as an institutional investor being a member of UN PRI. UN PRI is the longest existing initiative in the field, and thus allows for a more comprehensive panel data structure. However, UN PRI focuses on sustainability in general. We rerun our analyses using CA100+ membership as an indicator for Responsible Investor. This initiative is only dedicated to climate action. The results are robust to the varying definition of Responsible Investors. Second, capital allocation decisions by Responsible Investors in the past might affect company decarbonization potential in the future. For example, a greener company might have used all the green technology available already at the moment when the Responsible Investor invests, and thus Responsible Investors might not be able to motivate the company to do more. We address this issue by running a lagged regression model with robust results. Finally, we run variations on our main settings (e.g., by excluding low institutional ownership or big three ownership) to ensure that outliers or specific observations do not drive the results.

This paper contributes to two strands of the literature. First, we add to the discussion on the role of institutional investors and capital markets in the decarbonization of the real economy. Atta-Darkua et al. (2023) find that Responsible Investors do indeed decarbonize their portfolios; however, they achieve this mainly through portfolio tilting, which raises doubts about the impacts in the real economy. In a similar vein, Heath et al. (2023) and Benz et al. (2021) show that mutual funds tend to avoid high-impact companies. We uniquely add to these findings by assessing the impact of Responsible Investors in the real economy through a company level instead of a investor or fund-level analysis. This allows us to control for company characteristics, which might explain carbon emissions or ownership structures. Our analysis also changes the perspective from the often discussed return effects of carbon emissions (see, e.g., Bolton and Kacperczyk (2021), Aswani et al. (2024) and Bolton and

Kacperczyk (2024)) to the impact of investors-company relationships in promoting climate action.

Second, we contribute to the literature on finance in climate agreements. Article 2.1c of the Paris Agreement is interpreted in different ways. Zamarioli et al. (2021) point out that the article implies a transformation of the global financial system. This is beyond transfer payments from the Global North to the Global South and requires the participation of non-state actors. Our paper is the first to explicitly target this question from an empirical point of view. We contribute by highlighting that the inclusion of non-state actors, institutional investors in this case, might not be highly effective in achieving the decarbonization of the real economy. As a result, regulators should be precise in the scope of finance in climate agreements and the role they assign to financial markets and specific types of financial institutions in global climate efforts.

The remainder of the paper is structured as follows. Section II outlines the methodology, Section III presents and discusses the results, and Section IV concludes.

II. Methodology

We apply an empirical approach based on an extensive institutional investor ownership data set and company-level data. We test the relationship between Responsible Investors and company decarbonization efforts using ordinary least squares (OLS) regressions and time-discrete hazard regressions in different model specifications.

A. Data

We build a panel data set that contains company and investor data using different data sources.

We retrieve a broad universe of publicly listed companies, including their unique identifiers (RIC and ISIN) available in the London Stock Exchange Groups (LSEG) database for the 2009-2023 period. We clean the data so that only primary listed equity of companies remains, as the data from LSEG contain other listed financial instruments, such as listed bonds, thereby avoiding to assign higher weights to certain companies due to multiple appearances in the data set.

Financial institutions differ in their role in climate action compared to real economy companies (Görgen et al., 2020). This is mainly the result of their main exposure to climate change via financed carbon emissions (Scope 3). In contrast, climate-relevant sectors in the real economy (Battiston et al., 2017) exhibit more direct carbon emissions (Scope 1 and Scope 2). To avoid measurement errors due to this different behavior and to measure the relationship between Responsible Investor ownership and real economy companies' Paris alignment, we remove financial institutions based on economic sector level classification by The LSEG Business Classification (TRBC) at the classification level 1.

For the remaining companies, we retrieve absolute and relative (carbon emissions divided by revenue) Scope 1 emissions from LSEG as independent variables for the analysis. We use reported carbon emission data only to avoid inconsistencies in the modeled data (Busch et al., 2022; Aswani et al., 2024; Bolton and Kacperczyk, 2024). We focus on Scope 1 carbon emissions, as these are under direct control of the company. Furthermore, following

the classification by Battiston et al. (2017)[1], we introduce a dummy variable that indicates whether a company operates in a climate-relevant sector (Climate Policy Relevant Sector) and a dummy variable that indicates the 10% of observations with the highest Scope 1 carbon emissions (Top 10% Scope 1 Emissions) in each year. This yields four different measures for the role of a company in the decarbonization, which we use in different regression settings. In addition to those different measures on companies' role in the transition, we collect data on the intention to decarbonize using their commitment to reduce carbon emission via announcements on the Science Based Targets Initiative platform. The resulting dummy variable $SBTI\ Commitment$ indicates whether or not a company has announced a commitment to reduce carbon emissions. To control for internal company carbon emission reduction targets, we retrieve a binary indicator that shows the presence of a company carbon emission reduction policy in a given year.

We add yearly MSCI industry-adjusted ESG ratings, which allows us to control for ESG integration strategies and compare the carbon emission development with the ESG rating development. MSCI ESG ratings are rated as one of the best ESG ratings in terms of quality and usefulness among practitioners in recent years (see, e.g., Wong and Petroy (2020) and Brock et al. (2023)) and provide a sufficiently historical time series. As a result, they should indicate the investment behavior of institutional investors in the market. MSCI industry-adjusted ESG ratings range between values of 0 and 10 with higher values indicating "greener" / "more sustainable" performance of the respective company. To avoid any time- or distributional effects in the ratings, we normalize the ratings on an annual basis following Berg et al. (2022).

Furthermore, we collect a set of company-specific control variables based on Ferreira and Matos (2008). For this purpose, we obtain end-of-year data from LSEG that include company market value (in USD), return on assets (ROA), total debt (in USD), book-to-market ratio (BTMR), cash holdings (in USD), revenue (in USD), stock returns, stock return volatility, dividend yield, the TRBC industry classification, and headquarters location. Based on the company market value (in USD), we remove all company observations with values smaller than 25 mUSD to exclude micro-sized enterprises from the analysis.

For the institutional ownership data set, we retrieve end-of-year institutional ownership

[1]We use a NACE to NAICS to TRBC matching for this procedure.

information for each company from the LSEG ownership database. This includes an investor-specific identifier (PermID) and the value of shares held by an investor in each company. Investor observations with missing values for the value of shares are removed. The same applies to all investor observations with the value of shares equal to zero. LSEG ownership data include entries from large private investors, inter alia, high-net-worth individuals and family offices. We remove all of these observations to ensure that we capture only institutional investors in our data. In addition, we remove all investor observations with aggregated portfolio values of less than 100 mUSD and number of companies held smaller five in a given year to avoid comparatively small or very specialized investors biasing the results.

We define 'Responsible Investors' as those institutional investors committed to action on climate change. To approximate this commitment, we use membership in sustainability-related institutional investor initiatives, namely, UN PRI and Climate Action 100+. Using public UN PRI Signatory and Climate Action 100+ membership data and LSEG's name matching followed by a manual review process, we create two lists of Responsible Investors. In addition, we add subsidiaries of the signatories up to the third subsidiary level to the signatory list. This is in line with Ben-David et al. (2021) who show correlated behavior by subunits of large institutional investors. We classify an investor as Responsible Investor from the year of signing up to the UN PRI. For the CA100+ member list, no signature date is published; therefore, we classify each member of the initiative as a CA100+ investor from the initialization of the initiative in the year 2017. In our main analysis, we use UN PRI as the proxy for Responsible Investor.

We calculate three ownership indicators for each company i in each year t. First, the Responsible Investor Share, which is the sum of value held by Responsible Investors in relation to the company's market value, see Equation 1. Second, the Institutional Investor Share, which is the sum of value held by all institutional investors divided by the company's market value, see Equation 2. Third, the Responsible Investor Ratio, which is the sum of holdings by Responsible Investors relative to the sum of holdings by institutional investors, see Equation 3. Using the Responsible Investor Ratio allows us to compare Responsible Investor preferences for company characteristics in relation to the average institutional investor behavior.

$$\text{Responsible Investor Share}_{i,t} = \frac{\sum \text{ Responsible Investor Value}_{i,t}}{\text{Market Value}_{i,t}} \tag{1}$$

$$\text{Institutional Investor Share}_{i,t} = \frac{\sum \text{ Institutional Investor Value}_{i,t}}{\text{Market Value}_{i,t}} \tag{2}$$

$$\text{Responsible Investor Ratio}_{i,t} = \frac{\sum \text{ Responsible Investor Value}_{i,t}}{\sum \text{ Institutional Investor Value}_{i,t}} \tag{3}$$

All continuous variables in the resulting data set are winorized at the levels 1% and 99%. We take the natural logarithm of control variables with strong tails or a higher skewness. The final data set contains 275,532 company-year observations coming from 25,050 unique companies; see Table I for summary statistics of selected variables. The limitations in the scope of the data set for the regression analysis mainly appear due to the limited availability of Scope 1 carbon emission data and ESG rating data.

B. Statistical Analysis

We run the analysis at the company level. This setting allows us to investigate whether certain characteristics of the company affect the relationship between the company and the investor. Using this company-level approach rather than an investor portfolio-based approach (e.g., as in Atta-Darkua et al. (2023)) comes with the advantage that we can explicitly control for other company-specific characteristics that may influence the investment preferences of investors and the effects that those characteristics might have on the companies' strategic decisions to decarbonize.

First, we test whether companies with high relevance for the decarbonization are held less by Responsible Investors. The focus of this regression analysis is on the climate relevance of companies measured through absolute and relative Scope 1 carbon emissions as well as the company being among the top 10% of high carbon-emitting company observations ("Top 10% Scope 1 Emissions") and operating primarily in a climate-relevant sector ("Climate Policy Relevant Sector") (all represented by ϕ). In addition, we control for company-level ESG ratings to ensure that investment strategies such as ESG integration do not drive the

	count	mean	std	min	25%	50%	75%	max
Responsible Investor Ratio	276372	0.36	0.32	0.00	0.04	0.31	0.61	1.00
Responsible Investor Share	276238	0.08	0.13	0.00	0.00	0.02	0.09	1.00
CA100+ Ratio	276372	0.06	0.15	0.00	0.00	0.00	0.03	1.00
CA100+ Share	276238	0.01	0.03	0.00	0.00	0.00	0.00	0.75
Institutional Investor Share	276238	0.19	0.24	0.00	0.02	0.09	0.27	1.00
log(Scope 1 Emissions)	35028	10.92	3.41	0.00	8.76	10.93	13.18	19.75
log(Scope 1 Intensity)	34910	0.19	0.42	0.00	0.00	0.01	0.14	8.51
log(Scope 2 Emissions)	34638	10.89	2.69	0.00	9.44	11.22	12.72	22.72
log(Scope 2 Intensity)	34537	0.07	0.17	0.00	0.01	0.02	0.07	7.36
ESG Rating (MSCI)	47837	4.70	2.33	0.00	2.90	4.63	6.50	10.00
Climate Policy Relevant Sector	276372	0.58	0.49	0.00	0.00	1.00	1.00	1.00
SBTI Commitment	276372	0.01	0.11	0.00	0.00	0.00	0.00	1.00
Emissions Policy	72476	0.66	0.47	0.00	0.00	1.00	1.00	1.00
log(Total Debt)	262632	2.10	4.25	-9.21	1.94	3.60	4.48	6.92
Return on Assets	269261	2.02	13.67	-48.97	0.89	4.10	7.89	33.05
log(Revenue)	262385	12.64	1.93	9.28	11.32	12.53	13.86	19.19
Book to Market Ratio	270079	0.81	3.79	-100.00	0.30	0.60	1.10	100.00
log(Cash Holdings)	253909	10.60	2.02	6.90	9.25	10.62	11.93	16.89
Stock Return	261823	13.97	52.58	-65.11	-18.36	4.14	32.23	206.87
log(Market Capitalization)	276238	6.02	1.77	3.85	4.48	5.85	7.15	12.92
Dividend Yield	276345	1.86	2.40	0.00	0.00	0.99	2.84	10.77
Historic Volatility	275532	0.45	0.21	0.13	0.30	0.41	0.56	0.99
North America	276372	0.18	0.38	0.00	0.00	0.00	0.00	1.00
European Union	276372	0.16	0.37	0.00	0.00	0.00	0.00	1.00
Rest of World	276372	0.66	0.47	0.00	0.00	1.00	1.00	1.00

The table presents summary statistics for the financial and environmental metrics across our dataset of companies and their investors. Each metric's distribution is described by count, mean, standard deviation, minimum, 25th percentile, median (50th percentile), 75th percentile, and maximum values. Note that ESG Rating is displayed non-normalized here.

Table I. Summary Statistics

results. We lag all independent variables by one year as the investor is very likely to need time to observe the company behavior and make informed investment decisions. We apply OLS regressions in the setting as depicted in Equation 4.

$$y_{i,t} = \beta_0 + \beta_1 \phi_{i,t-1} + \beta_2 \text{ESG Rating}_{i,t-1} + \boldsymbol{\beta}_X X_{i,t-1} + \text{FE} + \epsilon_{i,t} \tag{4}$$

Here, the dependent variable, denoted by $y_{i,t}$, can be the Responsible Investor Ratio or the

Institutional Investor Share for each company i in year t. The model includes an intercept β_0, and coefficients β_1 to capture the impact of climate relevance indicator ϕ and β_2 to capture the effect of the MSCI ESG Rating (ESG) on the dependent ownership variable. Furthermore, $\boldsymbol{\beta}_X$ and X denote the vectors for company-specific time-variant control variables. FE denotes fixed effects including time (year), sector (TRBC level 1) and headquarter location (Europe, North America or Rest of the World). ϵ is the error term.

Second, we test whether Responsible Investor ownership positively relates to decarbonization of the company, that is, whether companies with higher Responsible Investor ownership decarbonize faster. The implementation of this analysis is two-fold. Initially, we analyze the relation between Responsible Investor ownership and a company's intention to publicly commit to carbon emission reduction targets using a time-discrete hazard model. This methodological approach allows to investigate how various company-level characteristics affect the probability of an carbon emission reduction announcement. The following Equation 5 formalizes the model:

$$\begin{aligned} \text{SBTI Commitment}_{i,t} = \beta_0 &+ \beta_1 \text{Responsible Ownership}_{i,t-1} \\ &+ \beta_2 \text{Institutional Ownership}_{i,t-1} \\ &+ \boldsymbol{\beta}_X X_{i,t-1} + \text{FE} + \epsilon_{i,t} \end{aligned} \tag{5}$$

On the left-hand side of the equation 5, the dependent variable $SBTI\ Commitment_{i,t}$ represents a dummy variable indicating whether company i has publicly committed to the Science Based Targets Initiative in year t. The model comprises an intercept β_0 and coefficients β_1 and β_2 which display the change in the probability of a company to publicly commit to SBTi subject to an 1 percentage point increase in the Responsible Investor Share (Responsible Ownership) and the Institutional Investor Share (Institutional Ownership) (see 1 and 2, respectively). β_X shows how certain company-specific time-varying financials affect this probability, and FE captures fixed effects including time (year), sector (TRBC level 1), and headquarter location (Europe, North America or Rest of the World). ϵ is the error term. The coefficient of interest is denoted β_1. A positive coefficient indicates a higher probability and vice versa.

In the second step, we shift the focus of the analysis toward the realization of company decarbonization and toward changes in the companies' sustainability performance. For this, we calculate Δ in all time-variant variables as changes of future years (1-5) compared to the respective base year. We use Responsible Investor Share in this setting to account for the overall influence of Responsible Investors on the company. We focus on Scope 1 carbon emissions in this setting, as these emissions are under direct control by the company and MSCI ratings to contrast our findings on decarbonization. We focus on absolute carbon emissions, as they are mainly relevant for achieving the targets of the Paris Agreement. We use the following regression setup; see Equation 6.

$$\begin{aligned}\Delta y_{i,t} = \beta_0 &+ \beta_1 \text{Responsible Ownership}_{i,t-x} + \beta_2 \text{Institutional Ownership}_{i,t-x} \\ &+ \beta_3 \Delta \text{Responsible Ownership}_{i,t} + \beta_4 \Delta \text{Institutional Ownership}_{i,t} \\ &+ \boldsymbol{\beta}_X X_{i,t-x} + \boldsymbol{\gamma}_X \Delta X_{i,t} + \text{FE} + \epsilon_{i,t} \end{aligned} \tag{6}$$

In this setup, the dependent variable, represented by $\Delta y_{i,t}$, denotes the change in Scope 1 carbon emissions and in ESG ratings for each company i at time t. The model comprises an intercept β_0 and coefficients β_1 and β_2 to evaluate the impacts of the Responsible Investor Share (Responsible Ownership) and the Institutional Investor Share (Institutional Ownership) on the dependent variable of time $t - x$, where x represents the years of change versus the target year. β_3 is the coefficient for the change in ownership from the target year i to the base year x. Furthermore, X and Δ X denote the vectors for the company-specific time-variant control variables in time t and $t-x$ and $\boldsymbol{\beta}_X$ and $\boldsymbol{\gamma}_X$ their respective coefficients. FE denotes fixed effects including time (year), sector (TRBC level 1), and headquarter location (Europe, North America or Rest of the World). ϵ is the error term.

Third, the decision on portfolio allocation by Responsible Investors is largely endogenous. Investors may invest in or shun companies for specific reasons. For example, an investor might anticipate that high carbon-emitting companies cannot decarbonize or choose specific companies that have the potential to do so. In contrast, a greener company might have used all the green technology available already at the moment when the Responsible Investor invests, and thus Responsible Investors might not be able to motivate the company to do

more. That is, the decision of the investors in analysis I could affect the results of analysis II. To check for this endogeneity, we perform a lagged dependent variable regression to rule out concerns about the direction of results. In this model, we control for the shunning of high carbon-emitting companies when assessing the future carbon emission development of these companies. β_5 in Equation 7 captures the potential effect that carbon emissions in t-1 could have on the results. The same setting is applied for MSCI ESG ratings.

$$\begin{aligned}\Delta y_{i,t} = \beta_0 &+ \beta_1 \text{Responsible Ownership}_{i,t-x} + \beta_2 \text{Institutional Ownership}_{i,t-x} \\ &+ \beta_3 \Delta \text{Responsible Ownership }_{i,t} + \beta_4 \Delta \text{Institutional Ownership }_{i,t} + \beta_5 y_{i,t-1} \\ &+ \boldsymbol{\beta}_X X_{i,t-x} + \boldsymbol{\gamma}_X \Delta X_{i,t} + \text{FE} + \epsilon_{i,t} \end{aligned} \tag{7}$$

In this setup, the dependent variable $\Delta y_{i,t}$ denotes the change in Scope 1 carbon emissions or in ESG ratings for each company i at time t. The model includes an intercept β_0, and coefficients β_1 and β_2 to evaluate the impacts of the Responsible Investor Share (Responsible Ownership) and the Institutional Investor Share (Institutional Ownership) on the dependent variable at time $t - x$, where x represents the years of change relative to the target year. The coefficient β_3 represents the change in responsible investor ownership from the base year to the target year, while β_4 captures the change in institutional investor ownership over the same period.

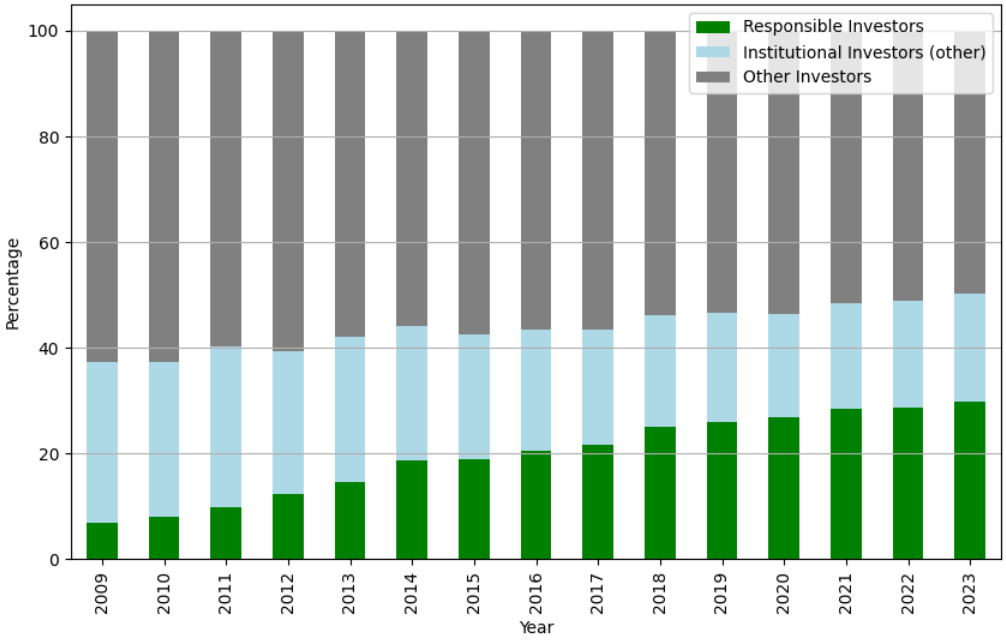
Furthermore, the model incorporates the lagged dependent variable $y_{i,t-1}$, with coefficient β_5, to capture the influence of the dependent variable of the previous period on the current period. The terms $X_{i,t-x}$ and $\Delta X_{i,t}$ denote the coefficient vectors for company-specific time-variant control variables at time $t - x$ and the change in these variables up to time t, respectively, with corresponding coefficients $\boldsymbol{\beta}_X$ and $\boldsymbol{\gamma}_X$. Fixed effects (FE) are included to control for unobserved heterogeneity, covering factors such as time (year), sector (TRBC level 1), and headquarters location (Europe, North America, or Rest of the World). $\epsilon_{i,t}$ is the error term.

III. Results and Discussion

A. Responsible Investors' portfolio allocation

Responsible Investors represent a significant share of capital markets. Their relevance in the equity market has grown steadily and reached 28.7% in 2022, see Figure 1. Given this relevance by size, these investors are within the scope of Article 2.1c. This provides Responsible Investors with the leverage over real economy companies to support the implementation of the Paris climate targets. However, the size of Responsible Investors in capital markets does not necessitate any impact on climate strategies by companies in their portfolios, nor does it ensure that their holdings are aligned with the Paris climate targets.

Responsible Investors are unlikely to hold the market portfolio given their sustainability focus. An indication of their sustainability preferences are carbon emission intensities at the portfolio level. They are informative about Responsible Investor exposures to low-carbon sectors and carbon-intensive companies. In 2022, Responsible Investors hold approximately 17.7% of the reported financed carbon emissions through their equity holdings. Here, we assume a fair share distribution of carbon emissions in equity markets only. The divergence between the share of the total market held and the associated share of Scope 1 carbon emissions held could be an indication of Responsible Investors' portfolio reallocation toward low carbon-emitting companies and avoidance ("shunning") of carbon-intensive companies. In doing so, they could actually be reallocating financial flows towards companies that are closer aligned with the Paris climate targets.

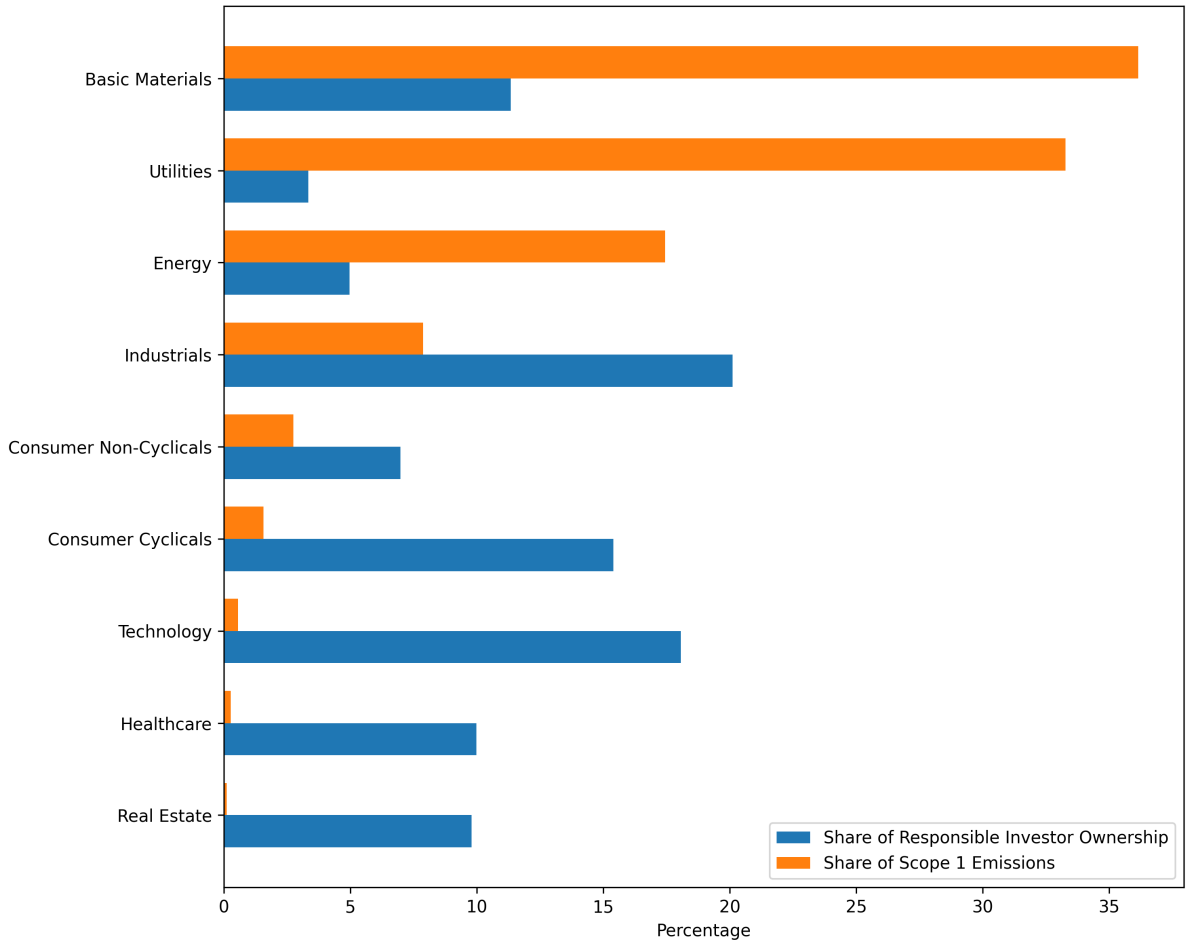


This Figure shows the relative share of Responsible Investors, institutional investors and other investors as shares of the total company market value over time.

Figure 1. Temporal Relevance of Responsible and Institutional Investors

Some sectors are of higher climate-relevance than others (Battiston et al., 2017). Thus, one strategy to achieve lower carbon-emitting financial flows is through sectoral reallocation. Figure 2 contrasts the average share of Responsible Investors' equity holdings in the main sectors of the real economy and the share of carbon emissions from each of these sectors in 2022, respectively. It shows that the participation of Responsible Investors is, on average, higher for companies operating in less carbon-intensive sectors with very low holdings in the highest carbon-emitting sectors, that is, Basic Materials (incl. cement, steel, chemicals), Utilities (incl. electricity and heat, sewerage), and Energy (incl. exploration, extraction, and refining of coal, oil, and gas). The distribution cannot be explained by the market value of the sectors alone. Underinvestment of Responsible Investors compared to all institutional investors correlates with the sectoral carbon emission intensity.

The descriptive findings indicate that Responsible Investors indeed hold substantial shares



This Figure shows the shares of (i) Scope 1 emissions and (ii) ownership by Responsible Investors per main economic sectors (TRBC Level 1 sectors) for the year 2022.

Figure 2. Responsible Investor Holdings and Emission Distribution

in the capital markets and, as such, could be considered within the scope of Article 2.1c of the Paris Agreement. The reallocation of capital away from companies in carbon-intensive sectors is a sign of a passive interpretation of the Article 2.1c on the side of Responsible Investors. That is, instead of working with carbon-intensive companies on transition strategies, they seem to shun them. In their own right, these descriptive results show the behaviour of Responsible Investors toward climate-related portfolio allocation. However, they can be driven by other company characteristics than climate characteristics that explain Responsible Investor's investment decisions. In the next step, we perform regression analyses in

which we control for company characteristics such as company size, leverage, or profitability, and their sector allocation in order to investigate whether the shunning persists.

B. Responsible Investors shun carbon-intensive companies

To test whether Responsible Investors shun carbon-intensive companies, we characterize companies according to their carbon emissions and their climate relevance. We use the indicators Scope 1 Absolute (continuous), Scope 1 Relative (continuous), Climate Policy Relevant Sector (binary), and Top-10% High Emitter (binary) to measure whether a company is climate relevant or even a high carbon emitter as independent variables. The dependent variable is the ratio of company value held by Responsible Investors to all institutional investors ("the Responsible Investor Ratio"). Under the Responsible Investor Ratio, the regression coefficients can be interpreted as the relative difference in company ownership by the Responsible Investor versus the ownership of all institutional investors after controlling for company characteristics.

The regression results show that Responsible Investors shun companies with relevance for the decarbonization, see Table II columns 1-4. The shunning holds for the different measures of the contribution of companies to climate change. All coefficients are negative and statistically significant ($\alpha = 1\%$), indicating that Responsible Investors hold significantly less in carbon-intensive and climate-relevant companies than the average institutional investor. For example, an increase of Scope 1 carbon emissions by one percentage point is associated with a decrease in the Responsible Investor Ratio by 0.3 percentage points on average. The significance of the results for Climate Policy Relevant Sector and Top 10% Scope 1 Emissions indicates that the results are robust beyond carbon emission-reporting companies. These findings strongly show high carbon emitter shunning by Responsible Investors, indicating that they aim to make their financial flows consistent with the Paris Agreement through portfolio allocation. They corroborate the results of Atta-Darkua et al. (2023) and Heath et al. (2023) at the company level.

ESG ratings are significantly positively related to the Responsible Investor Ratio in all four specifications. The inclusion of ESG ratings ensures that the regression models capture changes in capital allocation by Responsible Investors based on classical ESG integration approaches, which is common practice among institutional investors. The interpretation

	Responsible Investor Ratio				Institutional Investor Share			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(Scope 1 Emissions)	-0.003***				-0.002***			
	(0.001)				(0.001)			
log(Scope 1 Intensity)		-0.033***				-0.016***		
		(0.005)				(0.005)		
Climate Policy Relevant Sector			-0.008***				-0.019***	
			(0.002)				(0.003)	
Top 10% Scope 1 Emissions				-0.019***				0.006
				(0.005)				(0.005)
ESG Rating	0.020***	0.018***	0.019***	0.019***	0.029***	0.028***	0.032***	0.032***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Book to Market Ratio	-0.005	-0.004	-0.004***	-0.004***	-0.046***	-0.046***	-0.010***	-0.010***
	(0.004)	(0.004)	(0.001)	(0.001)	(0.005)	(0.005)	(0.001)	(0.001)
Dividend Yield	0.001*	0.001*	0.001	0.001	-0.009***	-0.009***	-0.008***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Historic Volatility	-0.087***	-0.087***	-0.067***	-0.068***	-0.104***	-0.104***	-0.094***	-0.098***
	(0.015)	(0.015)	(0.010)	(0.010)	(0.018)	(0.018)	(0.011)	(0.011)
log(ROA)	0.006***	0.006***	0.004***	0.004***	0.006***	0.006***	0.010***	0.010***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
log(Revenue)	0.008***	0.004**	0.001	0.002	0.012***	0.009***	0.002*	0.002
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
log(Total Debt to Equity)	-0.003***	-0.003***	-0.001*	-0.001*	-0.003***	-0.003***	0.001	0.001
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Stock Return	0.000***	0.000***	0.000*	0.000*	0.000	0.000	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log(Cash Holdings)	0.007***	0.007***	0.010***	0.009***	-0.004***	-0.004***	-0.002*	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
log(Market Value)	-0.014***	-0.013***	-0.005***	-0.004***	-0.018***	-0.018***	0.009***	0.009***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Constant	0.424***	0.445***	0.356***	0.347***	0.441***	0.453***	0.244***	0.241***
	(0.018)	(0.018)	(0.013)	(0.013)	(0.021)	(0.021)	(0.013)	(0.014)
Observations	18207	18207	38934	38934	18207	18207	38934	38934
Adjusted R^2	0.277	0.279	0.246	0.246	0.398	0.398	0.443	0.442
F Statistic	7315.3***	7326.5***	11954.6***	12039.2***	3134.1***	3122.0***	5165.5***	5161.1***

This table presents the regression results for high carbon emitter shunning, showing the relationship between financial variables, ESG ratings, and climate factors in portfolio allocation by Responsible Investors and institutional investors. Columns 1 through 4 show the results for Responsible Investors who are signatories of the United Nations Principles for Responsible Investment (UN PRI), while columns 5 through 8 pertain to general institutional investors. The dependent variable is the level of investment in the companies by the respective investor group. Independent variables are logarithmic transformations of Scope 1 emissions and Scope 1 intensity, respectively, and Climate Policy Relevant Sector (that is, the company is in a climate sector), and Top 10% Scope 1 Emissions (that is, the company-year observation is among the highest 10% of absolute emissions). In addition to the control variables, all regression setups include region, year and industry fixed effects. All independent time-varying variables are lagged by 1 period. Standard errors are in parentheses below the coefficients and are clustered at the company-year level. The significance levels are indicated as *p<0.1; **p<0.05; ***p<0.01.

Table II. High Carbon Emitter Shunning Regressions

of these positive and significant coefficients is two-fold. First, companies with a better "greenness" profile have a higher Responsible Investor Ratio. This means that Responsible Investors tend to favor companies with better ESG ratings more strongly than the average

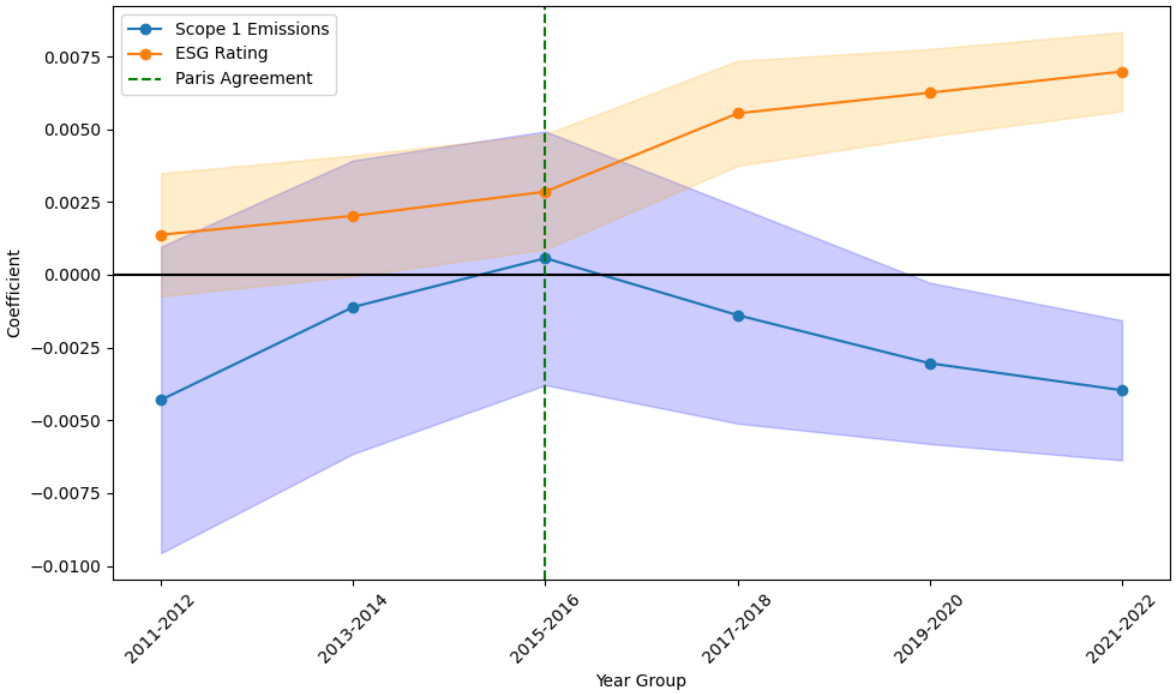
institutional investor. Second, the significantly negative relationship between the different company-level climate measures and the Responsible Investor Ratio is very likely to result from the shunning of carbon-intensive companies and is not solely attributable to the preference for companies with a high ESG rating.[2]

The debate about the role of institutional investors has intensified in recent years. With Article 2.1c of the Paris Agreement and the subsequent establishment of more dedicated investor initiatives and a growing participation (recall Figure 1), we expect the effects to increase over time. As Figure 3 shows, the shunning of carbon-intensive and climate-relevant companies becomes significant only after the Paris Agreement and is more strongly pronounced rather recently. This finding indicates that Responsible Investors react to the Paris Agreement and channel financial flows to lower carbon-emitting companies more strongly than Institutional Investors in aggregate. Note that statistical power in these biennial regressions is relatively low because of the low number of observations per bucket. The significant positive relationship between ESG ratings and the ratio of ownership of Responsible Investors to ownership of institutional investors also increases over time, which is in line with the increasing focus of the industry on ESG investing (Amir and Serafeim, 2018).

Interestingly, all institutional investors also shun carbon-intensive and climate-relevant companies (Table 1, columns 5-8). We observe a significantly negative relation between the ownership share of institutional investors ("Institutional Investor Share") and absolute Scope 1 emissions, Scope 1 emission intensity, and climate policy relevant sector (α=1%). The effect disappears statistically for the dummy variable Top 10% Scope 1 emissions. ESG ratings are also significantly positive related to Institutional Investors Share (α=1%) as well. Again, indicating that institutional investors generally have a preference for companies with better ESG ratings.

The results at the institutional investor level allow us to draw two conclusions. First, the coefficients for Responsible Investor Ratios in Table II (columns 1 through 4) are conservative, as they do not reflect the general shunning of institutional investors. Second, institutional investors generally tend to shift their portfolio allocation from high carbonemitting companies toward other parts of the capital market, that is, "greener" companies. Hence, it is likely that there are other market actors willing to take higher levels of carbon emissions and

[2]In Appendix A, we present the regression results without ESG ratings.



This Figure shows portfolio allocation with respect to ESG ratings and absolute Scope 1 Emissions by Responsible Investors relative to all institutional investors over time. Regression coefficients are plotted on the y-axis with 5% confidence intervals. We repeat the regression setup from Table II but on a biennial basis. The significance levels are lower due to the lower availability of data in the stratified data sets in each regression.

Figure 3. Biennial Investment Focus by Responsible Investors

transition relevant companies into their portfolios. This conclusion could be interpreted as supporting evidence for a split in capital markets between green and conventional / brown investors (Pástor et al., 2021). This raises questions about whether (secondary) capital markets can help steer the real economy in line with the Paris climate objectives if there are sufficient buyers for the stocks of these companies (Berk and van Binsbergen, 2025).

C. Responsible Investors and company-level carbon emission reduction - The missing link to decarbonization

So far, we have shown that Responsible Investors seem to make financial flows consistent with the targets of the Paris Agreement by allocating capital toward more sustainable and less carbon-intensive investment objectives. Given the limited link between capital allocation and real economy decarbonization (e.g. Berk and van Binsbergen (2025) and Kahn et al. (2023)),

these results only support the view that Responsible Investors play a passive role in achieving the Paris targets. That is, they allocate capital to align their portfolios with the Paris climate targets, but do not work with the real economy on actual reduction of carbon emissions. To better understand whether Responsible Investors also take a more active role, we turn to the question whether those companies with a higher Responsible Investors ownership decarbonize faster next. For the following analyses, we distinguish between a company's intention to decarbonize and its realization. We begin with investigating the relation of Responsible Investor ownership and the probability of a company to publicly announce and commit to carbon emission reduction targets. A company-level commitment to carbon emission reduction may indicate that the firm is changing its behavior with subsequent carbon emission reductions.

Figure 4 shows the results that include a set of time-varying control variables. As shown in the setting "Basic", a one percentage point increase in the Responsible Investor Share in the companies' ownership in the previous year increases the odds of a firm committing to $SBTI$ by more than 9 times[3]. We expand this basic scenario by taking into account additional fixed effects within the regression (see setting "With FE"), namely year- and sector-specific effects. The effect of an additional increase in the Responsible Investor Share of 1 percentage points on the probability of company commitment is lower, still showing a significant increase in the odds by 2.3 times. It should be noted that the number of companies that commit to $SBTI$ is very low ($\sim$ 1% of observations), which means that the absolute economic effect remains limited.

According to Bolton and Kacperczyk (2025), best-in-class companies are more likely to announce their climate commitments. Therefore, we control for internal carbon emission reduction policies to proxy for such behaviour (setting "Emission Policy"). The effect of increasing responsible ownership on the probability of publicly committing to reduction targets remains stable even after incorporating a dummy variable that indicates whether a firm has an internal carbon emission reduction policy prior to the commitment.

Responsible Investor ownership may take time to influence firm behavior. We take this

[3]In this setting, we use Responsible Investor Share as opposed to the Responsible Investor Ratio to better account for Responsible Investors' leverage on company decisions, e.g., voting power at general annual meetings or relevance as part of investor relations / closed-door engagements.

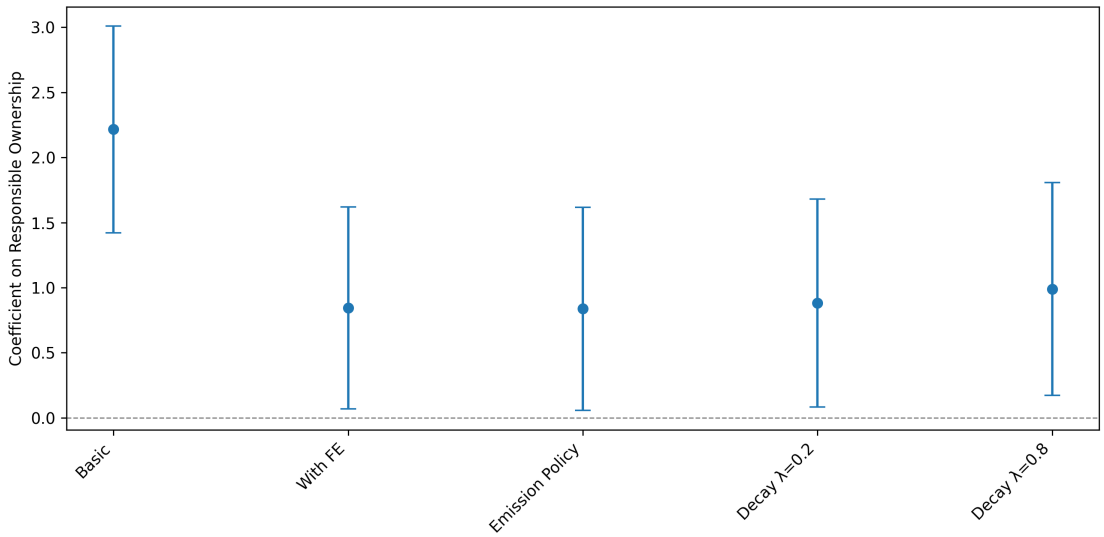


Figure 4. Commitments and Green Ownership

into considerations in the remaining specifications (Decay settings) by accounting for the ownership of Responsible Investors in prior years. We adjust equation 5 by replacing the Responsible Investor Share in t-1 with a weighted average value of the Responsible Investor Share from t-5 to t-1. We implement two weighting factors. $\lambda = 0.2$ assigns a high weight to more recent years, whereas $\lambda = 0.8$ puts nearly equal weights to each of the five years. The resulting regression coefficients of the weighted Responsible Investor Share show similar effect sizes with a slightly higher effect when more weight is placed on the past ($\lambda = 0.8$). This may indicate that Responsible Investors need time to influence corporate behaviour.

The prior analysis provides evidence for a positive relation of Responsible Ownership and the companies' probability to publicly commit to carbon emission reduction targets, that is, their intention to decarbonize. However, as Bolton and Kacperczyk (2025) point out, these commitments are likely to have minimal effects on company decarbonization so far and, as such, could be cost-effective strategy signals for companies in dealing with higher shares of Responsible Investors demands. Thus, the question remains whether companies with high Responsible Ownership are more likely to follow their commitment by actively reducing their carbon emissions.

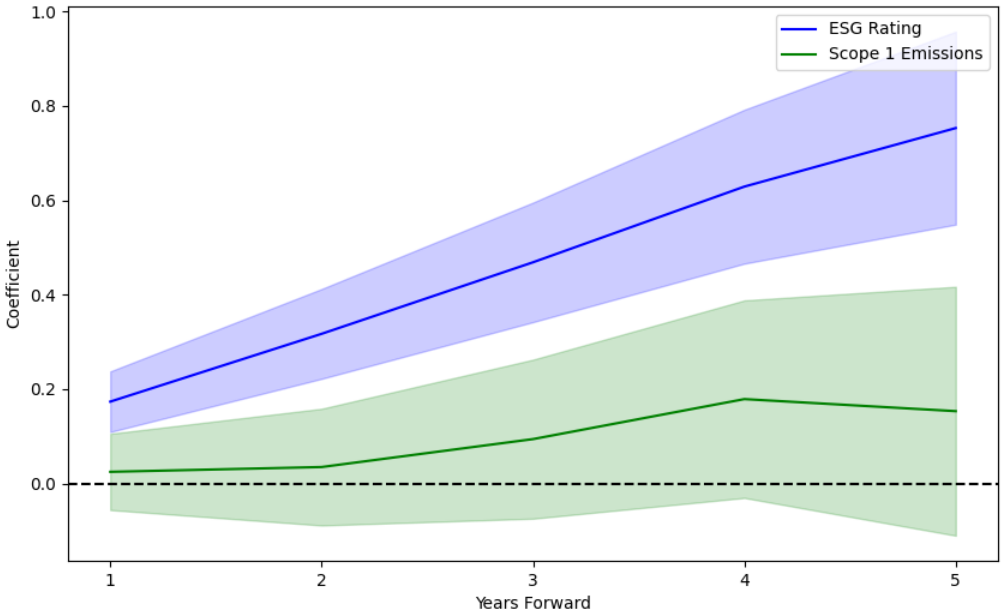
We examine how Responsible Investor ownership affects company decarbonization by as-

sessing their holdings in companies ("Responsible Investor Share") in relation to changes in company-level carbon emissions. The setup controls for company characteristics and institutional ownership. Additionally, we control for institutional investor ownership to ensure that we do not capture general effects of institutional investor ownership at the company level, but only those by Responsible Investor ownership.

Figure 5 shows the change in carbon emissions at the company level over time in relation to the Responsible Investor ownership. We do not find evidence that companies' Scope 1 carbon emissions decline significantly with higher Responsible Investor ownership. This means that a higher ownership of Responsible Investors is not related to the decarbonization of companies. If anything, we find a positive albeit statistically insignificant relationship between company-level carbon emission development and Responsible Investor ownership. As a consequence of this finding, we conclude that the engagement and voicing channel has limited effects on the decarbonization of companies at the aggregate global level. This supports the critical view on engagement at the system level by Berg et al. (2023). These findings call into question whether Responsible Investors take an active role in shaping a Paris-aligned real economy.

Interestingly, a very different picture emerges for changes in ESG ratings. If we run the regressions using ESG ratings, we find a significant positive relation of Responsible Investor ownership and changes in ESG ratings over time. This suggests a greater interest from Responsible Investors in improving the performance of the ESG rating than the decarbonization in the real economy. The strong use of ESG ratings and, therefore, the implicit or even explicit target setting using this metric, for example, as part of C-level compensation by some companies (Cohen et al., 2023b), could explain this result. Given the low correlation between ESG ratings and actual decarbonization of companies (Elmalt et al., 2021), this finding further corroborates the interpretation that Responsible Investors prioritize the perceived sustainability performance of their portfolio over decarbonization in the real economy.

The Paris Agreement targets absolute carbon emission reductions due to the physical limits of the carbon budget (Intergovernmental Panel on Climate Change (IPCC), 2021). Therefore, the actual Paris-aligned business model transition should also target absolute carbon emission reduction. However, it is possible that some companies with relatively carbon-efficient technologies need to increase their own absolute carbon emissions to replace more



This Figure shows how ESG ratings and Scope 1 Emissions change in relation to the level of Responsible Investor ownership over time. Regression coefficients plotted on the y-axis with 5% confidence intervals refer to an 1% point increase in Responsible Ownership. Regressions are executed on an annual basis. The tables for the underlying regression are reported in Appendix A.

Figure 5. Temporal
Change of Sustainability in Companies in Relation to Responsible Investor Ownership

inefficient competitors (Aswani et al., 2024). In this scenario, absolute carbon emissions were to decrease at the macro-level, while company-level carbon emissions would develop inconsistently. Responsible Investors aware of such situations could be willing to hold more carbon-efficient companies and would be willing to keep or even increase absolute in these companies for the "greater good". In this situation, they would rather work with companies to reduce relative carbon emissions. We test for this by rerunning the analysis using Scope 1 carbon emission intensities. Table III shows that the results remain insignificant, ruling out this explanation. This corroborates our conclusion that Responsible Investors do not pursue an active role under Article 2.1c.

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
Responsible Investor Share	0.0105	0.0081	0.0148	0.0342*	0.0336
	(0.0081)	(0.0122)	(0.0147)	(0.0180)	(0.0217)
Institutional Investor Share	-0.0009	0.0010	-0.0001	-0.0156	-0.0178
	(0.0059)	(0.0088)	(0.0105)	(0.0123)	(0.0142)
Time-variant company controls	Y	Y	Y	Y	Y
Δ Time-variant company controls	Y	Y	Y	Y	Y
Fixed Effects	Y	Y	Y	Y	Y
Observations	21754	17047	13706	11007	8902
Adjusted R^2	0.0570	0.0825	0.0746	0.0819	0.0851
F-Statistic	12.76***	14.34***	13.49***	12.99***	11.51***

This table presents the regression results for the relationship between Scope 1 emission intensity and the independent variables, showing the effects of changes over one to five years (Δ1 to Δ5). Each column represents a different time horizon. The independent variable of interest is Responsible Investor Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. For the full regression table, see Appendix A. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company year level.

Table III. Scope 1 Intensity (Δ1 - Δ5)

D. Robustness

The findings of this study challenge the prevailing narrative and communication from both the industry and many policy makers on the role of Responsible Investors in global climate efforts. To ensure the econometric and conceptual robustness of our conclusions, we perform a series of robustness checks. We demonstrate that our findings are valid across different definitions of Responsible Investors, address endogeneity concerns related to their holdings in specific companies, and account for potential outliers in our sample. This confirms the validity of our results and supports the reliability of our conclusions.

Alternative Definition of Responsible Investors

In our main analysis, we use the membership in the UN PRI as the proxy for Responsible Investors. UN PRI is the longest existing initiative in the field, and thus allows for a more comprehensive panel data structure. However, UN PRI focuses on sustainability in general. Although much of the sustainability debate in developed countries is on climate change

mitigation, we could introduce an error in the measurement through our decision. Therefore, we repeat the analysis on shunning and decarbonization using the Climate Action 100+ membership as an indication for Responsible Investors. According to their statutes, these investors focus mainly on the decarbonization of companies through engagement (Climate Action 100+, 2023).

Table IV shows that CA100+ investors also shun carbon-intensive companies, although at a lower level. The lower level of shunning seems plausible given the lower ownership of CA100+ investors compared to Responsible Investors defined by UN PRI membership. Contrary to UN PRI signatories, they actually hold more shares in companies in climate policy relevant sectors than the average institutional investor. However, due to the strong shunning by institutional investors in general, this still means that CA100+ investors shun these sectors compared to the average investor. The preference for companies with higher ESG ratings is also observable. Hence, the shunning is robust for this alternative definition of Responsible Investors.

	CA100+ Ratio			
	(1)	(2)	(3)	(4)
log(Scope 1 Emissions)	-0.001***			
	(0.000)			
log(Scope 1 Intensity)		-0.014***		
		(0.002)		
Climate Policy Relevant Sector			0.005***	
			(0.001)	
Top 10% Scope 1 Emissions				-0.009***
				(0.002)
ESG Rating	0.009***	0.008***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
Time-variant company controls	Y	Y	Y	Y
Fixed Effects	Y	Y	Y	Y
Observations	18207	18207	38934	38934
Adjusted R^2	0.301	0.302	0.299	0.299
F Statistic	570.2***	569.6***	1007.2***	1008.5***

This table presents the regression results for high carbon emitter shunning, showing the relationship between various financial, ESG ratings, and climate factors on the portfolio allocation by Responsible Investors. Here, we use CA100+ Share membership as a proxy for Responsible Investor. The dependent variable is the level of investment in companies by the respective investor group. Independent variables are logarithmic transformations of Scope 1 emissions, Scope 1 intensity, Climate Policy Relevant Sector (that is, the company is in a climate sector), and Top 10% Scope 1 Emissions (that is, the company x year observation is among the highest 10% of absolute emissions). In addition, control variables include financial metrics, namely the book-to-market ratio, dividend yield, historic stock return volatility, return on assets (ROA) (log.), revenue (log.), total debt to equity (log.), stock return, cash holdings (log.), and market capitalization (log.), as well as year and industry fixed effects and regional dummy variables for the European Union and North America. All independent time-varying variables are lagged by 1 period. Standard errors are in parentheses below the coefficients and clustered at the company-year level. The significance levels are indicated as *p<0.1; **p<0.05; ***p<0.01.

Table IV. High Carbon Emitter Shunning Using CA100+ Investors

A declared focus of CA100+ is on engaging with high carbon emitters to decarbonize their business models (Climate Action 100+, 2023). As a result, we would expect a relationship between CA100+ ownership and decarbonization of companies. However, Table V shows that CA100+ ownership is not associated with a decrease in the carbon emissions of companies. In Annex A, we also document robustness for Scope 1 intensities and the improvement in ESG ratings in relation to CA100+ ownership. Again, this underscores that our main results are robust to the definition of a Responsible Investor.

	Δ 1 Year (1)	Δ 2 Year (2)	Δ 3 Year (3)	Δ 4 Year (4)	Δ 5 Year (5)
CA100+ Share	-0.1099	-0.1843	0.0497	0.2527	0.2994
	(0.0911)	(0.1404)	(0.1911)	(0.2563)	(0.3425)
Time-variant company controls	Y	Y	Y	Y	Y
Δ Time-variant company controls	Y	Y	Y	Y	Y
Fixed Effects	Y	Y	Y	Y	Y
Observations	21754	17047	13706	11007	8902
Adjusted R^2	0.0139	0.0279	0.0403	0.0563	0.0779
F-Statistic	4.93^{***}	7.68^{***}	9.90^{***}	10.93^{***}	11.96^{***}

This table presents the regression results for the relationship between Scope 1 emissions (absolute) and the independent variables, showing the effects of changes over one to five years (Δ1 to Δ5). Each column represents a different time horizon. The independent variable of interest is CA100+ Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company year level.

Table V. Scope 1 Emissions (Δ1 - Δ5)

Some caution in interpreting the results of the CA100+ analysis is warranted for two reasons. First, CA100+ does not provide signature year data for its members. In the absence of better data, we characterize all investors as CA100+ investors from the year the initiative was founded. This could inflate the CA100+ based Responsible Investor Share, especially in earlier periods. Second, the initiative was only founded in 2017 limiting the periods available for the analysis of decarbonization. This reduces the statistical power of our analysis on company transitions, especially when considering four or five years of change, and makes these results more prone to outliers.

Endogenous Investment Decisions

The decision on the portfolio allocation by Responsible Investors is largely endogenous. Investors may invest in or shun companies for specific reasons. As such, capital allocation decisions by Responsible Investors in the past might affect company decarbonization potential in the future. For example, a greener company might have used all the green technology available already at the time when the Responsible Investor invests. Thus, Responsible Investors might not be able to motivate the company to invest more in their decarbonization. This can affect the outcomes of the decarbonization in the following years and thus the

potential relation of Responsible Investor ownership and company-level decarbonization. To account for this scenario, we run a lagged dependent variable model for the decarbonization setting.

The lagged dependent variable model shows that the main results are robust. Table VI highlights that the ownership of Responsible Investors is not significantly related to changes in company-level carbon emissions. Not surprisingly, the lagged Scope 1 carbon emissions are negatively related to future carbon emission changes as companies with higher ex-ante carbon emissions might find it easier to decarbonize. The same result holds for Scope 1 intensities. The improvements in ESG ratings in relation to Responsible ownership are also robust. The regression tables for Scope 1 intensities and ESG ratings are reported in the Appendix A.

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
Responsible Investor Share	-0.0370	-0.0704	-0.0779	-0.0705	-0.0112
	(0.0429)	(0.0676)	(0.0903)	(0.1136)	(0.1451)
Institutional Investor Share	-0.0282	-0.0420	-0.0866	-0.0778	-0.1746*
	(0.0280)	(0.0441)	(0.0580)	(0.0729)	(0.0918)
lag log(Scope 1 Emissions)	-0.0392***	-0.0794***	-0.1075***	-0.1408***	-0.1537***
	(0.0035)	(0.0059)	(0.0081)	(0.0101)	(0.0119)
Time-variant company controls	Y	Y	Y	Y	Y
Δ Time-variant company controls	Y	Y	Y	Y	Y
Fixed Effects	Y	Y	Y	Y	Y
Observations	17263	13474	10797	8730	7091
Adjusted R^2	0.0367	0.0744	0.0980	0.1356	0.1638
F-Statistic	6.96***	10.83***	12.76***	15.07***	15.82***

This table presents the regression results for the relationship between Scope 1 emissions (absolute) and the independent variables in the dependent variable model, showing the effects of changes over one to five years (Δ1 to Δ5). Each column represents a different time horizon. The independent variable of interest is Responsible Investor Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company year level.

Table VI. Scope 1 Emissions (Δ1 - Δ5)

Ownership Data

An additional concern with our use of the Responsible Investor Ratio is the potential influence of high ratios resulting from small numbers of institutional investors holding shares in a company and those investors happening to be Responsible Investors. This situation could distort the analysis, as it may not accurately reflect a broader trend. As this situation is most likely to result from a low overall institutional investor ownership, we exclude all observations in which the share of institutional investors is equal to or below 10% of the company's market capitalization. This threshold helps ensure that the results are based on companies with a substantial level of institutional investor ownership, providing a more accurate assessment of the impact of Responsible Investors. As shown in Table VII, the results remain robust after this adjustment, indicating that our findings are not driven by cases of low overall institutional investor ownership.

	Responsible Investor Ratio			
	(1)	(2)	(3)	(4)
lag log(Scope 1 Emissions)	-0.003***			
	(0.001)			
lag log(Scope 1 Intensity)		-0.031***		
		(0.005)		
Climate Policy Relevant Sector			-0.007***	
			(0.002)	
Top 10% Scope 1 Emissions				-0.019***
				(0.005)
lag ESG Rating	0.023***	0.022***	0.023***	0.023***
	(0.001)	(0.001)	(0.001)	(0.001)
Time-variant company controls	Y	Y	Y	Y
Fixed Effects	Y	Y	Y	Y
Observations	16701	16701	33475	33475
Adjusted R^2	0.288	0.290	0.278	0.278
F Statistic	7064.2***	7081.0***	11562.6***	11640.4***

This table presents the regression results for high carbon emitter shunning, showing the relationship between various financial, ESG ratings, and climate factors on the portfolio allocation by Responsible Investors. The table highlights that results are robust after only keeping all observations with Institutional Investor Shares > 10%. Columns 1 through 4 show the results for Responsible Investors who are signatories of the United Nations Principles for Responsible Investment (UN PRI). The dependent variable is the level of investment in companies by the respective investor group. Independent variables are logarithmic transformations of Scope 1 emissions, Scope 1 intensity, Climate Policy Relevant Sector (that is, the company is in a climate sector), and Top 10% Scope 1 Emissions (that is, the company x year observation is among the highest 10% of absolute emissions). In addition, control variables include financial metrics, namely the book-to-market ratio, dividend yield, historic stock return volatility, return on assets (ROA) (log.), revenue (log.), total debt to equity (log.), stock return, cash holdings (log.), and market capitalization (log.), as well as year and industry fixed effects and regional dummy variables for the European Union and North America. All independent time-varying variables are lagged by 1 period. Standard errors are in parentheses below the coefficients and clustered at the company-year level. The significance levels are indicated as *p<0.1; **p<0.05; ***p<0.01.

Table VII. High Carbon Emitter Shunning with Institutional Investor Shares > 10%

Finally, the big three (BlackRock, State Street Global Advisors, Vanguard) have signed the UN PRI. Their strong presence on the capital markets (Bebchuk and Hirst, 2019) could inflate the size of responsible ownership in companies in the real economy. This could affect our results due to their universal ownership and their relatively high quantitative effect on our key variables. We run the analyses without the Big Three. The results are robust; see Tables VIII and IX.

	Responsible Investor Ratio			
	(1)	(2)	(3)	(4)
lag log(Scope 1 Emissions)	-0.002***			
	(0.001)			
lag log(Scope 1 Intensity)		-0.024***		
		(0.004)		
Climate Policy Relevant Sector			-0.009***	
			(0.002)	
Top 10% Scope 1 Emissions				-0.019***
				(0.004)
lag ESG Rating	0.019***	0.019***	0.020***	0.020***
Time-variant company controls	Y	Y	Y	Y
Fixed Effects	Y	Y	Y	Y
Observations	16701	16701	33475	33475
Adjusted R^2	0.244	0.245	0.234	0.234
F Statistic	3824.2***	3823.7***	6218.4***	6242.6***

This table presents the regression results for high carbon emitter shunning, showing the relationship between various financial, ESG ratings, and climate factors on the portfolio allocation by Responsible Investors. The table highlights that results are robust after removing the Big Three (BlackRock, State Street Global Advisors, Vanguard) from the Responsible Investor Ratio. Columns 1 through 4 show the results for Responsible Investors who are signatories of the United Nations Principles for Responsible Investment (UN PRI). The dependent variable is the level of investment in companies by the respective investor group. Independent variables are logarithmic transformations of Scope 1 emissions, Scope 1 intensity, Climate Policy Relevant Sector (that is, the company is in a climate sector), and Top 10% Scope 1 Emissions (that is, the company x year observation is among the highest 10% of absolute emissions). In addition, control variables include financial metrics, namely the book-to-market ratio, dividend yield, historic stock return volatility, return on assets (ROA) (log.), revenue (log.), total debt to equity (log.), stock return, cash holdings (log.), and market capitalization (log.), as well as year and industry fixed effects and regional dummy variables for the European Union and North America. All independent time-varying variables are lagged by 1 period. Standard errors are in parentheses below the coefficients and clustered at the company-year level. The significance levels are indicated as *p<0.1; **p<0.05; ***p<0.01.

Table VIII. High Carbon Emitter Shunning w/o Big Three

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
Responsible Investor Share (w/o Big Three)	0.0461	0.0261	0.0864	0.1314	0.0808
	(0.0475)	(0.0715)	(0.0940)	(0.1151)	(0.1442)
Time-variant company controls	Y	Y	Y	Y	Y
Δ Time-variant company controls	Y	Y	Y	Y	Y
Fixed Effects	Y	Y	Y	Y	Y
Observations	21754	17047	13706	11007	8902
Adjusted R^2	0.0140	0.0285	0.0412	0.0568	0.0780
F-Statistic	4.90^{***}	7.76^{***}	10.19^{***}	11.05^{***}	11.94^{***}

This table presents the regression results for the relationship between Scope 1 carbon emissions (absolute) and the independent variables, showing the effects of changes over one to five years (Δ1 to Δ5). Here, we exclude the Big Three (BlackRock, State Street Global Advisors, Vanguard) from the Responsible Investor Share. Each column represents a different time horizon. The independent variable of interest is Responsible Investor Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company year level.

Table IX. Scope 1 Emissions (Δ1 - Δ5) w/o Big Three

IV. Conclusion

Our study reveals that Responsible Investors tend to shun companies with high carbon emissions and significant roles in climate mitigation, instead favoring greener assets. Although this behavior makes their portfolios more consistent with the Paris Agreement's climate targets, it reduces their leverage to influence companies with substantial potential for carbon emission reductions. Importantly, we find no evidence that companies with higher ownership by Responsible Investors decarbonize faster. Instead, these companies show significant improvements in ESG ratings, a metric widely used in financial markets but arguably less connected to actual physical changes at the company level. These findings call into question the transformative role of institutional investors under Article 2.1c of the Paris Agreement.

Several reasons might explain our findings. First, the integration of climate change as part of the investment process has only recently reached the mainstream in finance. Processes and methodologies for Paris-aligned investment are still under development and implementation. Given that effects are likely to take some time to materialize in the real economy, our findings do not rule out that Responsible Investor ownership will relate to or even drive decarbonization in real economy companies in the future. However, other studies question the potential effect size for the future (Berk and van Binsbergen, 2025; Hartzmark and Shue, 2023).

Second, while most Responsible Investors regard themselves within the scope of Article 2.1c, our results indicate a passive interpretation of their role. That is, (i) they sell "brown" assets to other actors in the financial system, and (ii) they aim to maximize return within their (slightly) greened portfolios. In the absence of existing and expected real economy regulation for decarbonization in accordance with Paris's climate objectives (Intergovernmental Panel on Climate Change (IPCC), 2021), it is very likely that maximization of risk-return is not achieved by urging companies to fully decarbonize in accordance with a Paris trajectory. Therefore, Responsible Investors may not use their ability to influence company decision-making on the Paris alignment to a full extent.

This study has limitations. First, our data are limited to mainly large and capital market-oriented corporations and exclude most small and medium-sized enterprises (SMEs) as well as private markets. The alignment of financial flows with the climate objectives could work

differently for those companies due to their different financial structures and the lack of discipline induced by capital markets. Second, we do not investigate other asset classes that are usually used to finance large companies, such as corporate bonds and syndicated loans, which could be effective in achieving company decarbonization. Third, (mandatory) company carbon emission reporting has only recently become standard practice in developed economies. This significantly reduces the number of companies covered in our carbon emission data set. Missing companies most likely show comparatively lower absolute Scope 1 carbon emissions and operate in countries with fewer reporting requirements as well as lower climate policy stringency.

The findings have implications for policy makers. Private finance has taken on an increasingly prominent role under the Paris Agreement. The findings indicate the need for a critical reflection on this prominent role. Given our findings, it is unlikely that private finance will become a key catalyst for carbon emission reduction in the real economy. Policy makers should therefore consider (i) if they consider institutional investors to be within the scope of Article 2.1c, and (ii) whether they expect institutional investors to make "financial flows consistent" with the Paris objectives or whether they want them help transform the real economy.

References

Amir, A.Z., Serafeim, G., 2018. Why and how investors use ESG information: Evidence from a global survey. Financial Analysts Journal 74. doi:10.2469/faj.v74.n3.2.

Aswani, J., Raghunandan, A., Rajgopal, S., 2024. Are Carbon Emissions Associated with Stock Returns? Review of Finance 28, 75–106. doi:10.1093/rof/rfad013.

Atta-Darkua, V., Glossner, S., Krueger, P., Matos, P., 2023. Decarbonizing Institutional Investor Portfolios: Helping to Green the Planet or Just Greening Your Portfolio? SSRN Electronic Journal .

Bas, M., Demmou, L., Franco, G., Garcia-Bernardo, J., 2023. Institutional shareholding, common ownership and productivity: A cross-country analysis. URL: https://dx.doi.org/10.1787/d398e5b4-en, doi:10.1787/d398e5b4-en.

Battiston, S., Mandel, A., Monasterolo, I., Schütze, F., Visentin, G., 2017. A climate stress-test of the financial system. Nature Climate Change 7. doi:10.1038/nclimate3255.

Bebchuk, L., Hirst, S., 2019. The specter of the giant Three. Boston University Law Review 99. doi:10.2139/ssrn.3385501.

Ben-David, I., Franzoni, F., Moussawi, R., Sedunov, J., 2021. The Granular Nature of Large Institutional Investors. Management Science 67, 6629–6659. doi:10.1287/mnsc.2020.3808.

Benz, L., Paulus, S., Scherer, J., Syryca, J., Trück, S., 2021. Investors' carbon risk exposure and their potential for shareholder engagement. Business Strategy and the Environment 30, 282–301. doi:10.1002/bse.2621.

Berg, F., Kölbel, J.F., Rigobon, R., 2022. Aggregate Confusion: The Divergence of ESG Ratings. Review of Finance 26. doi:10.1093/rof/rfac033.

Berg, T., Ma, L., Streitz, D., 2023. Out of sight, out of mind: Divestments and the Global Reallocation of Pollutive Assets. SSRN URL: https://ssrn.com/abstract=4368113.

Berk, J.B., van Binsbergen, J.H., 2025. The impact of impact investing. Journal of Financial Economics 164, 103972. doi:10.1016/j.jfineco.2024.103972.

Bolton, P., Kacperczyk, M., 2021. Do investors care about carbon risk? Journal of Financial Economics 142. doi:10.1016/j.jfineco.2021.05.008.

Bolton, P., Kacperczyk, M., 2024. Are Carbon Emissions Associated with Stock Returns? Comment. Review of Finance 28, 107–109. doi:10.1093/rof/rfad019.

Bolton, P., Kacperczyk, M., 2025. Firm Commitments. Management Science doi:10.1287/mnsc.2024.07298.

Brock, E.K., Nelson, J., Brackley, A., 2023. Rate the Raters. Technical Report. SustainAbility Insitute by ERM. URL: https://www.sustainability.com/globalassets/sustainability.com/thinking/pdfs/2023/rate-the-raters-report-april-2023.pdf.

Busch, T., Johnson, M., Pioch, T., 2022. Corporate carbon performance data: Quo vadis? Journal of Industrial Ecology 26. doi:10.1111/jiec.13008.

Caldecott, B., Clark, A., Harnett, E., Koskelo, K., Wilson, C., Liu, F., 2022. Sustainable Finance and Transmission Mechanisms to the Real Economy URL: https://www.smithschool.ox.ac.uk/sites/default/files/2022-04/Sustainable-Finance-and-Transmission-Mechanisms-to-the-Real-Economy.pdf.

Climate Action 100+, 2023. Progress Update 2023. Technical Report. Climate Action 100+. URL: https://www.climateaction100.org/wp-content/uploads/2024/01/Climate-Action-100-Progress-Update-2023.pdf.

Cohen, S., Kadach, I., Ormazabal, G., 2023a. Institutional investors, climate disclosure, and carbon emissions. Journal of Accounting and Economics 76. doi:10.1016/j.jacceco.2023.101640.

Cohen, S., Kadach, I., Ormazabal, G., Reichelstein, S., 2023b. Executive Compensation Tied to ESG Performance: International Evidence. Journal of Accounting Research 61. doi:10.1111/1475-679X.12481.

De Angelis, T., Tankov, P., Zerbib, O.D., 2023. Climate Impact Investing. Management Science 69, 7669–7692. doi:10.1287/mnsc.2022.4472.

Elmalt, D., Igan, D., Kirti, D., 2021. ESG Investing: Only Part of the Climate Puzzle. URL: https://cepr.org/publications/dp16061.

Ferreira, M.A., Matos, P., 2008. The colors of investors' money: The role of institutional investors around the world. Journal of Financial Economics 88. doi:10.1016/j.jfineco.2007.07.003.

GFANZ, 2024. Accelerating the transition to a net-zero global economy. URL: https://www.gfanzero.com/.

Görgen, M., Nerlinger, M., Wilkens, M., 2020. Carbon Risk. SSRN Electronic Journal doi:10.2139/ssrn.2930897.

Hartzmark, S.M., Shue, K., 2023. Counterproductive Sustainable Investing: The Impact Elasticity of Brown and Green Firms. SSRN Electronic Journal doi:10.2139/ssrn.4359282.

Heath, D., Macciocchi, D., Michaely, R., C. Ringgenberg, M., 2023. Does Socially Responsible Investing Change Firm Behavior? Review of Finance doi:10.1093/rof/rfad002.

Hoepner, A.G.F., Oikonomou, I., Sautner, Z., Starks, L.T., Zhou, X.Y., 2024. ESG shareholder engagement and downside risk. Review of Finance 28, 483–510. doi:10.1093/rof/rfad034.

Ilhan, E., Krueger, P., Sautner, Z., Starks, L.T., 2023. Climate Risk Disclosure and Institutional Investors. Review of Financial Studies 36. doi:10.1093/rfs/hhad002.

Intergovernmental Panel on Climate Change (IPCC), 2021. Summary for Policymakers (AR6) - Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Technical Report. URL: https://www.ipcc.ch/report/ar6/syr/summary-for-policymakers/.

Kahn, M.E., Matsusaka, J., Shu, C., 2023. Divestment and Engagement: The Effect of Green Investors on Corporate Carbon Emissions. URL: http://www.nber.org/papers/w31791, doi:10.3386/w31791.

Pástor, L., Stambaugh, R.F., Taylor, L.A., 2021. Sustainable investing in equilibrium. Journal of Financial Economics 142. doi:10.1016/j.jfineco.2020.12.011.

PRI, 2024. Principles for Responsible Investment Annual Report 2024. Technical Report. Principles for Responsible Investing. London. URL: https://www.unpri.org/download?ac=21536.

United Nations, 2015. Paris Agreement - UNFCCC. URL: https://unfccc.int/process-and-meetings/the-paris-agreement.

Wong, C., Petroy, E., 2020. Rate the Raters. Technical Report 2. SustainAbility Institute by ERM. URL: https://www.sustainability.com/globalassets/sustainability.com/thinking/pdfs/sustainability-ratetheraters2020-report.pdf.

Zamarioli, L.H., Pauw, P., König, M., Chenet, H., 2021. The climate consistency goal and the transformation of global finance. Nature Climate Change 11. doi:10.1038/s41558-021-01083-w.

Online Appendix

A. Supplementary Tables

A. Shunning without ESG rating

This table presents the regression results for the shunning of carbon-intensive companies, showing the relationship between various financial and climate factors on the portfolio allocation by Responsible Investors and institutional investors. The table highlights that results are robust after removing ESG ratings. The results get stronger for institutional investors. Columns 1 through 4 show the results for Responsible Investors who are signatories of the United Nations Principles for Responsible Investment (UN PRI), while columns 5 through 8 pertain to general institutional investors. The dependent variable is the level of investment in companies by the respective investor group. Independent variables are logarithmic transformations of Scope 1 emissions, Scope 1 intensity, Climate Policy Relevant Sector (that is, the company is in a climate sector), and Top 10% Scope 1 Emissions (that is, the company x year observation is among the highest 10% of absolute emissions). In addition, control variables include financial metrics, namely the book-to-market ratio, dividend yield, historic stock return volatility, return on assets (ROA) (log.), revenue (log.), total debt to equity (log.), stock return, cash holdings (log.), and market capitalization (log.), as well as year and industry fixed effects and regional dummy variables for the European Union and North America. All independent time-varying variables are lagged by 1 period. Standard errors are in parentheses below the coefficients and clustered at the company-year level. The significance levels are indicated as *p<0.1; **p<0.05; ***p<0.01.

	Responsible Investor Ratio				Institutional Investor Share			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(Scope 1 Emissions)	-0.003***				-0.005***			
	(0.001)				(0.001)			
log(Scope 1 Intensity)		-0.030***				-0.031***		
		(0.004)				(0.004)		
Climate Policy Relevant Sector			-0.005***				-0.022***	
			(0.002)				(0.001)	
Top 10% Scope 1 Emissions				-0.025***				-0.028***
				(0.004)				(0.005)
Book to Market Ratio	0.004	0.004	0.004***	0.004***	-0.033***	-0.032***	-0.002**	-0.002**
	(0.003)	(0.003)	(0.001)	(0.001)	(0.004)	(0.004)	(0.001)	(0.001)
Dividend Yield	0.001*	0.001**	0.002***	0.002***	-0.006***	-0.006***	-0.000	-0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
European Union	0.040***	0.039***	0.054***	0.055***	0.124***	0.123***	0.113***	0.115***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.001)	(0.001)
Historic Volatility	-0.072***	-0.070***	-0.022***	-0.023***	-0.077***	-0.075***	-0.122***	-0.124***
	(0.013)	(0.013)	(0.005)	(0.005)	(0.014)	(0.014)	(0.003)	(0.003)
log(ROA)	0.005***	0.005***	0.004***	0.004***	0.006***	0.006***	0.008***	0.008***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
log(Revenue)	0.004**	0.001	0.022***	0.022***	0.016***	0.011***	0.020***	0.020***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
log(Total Debt to Equity)	-0.002***	-0.002***	-0.000	-0.000*	-0.003***	-0.003***	-0.002***	-0.002***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
North America	0.021***	0.021***	0.039***	0.040***	0.402***	0.402***	0.373***	0.376***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.004)	(0.004)	(0.002)	(0.002)
Stock Return	0.000*	0.000*	0.000***	0.000***	-0.000***	-0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log(Cash Holdings)	0.008***	0.007***	0.008***	0.008***	-0.006***	-0.006***	-0.005***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
log(Market Value)	-0.003*	-0.003	-0.002*	-0.001*	0.003	0.003	0.034***	0.034***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Constant	0.365***	0.385***	-0.005	-0.011	0.223***	0.248***	-0.208***	-0.226***
	(0.015)	(0.015)	(0.007)	(0.007)	(0.016)	(0.017)	(0.005)	(0.005)
Observations	27006	27006	172284	172284	27006	27006	172284	172284
Adjusted R^2	0.228	0.230	0.171	0.171	0.372	0.373	0.452	0.451
F Statistic	9425.3***	9416.0***	17232.7***	17260.7***	3776.9***	3758.7***	7795.8***	7787.7***

Table X. Shunning of
Carbon-Intensive Companies by Responsible Investors w/o ESG Ratings

B. Shunning with high institutional ownership

This table presents the regression results for the shunning of carbon-intensive companies, showing the relationship between various financial, ESG ratings, and climate factors on the portfolio allocation by Responsible Investors and institutional investors. The table highlights that results are robust after only keeping all observations with Institutional Investor Shares > 10%. Columns 1 through 4 show the results for Responsible Investors who are signatories of the United Nations Principles for Responsible Investment (UN PRI). The dependent variable is the level of investment in companies by the respective investor group. Independent variables are logarithmic transformations of Scope 1 emissions, Scope 1 intensity, Climate Policy Relevant Sector (that is, the company is in a climate sector), and Top 10% Scope 1 Emissions (that is, the company x year observation is among the highest 10% of absolute emissions). In addition, control variables include financial metrics, namely the book-to-market ratio, dividend yield, historic stock return volatility, return on assets (ROA) (log.), revenue (log.), total debt to equity (log.), stock return, cash holdings (log.), and market capitalization (log.), as well as year and industry fixed effects and regional dummy variables for the European Union and North America. All independent time-varying variables are lagged by 1 period. Standard errors are in parentheses below the coefficients and clustered at the company-year level. The significance levels are indicated as *p<0.1; **p<0.05; ***p<0.01.

	Responsible Investor Ratio				Institutional Investor Share			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(Scope 1 Emissions)	-0.003***				-0.001			
	(0.001)				(0.001)			
log(Scope 1 Intensity)		-0.031***				-0.012**		
		(0.005)				(0.006)		
Climate Policy Relevant Sector			-0.007***				-0.020***	
			(0.002)				(0.003)	
Top 10% Scope 1 Emissions				-0.019***				0.004
				(0.005)				(0.006)
ESG Rating	0.023***	0.022***	0.023***	0.023***	0.021***	0.020***	0.022***	0.022***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Book to Market Ratio	-0.015***	-0.014***	-0.016***	-0.015***	-0.039***	-0.039***	-0.028***	-0.029***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.005)	(0.005)	(0.004)	(0.004)
Dividend Yield	0.000	0.000	0.000	0.000	-0.008***	-0.008***	-0.007***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
European Union	0.021***	0.021***	0.018***	0.019***	0.091***	0.091***	0.096***	0.096***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)
Historic Volatility	-0.099***	-0.100***	-0.105***	-0.106***	-0.089***	-0.090***	-0.050***	-0.055***
	(0.016)	(0.016)	(0.010)	(0.010)	(0.018)	(0.018)	(0.011)	(0.011)
log(ROA)	0.004**	0.004**	0.003**	0.003**	0.008***	0.008***	0.007***	0.006***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
log(Revenue)	0.009***	0.006***	0.004***	0.005***	0.008***	0.007***	0.005***	0.005***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
log(Total Debt to Equity)	-0.003***	-0.003***	-0.001***	-0.001***	-0.002**	-0.002***	0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
North America	0.021***	0.021***	0.024***	0.025***	0.368***	0.368***	0.374***	0.376***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.004)	(0.004)	(0.003)	(0.003)
Stock Return	0.000**	0.000**	0.000***	0.000***	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log(Cash Holdings)	0.006***	0.006***	0.010***	0.009***	-0.003*	-0.003*	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
log(Market Value)	-0.016***	-0.015***	-0.009***	-0.008***	-0.016***	-0.015***	0.000	-0.000
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	0.436***	0.457***	0.364***	0.355***	0.461***	0.470***	0.319***	0.315***
	(0.019)	(0.018)	(0.013)	(0.013)	(0.021)	(0.021)	(0.014)	(0.014)
Observations	16701	16701	33475	33475	16701	16701	33475	33475
Adjusted R^2	0.288	0.290	0.278	0.278	0.374	0.374	0.414	0.413
F Statistic	7064.2***	7081.0***	11562.6***	11640.4***	3484.6***	3477.1***	6081.4***	6071.7***

Table XI. Shunning of
Carbon-Intensive Companies with Institutional Investor Shares > 10%

This table presents the regression results examining the relationship between responsible investor ownership and company commitment to the Science Based Targets initiative (SBTi). The dependent variable is a binary indicator equal to one if the company commits to the SBTi in a given year. The key independent variable is the share of Responsible Investors measured as the proportion of shareholders who are signatories of the United Nations Principles for Responsible Investment (UN PRI), which is lagged by one year. Additional controls include company-level financial variables such as market capitalization (log), total debt (log), return on assets (ROA), revenue (log), book-to-market ratio, dividend yield, stock return, cash holdings (log), and measures of risk (e.g., historic volatility), all lagged by one period. Where included, year and industry fixed effects as well as regional dummies for the European Union and North America help account for structural differences across time and space. Certain specifications also control for whether companies have an emissions-related policy. Standard errors, shown in parentheses, are clustered at the company level. Significance levels are indicated as *p<0.1; **p<0.05; ***p<0.01.

	Basic	With FE	Emission Policy	Decay λ=0.2	Decay λ=0.8
	(1)	(2)	(3)	(4)	(5)
UNPRI Share	2.2156***	0.8445**	0.8372**	0.8821**	0.9893**
	(0.4050)	(0.3963)	(0.3985)	(0.4071)	(0.4174)
Institutional Investor Share	-0.3756	0.7692***	0.7727***	0.7546***	0.7478***
	(0.2926)	(0.2833)	(0.2860)	(0.2866)	(0.2706)
log(Market Capitalization)	0.2559***	0.1968***	0.2063***	0.2067***	0.2072***
	(0.0417)	(0.0498)	(0.0497)	(0.0497)	(0.0499)
log(Total Debt)	0.0816***	0.0535**	0.0534**	0.0535**	0.0535**
	(0.0189)	(0.0219)	(0.0223)	(0.0223)	(0.0223)
Return on Assets	-0.1133***	-0.1169***	-0.1173***	-0.1176***	-0.1178***
	(0.0409)	(0.0421)	(0.0420)	(0.0420)	(0.0420)
log(Revenue)	0.1653***	0.2360***	0.2254***	0.2251***	0.2236***
	(0.0392)	(0.0492)	(0.0491)	(0.0491)	(0.0493)
Book-to-Market Ratio	-0.0781	-0.1019	-0.0780	-0.0782	-0.0810
	(0.1253)	(0.1415)	(0.1369)	(0.1370)	(0.1384)
log(Cash Holdings)	-0.0071	-0.0407	-0.0451	-0.0451	-0.0445
	(0.0291)	(0.0330)	(0.0334)	(0.0334)	(0.0335)
Stock Return	-0.0005	0.0008	0.0009	0.0009	0.0009
	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
Historic Volatility	1.1102***	-1.1038***	-1.0184**	-1.0127**	-1.0021**
	(0.2794)	(0.3905)	(0.3955)	(0.3957)	(0.3957)
Dividend Yield	-0.0156	0.0153	0.0175	0.0172	0.0159
	(0.0172)	(0.0187)	(0.0188)	(0.0188)	(0.0188)
log(Scope 1 Emissions)	-0.0627***	0.0124	0.0012	0.0011	0.0006
	(0.0120)	(0.0172)	(0.0175)	(0.0175)	(0.0176)
Emissions Policy	N/A	N/A	1.1272***	1.1270***	1.1261***
			(0.2447)	(0.2447)	(0.2448)
North America	-0.1838	-0.1176	-0.0889	-0.0943	-0.1154
	(0.1145)	(0.1279)	(0.1283)	(0.1287)	(0.1307)
European Union	0.9062***	1.1307***	1.1153***	1.1138***	1.1066***
	(0.0803)	(0.0899)	(0.0897)	(0.0897)	(0.0900)
Constant	-7.8040***	-13.7788***	-14.5869***	-14.5786***	-14.5357***
	(0.3875)	(1.0898)	(1.1098)	(1.1101)	(1.1115)
Observations	17386	17386	17208	17208	17208
Pseudo R^2	0.0752	0.1799	0.1832	0.1832	0.1833

Table XII. Effect of Responsible Ownership on SBTi Commitment

C. Company Commitment

D. Shunning without Big Three

This table presents the regression results for the shunning of carbon-intensive companies, showing the relationship between various financial, ESG ratings, and climate factors on the portfolio allocation by Responsible Investors and institutional investors. The table highlights that results are robust after removing the Big Three (BlackRock, State Street Global Advisors, Vanguard) from the Responsible Investor Ratio. Columns 1 through 4 show the results for Responsible Investors who are signatories of the United Nations Principles for Responsible Investment (UN PRI). The dependent variable is the level of investment in companies by the respective investor group. Independent variables are logarithmic transformations of Scope 1 emissions, Scope 1 intensity, Climate Policy Relevant Sector (that is, the company is in a climate sector), and Top 10% Scope 1 Emissions (that is, the company x year observation is among the highest 10% of absolute emissions). In addition, control variables include financial metrics, namely the book-to-market ratio, dividend yield, historic stock return volatility, return on assets (ROA) (log.), revenue (log.), total debt to equity (log.), stock return, cash holdings (log.), and market capitalization (log.), as well as year and industry fixed effects and regional dummy variables for the European Union and North America. All independent time-varying variables are lagged by 1 period. Standard errors are in parentheses below the coefficients and clustered at the company-year level. The significance levels are indicated as *p<0.1; **p<0.05; ***p<0.01.

	Responsible Investor Ratio				Institutional Investor Share			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(Scope 1 Emissions)	-0.002***				-0.001			
	(0.001)				(0.001)			
log(Scope 1 Intensity)		-0.024***				-0.012**		
		(0.004)				(0.006)		
Climate Policy Relevant Sector			-0.009***				-0.020***	
			(0.002)				(0.003)	
Top 10% Scope 1 Emissions				-0.019***				0.004
				(0.004)				(0.006)
ESG Rating	0.019***	0.019***	0.020***	0.020***	0.021***	0.020***	0.022***	0.022***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Book to Market Ratio	-0.015***	-0.014***	-0.013***	-0.013***	-0.039***	-0.039***	-0.028***	-0.029***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.005)	(0.005)	(0.004)	(0.004)
Dividend Yield	-0.004***	-0.004***	-0.003***	-0.003***	-0.008***	-0.008***	-0.007***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
European Union	0.027***	0.026***	0.022***	0.022***	0.091***	0.091***	0.096***	0.096***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)
Historic Volatility	-0.101***	-0.102***	-0.109***	-0.110***	-0.089***	-0.090***	-0.050***	-0.055***
	(0.014)	(0.014)	(0.009)	(0.009)	(0.018)	(0.018)	(0.011)	(0.011)
log(ROA)	0.004**	0.004**	0.004***	0.004***	0.008***	0.008***	0.007***	0.006***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
log(Revenue)	0.005***	0.002	-0.001	-0.001	0.008***	0.007***	0.005***	0.005***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
log(Total Debt)	-0.003***	-0.003***	-0.000	-0.000	-0.002**	-0.002***	0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
North America	-0.047***	-0.047***	-0.066***	-0.065***	0.368***	0.368***	0.374***	0.376***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.004)	(0.004)	(0.003)	(0.003)
Stock Return	0.000	0.000	0.000**	0.000**	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log(Cash Holdings)	0.007***	0.007***	0.010***	0.009***	-0.003*	-0.003*	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
log(Market Capitalization)	-0.031***	-0.031***	-0.020***	-0.020***	-0.016***	-0.015***	0.000	-0.000
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	0.497***	0.514***	0.427***	0.418***	0.461***	0.470***	0.319***	0.315***
	(0.017)	(0.017)	(0.012)	(0.012)	(0.021)	(0.021)	(0.014)	(0.014)
Observations	16701	16701	33475	33475	16701	16701	33475	33475
Adjusted R^2	0.244	0.245	0.234	0.234	0.374	0.374	0.414	0.413
F Statistic	3824.2***	3823.7***	6218.4***	6242.6***	3484.6***	3477.1***	6081.4***	6071.7***

Table XIII. Shunning of Carbon-Intensive Companies w/o Big Three

E. Decarbonization

This table presents the regression results for the relationship between ESG ratings and the independent variables, showing the effects of changes over one to five years (Δ1 to Δ5). Each column represents a different time horizon. The independent variable of interest is Responsible Investor Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company x year level.

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
Responsible Investor Share	0.1735***	0.3172***	0.4687***	0.6290***	0.7530***
	(0.0327)	(0.0486)	(0.0646)	(0.0832)	(0.1043)
Institutional Investor Share	-0.0026	0.0117	0.0212	0.0212	0.0150
	(0.0207)	(0.0308)	(0.0407)	(0.0517)	(0.0636)
Book to Market Ratio	-0.0032	-0.0043	-0.0064	-0.0118	-0.0492**
	(0.0024)	(0.0032)	(0.0046)	(0.0108)	(0.0210)
European Union	0.0206***	0.0274***	0.0538***	0.0672***	0.0886***
	(0.0068)	(0.0099)	(0.0128)	(0.0162)	(0.0197)
log(ROA)	0.0122***	0.0175***	0.0254***	0.0299***	0.0263*
	(0.0042)	(0.0066)	(0.0084)	(0.0109)	(0.0135)
log(Revenue)	-0.0019	-0.0138**	-0.0234***	-0.0275***	-0.0320***
	(0.0036)	(0.0054)	(0.0071)	(0.0092)	(0.0116)
log(Total Debt to Equity)	0.0020**	0.0052***	0.0069***	0.0090***	0.0105***
	(0.0009)	(0.0015)	(0.0019)	(0.0025)	(0.0033)
North America	-0.0093	-0.0383***	-0.0433***	-0.0573***	-0.0751***
	(0.0085)	(0.0124)	(0.0157)	(0.0196)	(0.0241)
Stock Return	-0.0002	0.0000	-0.0005**	-0.0005*	-0.0004
	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0003)
log(Cash Holdings)	0.0021	0.0084**	0.0090*	0.0070	0.0084
	(0.0024)	(0.0036)	(0.0047)	(0.0061)	(0.0076)
log(Market Value)	0.0014	0.0043	0.0125*	0.0180*	0.0167
	(0.0036)	(0.0055)	(0.0072)	(0.0094)	(0.0120)
Book to Market Ratio Δ1 - Δ5	0.0027	0.0110	0.0268*	0.0266	0.0074
	(0.0125)	(0.0079)	(0.0163)	(0.0188)	(0.0212)
Institutional Share Δ1 - Δ5	0.0470	0.1053*	0.1844***	0.2168***	0.1238
	(0.0535)	(0.0605)	(0.0691)	(0.0825)	(0.0960)
log(ROA) Δ1 - Δ5	0.0039	0.0137**	0.0315***	0.0210**	0.0086
	(0.0044)	(0.0059)	(0.0074)	(0.0090)	(0.0112)
log(Revenue) Δ1 - Δ5	0.0136	-0.0241	-0.0354*	-0.0409*	-0.0078
	(0.0159)	(0.0178)	(0.0200)	(0.0219)	(0.0236)
log(Total Debt to Equity) Δ1 - Δ5	0.0008	0.0040*	0.0033	0.0042	0.0043
	(0.0018)	(0.0021)	(0.0025)	(0.0031)	(0.0038)
Stock Return Δ1 - Δ5	-0.0001	-0.0001	-0.0003*	-0.0005**	-0.0004
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0003)
Responsible Investor Share Δ1 - Δ5	-0.0271	0.0527	0.0166	0.1356	0.2954**
	(0.0724)	(0.0788)	(0.0881)	(0.1005)	(0.1165)
log(Cash Holdings) Δ1 - Δ5	0.0035	0.0041	0.0041	0.0009	0.0083
	(0.0040)	(0.0049)	(0.0058)	(0.0071)	(0.0086)
log(Market Value) Δ1 - Δ5	0.0228	0.0291**	0.0543***	0.0912***	0.0811***
	(0.0161)	(0.0139)	(0.0157)	(0.0175)	(0.0194)
Constant	-0.0449	0.0824	0.2570***	0.3067***	0.3742***
	(0.0413)	(0.0633)	(0.0779)	(0.0946)	(0.1133)
Observations	29780	23934	19210	15110	11997
Adjusted R^2	0.0102	0.0160	0.0278	0.0338	0.0403
F-Statistic	8.22***	9.46***	14.07***	14.77***	14.76***

Table XIV. ESG Rating (Δ1 - Δ5)

This table presents the regression results for the relationship between Scope 1 emissions (absolute) and the independent variables, showing the effects of changes over one to five years (Δ1 to Δ5). Each column represents a different time horizon. The independent variable of interest is Responsible Investor Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company x year level.

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
Responsible Investor Share	0.0248	0.0350	0.0941	0.1789*	0.1533
	(0.0412)	(0.0631)	(0.0859)	(0.1068)	(0.1345)
Institutional Investor Share	-0.0368	-0.0881**	-0.1586***	-0.2188***	-0.2176**
	(0.0271)	(0.0415)	(0.0566)	(0.0686)	(0.0854)
Book to Market Ratio	-0.0032	-0.0059	-0.0210	-0.0052	-0.0144
	(0.0135)	(0.0179)	(0.0245)	(0.0329)	(0.0410)
European Union	-0.0350***	-0.0765***	-0.1042***	-0.1325***	-0.1554***
	(0.0097)	(0.0144)	(0.0188)	(0.0233)	(0.0275)
log(ROA)	-0.0085	-0.0130	-0.0107	-0.0118	-0.0038
	(0.0071)	(0.0112)	(0.0142)	(0.0180)	(0.0217)
log(Revenue)	-0.0043	-0.0008	0.0021	-0.0028	-0.0196
	(0.0065)	(0.0095)	(0.0124)	(0.0159)	(0.0182)
log(Total Debt to Equity)	0.0025	0.0030	0.0034	0.0061	0.0098
	(0.0020)	(0.0026)	(0.0036)	(0.0045)	(0.0060)
North America	-0.0242*	-0.0604***	-0.0755***	-0.0765***	-0.0969***
	(0.0135)	(0.0185)	(0.0244)	(0.0284)	(0.0335)
Stock Return	-0.0002	-0.0001	-0.0002	0.0006	-0.0001
	(0.0002)	(0.0003)	(0.0004)	(0.0005)	(0.0005)
log(Cash Holdings)	-0.0034	-0.0036	-0.0052	-0.0034	0.0138
	(0.0040)	(0.0059)	(0.0077)	(0.0092)	(0.0116)
log(Market Value)	0.0059	0.0001	-0.0039	-0.0061	-0.0124
	(0.0061)	(0.0092)	(0.0121)	(0.0149)	(0.0171)
Book to Market Ratio Δ1 - Δ5	-0.0096	0.0135	0.0551*	0.1027**	0.0946*
	(0.0282)	(0.0280)	(0.0315)	(0.0442)	(0.0517)
Institutional Share Δ1 - Δ5	0.0414	-0.1785**	-0.2497**	-0.2413**	-0.1873
	(0.0789)	(0.0892)	(0.1023)	(0.1040)	(0.1220)
log(ROA) Δ1 - Δ5	-0.0081	-0.0283***	-0.0221*	-0.0345**	-0.0538***
	(0.0066)	(0.0100)	(0.0113)	(0.0142)	(0.0165)
log(Revenue) Δ1 - Δ5	0.3123***	0.3994***	0.4995***	0.5674***	0.6432***
	(0.0392)	(0.0411)	(0.0403)	(0.0460)	(0.0543)
log(Total Debt to Equity) Δ1 - Δ5	0.0093**	0.0066	0.0086*	0.0077	0.0049
	(0.0043)	(0.0044)	(0.0049)	(0.0055)	(0.0067)
Stock Return Δ1 - Δ5	-0.0004**	-0.0005*	-0.0006**	-0.0002	-0.0004
	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0004)
Responsible Investor Share Δ1 - Δ5	0.0223	0.2687**	0.2593**	0.2035	0.0389
	(0.1094)	(0.1116)	(0.1275)	(0.1378)	(0.1566)
log(Cash Holdings) Δ1 - Δ5	-0.0077	-0.0112	-0.0166*	-0.0093	0.0028
	(0.0067)	(0.0077)	(0.0095)	(0.0113)	(0.0139)
log(Market Value) Δ1 - Δ5	0.0297	0.0203	0.0223	0.0318	0.0626**
	(0.0301)	(0.0265)	(0.0262)	(0.0288)	(0.0311)
Constant	0.0584	0.1055	0.1373	0.2312	0.4016**
	(0.0675)	(0.0967)	(0.1223)	(0.1568)	(0.1751)
Observations	21754	17047	13706	11007	8902
Adjusted R^2	0.0139	0.0281	0.0405	0.0565	0.0779
F-Statistic	4.92***	7.63***	9.92***	10.94***	11.91***

Table XV. Scope 1 Emissions (Δ1 - Δ5)

This table presents the regression results for the relationship between Scope 1 emission intensity and the independent variables, showing the effects of changes over one to five years (Δ1 to Δ5). Each column represents a different time horizon. The independent variable of interest is Responsible Investor Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company x year level.

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
Responsible Investor Share	0.0105	0.0081	0.0148	0.0342*	0.0336
	(0.0081)	(0.0122)	(0.0147)	(0.0180)	(0.0217)
Institutional Investor Share	-0.0009	0.0010	-0.0001	-0.0156	-0.0178
	(0.0059)	(0.0088)	(0.0105)	(0.0123)	(0.0142)
Book to Market Ratio	-0.0042***	-0.0084***	-0.0184***	-0.0206***	-0.0283***
	(0.0016)	(0.0028)	(0.0038)	(0.0055)	(0.0076)
European Union	-0.0026*	-0.0069***	-0.0142***	-0.0197***	-0.0276***
	(0.0015)	(0.0023)	(0.0028)	(0.0035)	(0.0044)
log(ROA)	-0.0036***	-0.0007	-0.0047*	-0.0016	-0.0025
	(0.0013)	(0.0021)	(0.0026)	(0.0029)	(0.0041)
log(Revenue)	-0.0008	0.0014	0.0008	0.0006	-0.0050
	(0.0012)	(0.0018)	(0.0024)	(0.0032)	(0.0040)
log(Total Debt to Equity)	-0.0003	-0.0003	-0.0006	0.0000	0.0004
	(0.0002)	(0.0004)	(0.0004)	(0.0006)	(0.0007)
North America	-0.0031	-0.0086**	-0.0189***	-0.0227***	-0.0322***
	(0.0022)	(0.0037)	(0.0040)	(0.0050)	(0.0063)
Stock Return	-0.0001	-0.0001	-0.0001*	-0.0000	-0.0001
	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
log(Cash Holdings)	-0.0006	-0.0017*	-0.0023*	-0.0011	0.0012
	(0.0007)	(0.0010)	(0.0013)	(0.0016)	(0.0022)
log(Market Value)	0.0019*	-0.0000	0.0017	0.0003	0.0026
	(0.0011)	(0.0015)	(0.0022)	(0.0027)	(0.0035)
Book to Market Ratio Δ1 - Δ5	0.0039	0.0077	0.0169***	0.0174***	0.0208**
	(0.0039)	(0.0051)	(0.0049)	(0.0064)	(0.0085)
Institutional Share Δ1 - Δ5	0.0027	-0.0408***	-0.0452**	-0.0493**	-0.0400*
	(0.0128)	(0.0155)	(0.0190)	(0.0210)	(0.0242)
log(ROA) Δ1 - Δ5	-0.0048***	-0.0037**	-0.0055***	-0.0056**	-0.0062**
	(0.0013)	(0.0019)	(0.0020)	(0.0024)	(0.0027)
log(Revenue) Δ1 - Δ5	-0.1114***	-0.1168***	-0.0887***	-0.0877***	-0.0856***
	(0.0173)	(0.0230)	(0.0134)	(0.0145)	(0.0160)
log(Total Debt to Equity) Δ1 - Δ5	-0.0001	0.0007	0.0007	0.0015*	0.0017*
	(0.0006)	(0.0005)	(0.0006)	(0.0008)	(0.0009)
Stock Return Δ1 - Δ5	-0.0001**	-0.0001***	-0.0002**	-0.0001	-0.0001
	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
Responsible Investor Share Δ1 - Δ5	-0.0039	0.0235	0.0043	-0.0057	-0.0298
	(0.0206)	(0.0191)	(0.0202)	(0.0228)	(0.0258)
log(Cash Holdings) Δ1 - Δ5	-0.0010	-0.0038**	-0.0042**	-0.0006	0.0011
	(0.0013)	(0.0015)	(0.0018)	(0.0020)	(0.0028)
log(Market Value) Δ1 - Δ5	0.0111*	0.0144**	0.0180***	0.0171***	0.0239***
	(0.0064)	(0.0059)	(0.0052)	(0.0054)	(0.0064)
Constant	0.0075	0.0049	0.0251	0.0345	0.0976***
	(0.0110)	(0.0204)	(0.0251)	(0.0319)	(0.0378)
Observations	21754	17047	13706	11007	8902
Adjusted R^2	0.0570	0.0825	0.0746	0.0819	0.0851
F-Statistic	12.76***	14.34***	13.49***	12.99***	11.51***

Table XVI. Scope 1 Intensity (Δ1 - Δ5)

F. Decarbonization lagged dependent variable

This table presents the regression results for the relationship between ESG ratings and the independent variables in the dependent variable model, showing the effects of changes over one to five years (Δ1 to Δ5). Each column represents a different time horizon. The independent variable of interest is Responsible Investor Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company x year level.

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
Responsible Investor Share	0.2856***	0.4894***	0.6947***	0.8675***	1.0726***
	(0.0363)	(0.0513)	(0.0687)	(0.0880)	(0.1099)
Institutional Investor Share	-0.0268	-0.0211	-0.0376	-0.0182	-0.0968
	(0.0233)	(0.0327)	(0.0433)	(0.0555)	(0.0689)
Book to Market Ratio	-0.0009	-0.0004	-0.0023	-0.0318*	-0.0580***
	(0.0018)	(0.0034)	(0.0323)	(0.0191)	(0.0225)
European Union	0.0738***	0.1278***	0.1926***	0.2474***	0.3060***
	(0.0078)	(0.0107)	(0.0143)	(0.0176)	(0.0214)
log(ROA)	0.0082*	0.0086	0.0098	0.0067	-0.0079
	(0.0046)	(0.0069)	(0.0099)	(0.0115)	(0.0142)
log(Revenue)	-0.0006	-0.0053	-0.0146*	-0.0137	-0.0267**
	(0.0040)	(0.0058)	(0.0084)	(0.0097)	(0.0119)
log(Total Debt to Equity)	0.0027**	0.0052***	0.0086***	0.0100***	0.0094***
	(0.0011)	(0.0016)	(0.0021)	(0.0027)	(0.0036)
North America	-0.0192**	-0.0610***	-0.0796***	-0.1049***	-0.1088***
	(0.0092)	(0.0129)	(0.0172)	(0.0208)	(0.0257)
Stock Return	-0.0001	0.0001	-0.0003	-0.0004	-0.0002
	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0004)
log(Cash Holdings)	-0.0002	0.0010	-0.0006	-0.0050	-0.0076
	(0.0027)	(0.0038)	(0.0051)	(0.0063)	(0.0079)
log(Market Value)	0.0086**	0.0185***	0.0334***	0.0411***	0.0580***
	(0.0040)	(0.0059)	(0.0093)	(0.0101)	(0.0124)
ESG Rating	-0.0809***	-0.1460***	-0.2108***	-0.2641***	-0.3064***
	(0.0032)	(0.0044)	(0.0057)	(0.0069)	(0.0083)
Book to Market Ratio Δ1 - Δ5	-0.0030	-0.0016	-0.0069	-0.0172	-0.0374*
	(0.0145)	(0.0143)	(0.0198)	(0.0221)	(0.0223)
Institutional Share Δ1 - Δ5	0.0988	0.1062*	0.1390*	0.2017**	-0.0097
	(0.0606)	(0.0644)	(0.0729)	(0.0893)	(0.1004)
log(ROA) Δ1 - Δ5	0.0048	0.0139**	0.0252***	0.0117	-0.0014
	(0.0049)	(0.0063)	(0.0079)	(0.0093)	(0.0117)
log(Revenue) Δ1 - Δ5	0.0012	-0.0450**	-0.0531**	-0.0429*	-0.0470*
	(0.0185)	(0.0197)	(0.0214)	(0.0226)	(0.0241)
log(Total Debt to Equity) Δ1 - Δ5	0.0008	0.0044*	0.0042	0.0043	0.0022
	(0.0021)	(0.0024)	(0.0027)	(0.0033)	(0.0040)
Stock Return Δ1 - Δ5	-0.0001	-0.0002	-0.0003	-0.0004*	-0.0005**
	(0.0001)	(0.0002)	(0.0002)	(0.0002)	(0.0003)
Responsible Investor Share Δ1 - Δ5	-0.0209	0.1869**	0.3064***	0.4663***	0.6611***
	(0.0792)	(0.0814)	(0.0923)	(0.1062)	(0.1206)
log(Cash Holdings) Δ1 - Δ5	0.0026	-0.0041	-0.0032	-0.0054	-0.0065
	(0.0043)	(0.0052)	(0.0062)	(0.0074)	(0.0088)
log(Market Value) Δ1 - Δ5	0.0177	0.0423***	0.0853***	0.1019***	0.1033***
	(0.0179)	(0.0160)	(0.0173)	(0.0186)	(0.0199)
Constant	-0.1066***	-0.1622***	-0.1815***	-0.2224***	-0.1180
	(0.0345)	(0.0503)	(0.0650)	(0.0801)	(0.0974)
Observations	24090	19321	15169	12012	9280
Adjusted R^2	0.0370	0.0739	0.1137	0.1446	0.1665
F-Statistic	23.32***	38.84***	49.63***	55.64***	53.50***

Table XVII. ESG Rating (Δ1 - Δ5)

This table presents the regression results for the relationship between Scope 1 emissions (absolute) and the independent variables in the dependent variable model, showing the effects of changes over one to five years (Δ1 to Δ5). Each column represents a different time horizon. The independent variable of interest is Responsible Investor Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company x year level.

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
Responsible Investor Share	-0.0370	-0.0704	-0.0779	-0.0705	-0.0112
	(0.0429)	(0.0676)	(0.0903)	(0.1136)	(0.1451)
Institutional Investor Share	-0.0282	-0.0420	-0.0866	-0.0778	-0.1746*
	(0.0280)	(0.0441)	(0.0580)	(0.0729)	(0.0918)
Book to Market Ratio	0.0111	0.0479**	0.0704**	0.0984***	0.0961**
	(0.0100)	(0.0206)	(0.0286)	(0.0344)	(0.0415)
European Union	-0.0573***	-0.1087***	-0.1400***	-0.1875***	-0.2008***
	(0.0097)	(0.0147)	(0.0193)	(0.0238)	(0.0283)
log(ROA)	-0.0093	-0.0087	-0.0131	-0.0219	-0.0155
	(0.0065)	(0.0110)	(0.0142)	(0.0195)	(0.0232)
log(Revenue)	0.0368***	0.0761***	0.0963***	0.1238***	0.1235***
	(0.0075)	(0.0116)	(0.0153)	(0.0198)	(0.0223)
log(Total Debt to Equity)	0.0033*	0.0077**	0.0121***	0.0160***	0.0250***
	(0.0018)	(0.0030)	(0.0041)	(0.0052)	(0.0069)
North America	-0.0267**	-0.0488**	-0.0444*	-0.0485*	-0.0555
	(0.0129)	(0.0190)	(0.0250)	(0.0292)	(0.0351)
Stock Return	0.0002	-0.0000	0.0001	0.0006	0.0000
	(0.0002)	(0.0003)	(0.0004)	(0.0005)	(0.0006)
log(Cash Holdings)	-0.0047	-0.0095	-0.0121	-0.0192**	-0.0080
	(0.0040)	(0.0060)	(0.0079)	(0.0096)	(0.0121)
log(Market Value)	0.0067	0.0089	0.0209*	0.0338**	0.0293*
	(0.0056)	(0.0092)	(0.0121)	(0.0152)	(0.0176)
log(Scope 1 Emissions)	-0.0392***	-0.0794***	-0.1075***	-0.1408***	-0.1537***
	(0.0035)	(0.0059)	(0.0081)	(0.0101)	(0.0119)
Book to Market Ratio Δ1 - Δ5	-0.0236	0.0050	0.0649*	0.0990**	0.1182**
	(0.0276)	(0.0339)	(0.0389)	(0.0463)	(0.0529)
Institutional Share Δ1 - Δ5	-0.0153	-0.1733*	-0.2083**	-0.0733	-0.2309*
	(0.0791)	(0.0934)	(0.1056)	(0.1081)	(0.1334)
log(ROA) Δ1 - Δ5	-0.0127*	-0.0167*	-0.0191*	-0.0356**	-0.0443***
	(0.0065)	(0.0090)	(0.0114)	(0.0143)	(0.0157)
log(Revenue) Δ1 - Δ5	0.3240***	0.3975***	0.4483***	0.5396***	0.6499***
	(0.0460)	(0.0442)	(0.0433)	(0.0533)	(0.0600)
log(Total Debt to Equity) Δ1 - Δ5	0.0090**	0.0075	0.0117**	0.0091	0.0099
	(0.0042)	(0.0052)	(0.0056)	(0.0065)	(0.0078)
Stock Return Δ1 - Δ5	-0.0001	-0.0002	-0.0001	0.0000	-0.0001
	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0004)
Responsible Investor Share Δ1 - Δ5	0.0061	0.0809	-0.0325	-0.0945	0.0205
	(0.1054)	(0.1157)	(0.1322)	(0.1418)	(0.1647)
log(Cash Holdings) Δ1 - Δ5	-0.0073	-0.0068	-0.0077	-0.0081	0.0044
	(0.0067)	(0.0073)	(0.0089)	(0.0106)	(0.0132)
log(Market Value) Δ1 - Δ5	-0.0104	-0.0108	0.0293	0.0339	0.0672**
	(0.0315)	(0.0280)	(0.0282)	(0.0303)	(0.0310)
Constant	0.0213	0.0146	0.0275	0.0133	0.0535
	(0.0558)	(0.0838)	(0.1089)	(0.1436)	(0.1585)
Observations	17263	13474	10797	8730	7091
Adjusted R^2	0.0367	0.0744	0.0980	0.1356	0.1638
F-Statistic	6.96***	10.83***	12.76***	15.07***	15.82***

Table XVIII. Scope 1 Emissions (Δ1 - Δ5)

This table presents the regression results for the relationship between Scope 1 emission intensities and the independent variables in the dependent variable model, showing the effects of changes over one to five years (Δ1 to Δ5). Each column represents a different time horizon. The independent variable of interest is Responsible Investor Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company x year level.

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
Responsible Investor Share	-0.0031	-0.0121	0.0005	0.0061	0.0152
	(0.0089)	(0.0138)	(0.0162)	(0.0208)	(0.0253)
Institutional Investor Share	0.0010	0.0016	-0.0055	-0.0043	-0.0097
	(0.0064)	(0.0097)	(0.0112)	(0.0141)	(0.0164)
Book to Market Ratio	-0.0016	-0.0015	-0.0076*	-0.0087	-0.0129*
	(0.0014)	(0.0029)	(0.0042)	(0.0058)	(0.0076)
European Union	-0.0061***	-0.0114***	-0.0213***	-0.0289***	-0.0351***
	(0.0015)	(0.0026)	(0.0030)	(0.0039)	(0.0045)
log(ROA)	-0.0023*	0.0016	-0.0040	-0.0040	-0.0047
	(0.0013)	(0.0023)	(0.0026)	(0.0031)	(0.0045)
log(Revenue)	-0.0006	-0.0007	-0.0035	-0.0053	-0.0066**
	(0.0013)	(0.0020)	(0.0026)	(0.0034)	(0.0034)
log(Total Debt to Equity)	0.0000	-0.0001	0.0000	0.0006	0.0010
	(0.0003)	(0.0004)	(0.0005)	(0.0007)	(0.0007)
North America	-0.0018	-0.0047	-0.0142***	-0.0209***	-0.0282***
	(0.0022)	(0.0044)	(0.0042)	(0.0057)	(0.0072)
Stock Return	-0.0000	-0.0000	-0.0001*	-0.0001	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
log(Cash Holdings)	-0.0011	-0.0021**	-0.0025*	-0.0018	-0.0016
	(0.0007)	(0.0011)	(0.0014)	(0.0018)	(0.0026)
log(Market Value)	0.0014	0.0016	0.0052**	0.0068**	0.0080***
	(0.0010)	(0.0016)	(0.0022)	(0.0029)	(0.0029)
log(Scope 1 Intensity)	-0.0406***	-0.0687***	-0.0917***	-0.1130***	-0.1394***
	(0.0052)	(0.0081)	(0.0099)	(0.0132)	(0.0178)
Book to Market Ratio Δ1 - Δ5	0.0056	0.0089	0.0163**	0.0193***	0.0238***
	(0.0045)	(0.0066)	(0.0064)	(0.0074)	(0.0086)
Institutional Share Δ1 - Δ5	0.0041	-0.0392**	-0.0476**	-0.0370	-0.0590**
	(0.0127)	(0.0178)	(0.0214)	(0.0231)	(0.0267)
log(ROA) Δ1 - Δ5	-0.0048***	-0.0019	-0.0063***	-0.0074***	-0.0062**
	(0.0014)	(0.0022)	(0.0021)	(0.0026)	(0.0025)
log(Revenue) Δ1 - Δ5	-0.1176***	-0.1296***	-0.0971***	-0.0885***	-0.0700***
	(0.0222)	(0.0290)	(0.0164)	(0.0183)	(0.0123)
log(Total Debt to Equity) Δ1 - Δ5	0.0005	0.0004	0.0011	0.0017*	0.0016**
	(0.0004)	(0.0005)	(0.0007)	(0.0009)	(0.0008)
Stock Return Δ1 - Δ5	-0.0000	-0.0001	-0.0001*	-0.0001	-0.0001
	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Responsible Investor Share Δ1 - Δ5	-0.0062	0.0041	-0.0143	-0.0319	-0.0178
	(0.0167)	(0.0231)	(0.0217)	(0.0256)	(0.0267)
log(Cash Holdings) Δ1 - Δ5	-0.0021	-0.0032**	-0.0030*	0.0013	0.0035
	(0.0015)	(0.0016)	(0.0017)	(0.0019)	(0.0034)
log(Market Value) Δ1 - Δ5	0.0104	0.0118	0.0206***	0.0220***	0.0233***
	(0.0074)	(0.0072)	(0.0061)	(0.0064)	(0.0055)
Constant	0.0323***	0.0560***	0.0997***	0.1120***	0.1270***
	(0.0108)	(0.0213)	(0.0243)	(0.0313)	(0.0271)
Observations	17261	13473	10797	8728	7090
Adjusted R^2	0.1060	0.1444	0.1398	0.1472	0.1760
F-Statistic	13.16***	13.54***	13.69***	14.58***	15.58***

Table XIX. Scope 1 Intensity (Δ1 - Δ5)

G. Decarbonization without Big Three

This table presents the regression results for the relationship between Scope 1 emissions (absolute) and the independent variables, showing the effects of changes over one to five years (Δ1 to Δ5). Here, we exclude the Big Three (BlackRock, State Street Global Advisors, Vanguard) from the Responsible Investor Share. Each column represents a different time horizon. The independent variable of interest is Responsible Investor Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company x year level.

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
Responsible Investor Share (w/o Big Three)	0.0461	0.0261	0.0864	0.1314	0.0808
	(0.0475)	(0.0715)	(0.0940)	(0.1151)	(0.1442)
Institutional Investor Share	-0.0441*	-0.0831**	-0.1533***	-0.1922***	-0.1962***
	(0.0259)	(0.0385)	(0.0512)	(0.0611)	(0.0757)
Book to Market Ratio	-0.0031	-0.0059	-0.0212	-0.0064	-0.0153
	(0.0135)	(0.0178)	(0.0245)	(0.0328)	(0.0407)
European Union	-0.0353***	-0.0761***	-0.1032***	-0.1305***	-0.1524***
	(0.0097)	(0.0144)	(0.0188)	(0.0233)	(0.0274)
log(ROA)	-0.0085	-0.0126	-0.0101	-0.0104	-0.0022
	(0.0071)	(0.0112)	(0.0142)	(0.0180)	(0.0217)
log(Revenue)	-0.0042	-0.0006	0.0024	-0.0024	-0.0197
	(0.0065)	(0.0095)	(0.0124)	(0.0159)	(0.0182)
log(Total Debt)	0.0025	0.0031	0.0037	0.0065	0.0102*
	(0.0020)	(0.0026)	(0.0036)	(0.0045)	(0.0060)
North America	-0.0218	-0.0576***	-0.0690***	-0.0690**	-0.0955***
	(0.0135)	(0.0189)	(0.0248)	(0.0288)	(0.0344)
Stock Return	-0.0002	-0.0001	-0.0002	0.0006	-0.0001
	(0.0002)	(0.0003)	(0.0004)	(0.0005)	(0.0005)
log(Cash Holdings)	-0.0036	-0.0039	-0.0056	-0.0038	0.0129
	(0.0040)	(0.0059)	(0.0077)	(0.0092)	(0.0116)
log(Market Capitalization)	0.0064	0.0007	-0.0025	-0.0047	-0.0110
	(0.0061)	(0.0092)	(0.0121)	(0.0149)	(0.0170)
Book to Market Ratio Δ1 - Δ5	-0.0093	0.0133	0.0539*	0.1012**	0.0931*
	(0.0282)	(0.0280)	(0.0315)	(0.0441)	(0.0516)
Institutional Share Δ1 - Δ5	-0.0037	-0.2276***	-0.3282***	-0.3056***	-0.2725**
	(0.0734)	(0.0854)	(0.0965)	(0.1015)	(0.1163)
log(ROA) Δ1 - Δ5	-0.0082	-0.0281***	-0.0222**	-0.0345**	-0.0540***
	(0.0066)	(0.0100)	(0.0113)	(0.0142)	(0.0165)
log(Revenue) Δ1 - Δ5	0.3121***	0.3990***	0.4993***	0.5661***	0.6417***
	(0.0392)	(0.0410)	(0.0402)	(0.0460)	(0.0542)
log(Total Debt) Δ1 - Δ5	0.0094**	0.0068	0.0090*	0.0081	0.0052
	(0.0043)	(0.0044)	(0.0049)	(0.0055)	(0.0067)
Stock Return Δ1 - Δ5	-0.0004**	-0.0005**	-0.0006**	-0.0002	-0.0004
	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0004)
Responsible Investor Share (w/o Big Three) Δ1 - Δ5	0.1401	0.4508***	0.5179***	0.4225***	0.2622
	(0.1118)	(0.1197)	(0.1384)	(0.1504)	(0.1718)
log(Cash Holdings) Δ1 - Δ5	-0.0078	-0.0112	-0.0167*	-0.0094	0.0025
	(0.0067)	(0.0077)	(0.0095)	(0.0113)	(0.0140)
log(Market Capitalization) Δ1 - Δ5	0.0320	0.0229	0.0245	0.0336	0.0628**
	(0.0301)	(0.0266)	(0.0263)	(0.0288)	(0.0311)
Constant	0.0536	0.0921	0.1137	0.1995	0.3868**
	(0.0674)	(0.0965)	(0.1224)	(0.1574)	(0.1759)
Observations	21754	17047	13706	11007	8902
Adjusted R^2	0.0140	0.0285	0.0412	0.0568	0.0780
F-Statistic	4.90***	7.76***	10.19***	11.05***	11.94***

Table XX. Scope 1 Emissions (Δ1 - Δ5) w/o Big Three

H. Robustness check CA100+

This table presents the regression results for the shunning of carbon-intensive companies, showing the relationship between various financial, ESG ratings, and climate factors on the portfolio allocation by Responsible Investors. Here, we use CA100+ Share membership as a proxy for Responsible Investor. The results are robust. The dependent variable is the level of investment in companies by the respective investor group. Independent variables are logarithmic transformations of Scope 1 emissions, Scope 1 intensity, Climate Policy Relevant Sector (that is, the company is in a climate sector), and Top 10% Scope 1 Emissions (that is, the company x year observation is among the highest 10% of absolute emissions). In addition, control variables include financial metrics, namely the book-to-market ratio, dividend yield, historic stock return volatility, return on assets (ROA) (log.), revenue (log.), total debt to equity (log.), stock return, cash holdings (log.), and market capitalization (log.), as well as year and industry fixed effects and regional dummy variables for the European Union and North America. All independent time-varying variables are lagged by 1 period. Standard errors are in parentheses below the coefficients and clustered at the company x year level. The significance levels are indicated as *p<0.1; **p<0.05; ***p<0.01.

	CA100+ Ratio				Institutional Investor Share			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(Scope 1 Emissions)	-0.001***				-0.002***			
	(0.000)				(0.001)			
log(Scope 1 Intensity)		-0.014***				-0.016***		
		(0.002)				(0.005)		
Climate Policy Relevant Sector			0.005***				-0.019***	
			(0.001)				(0.003)	
Top 10% Scope 1 Emissions				-0.009***				0.006
				(0.002)				(0.005)
ESG Rating	0.009***	0.008***	0.006***	0.006***	0.029***	0.028***	0.032***	0.032***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Book to Market Ratio	-0.003	-0.003	-0.002***	-0.002***	-0.046***	-0.046***	-0.010***	-0.010***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.005)	(0.005)	(0.001)	(0.001)
Dividend Yield	-0.003***	-0.003***	-0.003***	-0.003***	-0.009***	-0.009***	-0.008***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
European Union	-0.039***	-0.039***	-0.041***	-0.042***	0.102***	0.102***	0.109***	0.109***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.004)	(0.004)	(0.003)	(0.003)
Historic Volatility	-0.088***	-0.088***	-0.086***	-0.085***	-0.104***	-0.104***	-0.094***	-0.098***
	(0.008)	(0.007)	(0.005)	(0.005)	(0.018)	(0.018)	(0.011)	(0.011)
log(ROA)	-0.006***	-0.006***	-0.003***	-0.004***	0.006***	0.006***	0.010***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
log(Revenue)	0.008***	0.007***	0.002***	0.002***	0.012***	0.009***	0.002*	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
log(Total Debt to Equity)	-0.002***	-0.002***	-0.001***	-0.001***	-0.003***	-0.003***	0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
North America	-0.043***	-0.044***	-0.048***	-0.049***	0.401***	0.401***	0.417***	0.419***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.004)	(0.004)	(0.003)	(0.003)
Stock Return	0.000**	0.000**	0.000	0.000	0.000	0.000	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log(Cash Holdings)	0.005***	0.005***	0.007***	0.007***	-0.004***	-0.004***	-0.002*	-0.002**
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
log(Market Value)	-0.008***	-0.008***	-0.007***	-0.007***	-0.018***	-0.018***	0.009***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Constant	0.033***	0.042***	0.070***	0.068***	0.441***	0.453***	0.244***	0.241***
	(0.009)	(0.009)	(0.007)	(0.007)	(0.021)	(0.021)	(0.013)	(0.014)
Observations	18207	18207	38934	38934	18207	18207	38934	38934
Adjusted R^2	0.301	0.302	0.299	0.299	0.398	0.398	0.443	0.442
F Statistic	570.2***	569.6***	1007.2***	1008.5***	3134.1***	3122.0***	5165.5***	5161.1***

Table XXI. Regression Result for Robustness Check for Shunning of Carbon-Intensive Companies Using CA100+ Investors

This table presents the regression results for the relationship between ESG ratings and the independent variables, showing the effects of changes over one to five years (Δ1 to Δ5). Each column represents a different time horizon. The independent variable of interest is CA100+ Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company x year level.

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
CA100+ Share	0.1489**	0.2790***	0.3311**	0.4157	-0.0000***
	(0.0633)	(0.0981)	(0.1462)	(0.2577)	(0.0000)
Institutional Investor Share	0.0720***	0.1487***	0.2232***	0.3008***	0.3634***
	(0.0135)	(0.0198)	(0.0258)	(0.0329)	(0.0406)
Book to Market Ratio	-0.0033	-0.0045	-0.0068	-0.0130	-0.0624***
	(0.0024)	(0.0032)	(0.0048)	(0.0195)	(0.0209)
European Union	0.0243***	0.0338***	0.0625***	0.0772***	0.0996***
	(0.0069)	(0.0099)	(0.0128)	(0.0163)	(0.0198)
log(ROA)	0.0127***	0.0188***	0.0274***	0.0316***	0.0263*
	(0.0042)	(0.0066)	(0.0085)	(0.0112)	(0.0135)
log(Revenue)	-0.0015	-0.0129**	-0.0223***	-0.0258***	-0.0290**
	(0.0036)	(0.0054)	(0.0071)	(0.0094)	(0.0116)
log(Total Debt to Equity)	0.0020**	0.0052***	0.0069***	0.0090***	0.0102***
	(0.0010)	(0.0015)	(0.0019)	(0.0025)	(0.0033)
North America	-0.0074	-0.0352***	-0.0456***	-0.0617***	-0.0784***
	(0.0087)	(0.0127)	(0.0162)	(0.0204)	(0.0250)
Stock Return	-0.0002	0.0000	-0.0005**	-0.0005*	-0.0004
	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0004)
log(Cash Holdings)	0.0016	0.0075**	0.0079*	0.0055	0.0081
	(0.0024)	(0.0036)	(0.0047)	(0.0061)	(0.0076)
log(Market Value)	0.0018	0.0048	0.0134*	0.0183*	0.0134
	(0.0036)	(0.0055)	(0.0072)	(0.0097)	(0.0119)
Book to Market Ratio Δ1 - Δ5	0.0018	0.0105	0.0247	0.0243	0.0007
	(0.0125)	(0.0086)	(0.0161)	(0.0194)	(0.0211)
CA100+ Share Δ1 - Δ5	-0.0638	0.0081	-0.0569	-0.0774	-0.0272
	(0.1055)	(0.1054)	(0.1159)	(0.1277)	(0.1433)
Institutional Share Δ1 - Δ5	0.0465	0.1480***	0.2296***	0.3320***	0.3285***
	(0.0424)	(0.0487)	(0.0554)	(0.0654)	(0.0750)
log(ROA) Δ1 - Δ5	0.0040	0.0140**	0.0319***	0.0210**	0.0075
	(0.0044)	(0.0059)	(0.0074)	(0.0090)	(0.0112)
log(Revenue) Δ1 - Δ5	0.0124	-0.0264	-0.0390*	-0.0440**	-0.0134
	(0.0159)	(0.0178)	(0.0200)	(0.0219)	(0.0237)
log(Total Debt to Equity) Δ1 - Δ5	0.0007	0.0038*	0.0029	0.0036	0.0033
	(0.0018)	(0.0021)	(0.0025)	(0.0031)	(0.0038)
Stock Return Δ1 - Δ5	-0.0001	-0.0001	-0.0003**	-0.0005**	-0.0004
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0003)
log(Cash Holdings) Δ1 - Δ5	0.0033	0.0035	0.0029	-0.0011	0.0064
	(0.0040)	(0.0049)	(0.0058)	(0.0072)	(0.0086)
log(Market Value) Δ1 - Δ5	0.0220	0.0284**	0.0534***	0.0906***	0.0805***
	(0.0161)	(0.0140)	(0.0157)	(0.0176)	(0.0194)
Constant	-0.0683*	0.0430	0.1995**	0.2390**	0.3136***
	(0.0410)	(0.0629)	(0.0777)	(0.0947)	(0.1136)
Observations	29780	23934	19210	15110	11997
Adjusted R^2	0.0093	0.0144	0.0249	0.0300	0.0361
F-Statistic	7.55***	8.38***	12.41***	12.77***	13.54***

Table XXII. ESG Rating (Δ1 - Δ5)

This table presents the regression results for the relationship between Scope 1 emissions (absolute) and the independent variables, showing the effects of changes over one to five years (Δ1 to Δ5). Each column represents a different time horizon. The independent variable of interest is CA100+ Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company x year level.

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
CA100+ Share	-0.1099	-0.1843	0.0497	0.2527	0.2994
	(0.0911)	(0.1404)	(0.1911)	(0.2563)	(0.3425)
Institutional Investor Share	-0.0140	-0.0423	-0.0935**	-0.1237***	-0.1472***
	(0.0207)	(0.0295)	(0.0397)	(0.0468)	(0.0553)
Book to Market Ratio	-0.0035	-0.0076	-0.0228	-0.0083	-0.0171
	(0.0135)	(0.0179)	(0.0245)	(0.0329)	(0.0409)
European Union	-0.0356***	-0.0787***	-0.1042***	-0.1300***	-0.1526***
	(0.0099)	(0.0147)	(0.0192)	(0.0237)	(0.0280)
log(ROA)	-0.0089	-0.0137	-0.0103	-0.0107	-0.0028
	(0.0070)	(0.0112)	(0.0142)	(0.0181)	(0.0218)
log(Revenue)	-0.0042	-0.0005	0.0026	-0.0019	-0.0191
	(0.0065)	(0.0095)	(0.0124)	(0.0159)	(0.0182)
log(Total Debt to Equity)	0.0023	0.0027	0.0032	0.0059	0.0097
	(0.0020)	(0.0027)	(0.0036)	(0.0045)	(0.0060)
North America	-0.0268*	-0.0630***	-0.0725***	-0.0716**	-0.0973***
	(0.0140)	(0.0192)	(0.0254)	(0.0293)	(0.0347)
Stock Return	-0.0002	-0.0001	-0.0002	0.0006	-0.0001
	(0.0002)	(0.0003)	(0.0004)	(0.0005)	(0.0005)
log(Cash Holdings)	-0.0033	-0.0029	-0.0047	-0.0031	0.0137
	(0.0040)	(0.0059)	(0.0077)	(0.0092)	(0.0116)
log(Market Value)	0.0059	-0.0007	-0.0054	-0.0083	-0.0140
	(0.0061)	(0.0092)	(0.0121)	(0.0149)	(0.0170)
Book to Market Ratio Δ1 - Δ5	-0.0101	0.0146	0.0557*	0.1020**	0.0944*
	(0.0283)	(0.0280)	(0.0315)	(0.0443)	(0.0517)
CA100+ Share Δ1 - Δ5	-0.0622	-0.1139	-0.1208	-0.0985	-0.1048
	(0.1740)	(0.1815)	(0.2063)	(0.2274)	(0.2530)
Institutional Share Δ1 - Δ5	0.0602	-0.0286	-0.0978	-0.1178	-0.1464
	(0.0631)	(0.0759)	(0.0849)	(0.0876)	(0.0941)
log(ROA) Δ1 - Δ5	-0.0083	-0.0280***	-0.0211*	-0.0337**	-0.0539***
	(0.0066)	(0.0100)	(0.0113)	(0.0142)	(0.0166)
log(Revenue) Δ1 - Δ5	0.3115***	0.3977***	0.4989***	0.5681***	0.6431***
	(0.0393)	(0.0413)	(0.0406)	(0.0463)	(0.0544)
log(Total Debt to Equity) Δ1 - Δ5	0.0092**	0.0064	0.0083*	0.0074	0.0047
	(0.0043)	(0.0044)	(0.0049)	(0.0055)	(0.0067)
Stock Return Δ1 - Δ5	-0.0004**	-0.0005*	-0.0006**	-0.0002	-0.0004
	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0004)
log(Cash Holdings) Δ1 - Δ5	-0.0078	-0.0108	-0.0163*	-0.0094	0.0027
	(0.0067)	(0.0077)	(0.0095)	(0.0113)	(0.0140)
log(Market Value) Δ1 - Δ5	0.0291	0.0211	0.0226	0.0309	0.0619**
	(0.0299)	(0.0266)	(0.0263)	(0.0289)	(0.0312)
Constant	0.0487	0.0925	0.1309	0.2223	0.3961**
	(0.0673)	(0.0967)	(0.1223)	(0.1560)	(0.1747)
Observations	21754	17047	13706	11007	8902
Adjusted R^2	0.0139	0.0279	0.0403	0.0563	0.0779
F-Statistic	4.93***	7.68***	9.90***	10.93***	11.96***

Table XXIII. Scope 1 Emissions (Δ1 - Δ5)

This table presents the regression results for the relationship between Scope 1 emission intensities and the independent variables, showing the effects of changes over one to five years (Δ1 to Δ5). Each column represents a different time horizon. The independent variable of interest is CA100+ Share. Additional independent variables are Institutional Investor Share, financial metrics (Book-to-Market Ratio, Return on Assets (ROA), Revenue, Total Debt, Cash Holdings, Market Capitalization), and geographical indicators (European Union, North America). The coefficients and standard errors (in parentheses) are presented for each variable. The significance levels are marked as *p<0.1; **p<0.05; ***p<0.01, with robust standard errors clustered at the company x year level.

	Δ 1 Year	Δ 2 Year	Δ 3 Year	Δ 4 Year	Δ 5 Year
	(1)	(2)	(3)	(4)	(5)
CA100+ Share	0.0202	0.0206	0.0693***	0.1220***	0.1416***
	(0.0141)	(0.0231)	(0.0255)	(0.0336)	(0.0441)
Institutional Investor Share	0.0026	0.0042	0.0040	-0.0051	-0.0086
	(0.0035)	(0.0055)	(0.0066)	(0.0081)	(0.0100)
Book to Market Ratio	-0.0042***	-0.0084***	-0.0184***	-0.0208***	-0.0287***
	(0.0016)	(0.0028)	(0.0039)	(0.0055)	(0.0076)
European Union	-0.0022	-0.0065***	-0.0137***	-0.0186***	-0.0266***
	(0.0016)	(0.0023)	(0.0029)	(0.0036)	(0.0045)
log(ROA)	-0.0035***	-0.0005	-0.0044*	-0.0011	-0.0021
	(0.0013)	(0.0021)	(0.0026)	(0.0029)	(0.0041)
log(Revenue)	-0.0008	0.0014	0.0008	0.0006	-0.0051
	(0.0012)	(0.0018)	(0.0025)	(0.0032)	(0.0040)
log(Total Debt to Equity)	-0.0002	-0.0003	-0.0006	0.0001	0.0004
	(0.0002)	(0.0004)	(0.0004)	(0.0006)	(0.0007)
North America	-0.0025	-0.0078**	-0.0179***	-0.0218***	-0.0330***
	(0.0023)	(0.0037)	(0.0042)	(0.0052)	(0.0065)
Stock Return	-0.0001*	-0.0001	-0.0001*	-0.0000	-0.0001
	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
log(Cash Holdings)	-0.0006	-0.0017*	-0.0024*	-0.0013	0.0010
	(0.0007)	(0.0010)	(0.0013)	(0.0016)	(0.0022)
log(Market Value)	0.0018*	-0.0001	0.0015	0.0000	0.0025
	(0.0011)	(0.0015)	(0.0022)	(0.0027)	(0.0035)
Book to Market Ratio Δ1 - Δ5	0.0038	0.0077	0.0168***	0.0172***	0.0208**
	(0.0039)	(0.0051)	(0.0049)	(0.0064)	(0.0085)
CA100+ Share Δ1 - Δ5	0.0305	0.0265	-0.0314	-0.0306	-0.0417
	(0.0277)	(0.0303)	(0.0276)	(0.0297)	(0.0313)
Institutional Share Δ1 - Δ5	-0.0014	-0.0314**	-0.0400***	-0.0485***	-0.0499***
	(0.0091)	(0.0133)	(0.0141)	(0.0152)	(0.0168)
log(ROA) Δ1 - Δ5	-0.0048***	-0.0036*	-0.0053***	-0.0054**	-0.0063**
	(0.0013)	(0.0019)	(0.0020)	(0.0024)	(0.0027)
log(Revenue) Δ1 - Δ5	-0.1115***	-0.1167***	-0.0881***	-0.0869***	-0.0853***
	(0.0173)	(0.0231)	(0.0135)	(0.0146)	(0.0161)
log(Total Debt to Equity) Δ1 - Δ5	-0.0001	0.0007	0.0006	0.0015*	0.0017*
	(0.0006)	(0.0005)	(0.0006)	(0.0008)	(0.0009)
Stock Return Δ1 - Δ5	-0.0001**	-0.0001***	-0.0002**	-0.0001	-0.0001
	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
log(Cash Holdings) Δ1 - Δ5	-0.0010	-0.0038**	-0.0041**	-0.0006	0.0010
	(0.0013)	(0.0015)	(0.0018)	(0.0020)	(0.0028)
log(Market Value) Δ1 - Δ5	0.0112*	0.0144**	0.0177***	0.0166***	0.0235***
	(0.0063)	(0.0059)	(0.0053)	(0.0054)	(0.0064)
Constant	0.0071	0.0051	0.0257	0.0343	0.0978***
	(0.0110)	(0.0202)	(0.0252)	(0.0320)	(0.0378)
Observations	21754	17047	13706	11007	8902
Adjusted R^2	0.0570	0.0824	0.0750	0.0824	0.0853
F-Statistic	12.61***	14.13***	13.60***	13.11***	11.42***

Table XXIV. Scope 1 Intensity (Δ1 - Δ5)

B. Variable List

Table XXV. Variable Definitions

Variable	Definition
ISIN	Company Identifier
(Investor) PermID	Investor Identifier
Log Scope 1 Emissions	Natural logarithm of Scope 1 Emissions
Log Scope 1 Intensity	Natural logarithm of Scope 1 Emissions divided by revenue
Climate Policy Relevant Sector	Dummy variable indicating a company operating in a climate-relevant sector according to Battiston et al. (2017)
Top 10% Scope 1 Emissions	Dummy variable indicating the highest 10% Scope 1 Emissions
ESG Rating	MSCI IVA industry adjusted ESG rating
SBTI Commitment	Dummy variable indicating a company committed to the Science Based Target Initiative
Emission Reduction Policy	Dummy variable indicating a company having an internal carbon emission reduction policy
Responsible Investor Share	Total share of company's market value held by UN PRI Investors
Institutional Investor Share	Total share of company's market value held by institutional investors
Responsible Investor Ratio	Responsible Investor Share divided by Institutional Investor Share
CA100+ Share	Total share of company's market value held by CA100+ investors
CA100+ Ratio	CA100+ Share divided by Institutional Investor Share
log(Market Value)	Natural logarithm of market value
Book-to-Market Ratio	Book valuation divided by market valuation
Dividend Yield	Dividend per share as a percentage of the share price

Continued on next page

Table XXV – continued from previous page

Variable	Definition
Historic Volatility	Historic stock return volatility
Stock Return	Yearly stock return measures as the percentage change from total return share price in t-1 to t
log(Cash Holdings)	Natural logarithm of cash holdings
log(Revenue)	Natural logarithm of revenue
log(ROA)	Natural logarithm of return on assets
log(Total Debt to Equity)	Natural logarithm of leverage ratio defined as total debt to common equity
European Union	Dummy variable indicating a company headquartered in an European country
North America	Dummy variable indicating a company headquartered in either the USA or Canada
Rest of the World	Dummy variable indicating company headquarter outside Europe and North America
TRBC (sector)	Company's sector classification according to TRBC level 2
Year	Dummy for the respective reporting year