Doing Better by Doing Good: ESG Information and Retail Investor Behavior

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Abstract

I investigate how the access to ESG information affects retail investor behavior by analyzing trading activity, portfolio holdings, and investment performance. Following the introduction of ESG information on the trading platform, investors increase their value-weighted ESG portfolio scores, they trade and purchase more high ESG score stocks and sell less high ESG stocks. They also improve stock selection by favoring companies with better fundamentals and stocks with higher returns and lower volatility. Portfolio tilting leads to better diversification, as investors hold more distinct equities and allocate capital across a broader range of countries and industries. On the performance side, increases in ESG and higher ESG scores are associated with higher returns, whereas the latter also relates to lower return volatility and higher Sharpe ratios. Finally, these adjustments are primarily driven by older investors, women, and individuals residing in areas with strong green policy support.

Keywords: Retail investor, personal finance, sustainable finance, behavioral finance, ESG investing, investor behaviour, ESG ratings, portfolio choice, investment performance

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1 Introduction

Sustainable investing, which integrates environmental, social, and governance (ESG) considerations into portfolio decisions alongside traditional financial metrics, has grown rapidly in recent years and become a major trend in global capital markets Avramov, Cheng, Lioui, and Tarelli (2022). According to the Global Sustainable Investment Alliance (2022), corporate engagement and shareholder action represent the most prevalent sustainable investment strategies globally, followed by ESG integration and exclusionary screening Alliance (2022).

Whereas engagement typically requires large equity stakes to influence management decisions, integration and screening can be adopted by investors of any size, allowing them to align portfolios with ethical and sustainability preferences. Both approaches depend on the availability and transparency of ESG-related information, which has fueled the growing emphasis on corporate ESG disclosure.

Recent surveys confirm this trend. A global survey by KPMG McCalla-Leacy, Shulman, and Threlfall (October 2022) reports that an increasing number of firms now disclose non-financial information, with reporting rates expected to rise further. Similarly, Escrig-Olmedo, Fernández-Izquierdo, Ferrero-Ferrero, Rivera-Lirio, and Muñoz-Torres (2019) argue that ESG disclosure has become an integral part of firms' competitive strategy. In parallel, specialized rating agencies have emerged, applying proprietary methodologies to assess firms' environmental, social, and governance performance. As a result, ESG ratings have become a central benchmark for companies, investors, and researchers in evaluating corporate sustainability.

Institutional investors have been the main focus of ESG-related research, showing that they value non-financial information and incorporate it into their investment strategies (e.g. Gibson, Krueger, and Mitali (2020); Riedl and Smeets (2017); Amel-Zadeh and Serafeim (2018)). However, their investment decisions are often shaped by regulatory mandates, reporting requirements, and client preferences, making it difficult to disen-

tangle personal views on sustainability. By contrast, retail investors manage their own capital and reveal preferences directly through their investment choices. Their reactions to ESG information therefore provide a clearer picture of how individuals interpret and apply sustainability considerations. Yet despite this relevance, there is relatively little empirical evidence on how the disclosure of portfolio-level ESG scores influences retail investor behavior.

This paper examines how retail investors respond to the disclosure of portfolio-level ESG information, focusing on trading behavior, portfolio composition, and investment strategies. It makes three contributions to the literature on access to ESG information and retail investor behavior. First, I extend the evidence on the consequences of ESG transparency by focusing on individual investors, whereas prior research has largely examined professional investors such as mutual funds and ETFs. Second, I exploit the introduction of ESG information on the trading platform of a large retail bank as an exogenous shock to retail investors, which provides clean identification of how additional information shapes investment choices in a clear before-and-after setting. Third, I add to the broader literature on financial disclosure by showing that ESG transparency not only affects institutional capital allocation but also directly shapes household portfolios. The findings demonstrate that access to ESG information directly affects the investment choices of retail investors, highlighting the importance of information provision in shaping household portfolios.

The remainder of the paper is organized as follows. Section 2 reviews the related literature. Section 3 describes the ESG tool introduced on the trading platform. Section 4 outlines the data sources and the empirical methodology. Section 5 presents the results on investor behavior in response to the information. Section 6 concludes.

2 Literature Review

Numerous studies have investigated investor behavior and preferences, particularly concerning non-financial information disclosure and ESG investing.

The theoretical literature on sustainable investing analyze the interplay between investor behavior, corporate strategy, and non-financial information disclosure. These studies investigate how ESG and CSR disclosures influence market dynamics, investment decisions, and corporate behavior.

Cartellier, Tankov, and Zerbib (2023) analyze the influence of investors‘ sustainability preferences and transparency on corporate greenwashing. The researchers demonstrates how investors with pro-environmental preferences who penalize firms for past environmental controversies impact corporate greenwashing. They find that sometimes companies engage in greenwashing to increase their environmental scores especially when the strength of investors' pro-environmental preferences is strong. Their findings suggest that strategies that penalize greenwashing, policies that enhance transparency, and technological innovations in the environmental sector help mitigate corporate greenwashing practices.

Avramov et al. (2022) analyze how uncertainty about corporate ESG profiles effects asset pricing and portfolio performance. The researchers find that under ESG uncertainty, in equilibrium, market premiums increase and demand for stocks decreases. At the same time CAPM alpha and effective beta rise with increased ESG uncertainty, and the negative relation between ESG and alpha weakens. They test the model predictions using the standard deviation of ESG ratings to proxy for ESG uncertainty. Their findings suggests that ESG uncertainty influences the risk-return trade-off, social impact, and economic welfare.

Guiral, Moon, Tan, and Yu (2020) investigates how corporate social responsibility (CSR) performance influences investors' assessments of a stock's fundamental value, focusing on the role of the affect-as-information heuristic. The study examines two key

conditions: the relevance of CSR activities to a firm's core business (material vs. immaterial CSR issues) and the nature of the CSR performance (positive vs. negative). Using experimental methods, the research reveals that the heuristic is applied only to immaterial and positive CSR issues. Conversely, investors adopt a more deliberate and systematic approach when evaluating material or negative CSR issues. The study suggests that investors' fundamental value estimates are not influenced by the presence of an explicit assessment when CSR performance is material, regardless of its positive or negative nature. However, for immaterial CSR issues, fundamental value estimates are higher when positive CSR performance lacks explicit assessment. This research highlights the conditional influence of CSR on investment decisions and underscores the nuanced ways in which CSR information is processed by investors.

In their theory building study Paetzold and Busch (2014) highlight that private investors, although generally highly interested in sustainable investing, refrain from it. They identify persistent barriers that prevent actual engagement in sustainable investing. They document that investors perceive sustainable investment to carry high volatility in combination with short investment time horizon and recent financial losses. They also find that financial advisors keep important information from their clients. Finally, they propose a decision-making framework to enhance the understanding of the engagement of private investors in sustainable investing.

The empirical literature documents various motivations for using ESG information in investment decisions. Some investors seek to align their personal ethical values with their investments and support companies they deem sustainable. These investors derive non-pecuniary utility, such as moral satisfaction, from making a positive environmental and social impact. Others believe that including ESG factors offers opportunities for superior risk-return trade-offs. Additionally, some investors use ESG ratings as a risk mitigation tool, while others employ them as a hedging device for their existing portfolios.

In a portfolio-level study Gibson Brandon, Glossner, Krueger, Matos, and Steffen (2022) analyze environmental, social, and governance (ESG) scores from institutional

investors that sign the Principles for Responsible Investment (PRI). They find that on average, institutional investors who sign the PRI show superior portfolio ESG scores and additionally improve their scores after joining the PRI. Further, regarding cross-country differences, only PRI signatories not located in the USA show superior portfolio ESG scores than nonsignatory investors whereas US signatories do not improve the ESG scores of portfolio companies after investing in them.

Riedl and Smeets (2017) on the other hand find support for non-financial preferences driving investment. The researchers provide both experimental and survey evidence indicating that investors who display more social behavior in trust game experiments and donate more to charity also tend to invest in more socially responsible equity funds. This behavior aligns with pro-social preferences driving ESG investments. Their survey evidence further reveals that these investors choose ESG funds despite expecting them to underperform, demonstrating a willingness to sacrifice returns to align their investments with their social preferences.

Evidence for hedging motives is provided by Krueger, Sautner, and Starks (2020). The researchers identify one of the primary motivations for sustainable investing as hedging against climate change-related long-term risks, a factor that has been widely recognized, especially by large and sophisticated institutional investors.

Amel-Zadeh and Serafeim (2018) also conducted a survey among investment firms to explore the motivations behind the use of ESG data. They found that the primary motivation for utilizing reported environmental, social, and governance (ESG) information is its relevance to investment performance. This is followed by client demand, product strategy, and ethical considerations. A significant barrier to the adoption of ESG information is the absence of standardized reporting. Among the various ESG investment strategies, negative screening is viewed as the least beneficial to investment outcomes, influenced primarily by product strategy and ethical motives. Conversely, full integration and engagement strategies are considered more advantageous and are primarily driven by their relevance to investment performance.

Evidence for non-financial utility drawn from sustainable investing is provided by Baker, Egan, and Sarkar (2022). The researchers find that shareholders pay higher fees for ESG-oriented index funds in exchange for their financial and non-financial benefits. This premium increased from 2019 to 2022, underscoring a growing appreciation for ESG's financial and non-financial benefits. The study also suggests that the majority of these benefits accrue to investors and firms, with intermediaries capturing a small fraction of the fees.

The effects of non-financial disclosure on the market are studied by Grewal, Riedl, and Serafeim (2019). The researchers investigate the market response to an EU directive for increased non-financial disclosure, particularly related to ESG performance. Their findings indicate an average negative market reaction of -0.79% across firms, with less severe impacts on firms that had stronger ESG performance and disclosure before the directive. The most negative reactions were noted in firms with weak pre-regulation ESG performance, showing a significant average return decline of -1.54%, whereas firms with strong pre-regulation disclosure saw gains of 0.52%.

Hartzmark and Sussman (2019) find causal evidence that investors value sustainability and the market views sustainability as a positive. They find evidence of positive affect influencing expectations of sustainable fund performance and nonpecuniary motives influencing investment decisions. Using a shock to the salience of the sustainability of the U.S. mutual fund market they show that investors care about sustainability and view it as indicator for positive future performance.

Ceccarelli, Ramelli, and Wagner (2023) show that investors care about their exposure to carbon risk. They find that after the release of Morningstar's novel carbon risk metrics, "low carbon" labeled mutual funds experienced a significant increase in investor demand. Further, fund managers actively reduced investment in firms with high carbon risk scores. Their findings show how climate-related information can channel capital flows in a low carbon direction and attract ESG investments.

3 ESG Tool and Information

This paper investigates the real trading effects of ESG information disclosure, focusing on the introduction of individual value-weighted portfolio ESG scores and detailed company-level ESG information on an online trading platform. I exploit a quasi-experimental setting in which, from the disclosure date onward, investors are provided with their personal value-weighted ESG portfolio score, which is calculated based on the subset of shares in their portfolio for which ESG ratings are available. In addition to the combined ESG score [1], investors are shown separate value-weighted portfolio scores for the environmental (E), social (S), and governance (G) pillars. Furthermore, they are informed of how many of their total holdings are covered by ESG data, i.e., the number of shares for which ESG scores are available out of the full set of portfolio positions. Figure 1 presents a stylized example of the ESG portfolio score interface. It includes a color-coded scale ranging from 0 to 100 (red to green), showing the overall portfolio ESG score as well as the individual E, S, and G pillar scores. In this example, only 35 out of 50 holdings have ESG data, which is also clearly indicated.



Figure 1: Stylized Example Value-weighted ESG Portfolio Scores

[1] The combined ESG portfolio score combines both self-disclosed and third party information covering the companies ESG impact and risks.

In addition to the aggregate ESG portfolio score, investors can also view company-level ESG information for each stock held in their account. Figure 2 provides a stylized illustration of an investor's portfolio, where individual ESG, E, S, and G scores are displayed alongside basic holding details for Companies A, B, and C.

Company	Quantity	Price	ESG Score	E Score	S Score	G Score
Company A	1	100	90	76	92	95
Company B	3	75	86	91	89	69
Company C	2	50	80	78	82	71

Figure 2: Stylized Example Company-level ESG Scores

Further, they can view a range of non-financial inclusion and exclusion criteria for each company. Although these screening criteria are typically designed with a specific screening purpose in mind, investors can use them flexibly for both inclusion and exclusion, and are not required to adhere strictly to the intended purpose. The investors can actively include or exclude companies with emission reduction targets, green innovation, resource optimization, business ethics, employees well-being, gender equality, human rights, product responsibility, ethical leadership, shareholders rights, sustainable strategy in their search request or exclude companies involved in agrochemicals, alcohol, animal testing, coal, gambling, GMO, nuclear, oil & gas, tobacco or weapons from it. Figure 3 shows a stylized example of the company-level ESG information including the screening values. Again they can see this information for any company in their portfolio if applicable.

Company	Qty	Price	ESG Score	E Score	S Score	G Score	Positive Screening	Negative Screening
Company A	1	100	90	76	92	95	▲ ● ■	▲
Company B	3	75	86	91	89	69	● ■	●
Company C	2	50	80	78	82	71	▲	▲ ● ■

Positive Screening

- •Emissions Reduction
- •Green Innovation
- •Resource Optimization
- •Business Ethics
- •Employees Well-being
- •Gender Equality
- •Human Rights
- •Product Responsibility
- •Ethical Leadership
- •Shareholders Rights
- •Sustainable Strategy

Negative Screening

- •Agrochemicals
- •Alcohol
- •Animal Testing
- •Coal
- •Gambling
- •GMO
- •Nuclear
- •Oil & Gas
- •Tobacco
- •Weapons

Figure 3: Stylized Example Company-level ESG Scores and Screening Values

4 Data and Research Design

4.1 Data

The data set includes daily transaction data and monthly portfolio holdings of investors covering a period of 12 months before and 12 months after the disclosure of the ESG score. The ESG scores are updated annually, with adjustments made to reflect newly available corporate information. However, as the data provider does not retain historical versions of the scores, the exact values at the time of disclosure cannot be fully replicated. However, ESG ratings tend to be relatively stable over time and rarely exhibit substantial changes. To minimize the risk of measurement error, I focus primarily on the 12-month period following the introduction of the ESG information, while also examining a shorter window of six months before and after the disclosure for robustness checks.

I exclude from the analyzes investors who hold only a single share type in their portfolio, as well as investors with zero trading activity in any asset class from one month before the event date through five months afterward. Investors opening their account 6 months after disclosure and closing it before disclosure are also not considered. This

way I focus on actively trading investors and investors that traded before and after the disclosure and therefore are likely to be affected by it.

4.2 Summary Statistics on Investors

Table 1 provides an overview of the investor sample and its demographic composition over the observation period. Panel A reports the quarterly number of investor–portfolio observations between 2022 and 2023. The number of quarterly records rises steadily from 150,482 in the first quarter of 2022 to 170,157 in the second quarter of 2023, reflecting the continuous expansion of active investor accounts. Panel B shows that the number of unique investors increases from 55,895 in 2022 to 59,309 in 2023, suggesting both sustained participation and moderate investor inflows over time. Panels C through H summarize cross-sectional investor characteristics. The majority of investors are located in the German-speaking region of Switzerland (68%), followed by the French-speaking (14%) and Italian-speaking (1%) regions, with only a small share from the Romansh area. Most investors reside in urban areas (58%), while roughly one quarter live in intermediate or rural regions (16% and 9%, respectively). The geographic distribution across the seven Swiss major regions mirrors the national population structure, with Zürich representing the largest share (25%), followed by Nordwestschweiz (12%), Espace Mittelland (11%), and Région lémanique (12%). Panel F documents the gender composition, indicating that approximately 72% of investors are male and 12% are female, which is broadly consistent with gender imbalances typically observed in retail trading data. Panel H shows the age distribution: the largest groups are between 35–44 years (20%) and 25–34 years (17%), followed by 45–54 years (17%) and 55–64 years (15%). About 12% of investors are aged 65 or above, while investors under 25 account for less than 4%.

Taken together, Table 1 depicts a stable and demographically diverse investor base that expands modestly over the sample period. The composition is dominated by urban, German-speaking, and middle-aged male investors, consistent with the demographic structure of the Swiss retail investment market.

Table 1: Summary Statistics on Investors

This table summarizes the composition and demographic characteristics of investors in the sample. Panel A reports quarterly and annual observation counts from 2022–2023, and Panel B shows the number of unique investors per year. Panels C–H describe language region, urbanization level, gender, Swiss major regions, and age groups.

Panel A: Quarterly observations

Year	quarter	# obs
2022	1	150482
2022	2	156438
2022	3	160274
2022	4	164031
2023	1	166984
2023	2	170157
2023	3	170587
2023	4	169167
		1308120

Panel D: Yearly observations

Year	# obs
2022	631225
2023	676895
	1308120

Panel B: Unique investors

Year	# investors
2022	55895
2023	59309

Panel C: Language area

N = 50152	freq	pct
German	41076	68,26
French	8278	13,76
Italian	737	1,22
Romanish	61	0,1

Panel E: Urbanisation (City / Country)

N = 50152	freq	pct
Urban	34894	57,98
Intermediate	9851	16,37
Rural	5407	8,98

Panel F: Gender (binary)

N = 50650	freq	pct
Female	7269	12,08
Male	43381	72,09

Panel G: Swiss major regions

Swiss Regions	freq	pct
Région lémanique	7005	11,64
Espace Mittelland	6873	11,42
Nordwestschweiz	7429	12,34
Zürich	15279	25,39
Ostschweiz	5872	9,76
Zentralschweiz	6987	11,61
Ticino	707	1,17

Panel H: Age groups

N = 50650	freq	pct
< 18	2	0
18-24	2067	3,43
25-34	9960	16,55
35-44	11967	19,89
45-54	10432	17,33
55-64	8972	14,91
≥ 65	7250	12,05

4.3 Summary Statistics on Portfolios

Table 2 provides descriptive statistics of portfolio holdings throughout the sample period, covering both the pre- and post-introduction phases of the ESG information tool. Table 3 reports portfolio characteristics during the 12 months preceding the introduction of the tool, while Table 4 summarizes the corresponding period following its implementation.

The introduction of the ESG information tool is associated with modest but systematic improvements in portfolio diversification and firm fundamentals. After the implementation, investors hold slightly more diversified portfolios. The mean number of distinct equity positions increases from 10.00 to 10.75, and the total number of instruments rises from 13.12 to 13.60. Diversification across economic dimensions also broadens, with the average number of industries represented increasing from 4.22 to 4.42 and the number of countries from 3.24 to 3.33. Compositionally, investors hold marginally more equities (10.60 to 11.05) and investment fund shares (1.46 to 1.55), while exposure to structured products declines (0.92 to 0.80), consistent with a reallocation toward simpler and more diversified asset classes.

Firm-level fundamentals display similar improvements. Average profitability (ROA) increases from 0.05 to 0.07, and leverage declines slightly from 0.24 to 0.23, indicating a tilt toward financially stronger and more stable firms. Firm size also rises modestly (from 16.81 to 16.98), while Tobin's Q decreases from 2.56 to 2.25, suggesting a shift away from highly valued growth firms toward larger, mature companies with stronger balance sheets. Moreover, the reduction in the cross-sectional dispersion of Tobin's Q, ROA, and firm size points to more homogeneous portfolios concentrated in firms with robust fundamentals.

ESG-related characteristics exhibit comparable positive trends. The overall ESG score increases from 66.46 to 67.12, and each of the E-, S-, and G-Pillar scores shows a small improvement. The ESGC composite score rises from 54.80 to 55.10, while the controversy score that is not directly displayed in the tool remains largely unchanged. This implies that investors did not increase exposure to firms with higher controversy risk.

Taken together, the findings in Tables 3 and 4 indicates that portfolios became slightly more diversified and tilted toward firms with stronger financial and sustainability profiles following the introduction of the ESG information tool. These results cannot be explained by changed in exposure to controversy risk but rather suggest that the new information made available through the tool itself influenced investors' portfolio adjustments toward higher-quality assets.

Table 2: Overall Portfolio Summary Statistics

This table displays the summary statistics of the end-of-month portfolio holdings across the full sample period i.e. both the pre- and post-introduction phases of the ESG information tool. Variables include portfolio composition (number of equities, bonds, structured products, investment shares, and total instruments), diversification measures (number of industries, countries, and unique holdings), firm fundamentals (market value, Tobin's Q, leverage, ROA, and size), and ESG-related scores (E-, S-, and G-Pillar scores, Controversy, ESGC, and overall ESG scores). All values are aggregated at the investor–month level.

	count	mean	sd	min	p1	p5	p25	p50	p75	p95	p99	max
nShares	1308120	10.85	14.30	1.00	1.00	2.00	4.00	7.00	13.00	32.00	61.00	858.00
nBonds	1308120	0.18	1.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	82.00
nStructuredProducts	1308120	0.85	4.48	0.00	0.00	0.00	0.00	0.00	0.00	4.00	13.00	381.00
nInvestmentShares	1308120	1.51	3.31	0.00	0.00	0.00	0.00	0.00	2.00	7.00	15.00	108.00
nMetals	1308120	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00
nTotalInstruments	1308120	13.39	16.83	1.00	1.00	2.00	5.00	9.00	16.00	38.00	74.00	1,010.00
nIndustries	1297079	4.33	2.17	1.00	1.00	1.00	3.00	4.00	6.00	8.00	10.00	12.00
nCountries	1297079	3.29	2.48	1.00	1.00	1.00	2.00	3.00	4.00	8.00	12.00	47.00
nUniqueShares	1297079	10.42	13.67	1.00	1.00	2.00	4.00	7.00	12.00	31.00	59.00	826.00
MV in million	1291351	192.21	326.76	0.00	0.11	1.48	20.27	65.38	197.78	865.13	1,648.29	2,618.60
Tobin‘s Q	1291351	2.39	2.14	0.00	0.27	0.50	1.19	1.93	2.95	5.71	9.57	64.86
Leverage	1291351	0.24	0.14	0.00	0.01	0.06	0.16	0.23	0.29	0.42	0.67	4.63
ROA	1291351	0.06	0.20	-5.03	-0.60	-0.18	0.03	0.09	0.14	0.22	0.31	0.47
Size	1291351	16.90	1.95	3.71	10.59	13.28	15.93	17.24	18.23	19.42	20.41	22.23
G Pillar	1280549	66.95	15.37	0.53	20.34	36.68	59.10	69.22	77.48	88.54	92.54	99.03
E Pillar	1280549	62.65	19.32	0.00	0.08	21.57	53.94	66.68	75.49	87.40	94.78	98.64
S Pillar	1280549	68.56	15.58	0.48	19.21	37.90	60.35	71.80	79.89	88.06	92.88	98.18
Controv Score	1280549	65.53	26.72	0.50	3.58	13.01	47.81	69.65	87.40	100.00	100.00	100.00
ESGC Score	1280549	54.97	13.19	1.01	17.63	32.39	46.86	56.05	63.95	74.89	82.84	94.11
ESG Score	1280549	66.83	15.28	1.01	18.25	35.67	59.43	69.84	77.69	86.06	90.28	95.58
Rolling 3M return	1308120	2.09	9.88	0.00	0.00	0.00	0.00	0.33	1.67	7.33	27.33	960.67
Rolling 6M return	1308120	2.12	9.39	0.00	0.00	0.00	0.17	0.50	1.50	7.33	26.83	809.00
Rolling 12M return	1308120	2.18	8.96	0.00	0.00	0.00	0.25	0.67	1.58	7.50	26.58	674.42

Table 3: Portfolio Summary Statistics Before Event

This table displays the summary statistics of the end-of-month portfolio holdings across the pre sample period i.e. before the introduction phases of the ESG information tool. Variables include portfolio composition (number of equities, bonds, structured products, investment shares, and total instruments), diversification measures (number of industries, countries, and unique holdings), firm fundamentals (market value, Tobin's Q, leverage, ROA, and size), and ESG-related scores (E-, S-, and G-Pillar scores, Controversy, ESGC, and overall ESG scores). All values are aggregated at the investor–month level.

	count	mean	sd	min	p1	p5	p25	p50	p75	p95	p99	max
nShares	576432	10.60	14.13	1.00	1.00	2.00	4.00	7.00	13.00	31.00	61.00	754.00
nBonds	576432	0.15	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	82.00
nStructuredProducts	576432	0.92	4.49	0.00	0.00	0.00	0.00	0.00	1.00	4.00	14.00	297.00
nInvestmentShares	576432	1.46	3.24	0.00	0.00	0.00	0.00	0.00	2.00	7.00	15.00	81.00
nMetals	576432	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00
nTotalInstruments	576432	13.12	16.58	1.00	1.00	2.00	5.00	9.00	16.00	38.00	74.00	823.00
nIndustries	569432	4.22	2.19	1.00	1.00	1.00	2.00	4.00	6.00	8.00	10.00	12.00
nCountries	569432	3.24	2.47	1.00	1.00	1.00	2.00	3.00	4.00	8.00	12.00	47.00
nUniqueShares	569432	10.00	13.28	1.00	1.00	2.00	3.00	6.00	12.00	30.00	58.00	712.00
MV in million	567800	190.81	335.53	0.00	0.12	1.39	17.79	59.43	186.25	887.57	1,684.72	2,618.60
Tobin‘s Q	567800	2.56	2.46	0.00	0.28	0.50	1.21	1.99	3.12	6.50	10.63	64.86
Leverage	567800	0.24	0.14	0.00	0.01	0.06	0.16	0.23	0.29	0.43	0.70	4.63
ROA	567800	0.05	0.21	-5.03	-0.67	-0.20	0.02	0.09	0.14	0.22	0.31	0.47
Size	567800	16.81	1.97	3.89	10.49	13.12	15.80	17.15	18.17	19.36	20.14	22.23
G Pillar	560163	66.63	15.60	0.53	19.82	35.91	58.52	68.95	77.39	88.47	92.68	99.03
E Pillar	560163	62.07	19.42	0.00	0.00	20.90	53.10	66.13	75.13	86.89	94.08	98.18
S Pillar	560163	68.30	15.60	0.48	19.51	37.70	59.90	71.49	79.74	88.03	92.82	98.18
Controv Score	560163	65.83	26.78	0.50	2.92	13.31	48.06	69.73	87.87	100.00	100.00	100.00
ESGC Score	560163	54.80	13.19	1.01	17.72	32.21	46.64	55.83	63.70	74.82	83.31	94.11
ESG Score	560163	66.46	15.38	1.01	18.62	35.04	58.81	69.47	77.55	85.73	90.16	95.58
Rolling 3M return	576432	2.29	10.46	0.00	0.00	0.00	0.00	0.33	1.67	8.33	30.33	779.33
Rolling 6M return	576432	2.36	9.82	0.00	0.00	0.00	0.17	0.67	1.83	8.50	30.00	642.83
Rolling 12M return	576432	2.47	9.09	0.00	0.00	0.00	0.25	0.75	1.92	8.75	30.00	617.92

Table 4: Portfolio Summary Statistics After Event

This table displays the summary statistics of the end-of-month portfolio holdings across the post sample period i.e. after the introduction phases of the ESG information tool. Variables include portfolio composition (number of equities, bonds, structured products, investment shares, and total instruments), diversification measures (number of industries, countries, and unique holdings), firm fundamentals (market value, Tobin's Q, leverage, ROA, and size), and ESG-related scores (E-, S-, and G-Pillar scores, Controversy, ESGC, and overall ESG scores). All values are aggregated at the investor–month level.

	count	mean	sd	min	p1	p5	p25	p50	p75	p95	p99	max
nShares	731688	11.05	14.42	1.00	1.00	2.00	4.00	7.00	13.00	32.00	62.00	858.00
nBonds	731688	0.20	1.55	0.00	0.00	0.00	0.00	0.00	0.00	1.00	5.00	64.00
nStructuredProducts	731688	0.80	4.47	0.00	0.00	0.00	0.00	0.00	0.00	3.00	12.00	381.00
nInvestmentShares	731688	1.55	3.37	0.00	0.00	0.00	0.00	0.00	2.00	7.00	16.00	108.00
nMetals	731688	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00
nTotalInstruments	731688	13.60	17.02	1.00	2.00	2.00	5.00	9.00	16.00	39.00	75.00	1,010.00
nIndustries	727647	4.42	2.15	1.00	1.00	1.00	3.00	4.00	6.00	8.00	10.00	12.00
nCountries	727647	3.33	2.49	1.00	1.00	1.00	2.00	3.00	4.00	8.00	12.00	47.00
nUniqueShares	727647	10.75	13.95	1.00	2.00	2.00	4.00	7.00	13.00	31.00	60.00	826.00
MV in million	723551	193.30	319.71	0.00	0.11	1.56	22.74	69.86	206.73	841.93	1,620.22	2,618.60
Tobin‘s Q	723551	2.25	1.83	0.00	0.27	0.51	1.17	1.89	2.83	5.11	7.78	64.86
Leverage	723551	0.23	0.14	0.00	0.01	0.06	0.16	0.22	0.29	0.42	0.64	4.63
ROA	723551	0.07	0.18	-5.03	-0.53	-0.16	0.04	0.10	0.14	0.22	0.31	0.47
Size	723551	16.98	1.93	3.71	10.69	13.41	16.03	17.31	18.28	19.47	20.62	22.19
G Pillar	720386	67.20	15.18	0.53	20.82	37.42	59.54	69.41	77.56	88.60	92.46	99.03
E Pillar	720386	63.11	19.23	0.00	0.27	22.18	54.63	67.09	75.75	87.78	95.44	98.64
S Pillar	720386	68.76	15.56	0.48	18.73	38.10	60.70	72.03	80.00	88.09	92.93	97.76
Controv Score	720386	65.29	26.67	0.50	4.06	12.78	47.61	69.59	87.06	100.00	100.00	100.00
ESGC Score	720386	55.10	13.20	1.01	17.53	32.54	47.04	56.21	64.14	74.94	82.61	94.11
ESG Score	720386	67.12	15.20	1.01	18.08	36.21	59.90	70.13	77.80	86.31	90.38	95.58
Rolling 3M return	731688	1.93	9.39	0.00	0.00	0.00	0.00	0.33	1.33	6.67	25.00	960.67
Rolling 6M return	731688	1.92	9.04	0.00	0.00	0.00	0.17	0.50	1.33	6.50	24.17	809.00
Rolling 12M return	731688	1.95	8.84	0.00	0.00	0.08	0.25	0.58	1.42	6.42	24.00	674.42

4.4 Methodology

All ESG-related scores are calculated based on the subset of equity holdings for which ESG data are available. Therefore, the coverage does not extend to the full investment universe but only to firms for which ESG information is provided by the external rater. This coverage typically includes larger and more actively traded firms and thus reflects companies that are of greater relevance from an investor perspective.

The environmental (E), social (S), and governance (G) pillar scores evaluate firms along these three dimensions, capturing their environmental practices, social responsibility, and governance structures. Each pillar score is expressed on a numerical scale from 0 to 100, where higher values indicate stronger performance within the respective category.

The overall ESG portfolio score displayed in the tool represents a value-weighted average of the firm-level ESG scores included in each investor's portfolio, where the weights correspond to the monetary value of each holding. Larger portfolio positions therefore exert greater influence on the aggregate score, while smaller positions contribute proportionally less.[2]

Corporate controversies are incorporated into the computation of the portfolio ESG score through this adjustment mechanism. The controversy score itself is not displayed to investors but lowers the firm's effective ESG rating when relevant. In the absence of controversies during the fiscal year, the adjusted and unadjusted ESG scores are identical.

Firm-level ESG scores are updated on a regular basis to incorporate newly disclosed company information and sustainability-related events. Firms that fail to report sufficient data receive lower scores for the affected indicators, which penalizes limited transparency in the scoring process.

In addition to the numerical ESG scores, investors are shown non-financial inclusion and exclusion indicators associated with their holdings. These screening variables iden-

[2]The value-weighted ESG score, referred to as the *ESGC Score*, combines the raw firm-level E, S, and G pillar scores with third-party information on corporate controversies. When a controversy score is lower than the raw ESG score for a firm, it reduces the overall score; otherwise, the two coincide. This adjustment ensures that negative events and reputational risks are reflected in the overall assessment.

tify whether portfolio companies satisfy positive sustainability criteria or are involved in excluded activity categories, such as controversial industries or practices. The thresholds applied to classify these criteria are strict, which means that screening values occur infrequently and are not expected to exert a material influence on portfolio-level outcomes. Nevertheless, they are controlled for in the empirical analysis to ensure robustness, while a detailed examination of their effects lies beyond the scope of this study.

In summary, the ESG information tool provides investors with a comprehensive, value-weighted measure of the sustainability profile of their portfolios, combining firm-level ESG performance with controversy adjustments and screening indicators. This design enables investors to align their investments with personal values and sustainability preferences, use the information as part of their risk management process, or adjust exposure toward firms with specific controversy or sustainability characteristics.

4.5 Testable Hypothesis

Based on the literature, the data, and the empirical design, I derive the following testable hypotheses:

H1. Following the disclosure of portfolio-level ESG information, investors adjust their trading behavior by increasing overall trading activity and trading more frequently in stocks covered by ESG information.

H2. As a result of this reallocation, investors' portfolios become more diversified across assets, industries, and countries, indicating improved portfolio structure and risk management.

H3. The introduction of ESG information leads to an increase in the overall portfolio ESG score.

H4. The increase in portfolio ESG scores is primarily driven by improvements in the

individual environmental (E), social (S), and governance (G) pillar scores rather than by changes in controversy scores.

H5. The change in portfolio ESG scores is stronger for investors with initially low ESG portfolios at the time of disclosure, suggesting that the adjustment is concentrated among less sustainable investors prior to the event.

H6. Controversy scores are not significantly associated with changes in portfolio ESG scores, implying that the observed shifts are not driven by changes in perceived controversy risk but by the newly available ESG information itself.

4.6 Panel Before-and-After Specification

4.6.1 Trade-Level ESG Score Effects

To examine how the types of company shares that investors trade, purchase and sell change following an ESG-score disclosure, I compare outcomes in the six months before versus the six months after each firm's disclosure date. I estimate the following panel specification:

$$\text{ShareScore}_{it} \;=\; \beta \times \text{PostDummy}_{it} \;+\; \gamma_t \;+\; \delta_j \;+\; \varepsilon_{it}$$

where:

- i indexes investors,
- t indexes month–year periods,
- j indexes industries,
- ShareScore_{it} is one of the firm's ESG-related scores in investor i's portfolio (e.g. overall ESG score, environmental pillar score, controversy score, etc.),

- PostDummy_{it} is an indicator that equals 1 in the 12 months after the firm's ESG tool introduction (and 0 otherwise),
- γ_t are month–year fixed effects capturing any common time trends,
- δ_j are industry fixed effects capturing persistent differences across industries,
- ε_{it} is the error term.

Standard errors are clustered at the investor level.

The coefficient β thus captures the average before-vs-after change in ShareScore around each disclosure date, netting out general time effects and industry differences.

4.6.2 Portfolio-Level ESG Score Effects

To examine how portfolio ESG scores evolve following each firm's ESG score disclosure, I compare observations in the twelve months before versus the six months after the disclosure date. I estimate the following panel specification:

$$\text{PortfolioScore}_{it} = \beta \times \text{PostDummy}_{it} + \alpha_t + \theta_j + \eta_{it}$$

where:

- i indexes investors,
- t indexes month–year periods,
- j indexes industries,
- $\text{PortfolioScore}_{it}$ is the value-weighted portfolio ESG score (e.g. overall ESG, environmental pillar, social pillar, governance, or controversy score),
- PostDummy_{it} is an indicator equal to 1 in the six months after the ESG tool introduction (0 otherwise),
- α_t are month–year fixed effects,
- θ_j are industry fixed effects,

- η_{it} is the error term.

Standard errors are clustered at the investor level. The coefficient β captures the average before-vs-after change in the portfolio ESG score around each disclosure date, netting out common time trends and industry differences.

5 Empirical Results

This section presents an empirical investigation of the impact of the ESG tool on investor trading behavior and monthly portfolio ESG scores. First, I examine the trading behavior and the ESG scores of the shares traded following the disclosure. Second, I analyze the distribution of ESGC portfolio scores before and after the disclosure of ESG information. Third, I analyze changes in various portfolio ESG scores after the ESG information disclosure and implication on the portfolio structures. Fourthly, I perform a investment performance analysis related to the portfolio ESG scores. Finally, I investigate the drivers for changes in the portfolio ESG scores.

5.1 Reaction to ESG Information

5.1.1 Trading Activity

This section analyzes how investor trading behavior changes around the introduction of the ESG information tool. The analysis focuses on whether the ESG characteristics of traded stocks differ before and after the disclosure date. To this end, I employ a regression-based framework that links the ESG quality of traded securities to an event indicator capturing the pre- and post-disclosure periods. This approach allows me to identify whether investors adjust their trading decisions in response to the newly available ESG information and to assess how these adjustments vary across different ESG dimensions.

Table 5 presents the baseline regression results, where the dependent variable is the

combined ESG score of traded stocks, and the key explanatory variable indicates whether the trade occurred before or after the disclosure event.

The key regressor is an indicator equal to one for trades in the twelve months after disclosure and zero before. In the full sample, the post-event coefficient is slightly negative for all trades and significantly negative for purchases, with no effect for sales. Splitting the sample by baseline ESG score reveals strong heterogeneity. For high-ESG investors (event score ≥ 55), purchases tilt toward lower-ESG stocks and sales toward higher-ESG stocks, suggesting partial rebalancing from already elevated ESG levels. In contrast, low-ESG investors (event score < 55) increase the ESG quality of purchases and reduce exposure to lower-ESG stocks. Taken together, the results imply a convergence pattern: portfolios of low-ESG investors upgrade while those of high-ESG investors rebalance slightly downward, leading to a more uniform distribution of ESG quality across investors.

Table 6 presents the same specification using the ESG performance score (TRESGS) as the dependent variable. In the full sample, post-event trades are associated with significantly higher ESG performance scores for all trades and separately for purchases and sales. The heterogeneity analysis again reveals convergence. High-ESG investors lower the ESG quality of purchased stocks and sell higher-ESG names, while low-ESG investors do the opposite by buying higher-ESG stocks and selling lower-ESG ones. The effect is strongest for purchases, suggesting active upgrading behavior among initially low-ESG investors. Overall, this pattern indicates a broad-based positive shift in traded ESG quality following disclosure, primarily driven by investors with lower initial ESG exposure.

Table 7 repeats the analysis using the controversy score (TRESGCCS) as the dependent variable. In the full sample, post-event coefficients are negative for all trades and purchases and insignificant for sales. Heterogeneity across baseline ESG scores is less consistent than for ESG performance. Among high-ESG investors, purchases are associated with lower controversy and sales with higher controversy, while for low-ESG investors the only robust effect occurs on the sell side, where post-event sales are linked to lower con-

Table 5: Trading Activity - TRESGCS

This tables regresses the a event indicator variable equal to 0, twelve months before event date and 1 twelve months after event date on the company share TRESGCS scores. Column (1) regresses all trades, column (2) only purchases and column (3) only sell transactions. Transaction characteristics controlled for are price and quantity and company characteristics are leverage, size, ROA, and Tobin's Q. Errors are cluster on investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) All	(2) Buy	(3) Sell
	TRESGCS	TRESGCS	TRESGCS
Panel A: Full sample			
Post	-0.124*	-0.338***	-0.014
	(-1.86)	(-4.64)	(-0.15)
Constant	18.195***	19.743***	15.444***
	(24.32)	(26.23)	(17.28)
Observations	1,241,918	801,813	430,993
Cluster	46,432	41,908	29,582
R^2	0.405	0.426	0.409
Panel B: Event score $\geq$ 55			
Post	-0.519***	-1.435***	1.011***
	(-7.16)	(-16.55)	(9.48)
Constant	22.821***	24.291***	19.890***
	(24.70)	(25.95)	(17.51)
Observations	627,261	410,170	212,407
Cluster	24,205	22,018	15,147
R^2	0.311	0.333	0.324
Panel C: Event score $<$ 55			
Post	0.289**	0.852***	-1.030***
	(2.55)	(7.22)	(-6.59)
Constant	12.939***	14.372***	10.665***
	(11.14)	(12.20)	(7.88)
Observations	614,653	391,638	218,583
Cluster	22,227	19,890	14,435
R^2	0.407	0.425	0.416
Transaction Characteristics	Y	Y	Y
Company Characteristics	Y	Y	Y
Industry FE	Y	Y	Y
Country FE	Y	Y	Y
Investor FE	Y	Y	Y

Table 6: Trading Activity - TRESGS

This tables regresses the a event indicator variable equal to 0, twelve months before event date and 1 twelve months after event date on the company share TRESGS scores. Column (1) regresses all trades, column (2) only purchases and column (3) only sell transactions. Transaction characteristics controlled for are price and quantity and company characteristics are leverage, size, ROA, and Tobin's Q. Errors are cluster on investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) All	(2) Buy	(3) Sell
	TRESGS	TRESGS	TRESGS
Panel A: Full sample			
Post	0.263***	0.287***	0.220***
	(5.81)	(5.67)	(3.36)
Constant	-55.344***	-55.228***	-55.215***
	(-132.06)	(-126.94)	(-107.01)
Observations	1,241,918	801,813	430,993
Cluster	46,432	41,908	29,582
R^2	0.690	0.698	0.693
Panel B: Event score $\geq$ 55			
Post	-0.084	-0.487***	0.720***
	(-1.53)	(-7.78)	(9.20)
Constant	-50.665***	-50.328***	-51.235***
	(-87.43)	(-85.54)	(-69.80)
Observations	627,261	410,170	212,407
Cluster	24,205	22,018	15,147
R^2	0.649	0.657	0.655
Panel C: Event score $<$ 55			
Post	0.588***	1.058***	-0.271***
	(8.37)	(13.46)	(-2.58)
Constant	-60.645***	-60.841***	-59.785***
	(-97.30)	(-91.80)	(-80.46)
Observations	614,653	391,638	218,583
Cluster	22,227	19,890	14,435
R^2	0.700	0.709	0.702
Transaction Characteristics	Y	Y	Y
Company Characteristics	Y	Y	Y
Industry FE	Y	Y	Y
Country FE	Y	Y	Y
Investor FE	Y	Y	Y

troversy scores. Overall, controversy does not emerge as a dominant explanatory channel and appears secondary relative to ESG performance. This finding aligns with the structure of the information environment, as controversy scores are not directly displayed on the trading platform but enter only indirectly through the aggregated, value-weighted portfolio score. Consequently, investors are unlikely to trade explicitly on controversy information.

Table 8 focuses on the environmental pillar (ENSCORE). Across the full sample, post-event trades exhibit significantly higher environmental scores, with stronger effects for purchases. Both high- and low-ESG investor groups show positive coefficients, but the effect is particularly pronounced for purchases by investors with low initial ESG exposure, suggesting that these investors actively increase their holdings in environmentally stronger firms. This pattern implies a broad positive tilt in trading activity toward firms with better environmental practices, reflecting the greater salience and intuitive appeal of environmental issues for retail investors.

Table 9 examines the governance pillar (CGSCORE). In the aggregate, post-event coefficients show a small decrease in governance scores for purchases and a positive effect for sales. Among high-ESG investors, purchases involve stocks with lower governance quality and sales target higher-governance firms, whereas low-ESG investors exhibit a weakly positive buy-side response and little change on the sell side. These results suggest some rebalancing within the governance dimension, though less systematic than in the environmental or social pillars. Overall, governance-related tilts appear more diffuse and harder to interpret, consistent with governance attributes being less directly observable or salient to retail investors compared to environmental and social information.

Table 10 reports results for the social pillar (SOSCORE). In the full sample, post-event trades are associated with higher social scores, again driven mainly by purchases. The split by baseline ESG shows that high-ESG investors decrease the social quality of purchased stocks and sell higher-scoring firms, whereas low-ESG investors do the opposite, buying higher-social-score firms and selling lower ones. The results reveal a clear

Table 7: Trading Activity - TRESGCCS

This tables regresses the a event indicator variable equal to 0, twelve months before event date and 1 twelve months after event date on the company share TRESGCCS scores. Column (1) regresses all trades, column (2) only purchases and column (3) only sell transactions. Transaction characteristics controlled for are price and quantity and company characteristics are leverage, size, ROA, and Tobin's Q. Errors are cluster on investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) All	(2) Buy	(3) Sell
	TRESGCCS	TRESGCCS	TRESGCCS
Panel A: Full sample			
Post	-0.496***	-1.004***	-0.100
	(-4.33)	(-7.80)	(-0.65)
Constant	276.069***	279.430***	269.539***
	(208.13)	(204.72)	(180.81)
Observations	1,241,918	801,813	430,993
Cluster	46,432	41,908	29,582
R^2	0.618	0.638	0.603
Panel B: Event score $\geq$ 55			
Post	-0.767***	-2.085***	1.257***
	(-6.85)	(-15.13)	(7.77)
Constant	277.027***	279.753***	271.611***
	(189.39)	(183.71)	(161.72)
Observations	627,261	410,170	212,407
Cluster	24,205	22,018	15,147
R^2	0.594	0.611	0.591
Panel C: Event score $<$ 55			
Post	-0.165	0.271	-1.483***
	(-0.80)	(1.21)	(-5.76)
Constant	274.827***	278.583***	267.857***
	(124.21)	(121.25)	(111.14)
Observations	614,653	391,638	218,583
Cluster	22,227	19,890	14,435
R^2	0.636	0.658	0.613
Transaction Characteristics	Y	Y	Y
Company Characteristics	Y	Y	Y
Industry FE	Y	Y	Y
Country FE	Y	Y	Y
Investor FE	Y	Y	Y

Table 8: Trading Activity - ENSCORE

This tables regresses the a event indicator variable equal to 0, twelve months before event date and 1 twelve months after event date on the company share ENSCORE scores. Column (1) regresses all trades, column (2) only purchases and column (3) only sell transactions. Transaction characteristics controlled for are price and quantity and company characteristics are leverage, size, ROA, and Tobin's Q. Errors are cluster on investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) All	(2) Buy	(3) Sell
	ENSCORE	ENSCORE	ENSCORE
Panel A: Full sample			
Post	1.035***	1.421***	0.412***
	(15.55)	(19.44)	(4.25)
Constant	-97.049***	-95.857***	-98.788***
	(-165.92)	(-156.98)	(-139.49)
Observations	1,241,916	801,811	430,993
Cluster	46,432	41,908	29,582
R^2	0.663	0.669	0.669
Panel B: Event score $\geq$ 55			
Post	0.742***	0.698***	0.981***
	(8.91)	(7.36)	(8.64)
Constant	-90.537***	-88.882***	-93.354***
	(-109.41)	(-103.14)	(-91.95)
Observations	627,261	410,170	212,407
Cluster	24,205	22,018	15,147
R^2	0.603	0.608	0.615
Panel C: Event score $<$ 55			
Post	1.289***	2.102***	-0.119
	(12.82)	(19.68)	(-0.75)
Constant	-104.606***	-103.989***	-105.277***
	(-126.93)	(-118.10)	(-109.49)
Observations	614,651	391,636	218,583
Cluster	22,227	19,890	14,435
R^2	0.691	0.699	0.693
Transaction Characteristics	Y	Y	Y
Company Characteristics	Y	Y	Y
Industry FE	Y	Y	Y
Country FE	Y	Y	Y
Investor FE	Y	Y	Y

Table 9: Trading Activity - CGSCORE

This tables regresses the a event indicator variable equal to 0, twelve months before event date and 1 twelve months after event date on the company share CGSCORE scores. Column (1) regresses all trades, column (2) only purchases and column (3) only sell transactions. Transaction characteristics controlled for are price and quantity and company characteristics are leverage, size, ROA, and Tobin's Q. Errors are cluster on investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) All	(2) Buy	(3) Sell
	CGSCORE	CGSCORE	CGSCORE
Panel A: Full sample			
Post	-0.136**	-0.472***	0.418***
	(-2.29)	(-7.14)	(4.69)
Constant	-26.186***	-26.208***	-25.783***
	(-48.44)	(-46.18)	(-39.90)
Observations	1,241,918	801,813	430,993
Cluster	46,432	41,908	29,582
R^2	0.501	0.515	0.502
Panel B: Event score $\geq$ 55			
Post	-0.387***	-1.121***	0.984***
	(-5.33)	(-13.37)	(9.33)
Constant	-20.997***	-20.383***	-22.007***
	(-33.67)	(-31.14)	(-28.91)
Observations	627,261	410,170	212,407
Cluster	24,205	22,018	15,147
R^2	0.457	0.467	0.467
Panel C: Event score $<$ 55			
Post	0.103	0.188*	-0.145
	(1.05)	(1.74)	(-1.02)
Constant	-31.249***	-31.773***	-29.729***
	(-35.47)	(-34.29)	(-28.70)
Observations	614,653	391,638	218,583
Cluster	22,227	19,890	14,435
R^2	0.509	0.525	0.506
Transaction Characteristics	Y	Y	Y
Company Characteristics	Y	Y	Y
Industry FE	Y	Y	Y
Country FE	Y	Y	Y
Investor FE	Y	Y	Y

cross-sectional tilt: high-ESG investors modestly reduce social exposure, while low-ESG investors increase it. Overall, the evidence points to a systematic reallocation toward firms with better social performance and supports the notion that social considerations are a key, intuitive dimension of retail ESG adjustments.

Taken together, Tables 5–10 reveal a consistent pattern of convergence in ESG quality following the introduction of portfolio-level ESG information. Low-ESG investors increase the ESG quality of traded stocks, especially along the environmental and social dimensions, while high-ESG investors modestly reduce exposure from elevated levels. Governance adjustments are weaker and less systematic, and controversy effects are limited, likely reflecting their indirect presentation within the tool. Overall, the evidence points to moderate but systematic portfolio upgrading among investors with initially low ESG exposure, driven by the more salient and intuitive environmental and social pillars.

Table 10: Trading Activity - SOSCORE

This tables regresses the a event indicator variable equal to 0, twelve months before event date and 1 twelve months after event date on the company share SOSCORE scores. Column (1) regresses all trades, column (2) only purchases and column (3) only sell transactions. Transaction characteristics controlled for are price and quantity and company characteristics are leverage, size, ROA, and Tobin's Q. Errors are cluster on investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) All	(2) Buy	(3) Sell
	SOSCORE	SOSCORE	SOSCORE
Panel A: Full sample			
Post	0.215***	0.316***	0.060
	(3.60)	(4.92)	(0.67)
Constant	-52.394***	-52.384***	-52.000***
	(-103.91)	(-99.99)	(-85.43)
Observations	1,241,918	801,813	430,993
Cluster	46,432	41,908	29,582
R^2	0.619	0.629	0.622
Panel B: Event score $\geq$ 55			
	(1) SOSCORE	(2) SOSCORE	(3) SOSCORE
Post	-0.174***	-0.509***	0.515***
	(-2.77)	(-6.89)	(5.62)
Constant	-49.328***	-49.419***	-49.111***
	(-67.89)	(-67.60)	(-52.44)
Observations	627,261	410,170	212,407
Cluster	24,205	22,018	15,147
R^2	0.590	0.601	0.595
Panel C: Event score $<$ 55			
	(1) SOSCORE	(2) SOSCORE	(3) SOSCORE
Post	0.576***	1.141***	-0.409***
	(5.87)	(11.06)	(-2.74)
Constant	-57.123***	-57.350***	-56.113***
	(-80.04)	(-74.83)	(-68.57)
Observations	614,653	391,638	218,583
Cluster	22,227	19,890	14,435
R^2	0.626	0.637	0.629
Transaction Characteristics	Y	Y	Y
Company Characteristics	Y	Y	Y
Industry FE	Y	Y	Y
Country FE	Y	Y	Y
Investor FE	Y	Y	Y

5.1.2 Value-weighted Portfolio Scores Densities

To examine how portfolio ESG scores evolve around the introduction of the ESG information tool, I plot the kernel density of portfolio-level ESG scores two weeks before and twelve months after the introduction. Figure 4 displays the estimated density of ESG portfolio scores two weeks prior to the disclosure date. The distribution is approximately unimodal and close to normal, with most mass centered slightly above 55. The lower tail extends over a wide range of low ESG values (below 40) but remains thin, whereas the upper tail (above 80) is shorter and slightly thicker. Overall, the shape suggests near symmetry with a mild left skew. Using kernel density estimates rather than raw histograms is appropriate because densities integrate to one, allowing direct comparison of distributional shapes across periods with differing sample sizes i.e. new investors investing into the ESG score companies. Furthermore, kernel estimates mitigate sensitivity to arbitrary bin widths in histograms and provide a smoother, more informative depiction of the data's central tendency, dispersion, and tail behavior.

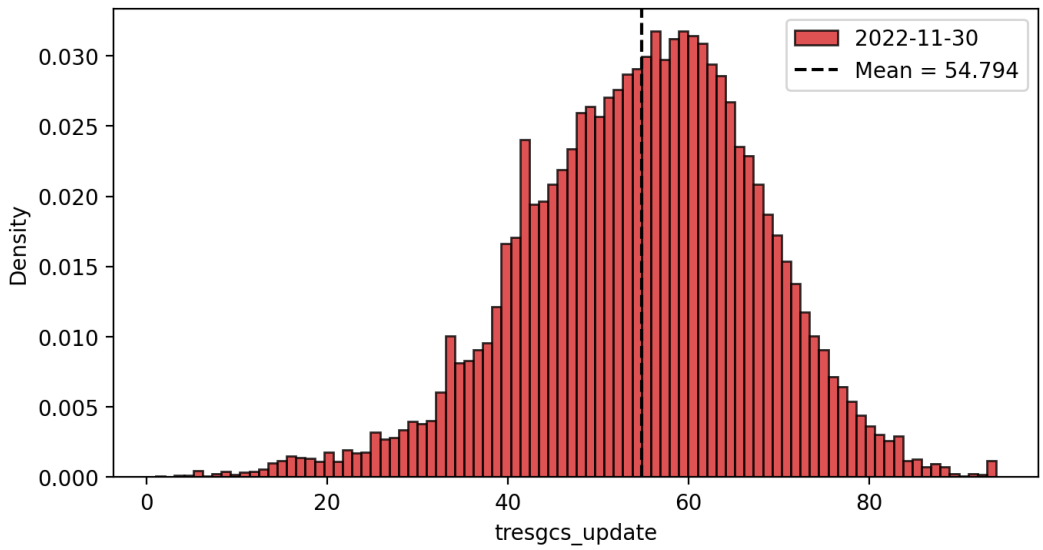


Figure 4: Distribution of ESGC portfolio scores two weeks before the event date

Figure 5 presents the distribution of ESG portfolio scores twelve months after the introduction of the ESG information tool. The distribution remains approximately normal

but appears slightly more dispersed around the mean. The average ESG portfolio score is 55.4, indicating no substantial shift in the central location compared to the pre-disclosure period. The lower tail becomes somewhat thicker, reflecting a small increase in portfolios with lower ESG scores, while the density rises more steeply between 40 and 55, suggesting a more concentrated accumulation of scores in the midrange. Overall, the shape remains broadly symmetric with only mild deviations from normality.

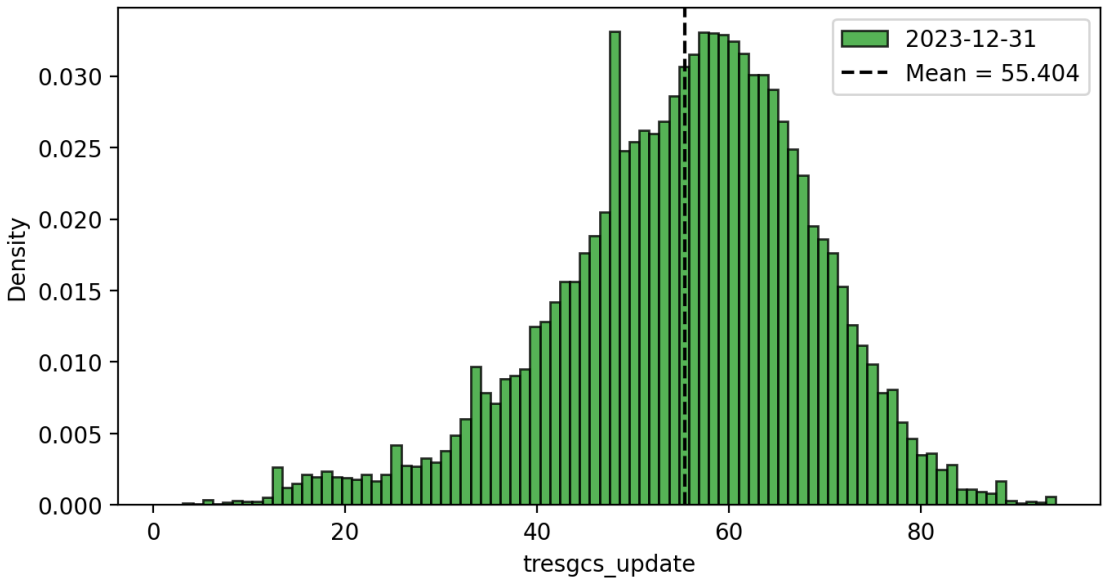


Figure 5: Distribution of ESGC portfolio scores twelve months after the event date

Figure 6 compares the distribution of ESG portfolio scores two weeks before and twelve months after the introduction of the ESG information tool. The difference between the two periods becomes clearly visible. Before the event, a larger share of portfolios exhibited combined ESG scores between 30 and 55. After the introduction of the tool, the density shifts uniformly across higher score intervals, with a noticeable increase in portfolios scoring between 55 and 80. Although the magnitude of this shift is moderate, the pattern reveals a consistent tilt toward higher ESG scores.

Several mechanisms could explain this pattern. Investors may have actively adjusted their holdings by selling firms with low ESG scores and purchasing shares with high ESG scores, thereby increasing the overall ESG portfolio score. Alternatively, investors may

have reallocated capital toward existing investments with high ESG scores and simply increasing portfolio weights rather than adding new shares. Finally, investors can reinvest capital from firms without ESG coverage, which are not considered in teh ESG portfolio score, toward firms for which ESG data became available.

The density plots provide descriptive rather than causal evidence. Although the mean ESG portfolio score increases only modestly, this does not necessarily imply weak investor response. The smooth upward shift in the distribution suggests that investors incorporated the new ESG information gradually and in a measured way rather than overreacting. The response likely depends on investors' initial ESG score. Investors with already high ESG scores at the event date may revert toward the mean, while investors with initially low ESG scores may move upward. In aggregate, these offsetting adjustments result in a relatively stable mean ESG score. To quantify the magnitude and statistical significance of these effects, formal regression analysis is required. Nevertheless, the descriptive evidence indicates a gradual shift in investor portfolios toward firms with stronger ESG performance following the disclosure.

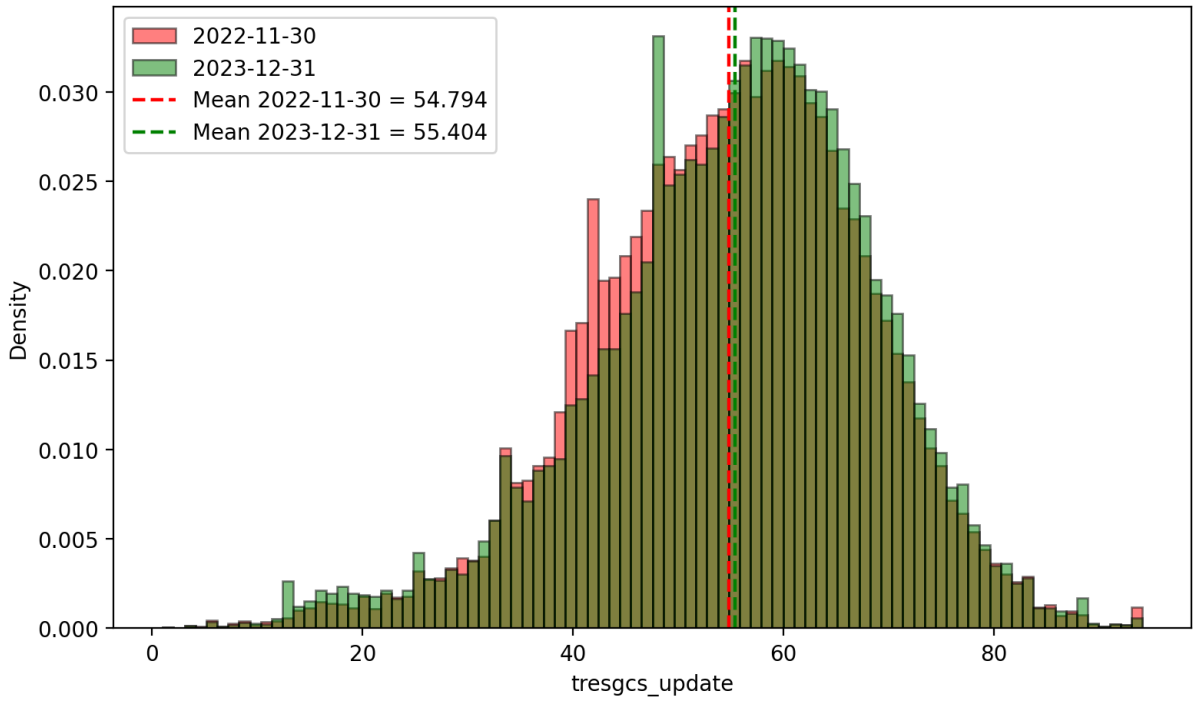


Figure 6: Change in ESGC score distribution: one day before vs. six months after event date

5.1.3 Value-weighted Portfolio Score Over Time

Next, I examine how changes in ESG portfolio scores differ between investors with below- and above-average ESG scores at the event date, since these groups are expected to react in opposite directions, reverting toward the mean. Figure 8 plots the monthly change in portfolio ESG scores for both groups before and after the introduction of the ESG information tool. Prior to the introduction, changes in both groups remained relatively stable over time, consistent with investors being unable to observe their ESG portfolio scores and therefore not actively adjusting them. After the introduction of the tool, variation in ESG scores increases, particularly among investors whose initial scores were below the sample mean. The red line, representing investors with below-mean ESG scores (below 55), fluctuates more strongly than the green line for above-mean investors, indicating that low-ESG investors reacted more actively and exhibited greater volatility in their portfolio ESG scores following disclosure. Figure 8 also presents the cumulative changes in ESG portfolio scores for the two groups before and after the tool's introduction. Before the disclosure, when investors did not have access to ESG information, both groups gradually built their portfolios toward the levels observed at the event date. High-ESG portfolios show a slower and more stable increase in ESG scores prior to the event, whereas low-ESG portfolios exhibit a steeper buildup. After the introduction of the tool, these dynamics reverse as portfolios that initially had low ESG scores display stronger cumulative increases over time, while portfolios with initially high ESG scores flatten and in some cases decline slightly. These results are consistent with a mean-reverting response to the new information. Investors with initially low ESG scores appear more motivated to improve their portfolio's ESG profile, whereas investors with initially high ESG scores tend to reduce exposure marginally. Overall, the evidence indicates a heterogeneous adjustment in which investors respond to the ESG disclosure depending on their initial ESG score.

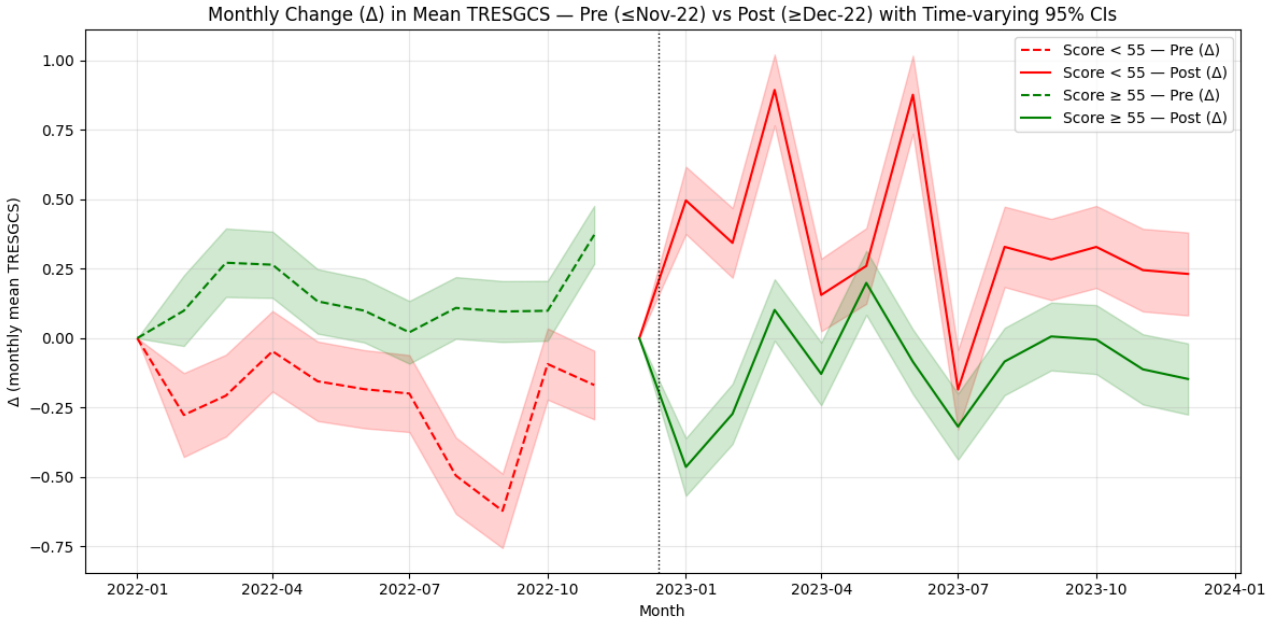


Figure 7: Change in ESG score: above and below 55 at event date

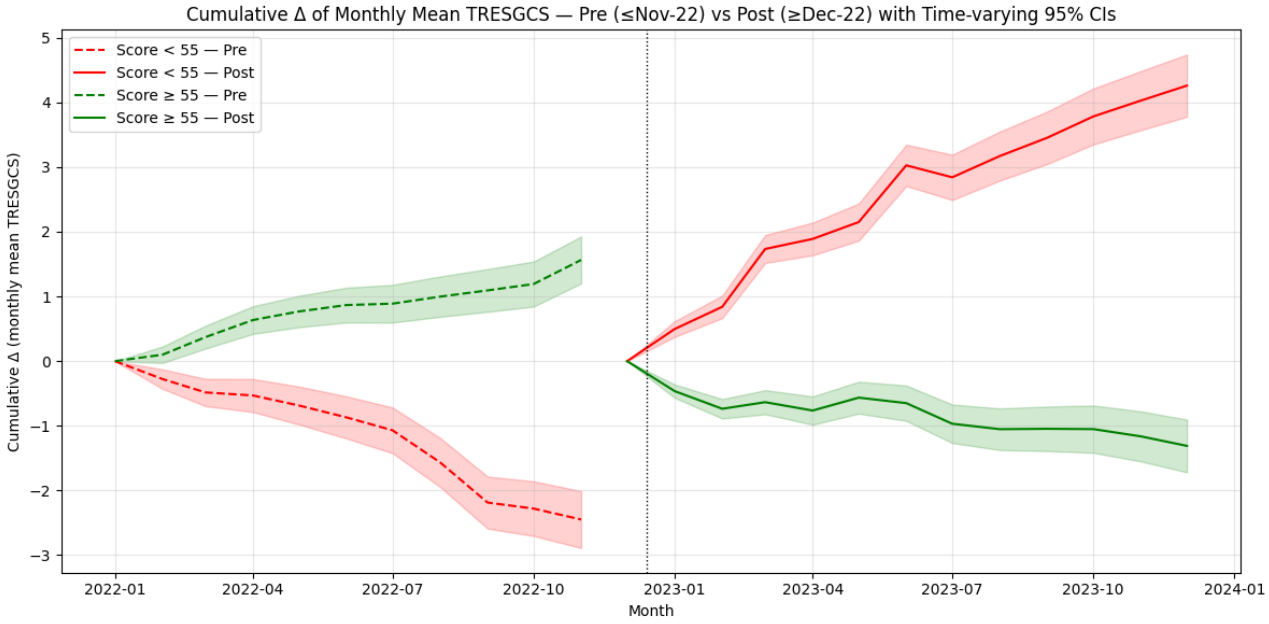


Figure 8: Cumulative change in ESG score: above and below 55 at event date

We have previously observed that investor responses to the introduction of the ESG information tool differ depending on whether their initial ESG portfolio score was below or above the sample mean. In this section, I formally test this finding in a regression setting.

Table 11 reports the average change in value-weighted ESG portfolio scores before and after the introduction of the ESG information tool. The coefficient on *Post* is positive and highly significant, indicating that investors on average increased the ESG quality of their portfolios following disclosure. This effect is consistent across post-event windows of one to three months and remains robust after including portfolio-level controls. Portfolios with a higher share of securities without ESG data exhibit smaller score changes, suggesting that limited coverage constrains the adjustment.

Table 12 examines whether this response depends on investors' initial ESG exposure. The coefficient on *Post* alone is negative, implying that investors with already high ESG scores slightly reduced their ESG exposure after the tool's introduction. In contrast, the interaction term *Post* $\times$ *Low event score* is strongly positive and statistically significant, indicating that investors with initially below-average ESG portfolios significantly increased their ESG scores. The magnitude of the effect grows across longer post-event windows, suggesting a gradual adjustment process. Taken together, the results support the interpretation that investor reactions are heterogeneous and consistent with a mean-reversion pattern: low-ESG investors upgrade their portfolios, whereas high-ESG investors rebalance modestly downward.

Table 11: ESG Portfolio Score Changes

This table regresses investor and portfolio characteristics on changes in value-weighted ESG portfolio scores. Column (1) captures relative changes, while column (2) focuses on absolute score changes from event date to 12 months later. Standard errors are clustered on investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) ESGC Score	(2) ESGC Score	(3) ESGC Score	(4) ESGC Score
Post	0.282***			
	(10.63)			
% Unmatched shares	-0.012***	-0.004*	-0.005**	-0.006**
	(-5.66)	(-1.95)	(-2.19)	(-2.55)
# Instruments	0.021***	-0.153***	-0.153***	-0.153***
	(3.99)	(-18.24)	(-18.07)	(-17.85)
Post 1-month gap		0.230***		
		(8.36)		
Post 2-month gap			0.283***	
			(9.78)	
Post 3-month gap				0.363***
				(11.89)
Constant	54.333***	53.735***	53.748***	53.758***
	(742.80)	(644.49)	(640.49)	(635.62)
Observations	1,231,865	1,178,341	1,125,207	1,072,304
Cluster	53,771	53,758	53,747	53,742
R^2	0.877	0.878	0.877	0.876
Investor FE	Y	Y	Y	Y
Screening Values	N	Y	Y	Y

Table 12: ESG Portfolio Score Changes and Event Score

This table regresses investor and portfolio characteristics on changes in value-weighted ESG portfolio scores. Column (1) captures relative changes, while column (2) focuses on absolute score changes from event date to 12 months later. Standard errors are clustered on investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) ESGC Score	(2) ESGC Score	(3) ESGC Score	(4) ESGC Score
Post	-0.100***			
	(-2.89)			
Post × Low event score	0.793***			
	(15.41)			
% Unmatched shares	-0.012***	-0.004*	-0.004*	-0.005**
	(-5.42)	(-1.72)	(-1.95)	(-2.31)
# Instruments	0.022***	-0.151***	-0.150***	-0.149***
	(4.25)	(-18.16)	(-17.97)	(-17.74)
Post 1-month gap		-0.202***		
		(-5.59)		
Post 1-month gap × Low event score		0.895***		
		(16.84)		
Post 2-month gap			-0.220***	
			(-5.82)	
Post 2-month gap × Low event score			1.044***	
			(18.83)	
Post 3-month gap				-0.207***
				(-5.22)
Post 3-month gap × Low event score				1.180***
				(20.48)
Constant	54.291***	53.696***	53.703***	53.709***
	(738.68)	(645.31)	(641.78)	(637.45)
Observations	1,231,865	1,178,341	1,125,207	1,072,304
Cluster	53,771	53,758	53,747	53,742
R^2	0.877	0.879	0.878	0.877
Investor FE	Y	Y	Y	Y
Screening Values	Y	Y	Y	Y

5.1.4 Portfolio Adjustment after ESG Disclosure

A natural next step is to examine how overall portfolio composition changed following the introduction of the ESG information tool. This section analyzes investor portfolio adjustments along three dimensions. First, changes in *asset holdings* are assessed through investments in equities, bonds, structured products, investment funds, metals, the total number of instruments, and the number of equities with ESG information. Second, *diversification and trading activity* are examined using the number of unique equity positions, the share of non-ESG holdings, the number of countries and industries represented, and monthly buy and sell activity. Third, changes in *company characteristics* are evaluated using the market value (in millions), return on assets (ROA), Tobin's Q, leverage, price-to-earnings ratio (P/E), beta, and alpha of firms held in investor portfolios. Together, these dimensions provide a comprehensive picture of how investors reallocated and diversified their portfolios after receiving information about their ESG performance.

Asset Holdings Table 13 presents results on changes in the asset composition of investor portfolios. Panel A reports estimates for the full sample, while Panels B and C distinguish between investors with above- and below-median ESG portfolio scores at the event date. Across all panels, the coefficient on the *Post* indicator is positive and significant for the number of equities, corporate bonds, investment funds, and total instruments, but negative for structured products. This pattern suggests that, after the introduction of the ESG tool, investors increased their allocations to traditional securities and reduced exposure to complex structured products. The increase in bond holdings implies that investors might have used the ESG information on issuers not only for equity selection but also for bond investments. The effect is more pronounced among investors with initially higher ESG scores (Panel B). Investors with lower initial scores (Panel C) also adjusted, though to a lesser extent. Overall, these findings indicate a shift toward more transparent, lower-risk investment strategies. The significant rise in the number of instruments and ESG-covered equities further shows that portfolios became broader and more aligned with the available sustainability information.

Table 13: Portfolio Adjustment - Other Asset Holdings

	(1) #Shares	(2) #Bonds	(3) #Str.Products	(4) #Inv.Shares	(5) #Metals	(6) #Instruments	(7) #ESG Shares
Panel A: Full sample							
Post	0.791***	0.055***	-0.080***	0.126***	-0.000***	0.891***	0.658***
	(45.71)	(17.91)	(-8.79)	(28.68)	(-4.07)	(40.54)	(44.51)
Constant	10.409***	0.146***	0.898***	1.440***	0.001***	12.893***	8.822***
	(1075.80)	(84.34)	(176.45)	(588.19)	(13.00)	(1048.41)	(1060.92)
Observations	1,307,944	1,307,944	1,307,944	1,307,944	1,307,944	1,307,944	1,279,451
Cluster	60,004	60,004	60,004	60,004	60,004	60,004	59,110
R^2	0.962	0.900	0.900	0.956	0.743	0.958	0.962
Panel B: Event score $\geq$ 55							
Post	0.986***	0.074***	-0.061***	0.137***	-0.000***	1.136***	0.794***
	(41.72)	(14.59)	(-5.49)	(24.17)	(-2.98)	(39.31)	(37.90)
Constant	11.082***	0.195***	0.890***	1.523***	0.001***	13.691***	9.727***
	(856.70)	(70.60)	(147.46)	(490.71)	(10.55)	(865.46)	(847.27)
Observations	643,970	643,970	643,970	643,970	643,970	643,970	641,868
Cluster	27,868	27,868	27,868	27,868	27,868	27,868	27,868
R^2	0.967	0.893	0.917	0.963	0.776	0.964	0.964
Panel C: Event score $<$ 55							
Post	0.593***	0.036***	-0.102***	0.118***	-0.000***	0.644***	0.514***
	(23.47)	(10.14)	(-8.13)	(17.17)	(-2.78)	(20.50)	(24.61)
Constant	10.409***	0.104***	0.947***	1.430***	0.001***	12.891***	8.234***
	(753.52)	(53.10)	(137.53)	(381.52)	(8.59)	(749.90)	(718.09)
Observations	594,934	594,934	594,934	594,934	594,934	594,934	589,026
Cluster	25,905	25,905	25,905	25,905	25,905	25,905	25,903
R^2	0.963	0.916	0.899	0.950	0.703	0.959	0.959
Investor FE	Y	Y	Y	Y	Y	Y	Y

Diversification and Trading Table 14 examines diversification and trading behavior. Again Panel A reports results for the full sample, with Panels B and C again separating high- and low-ESG investors at the event date. Following the disclosure, the number of unique holdings, industries, and countries represented in portfolios increased significantly, confirming improved diversification across sectors and geographies. However, the reaction differs by ESG group. For investors with initially low ESG scores (Panel C), the share of unmatched holdings namely shares without ESG score coverage, declines significantly, suggesting a deliberate reallocation toward assets with available ESG information. In contrast, investors with initially high ESG scores (Panel B) slightly increase their exposure to unmatched firms, consistent with a tendency to maintain or even "protect" their pre-existing high ESG ratings by incorporating firms not covered by ESG scoring rather than diluting their portfolios with lower-rated companies. Overall, these patterns suggest that both groups respond to the introduction of ESG information but in opposite ways: low-score investors move toward transparency and ESG integration, while high-score investors maintain flexibility by including firms without disclosed ESG ratings. Trading activity, measured by buy and sell turnover, declines across all groups, indicating that investors became more stable in their allocation decisions and more satisfied with their post-disclosure portfolios.

Table 14: Portfolio Adjustment - Diversification - Trading
This table displays regressions . Errors are cluster on investor. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) # Uni.shares	(2) % Unmatched	(3) Countries	(4) Industries	(5) Buy	(6) Sell
Panel A: Full sample						
Post	1.128***	0.218***	0.173***	0.281***	-0.290***	-0.060***
	(66.37)	(4.56)	(46.09)	(71.00)	(-21.15)	(-4.92)
Constant	10.066***	16.095***	3.254***	4.249***	1.398***	0.832***
	(1081.19)	(615.42)	(1587.15)	(1960.75)	(186.43)	(125.73)
Observations	1,237,578	1,238,904	1,237,578	1,237,578	1,238,904	1,238,904
Cluster	53,759	53,773	53,759	53,759	53,773	53,773
R^2	0.963	0.802	0.939	0.904	0.604	0.679
Panel B: Event score $\geq$ 55						
Post	1.243***	0.416***	0.155***	0.279***	-0.221***	-0.034**
	(52.52)	(6.54)	(31.82)	(51.84)	(-11.64)	(-2.26)
Constant	9.992***	14.763***	3.039***	4.373***	1.317***	0.762***
	(737.52)	(407.43)	(1088.67)	(1417.83)	(121.97)	(87.84)
Observations	702,918	713,010	702,918	702,918	713,010	713,010
Cluster	33,594	34,099	33,594	33,594	34,099	34,099
R^2	0.959	0.840	0.944	0.909	0.620	0.657
Panel C: Event score $<$ 55						
Post	0.993***	-0.321***	0.192***	0.284***	-0.352***	-0.087***
	(40.40)	(-4.19)	(33.90)	(49.44)	(-15.43)	(-4.28)
Constant	9.549***	20.615***	3.378***	3.938***	1.547***	0.923***
	(709.45)	(491.35)	(1087.59)	(1252.06)	(124.06)	(83.35)
Observations	593,956	594,934	593,956	593,956	594,934	594,934
Cluster	25,891	25,905	25,891	25,891	25,905	25,905
R^2	0.960	0.804	0.929	0.895	0.587	0.679
Investor FE	Y	Y	Y	Y	Y	Y

Company Characteristics Table 15 analyzes changes in the firm-level fundamentals of portfolio constituents. Again Panel A reports results for the full sample, while Panels B and C distinguish between investors with above- and below-median ESG scores at the

event date. Across all groups, investors reallocate toward firms with higher profitability (ROA), lower leverage, and lower Tobin's Q, consistent with a shift toward financially stronger and more mature firms. Both high- and low-ESG score investors hold portfolios with higher alpha, indicating improved risk-adjusted performance following the disclosure. However, the groups differ in other dimensions. Investors with initially low ESG scores increase their exposure to larger firms, which are more likely to provide ESG disclosure and have better ESG coverage. In contrast, investors with initially high ESG scores shift toward smaller firms, consistent with a search for alternative opportunities outside the already well-rated ESG universe. This divergence in size preference also explains the heterogeneous behavior in market risk exposure: while high-ESG investors reduce portfolio beta, indicating lower systematic risk, low-ESG investors tilt toward larger, more market-sensitive firms, increasing their beta exposure. As a result, the coefficient for the full sample appears to be insignificant.

Overall, these results indicate that after the ESG tool was introduced, investors across the distribution improved their portfolios by holding firms with stronger fundamentals, higher profitability, and better valuations, but adjusted their risk exposure differently depending on their initial ESG positioning.

Table 15: Portfolio Adjustment - Company Characteristics
This table displays regressions . Errors are cluster on investor. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) MVmil	(2) ROA	(3) TobinsQ	(4) Leverage	(5) PE	(6) Beta	(7) Alpha
Panel A: Full sample							
Post	-0.701	0.013***	-0.303***	-0.003***	411.833***	0.001	0.052***
	(-1.19)	(20.20)	(-46.52)	(-6.39)	(23.95)	(0.76)	(6.36)
Constant	193.306***	0.060***	2.527***	0.237***	65.677***	1.160***	-0.358***
	(598.99)	(172.89)	(709.47)	(955.52)	(10.47)	(2673.39)	(-120.97)
Observations	1,234,393	1,234,393	1,234,393	1,234,393	829,239	871,949	871,949
Cluster	53,766	53,766	53,766	53,766	52,992	53,642	53,642
R^2	0.888	0.682	0.750	0.718	0.367	0.833	0.831
Panel B: Event score $\geq$ 55							
Post	-7.874***	0.019***	-0.514***	-0.004***	395.489***	-0.008***	0.067***
	(-7.41)	(17.02)	(-43.57)	(-5.87)	(14.88)	(-3.77)	(4.06)
Constant	273.643***	0.036***	2.980***	0.232***	89.332***	1.259***	-0.508***
	(470.91)	(57.46)	(461.74)	(559.71)	(9.16)	(1543.25)	(-85.11)
Observations	591,550	591,550	591,550	591,550	382,778	417,028	417,028
Cluster	25,898	25,898	25,898	25,898	25,240	25,776	25,776
R^2	0.894	0.680	0.732	0.715	0.411	0.817	0.833
Panel C: Event score $<$ 55							
Post	5.949***	0.007***	-0.130***	-0.001	424.016***	0.011***	0.053***
	(10.41)	(8.41)	(-16.88)	(-1.63)	(19.03)	(6.55)	(4.83)
Constant	123.607***	0.073***	2.198***	0.241***	46.727***	1.077***	-0.246***
	(378.53)	(160.49)	(501.03)	(705.81)	(5.57)	(1767.36)	(-59.34)
Observations	699,589	699,589	699,589	699,589	463,368	477,964	477,964
Cluster	33,428	33,428	33,428	33,428	31,500	32,017	32,017
R^2	0.840	0.729	0.780	0.725	0.358	0.640	0.319
Investor FE	Y	Y	Y	Y	Y	Y	Y

5.2 Performance Analysis

This section investigates the relationship between ESG portfolio scores and realized investment performance. I compute end-of-month portfolio returns and return volatility from net portfolio values (NAV). Each month, investor portfolios are classified dynamically into *above-median* and *below-median* ESG groups based on the value-weighted ESG score of their holdings. The monthly reclassification is relative to the cross-sectional distribution in that month, which accommodates shifting market conditions and sectoral trends.

5.2.1 Performance Figures

Figure 9 reports average monthly returns for the dynamically rebalanced above- and below-median ESG groups. Both groups co-move with the market and therefore show similar pattern. Below-median ESG portfolios tend to earn slightly higher returns in rising markets and experience materially larger losses during drawdowns leading to higher volatility. Above-median ESG portfolios exhibit lower return volatility and smaller drawdowns, consistent with greater resilience in stressed periods.

Figure 10 presents cumulative returns for the two groups. Over the sample, the above-median ESG group outperforms the below-median group, with the performance gap widening further after the introduction of the ESG information tool. The evolution of the series can be interpreted as the performance of a simple replication strategy that, at the end of each month, rebalances into the portfolios with above-median ESG scores. In other words, the cumulative return of the high-ESG group approximates the return that an investor would have achieved by systematically reallocating capital toward portfolios with the strongest ESG profiles each month.

Figure 11 corroborates these findings using ESG quartiles. Cumulative performance increases monotonically with the ESG portfolio score, indicating a linear relation between ESG scores and returns under monthly rebalancing.

Finally, Figure 12 compares cumulative returns across ESG quartiles before and after

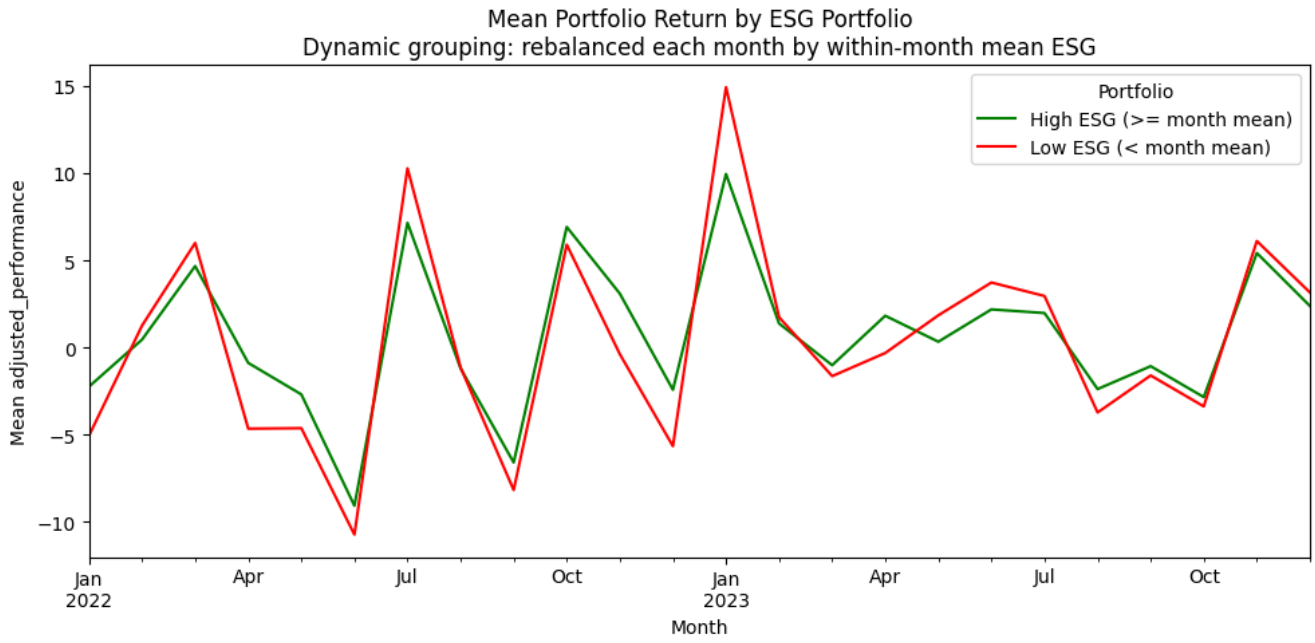


Figure 9: Absolute portfolio performance over- and under mean ESG score portfolios

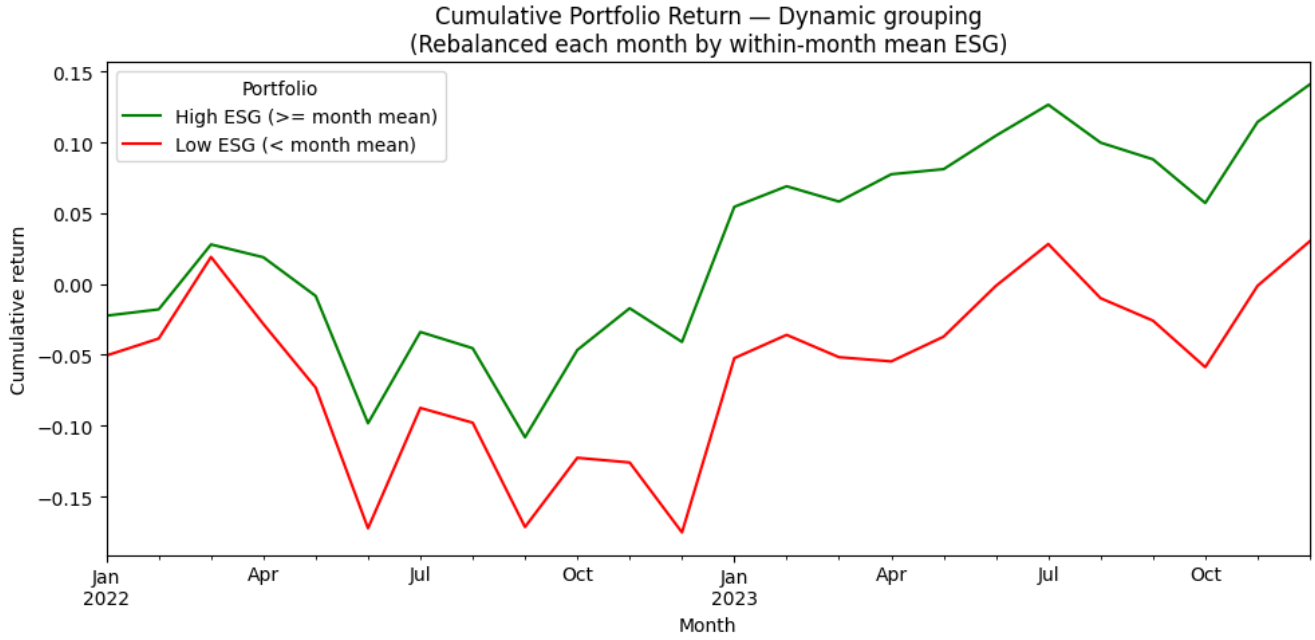


Figure 10: Cumulative portfolio return over- and under mean ESG score portfolios

the tool's introduction. In the pre-introduction period, the previously observed monotonic relation between ESG and performance is evident. After investors observe their ESG portfolio scores, the return lines converge and the outperformance of higher-ESG portfolios becomes less pronounced. The convergence indicates that investors rebalanced

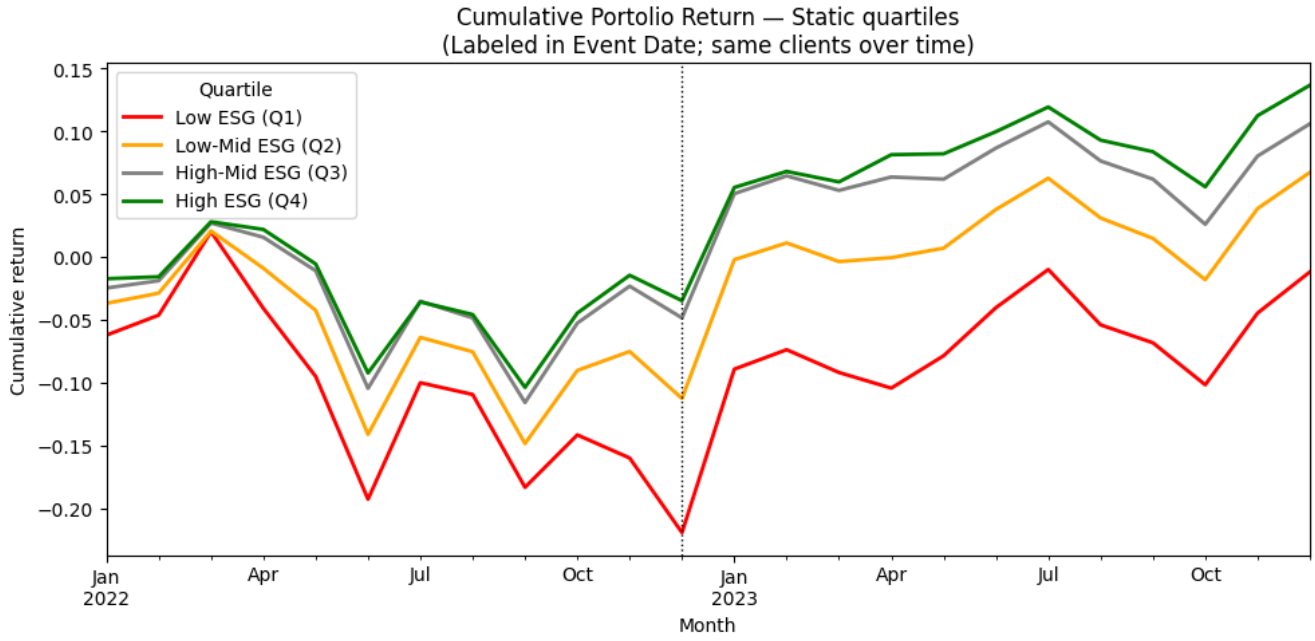


Figure 11: Absolute portfolio performance over- and under mean ESG score portfolios

their portfolios toward ESG exposures that reflected their individual preferences. This behavior is consistent with a willingness to trade off part of their financial performance for non-pecuniary satisfaction derived from holding higher-ESG portfolios. These results demonstrate that the ESG information tool effectively altered investor behavior, inducing a measurable and economically meaningful shift in portfolio allocation. The observed post-introduction convergence aligns with theoretical asset pricing models that incorporate non-pecuniary utility components (e.g. Ľuboš Pástor, Stambaugh, and Taylor (2021), which predict that investors who derive utility from sustainability characteristics accept lower expected short-term returns in exchange for value alignment. In line with these frameworks, the evidence suggests that once investors internalize ESG preferences, they adopt longer-term investment horizons and prioritize sustainable holdings over short-term return maximization.

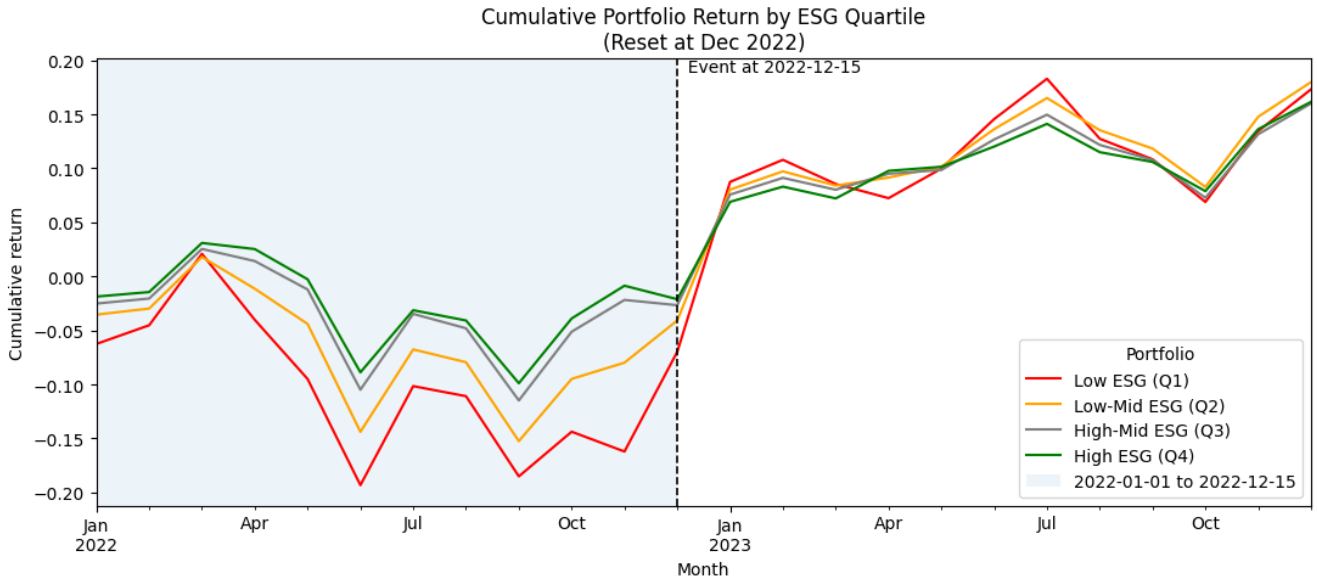


Figure 12: Cumulative portfolio return over- and under mean ESG score portfolios

5.2.2 Performance Analysis Regressions

Table 16 reports changes in portfolio performance before and after the introduction of the ESG information tool. The coefficient on *Post* is positive and highly significant across all performance measures. Average three-month returns rise by approximately 2 percentage points, while return volatility declines modestly, resulting in a substantial improvement in the Sharpe ratio and higher cumulative wealth for a CHF 1,000 investment. These results suggest that portfolio performance improves and risk decreases after investors gain access to ESG information. Portfolios with a higher share of securities lacking ESG data exhibit lower returns and higher volatility, indicating that limited ESG coverage constrains performance. Overall, the evidence points to enhanced stability and efficiency of portfolios following the tool's introduction.

Table 17 extends the analysis by interacting the post-event indicator with a dummy for investors whose portfolios had below-average ESG scores at the event date. The interaction term is positive and highly significant for portfolio returns and cumulative wealth, indicating that initially low-ESG investors experience the strongest performance gains after the tool's introduction. Volatility for this group increases slightly, while risk-

Table 16: Performance and Event

This table displays regressions . Errors are cluster on investor. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) 3M Return	(2) 3M Vol	(3) 3M SR	(4) 3M Ret 1kCHF
Post	2.099***	-0.016***	4.210***	0.514***
	(144.13)	(-105.48)	(156.74)	(53.34)
% Unmatched shares	-0.012***	-0.000***	-0.009***	-0.007***
	(-14.46)	(-10.77)	(-6.33)	(-10.42)
# Insturments	0.001	-0.000***	-0.065***	0.009***
	(0.54)	(-3.73)	(-15.25)	(9.47)
Constant	-1.378***	0.079***	-1.757***	-0.533***
	(-37.57)	(202.17)	(-29.57)	(-32.11)
Observations	1,116,758	1,205,136	1,238,904	1,116,758
Cluster	53,578	53,662	53,773	53,578
R^2	0.258	0.357	0.210	0.349
Screening Values	Y	Y	Y	Y
Investor FE	Y	Y	Y	Y

adjusted returns remain unchanged. The results suggest that low-ESG investors respond more actively to the new information, rebalancing toward higher-return opportunities even at the cost of marginally greater risk, whereas high-ESG investors maintain more stable but less dynamic portfolios.

Table 17: Performance and Event

This table displays regressions . Errors are cluster on investor. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) 3M Return	(2) 3M Vol	(3) 3M SR	(4) 3M Ret 1kCHF
Post	1.730***	-0.018***	4.218***	0.376***
	(96.68)	(-96.61)	(115.27)	(33.90)
Post × Low event score	0.779***	0.004***	-0.017	0.290***
	(27.74)	(13.21)	(-0.33)	(15.13)
% Unmatched shares	-0.012***	-0.000***	-0.009***	-0.007***
	(-13.74)	(-10.38)	(-6.34)	(-10.09)
# Instruments	0.003	-0.000***	-0.065***	0.009***
	(1.28)	(-3.42)	(-15.25)	(9.99)
Constant	-1.424***	0.079***	-1.756***	-0.550***
	(-38.90)	(201.13)	(-29.53)	(-32.75)
Observations	1,116,758	1,205,136	1,238,904	1,116,758
Cluster	53,578	53,662	53,773	53,578
R^2	0.260	0.357	0.210	0.350
Screening Values FE	Y	Y	Y	Y
Investor FE	Y	Y	Y	Y

5.2.3 Event-Study Analysis of Portfolio Performance

To examine the temporal evolution of portfolio performance around the introduction of the ESG information tool, Table 18–20 present event-study regressions based on rolling three-month portfolio performance measures. These include realized returns, volatility, Sharpe ratios, and the cumulative return on CHF 1,000 invested. The estimates track how performance adjusted month by month after investors first gained access to portfolio

ESG information.

Table 18 summarizes the dynamic adjustment in portfolio performance for the full investor sample. The coefficients indicate a sharp improvement in returns and risk-adjusted performance immediately after the ESG tool was introduced in December 2022 and January 2023. Three-month returns and Sharpe ratios reach their highest levels in the first quarter of 2023, while volatility remains contained or declines modestly, implying improved risk efficiency. As the year progresses, performance gradually normalizes, though it remains positive throughout, suggesting that portfolios stabilized after an initial adjustment phase. The persistent reduction in volatility indicates that, even as returns reverted to moderate levels, investors maintained better-diversified and less risky portfolios. Overall, the evolution of the coefficients points to a short-term boost and a lasting improvement in portfolio stability following ESG disclosure.

Table 19 focuses on investors with below-median ESG portfolio scores at the event date. Their return and Sharpe ratio dynamics exhibit a stronger and more persistent improvement relative to the full sample. Three-month returns rise sharply in the first months after the tool's introduction and remain elevated through mid-2023, consistent with active portfolio rebalancing toward higher-quality and better-performing assets. Volatility temporarily increases in early months, reflecting active trading and adjustment, but declines substantially thereafter. By the second half of 2023, these investors achieve both higher average returns and lower volatility, indicating improved efficiency and a successful transition toward portfolios with stronger fundamentals and greater ESG alignment.

Table 20 reports results for investors with above-median ESG portfolio scores at the event date. Their performance pattern differs from that of the low-score group. Returns increase moderately in early 2023 but peak earlier and decline more rapidly thereafter, suggesting less aggressive rebalancing once ESG information became available. Nevertheless, volatility declines consistently throughout the period, and Sharpe ratios remain high in the first half of the year, implying that high-ESG investors preserved stable and efficient portfolios rather than seeking additional gains. This behavior is consistent with

Table 18: Event-study regressions: All Rolling 3M performance metrics (updated)se clustered on investor-level

	Rol3M Return	Vol3M	3M Sharpe	Rol3M Ret/1k CHF
Dec 2022	1.818***	-0.009***	4.696***	0.428***
	(62.20)	(-31.99)	(85.21)	(25.41)
Jan 2023	3.808***	0.011***	7.989***	0.969***
	(188.85)	(45.88)	(213.31)	(65.36)
Feb 2023	3.633***	0.009***	7.969***	1.005***
	(173.49)	(38.73)	(208.96)	(66.48)
Mar–Apr 2023	2.867***	-0.012***	5.598***	0.636***
	(133.97)	(-53.70)	(155.45)	(54.43)
May–Jun 2023	1.606***	-0.026***	3.217***	0.344***
	(81.70)	(-115.89)	(79.22)	(33.87)
Jul–Aug 2023	2.332***	-0.030***	4.658***	0.676***
	(117.26)	(-142.66)	(114.77)	(52.43)
Sep–Dec 2023	0.880***	-0.024***	1.301***	0.183***
	(47.06)	(-126.50)	(38.48)	(15.77)
Observations	1,116,758	1,205,136	1,238,904	1,116,758
R^2	0.283	0.386	0.239	0.354
Screening Values FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Investor FE	Y	Y	Y	Y

Robust t-statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 19: Event-study regressions: Rolling 3M performance metrics (event score < 55)se clustered on investor-level

	Rol3M Return	Vol3M	3M Sharpe	Rol3M Ret/1k CHF
Dec 2022	1.000***	-0.007***	2.548***	0.230***
	(23.02)	(-16.60)	(33.14)	(8.69)
Jan 2023	3.777***	0.023***	6.798***	1.150***
	(118.10)	(57.28)	(118.37)	(46.57)
Feb 2023	4.178***	0.019***	7.889***	1.321***
	(126.07)	(50.14)	(142.02)	(51.21)
Mar–Apr 2023	3.385***	-0.009***	5.489***	0.817***
	(97.93)	(-26.92)	(105.01)	(41.47)
May–Jun 2023	2.133***	-0.025***	3.743***	0.463***
	(67.79)	(-70.16)	(63.49)	(26.88)
Jul–Aug 2023	3.329***	-0.029***	5.820***	1.001***
	(106.10)	(-88.59)	(102.40)	(44.93)
Sep–Dec 2023	1.296***	-0.025***	1.495***	0.261***
	(44.53)	(-83.36)	(30.31)	(13.66)
Observations	525,367	575,966	594,934	525,367
R^2	0.282	0.371	0.239	0.361
Screening Values FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Investor FE	Y	Y	Y	Y

Robust t-statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

investors already holding well-diversified, high-quality portfolios before disclosure and using the ESG information primarily to confirm, rather than alter, existing strategies.

Table 20: Event-study regressions: Rolling 3M performance metrics (event score > 55, updated) se clustered on investor-level

	Rol3M Return	Vol3M	3M Sharpe	Rol3M Ret/1k CHF
Dec 2022	2.794***	-0.011***	7.230***	0.656***
	(77.00)	(-28.62)	(98.77)	(30.71)
Jan 2023	3.828***	0.000	9.095***	0.812***
	(150.43)	(1.39)	(190.49)	(46.34)
Feb 2023	3.158***	-0.000	8.048***	0.731***
	(120.59)	(-0.15)	(153.58)	(42.79)
Mar–Apr 2023	2.414***	-0.014***	5.700***	0.478***
	(92.44)	(-51.03)	(114.83)	(35.39)
May–Jun 2023	1.130***	-0.027***	2.719***	0.237***
	(46.94)	(-95.95)	(48.70)	(20.48)
Jul–Aug 2023	1.429***	-0.031***	3.587***	0.382***
	(60.07)	(-115.86)	(62.95)	(27.65)
Sep–Dec 2023	0.491***	-0.024***	1.113***	0.106***
	(20.62)	(-97.52)	(23.95)	(7.84)
Observations	591,391	629,170	643,970	591,391
R^2	0.294	0.371	0.247	0.340
Screening Values FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Investor FE	Y	Y	Y	Y

Robust t-statistics in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Across all groups, portfolio performance improves in the months following the introduction of the ESG information tool. The strongest effects appear among investors with initially low ESG scores, who experience significant gains in returns and risk-adjusted performance as they realign their holdings toward higher-quality firms. High-ESG investors exhibit smaller but more stable adjustments, maintaining low volatility and consistent performance. Together, these findings indicate that access to ESG portfolio information enhanced overall portfolio efficiency.

5.3 Investor Features and Change

Table 21 examines which investor- and portfolio-level characteristics predict subsequent changes in value-weighted portfolio ESG scores over six and twelve months after disclosure. The dependent variable is the change in the portfolio ESG score, reported as absolute (Δ) and relative (scaled by the event-date score) changes.

Portfolio composition. Investors holding a larger # Shares at the event date reduce their ESG scores thereafter (negative coefficients across horizons), whereas a higher # Unique shares (consistent with more granular stock selection) is associated with subsequent *increases* in ESG scores. Exposure to structured products and a broader spread across industries (# Industries invest) are also positively related to later ESG upgrades, while wider geographic spread (# Countries invest) predicts *smaller* or negative changes. Event-day ESG score enters strongly and negatively in all specifications, indicating mean reversion: investors with lower initial scores subsequently raise their ESG scores more.

Investor characteristics and past performance. GLP support is weakly positive. Female and older investors exhibit larger subsequent increases in ESG scores. Past six-month returns are positively related to later ESG upgrades, while higher past volatility and (to a lesser extent) higher past Sharpe ratios predict smaller or negative changes, consistent with riskier or already risk-efficient portfolios adjusting less toward higher ESG profiles.

Taken together, the results indicate that ESG score *increases* are concentrated among investors with lower initial ESG exposure, more granular equity selection, and stronger recent performance, whereas broad country diversification and high initial ESG levels are associated with smaller adjustments. These patterns are consistent with incremental rebalancing toward higher-ESG holdings rather than blanket shifts.

Table 21: ESG Portfolio Score Changes and Characteristics

	(1) Δ 6m Abs.	(2) Δ 6m Rel.	(3) Δ 12m Abs.	(4) Δ 12m Rel.
# Shares	-0.331***	-0.008***	-0.521***	-0.015***
	(-14.28)	(-11.14)	(-15.31)	(-12.83)
# Uni. shares	0.360***	0.009***	0.563***	0.016***
	(14.62)	(11.39)	(15.64)	(13.14)
# Struc.products	0.023***	0.001**	0.040***	0.001***
	(3.00)	(2.11)	(3.80)	(2.92)
# Industries invest	0.123***	0.005***	0.260***	0.010***
	(5.93)	(6.85)	(9.08)	(10.00)
# Countries invest	-0.142***	-0.003***	-0.225***	-0.006***
	(-7.28)	(-5.23)	(-8.37)	(-6.59)
Event score	-0.130***	-0.003***	-0.417***	-0.008***
	(-47.19)	(-28.26)	(-109.12)	(-59.78)
GLP support	0.022***	0.001***	0.006	0.001**
	(2.62)	(2.75)	(0.53)	(2.07)
Past 6m returns	0.156***	0.002*	0.306***	0.005***
	(5.54)	(1.88)	(7.83)	(4.17)
Past 6m SR	-1.246***	-0.013	-2.466***	-0.032***
	(-4.79)	(-1.49)	(-6.83)	(-2.66)
Past 6m Ret1kCHF	-0.007	0.002***	-0.015	0.001
	(-0.83)	(5.26)	(-1.20)	(1.44)
Past 6m volatility	-6.542***	-0.197***	-8.662***	-0.387***
	(-8.06)	(-7.48)	(-7.69)	(-10.25)
Female	0.174*	0.007**	0.785***	0.014***
	(1.94)	(2.39)	(6.33)	(3.48)
Age group	0.065***	0.001	0.353***	0.008***
	(2.73)	(0.90)	(10.76)	(7.01)
Constant	9.246***	0.170***	20.898***	0.358***
	(9.38)	(5.31)	(15.29)	(7.83)
Observations	36,688	36,688	35,868	35,868
R^2	0.062	0.026	0.260	0.095

Notes: This table regresses investor and portfolio characteristics on changes in value-weighted ESG portfolio scores. Column (1) and (3) capture absolute changes, while column (2) and (4) focuses on relative score changes from event date to 6 and 12 months later, accordingly. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).
Insignificant controls omitted from display: # Bonds, # Metals, Past green passive investment, GPS support, City/Country loccation, Language area , Cash Value, Asset Value.

6 Conclusion

This paper provides the first comprehensive evidence on how individual investors adjust their real-world portfolios in response to ESG score disclosure and how these changes affect portfolio performance. In contrast to previous studies that simulate portfolio construction, track indices, or rely on hypothetical preferences, this research draws on actual investment behavior. I analyze realized returns accounting for transaction costs, portfolio strategies across all asset classes, and observed decisions made by retail investors.

This study examines how individual investors respond to the introduction of ESG (Environmental, Social, and Governance) information on a retail trading platform. Exploiting a unique setting in which ESG scores were disclosed to investors for the first time, I analyze shifts in investor behavior, portfolio composition, and performance outcomes.

The findings demonstrate that the availability of ESG information leads to a significant reallocation of portfolios toward higher ESG score assets. This adjustment is not merely symbolic but rather, it reflects a meaningful integration of non-financial preferences into investment decisions. Investors sell lower ESG-rated stocks and buy higher-rated ones, leading to a measurable increase in the overall ESG quality of their portfolios. This reallocation is especially pronounced among older investors, women, and individuals residing in regions with higher support for green political parties, underscoring the role of values-driven motivations.

The introduction of the ESG information tool also led to broader improvements in portfolio structure and quality. After disclosure, investors increased their holdings of equities and corporate bonds while reducing exposure to structured products, suggesting a shift away from complex or higher-risk instruments toward more transparent and fundamentally sound assets. They also expanded the number of instruments held and invested more frequently in companies with available ESG information, indicating more informed and deliberate portfolio construction.

Diversification improved as well and findings on trading activity are consistent with greater satisfaction and a lower need for short-term adjustments. Overall, these dy-

namics point to broad-based improvements in portfolio diversification and informational efficiency following ESG disclosure.

At the firm level, investors reallocated toward companies with stronger fundamentals. The effects are most pronounced among investors with higher initial ESG scores, indicating that ESG information supports both value alignment and financial prudence.

Performance analyses further reveal that higher-ESG portfolios are associated with superior financial outcomes. Event-study results show that these performance improvements emerged immediately after the tool's introduction and persisted throughout the following year. The effects are strongest among investors with initially low ESG scores, who achieved substantial gains in returns and stability as they rebalanced toward higher-quality assets.

The analysis shows that adjustments in ESG portfolio scores were implemented in a prudent and economically meaningful manner. Investors did not blindly chase high ESG scores but instead constructed more diversified portfolios and selected firms with stronger fundamentals.

This paper contributes to the ongoing debate about the role and value of ESG disclosures in finance. The findings demonstrate that transparency in ESG information leads to measurable and meaningful changes in portfolio construction. Access to ESG data enables investors to build more diversified, higher-quality portfolios, improve their return–risk profiles, and align their holdings with both financial and non-financial objectives. This challenges the common assumption that incorporating ESG necessarily involves financial trade-offs. Instead, the evidence suggests that access to ESG information can create a "doing well by doing good" scenario, yielding both sustainable outcomes and sound financial performance.

Overall, this study provides unique behavioral evidence that simple, well-designed ESG information tools can guide individual investors toward better-informed, more disciplined, and ultimately more successful investment decisions. These results strengthen the case for broader ESG transparency and integration in retail financial services.

Theoretical Illustration: Attention, ESG Constraints, and Diversification

The empirical results show that retail investors tilt toward high-ESG assets, raise portfolio ESG scores, and (mechanically) improve diversification after disclosure. To provide intuition, I present a stylized portfolio choice model in which limited investor attention and an ESG constraint interact to generate diversification benefits. The goal is not to propose a general theory but to offer a simple mechanism consistent with the empirical patterns.

Restricted Attention Set

Suppose investors initially restrict their attention to a set $S_1 \subset \{1, \ldots, N\}$ of assets (e.g., a narrow set of high-return, correlated stocks). Portfolio weights are $w \in \mathbb{R}^{|S_1|}$ with $w_i \geq 0$ and $\mathbf{1}'w = 1$. The investor solves:

$$\min_{w \in \mathbb{R}^{|S_1|}} \; w' \Sigma_{S_1} w \quad \text{s.t.} \quad \mu'_{S_1} w \geq R, \;\; \mathbf{1}'w = 1, \;\; w \geq 0,$$

which yields the efficient frontier on S_1. At target return R , the resulting portfolio w^{S_1} may be poorly diversified if assets in S_1 are highly correlated.

Introducing the ESG Constraint

Each asset i carries an ESG score $E_i \in [0, 100]$, and the portfolio's ESG score is

$$E(w) = \sum_i w_i E_i.$$

Suppose the restricted-attention portfolio satisfies $E(w^{S_1}) < e$, where e is a desired ESG level. To meet this constraint, the investor must expand their attention set to $S_2 \supset S_1$, e.g., by including high-E assets (like B_2.

The optimization problem becomes:

$$\min_{w \in \mathbb{R}^{|S_2|}} \; w' \Sigma_{S_2} w \quad \text{s.t.} \quad \mu'_{S_2} w \geq R, \;\; E'_{S_2} w \geq e, \;\; \mathbf{1}' w = 1, \;\; w \geq 0.$$

Implications

The ESG constraint forces the inclusion of high-E, weakly correlated assets, expanding the feasible set. At the same expected return R, the portfolio volatility declines, $\sigma(w^{S_2}) < \sigma(w^{S_1})$, leading mechanically to improved diversification and a higher Sharpe ratio.

Illustrative Graphs

Figures 13 and 14 provide stylized illustrations of the mechanism. They are schematic (not estimates) and mirror the model logic: adding a high-E, weak-ρ asset shifts the efficient frontier left at a given R.

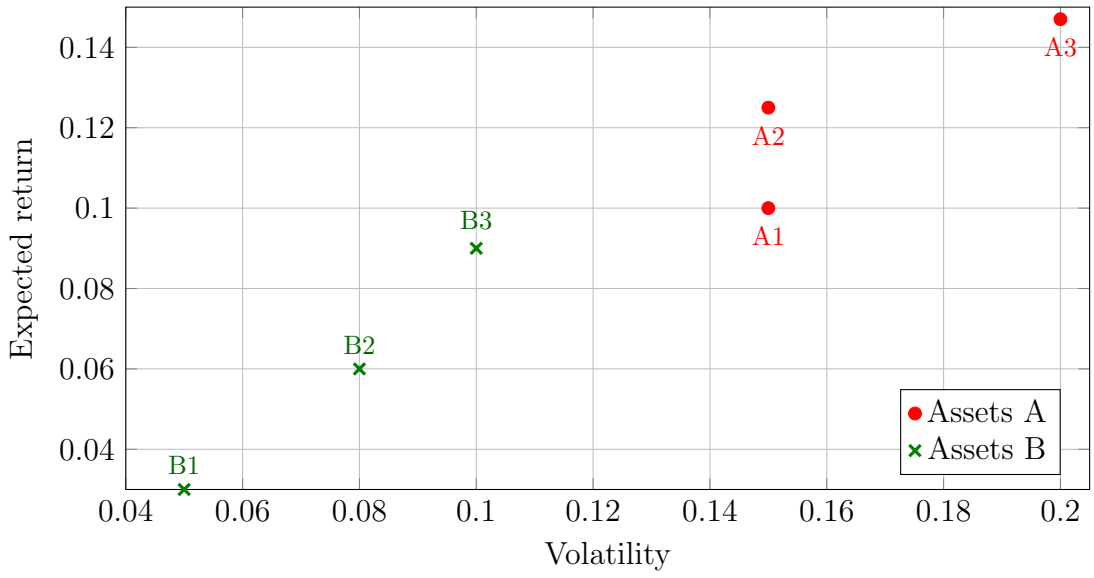


Figure 13: Return–volatility locations. A assets: higher mean/volatility and high within-A correlation; B assets: lower mean/volatility and weak correlation with A.

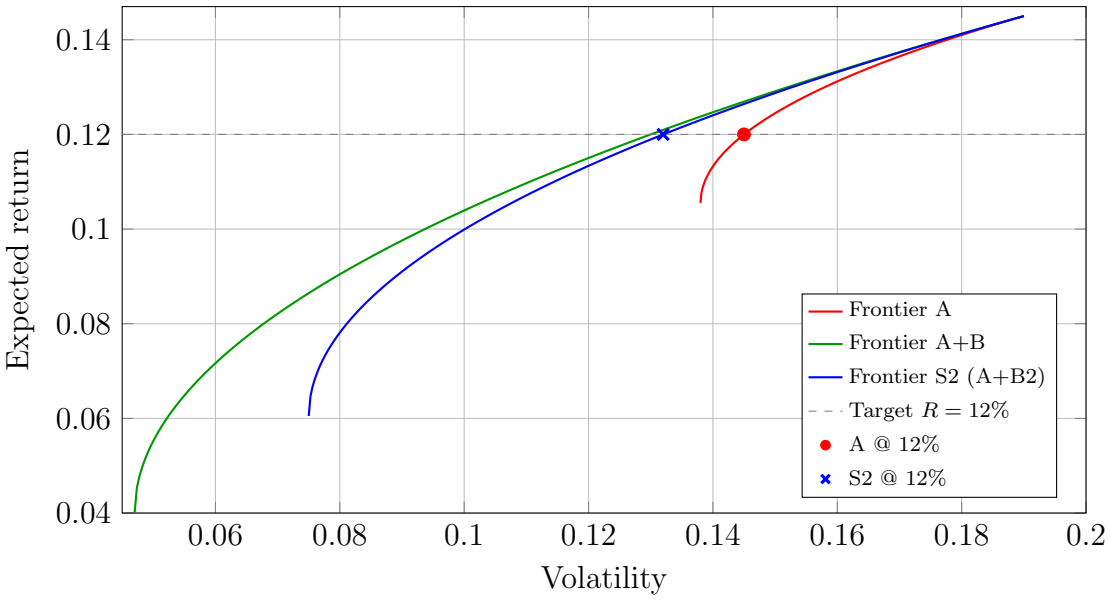


Figure 14: Efficient frontiers are increasing and concave, and meet at a common endpoint. Adding a high-E, weakly correlated asset expands feasibility and shifts the frontier left; at the same target $R = 12\%$, volatility falls from the A frontier to S2.

Performance Measurement from Flow-Adjusted Portfolio Values

Let $V^*_{i,t}$ denote investor i's end-of-month portfolio value *net of* external flows (deposits, withdrawals, fees, dividends), i.e., a flow-adjusted NAV. Monthly portfolio return is

$$r_{i,t} \;=\; \frac{V^*_{i,t}}{V^*_{i,t-1}} - 1.$$

Construction of three-month performance metrics. I winsorize $r_{i,t}$ at the 5th/95th percentiles by month and form rolling three-month statistics:

$$\bar{r}^{(3)}_{i,t} = \tfrac{1}{3}\sum_{k=0}^{2} r_{i,t-k}, \qquad \sigma^{(3)}_{i,t} = \sqrt{\tfrac{1}{3}\sum_{k=0}^{2}\left(r_{i,t-k} - \bar{r}^{(3)}_{i,t}\right)^2},$$

$$\mathrm{SR}^{(3)}_{i,t} \;=\; \frac{\bar{r}^{(3)}_{i,t}}{\sigma^{(3)}_{i,t}}.$$

I interpret $\mathrm{SR}^{(3)}_{i,t}$ as a return-to-volatility ("Sharpe-with-r_f=0") ratio. At a monthly frequency for CHF-based investors, the risk-free component is typically small relative to

portfolio returns, so subtracting r_f has a negligible impact on inference and does not affect cross-sectional ranking (since r_f is common across investors in a given month). As a robustness, one can recompute using a CHF money-market proxy (e.g., SARON/Confederation bill yield); results are qualitatively unchanged in practice because the numerator adjustment is only a few basis points per month.

Standard errors and overlapping windows. The three-month windows overlap, implying short-horizon serial correlation (approximately MA(2)). All panel regressions therefore report *two-way clustered* standard errors (by investor and by calendar month), which allow arbitrary serial correlation within investor over time and arbitrary cross-sectional correlation within month. If instead one runs pure time-series regressions on monthly aggregates (e.g., cross-sectional means), a Newey–West HAC estimator with lag 2 is appropriate.

Equity sleeve vs. full portfolio. In my sample, ESG scores are available for some equities only. I therefore (i) compute full-portfolio metrics as above; (ii) compute an equity-sleeve return using equity holdings and equity cash flows; and (iii) control for ESG coverage (value and count) and the equity weight. Results are reported side-by-side. The main specifications also include investor fixed effects and controls for firm characteristics (size, leverage, ROA, Tobin's Q) where relevant, with errors two-way clustered by investor and month.

References

Global Sustainable Investment Alliance. Global sustainable investment review 2022. 2022. URL https://www.gsi-alliance.org/wp-content/uploads/2023/12/GSIA-Report-2022.pdf.

Amir Amel-Zadeh and George Serafeim. Why and how investors use esg information: Evidence

from a global survey. *Financial Analysts Journal*, 74(3):87–103, 2018. doi: 10.2469/faj.v74.n3.2. URL https://doi.org/10.2469/faj.v74.n3.2.

Doron Avramov, Si Cheng, Abraham Lioui, and Andrea Tarelli. Sustainable investing with esg rating uncertainty. *Journal of Financial Economics*, 145(2, Part B):642–664, 2022. ISSN 0304-405X. doi: https://doi.org/10.1016/j.jfineco.2021.09.009. URL https://www.sciencedirect.com/science/article/pii/S0304405X21003974.

Malcolm Baker, Mark L Egan, and Suproteem K Sarkar. How do investors value esg? Working Paper 30708, National Bureau of Economic Research, December 2022. URL http://www.nber.org/papers/w30708.

Fanny Cartellier, Peter Tankov, and Olivier David Zerbib. Can investors curb greenwashing? *Available at SSRN 4644741*, 2023.

Marco Ceccarelli, Stefano Ramelli, and Alexander F Wagner. Low Carbon Mutual Funds*. *Review of Finance*, 28(1):45–74, 04 2023. ISSN 1572-3097. doi: 10.1093/rof/rfad015. URL https://doi.org/10.1093/rof/rfad015.

Elena Escrig-Olmedo, María Ángeles Fernández-Izquierdo, Idoya Ferrero-Ferrero, Juana María Rivera-Lirio, and María Jesús Muñoz-Torres. Rating the raters: Evaluating how esg rating agencies integrate sustainability principles. *Sustainability*, 11(3), 2019. ISSN 2071-1050. doi: 10.3390/su11030915. URL https://www.mdpi.com/2071-1050/11/3/915.

Rajna Gibson, Philipp Krueger, and Shema F Mitali. The sustainability footprint of institutional investors: Esg driven price pressure and performance. *Swiss Finance Institute Research Paper*, (17-05), 2020.

Rajna Gibson Brandon, Simon Glossner, Philipp Krueger, Pedro Matos, and Tom Steffen. Do Responsible Investors Invest Responsibly?*. *Review of Finance*, 26(6):1389–1432, 09 2022. ISSN 1572-3097. doi: 10.1093/rof/rfac064. URL https://doi.org/10.1093/rof/rfac064.

Jody Grewal, Edward J Riedl, and George Serafeim. Market reaction to mandatory nonfinancial disclosure. *Management Science*, 65(7):3061–3084, 2019.

Andres Guiral, Doocheol Moon, Hun-Tong Tan, and Yao Yu. What drives investor response to csr performance reports? *Contemporary Accounting Research*, 37(1):101–130, 2020. doi: https://doi.org/10.1111/1911-3846.12521. URL https://onlinelibrary.wiley.com/doi/abs/10.1111/1911-3846.12521.

Samuel M Hartzmark and Abigail B Sussman. Do investors value sustainability? a natural experiment examining ranking and fund flows. *The Journal of Finance*, 74(6):2789–2837, 2019.

Philipp Krueger, Zacharias Sautner, and Laura T Starks. The importance of climate risks for institutional investors. *The Review of Financial Studies*, 33(3):1067–1111, 2020.

John McCalla-Leacy, Jennifer Shulman, and Richard Threlfall. Big shifts, small steps - survey of sustainability reporting 2022. pages Publication number: 138280–G, October 2022. URL https://assets.kpmg.com/content/dam/kpmg/se/pdf/komm/2022/Global-Survey-of-Sustainability-Reporting-2022.pdf.

Falko Paetzold and Timo Busch. Unleashing the powerful few: Sustainable investing behaviour of wealthy private investors. *Organization & Environment*, 27(4):347–367, 2014.

Arno Riedl and Paul Smeets. Why do investors hold socially responsible mutual funds? *The Journal of Finance*, 72(6):2505–2550, 2017. doi: https://doi.org/10.1111/jofi.12547. URL https://onlinelibrary.wiley.com/doi/abs/10.1111/jofi.12547.

Ľuboš Pástor, Robert F. Stambaugh, and Lucian A. Taylor. Sustainable investing in equilibrium. *Journal of Financial Economics*, 142(2):550–571, 2021. ISSN 0304-405X. doi: https://doi.org/10.1016/j.jfineco.2020.12.011. URL https://www.sciencedirect.com/science/article/pii/S0304405X20303512.

Appendix

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7 Planned Extension

7.1 ESG Screening Values

7.1.1 Positive Values

7.1.2 Negative Values

7.2 Investor Heterogeneity

7.2.1 Responsiveness Classification

7.3 The Role of Past Performance in ESG Portfolio Tilting

Building on the results above, which show that investors adjust their portfolios in response to the disclosure of ESG scores, I propose a further investigation into the role of past portfolio performance in shaping this response.

Specifically, I aim to test the hypothesis that an investor's reaction to ESG score disclosure is moderated by the performance of their portfolio in the months leading up to the event. My conjecture is that investors experiencing poor returns before the ESG score disclosure—and who simultaneously hold portfolios with high ESG scores—may attribute their underperformance to the perceived financial cost of ESG investing. This could trigger a strategic tilting of their portfolios away from high ESG-score assets and toward lower-ESG alternatives. Conversely, investors with strong prior performance and high ESG scores may interpret this alignment positively and double down on sustainable investments.

To formally test this, I will augment the existing empirical model with interaction terms between:

- the ESG score of the portfolio at the event date (Event_score), and

- a measure of past portfolio performance (e.g., trailing 6-month or 12-month returns before the disclosure).

The baseline specification is as follows:

$$\text{PostDisclosureChange}_{it} = \alpha + \beta_1 \text{Event_score}_{it} + \beta_2 \text{PastReturn}_{it} + \beta_3 (\text{Event_score}_{it} \times \text{PastReturn}_{it}) + \gamma X_{it} + \epsilon_{it}$$

where $\text{PostDisclosureChange}_{it}$ could reflect changes in ESG portfolio scores, trading activity, or shifts in holdings across the ESG distribution. X_{it} includes portfolio controls (e.g., number of instruments, unmatched share percentage, portfolio size).

I will stratify the analysis based on ESG score quantiles at event date and conduct subsample regressions for underperforming vs. outperforming investors. The goal is to uncover whether poor past performance leads to ESG score-driven "blame attribution," resulting in reversed ESG tilting.

This analysis will help address the behavioral underpinnings of ESG trading responses and enrich the understanding of how investors evaluate the financial consequences of sustainability preferences.

7.4 Investment Strategy Typology

7.4.1 Momentum vs. Contrarian Behavior

7.4.2 Active vs. Passive Allocation

7.4.3 Linking Strategy to ESG Orientation

7.5 Investor Strategy Classification: Momentum vs. Contrarian

To enrich the understanding of ESG-related trading behavior, this section introduces a trading style classification, based on the framework of Grinblatt et al. (2020). The aim is to assess whether ESG-conscious investors behave as momentum or contrarian traders, and whether such

strategies relate to portfolio performance or sustainability alignment.

Return-Based Style Metrics: Two dynamic measures are constructed using monthly portfolio holdings and stock returns:

- **L0M (Lag-Zero Momentum):**

$$\text{L0M}_{it} = \sum_{j=1}^{N_t} (w_{ijt} - w_{ijt-1})\, R_{jt-1}$$

  This metric captures whether investors tilt their portfolios toward stocks that performed well in the previous month. A positive L0M implies momentum trading, while a negative value signals contrarian behavior.

- **F1M (Forward-One Momentum):**

$$\text{F1M}_{it} = \sum_{j=1}^{N_t} (w_{ijt} - w_{ijt-1})\, R_{jt+1}$$

  This metric evaluates the future return performance of the trading strategy. A positive F1M suggests that investors successfully timed their trades, while a negative value reflects poor foresight or deteriorating returns.

ESG-Based Style Metrics: In addition to return-based measures, I construct analogous momentum/contrarian indicators based on monthly ESG score dynamics:

- **ESG-L0M:**

$$\text{ESG-L0M}_{it} = \sum_{j=1}^{N_t} (w_{ijt} - w_{ijt-1})\, ESG_{jt-1}$$

  This measures whether investors reweight toward stocks with high ESG scores in the prior month.

- **ESG-F1M:**

$$\text{ESG-F1M}_{it} = \sum_{j=1}^{N_t} (w_{ijt} - w_{ijt-1})\, ESG_{jt+1}$$

This assesses whether changes in portfolio weights align with subsequent increases in ESG scores, indicating forward-looking ESG upgrading.

Research Design Fit: The event study setting is well-suited for this strategy classification. By tracking both return- and ESG-based metrics before and after the ESG information disclosure, I will examine:

- Whether ESG-responsive investors tend to follow momentum or contrarian patterns.
- Whether these strategies improve portfolio performance (via F1M) or sustainability alignment (via ESG-F1M).
- How patterns differ based on investor characteristics and initial ESG exposure at the disclosure date.

This dual approach—linking investor reaction to both returns and ESG score dynamics—offers a comprehensive view of whether sustainable investment is driven by values, performance attribution, or trading style shifts.