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

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Preliminary and incomplete, please do not circulate

Abstract

This paper studies how retail investors adjust their portfolios when ESG scores are introduced on a trading platform. Exploiting the first-time disclosure of portfolio-level ESG scores, I examine changes in asset allocation, firm selection, diversification, and performance. Investors actively respond to the disclosed score, with adjustments strongly anchored to the first observed level. Low-ESG investors increase, and high-ESG investors decrease, ESG exposure, generating partial mean reversion through coordinated purchases and sales. Beyond ESG tilts, portfolio reallocations differ across response groups. ESG-motivated tilters shift toward more profitable and lower-beta firms, while investors without strong ESG incentives primarily expand diversification. Higher-ESG portfolios outperform lower-ESG portfolios, and upward tilters earn higher returns across multiple horizons without a systematic increase in risk. Changes in value-weighted ESG scores predict subsequent returns, particularly for upward tilters. ESG adjustments are strongest among older investors, women, and investors in regions with stronger pro-environmental political 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 incorporates environmental, social, and governance considerations into portfolio decisions, has grown rapidly and now represents a substantial share of global assets under management Avramov, Cheng, Lioui, and Tarelli (2022). At the same time, the expansion of ESG reporting and rating activity has increased the amount of sustainability information available to financial market participants McCalla-Leacy, Shulman, and Threlfall (October 2022) Escrig-Olmedo, Fernández-Izquierdo, Ferrero-Ferrero, Rivera-Lirio, and Muñoz-Torres (2019). While this development has been widely studied in the context of firms and institutional investors, who are shown to use nonfinancial information in their investment strategies (e.g. Gibson, Krueger, and Mitali (2020); Riedl and Smeets (2017); Amel-Zadeh and Serafeim (2018), much less is known about how individual investors use ESG information when making portfolio decisions.

Understanding retail investor responses to ESG information is important for several reasons. Households directly control a large share of financial wealth, and their preferences may influence asset demand, firm financing conditions, and equilibrium asset prices. Unlike institutions, retail investors are not typically bound by mandates or client contracts, so their portfolio choices more directly reflect personal preferences, including nonpecuniary motives. Yet existing research provides limited evidence on how individuals respond when ESG information becomes salient for their own portfolios, rather than as an abstract firm characteristic.

This paper examines how retail investors respond to the introduction of ESG information on a trading platform, focusing on trading behavior, portfolio composition, and investment performance. I exploit the launch of an ESG tool on the platform that provides stock level ESG information and the value weighted ESG score of each investor's portfolio. I treat the first disclosure of this portfolio ESG score as an investor specific, plausibly exogenous information shock, under the assumption that investors could not precisely anticipate their portfolio ESG score prior to its disclosure. The portfolio ESG

score is individually tailored to existing holdings, computationally complex, and based on costly ESG data that were not previously provided on the platform. Moreover, the cross sectional distribution of portfolio ESG scores at disclosure is approximately normal and exhibits no bunching, suggesting that investors cannot systematically anticipate whether their score will be high or low. I compare investors with high and low initial ESG scores to a middle group that serves as a benchmark, include calendar time fixed effects, and exploit the panel structure of the data to include investor fixed effects. I define investor-specific event time using the first portfolio activity after the tool's introduction. This design allows me to interpret changes in behavior around the first observed ESG score as causal responses to new information.

Within this setting, the paper makes four contributions. First, I document direct behavioral responses to ESG disclosure at the investor level. Investors adjust the value weighted ESG score of their portfolios after first observing it, and these adjustments are anchored to the initial score they see. Investors with low initial scores increase their ESG exposure by buying higher ESG stocks and selling lower ESG stocks, while investors with high initial scores move in the opposite direction, leading to mean reversion in portfolio ESG composition. Second, I show that ESG disclosure has broader portfolio implications beyond ESG tilting. Investors who adjust their ESG exposure also change the composition of their portfolios along non ESG dimensions, including industry diversification, firm profitability, and market risk. This highlights that sustainability information can reshape overall portfolio structure rather than only affecting preferences over ESG characteristics. Third, I examine portfolio performance under two distinct information regimes. Before investors observe their portfolio ESG scores, higher ESG portfolios outperform lower ESG portfolios. After ESG exposure becomes salient, this return differential disappears. This pattern is consistent with investors trading off financial performance for alignment with nonpecuniary preferences once ESG information becomes personally relevant. Fourth, I document systematic heterogeneity in responses to ESG disclosure. Adjustments in portfolio ESG exposure are strongest among older investors, women, and investors residing

in regions with stronger support for environmentally oriented policies, indicating that investor characteristics shape the strength of values based investing.

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		

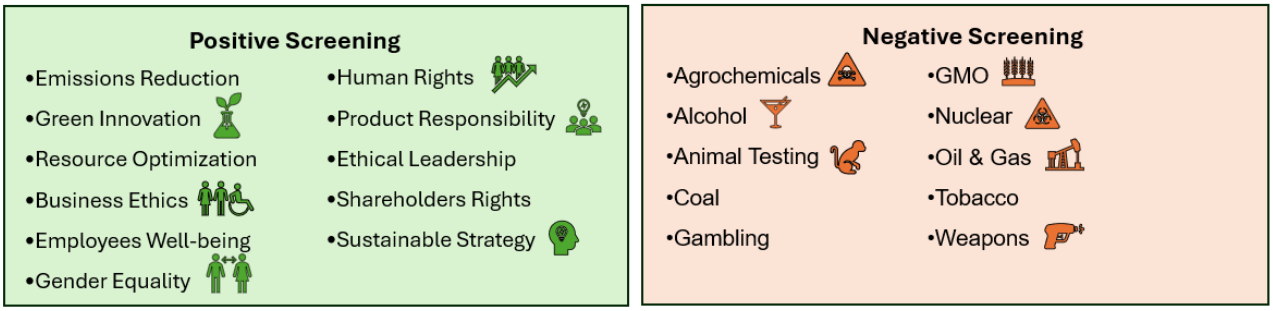


Figure 3: Stylized Example Company-level ESG Scores and Screening Values

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 Hypotheses

Based on the institutional setting and the empirical design, I derive the following testable hypotheses:

H1. ESG Adjustment: Retail investors change the value-weighted ESG score of their portfolios after the first disclosure of portfolio-level ESG information.

H2. Anchoring and Mean Reversion: Changes in portfolio ESG scores following first disclosure are negatively related to the initial portfolio ESG score observed by the investor.

H3. Trading Mechanism: Adjustments in portfolio ESG scores are driven by trades in individual securities, with investors increasing (decreasing) purchases of higher-ESG stocks and decreasing (increasing) holdings of lower-ESG stocks when their initial portfolio ESG score is low (high).

H4. Portfolio Reallocation: Investors who adjust their portfolio ESG scores also change broader portfolio characteristics, increasing industry diversification and tilting toward firms with higher profitability and lower market risk.

H5. Performance Dynamics: The positive return differential between high- and low-ESG portfolios observed prior to ESG score disclosure weakens or disappears after investors observe their portfolio ESG scores.

H6. Investor Heterogeneity: Increases in portfolio ESG scores following first disclosure are larger among older investors, women, and investors residing in regions with stronger support for environmental policies.

4.6 Regression Specification

4.6.1 Monthly Portfolio ESG Scores

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

$$\begin{aligned}\text{PortfolioESG}_{i,t} = \beta_0 &+ \beta_1 \,\text{PostTool}_{i,t} \\ &+ \sum_{g \neq \text{Mid}} \beta_{2g}\, \mathbf{1}\{\text{ScoreGroup}_i = g\} \\ &+ \sum_{g \neq \text{Mid}} \beta_{3g} \Big(\text{PostTool}_{i,t} \times \mathbf{1}\{\text{ScoreGroup}_i = g\}\Big) \\ &+ \boldsymbol{\gamma}' \,\text{PortfolioControls}_{i,t} + \boldsymbol{\delta}' \,\text{ScreeningIndicators}_i \\ &+ \alpha_i + \tau_t + \varepsilon_{i,t}.\end{aligned}$$

- $\text{PortfolioESG}_{i,t}$: investor i's value-weighted portfolio ESG score at month-end t.

- $\text{PostTool}_{i,t}$: 1 after investor i first sees the ESG tool (investor-specific treatment timing).
- ScoreGroup_i: initial portfolio ESG score group (Mid is the omitted reference group).
- $\text{PortfolioControls}_{i,t}$: monthly portfolio characteristics (event score, unmatched percentage, # instruments).
- $\text{ScreeningIndicators}_i$: ESG screening dummies (E/S/G exclusions and flags).
- Fixed effects: investor FE α_i and month-year FE τ_t; SEs two-way clustered (investor, month-year).

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.

4.6.2 Daily Stock Transactions

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 twelve months before versus the twelve months after each firm's disclosure date. I estimate the following panel specification:

$$
\begin{aligned}
\text{StockESGScore}_{i,s,t} = \beta_0 &+ \beta_1 \,\text{PostTool}_{i,t} \\
&+ \sum_{g \neq \text{Mid}} \beta_{2g}\, \mathbf{1}\{\text{ScoreGroup}_i = g\} \\
&+ \sum_{g \neq \text{Mid}} \beta_{3g}\, (\text{PostTool}_{i,t} \times \mathbf{1}\{\text{ScoreGroup}_i = g\}) \\
&+ \boldsymbol{\gamma}' \,\text{FirmChar}_{s,t} + \boldsymbol{\delta}' \,\text{TradeChar}_{i,s,t} \\
&+ \alpha_i + \mu_k + \lambda_c + \eta_{i,k} + \kappa_{i,c} + \varepsilon_{i,s,t}.
\end{aligned}
$$

- StockESGScore$_{i,s,t}$: ESG score of traded stock.
- PostTool$_{i,t}$: = 1 after investor i first sees the ESG tool (investor-specific timing).
- ScoreGroup$_i$: initial portfolio ESG score group (Mid = omitted reference).
- FirmChar$_{s,t}$: Tobin's Q, leverage, ROA, size.
- TradeChar$_{i,s,t}$: transaction price, quantity.
- Fixed effects: investor (α_i), industry (μ_k), country (λ_c), investor×industry ($\eta_{i,k}$), investor×country ($\kappa_{i,c}$).
- SEs: two-way clustered at investor and trade-date 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.

4.6.3 Change in Portfolio ESG Score and Returns

To test whether past changes in an investor's portfolio ESG score predict subsequent portfolio returns and whether this relation differs after ESG disclosure and across response groups, I estimate the following triple difference in differences specification. The score change is measured either using the value-weighted portfolio ESG score (VW) or the equally weighted portfolio ESG score (EW):

$$
\begin{aligned}
\text{MonRetWin}_{i,t} = \beta_0 &+ \beta_1 \, \Delta\text{Score}^{w}_{i,t-1} + \beta_2 \, \text{Post}_{i,t} + \beta_3 \left(\text{Post}_{i,t} \times \Delta\text{Score}^{w}_{i,t-1}\right) \\
&+ \sum_{g \in \{\text{Low,High}\}} \beta_{4g} \, \mathbf{1}\{\text{ScoreGroup}_i = g\} \\
&+ \sum_{g \in \{\text{Low,High}\}} \beta_{5g} \left(\mathbf{1}\{\text{ScoreGroup}_i = g\} \times \Delta\text{Score}^{w}_{i,t-1}\right) \\
&+ \sum_{g \in \{\text{Low,High}\}} \beta_{6g} \left(\text{Post}_{i,t} \times \mathbf{1}\{\text{ScoreGroup}_i = g\}\right) \\
&+ \sum_{g \in \{\text{Low,High}\}} \beta_{7g} \left(\text{Post}_{i,t} \times \mathbf{1}\{\text{ScoreGroup}_i = g\} \times \Delta\text{Score}^{w}_{i,t-1}\right) \\
&+ \boldsymbol{\gamma}' \, \mathbf{X}_{i,t} + \alpha_i + \tau_t + \varepsilon_{i,t},
\end{aligned}
$$

- $\text{MonRetWin}_{i,t}$: investor i's monthly portfolio return computed from end-of-month NAV changes.
- $\Delta\text{Score}^{w}_{i,t-1}$: change in investor i's portfolio ESG score from $t-2$ to $t-1$, computed using weighting scheme $w \in \{\text{VW}, \text{EW}\}$.
  - For $w = \text{VW}$, $\Delta\text{Score}^{\text{VW}}_{i,t-1} \equiv \Delta\text{ESGCScore}_{i,t-1}$ is the change in the value-weighted portfolio ESG score shown on the platform.
  - For $w = \text{EW}$, $\Delta\text{Score}^{\text{EW}}_{i,t-1}$ is the change in the equally weighted portfolio ESG score.
- $\text{Post}_{i,t}$: investor-specific indicator equal to one for months after investor i first observes their portfolio ESG score.
- $\mathbf{1}\{\text{ScoreGroup}_i = g\}$: indicator for the initial ESG score group at disclosure, where $g \in \{\text{Low}, \text{High}\}$ and the omitted reference group is Mid.
- $\mathbf{X}_{i,t}$: time-varying controls (ESG score components, screening values, % unmatched holdings, number of instruments).

- Fixed effects: investor fixed effects (α_i) and year-month fixed effects (τ_t).
- Standard errors: two-way clustered at the investor and month levels.

For a given weighting scheme w, the coefficient β_1 captures the average relation between lagged changes in the portfolio ESG score and subsequent returns in the pre-disclosure period for the middle group. The coefficient β_3 captures how this relation changes after disclosure for the middle group. The coefficients β_{7g} capture the triple interaction effects, that is, how the post-disclosure change in the return predictability of $\Delta\text{Score}_{t-1}^{w}$ differs for the low and high initial-score groups relative to the middle group.

5 Empirical Results

This section presents the empirical evidence on how retail investors respond to the introduction of ESG information on the trading platform. I begin by examining the distribution of portfolio ESG scores around the disclosure of ESG information. Next, I analyze trading behavior following disclosure, focusing on the ESG characteristics of the securities investors buy and sell. I then study changes in investors' value weighted portfolio ESG scores and the associated shifts in broader portfolio characteristics, including diversification, profitability, and risk.

I subsequently examine portfolio performance in relation to ESG exposure, distinguishing between periods before and after investors observe their portfolio ESG scores. Finally, I investigate heterogeneity in responses to ESG disclosure across investor characteristics to identify which investors are most likely to adjust their portfolio ESG exposure.

5.1 Investor Responses to ESG Disclosure

5.1.1 Descriptive Evidence on Portfolio ESG Adjustment

To examine how portfolio ESG scores change following the introduction of ESG information, I first analyze the cross-sectional distribution of value-weighted portfolio ESG scores

at disclosure and twelve months later. Figure 4 shows the kernel density of portfolio ESG scores on the event date (blue) and one year (yellow) after the introduction of the ESG tool. The distributions are approximately normal at both points in time, indicating no bunching and an adequate sample size. However, a shift in mass toward higher ESG score ranges is visible after disclosure. Although the pattern reveals a consistent tilt toward higher ESG scores, the magnitude of this shift is moderate.

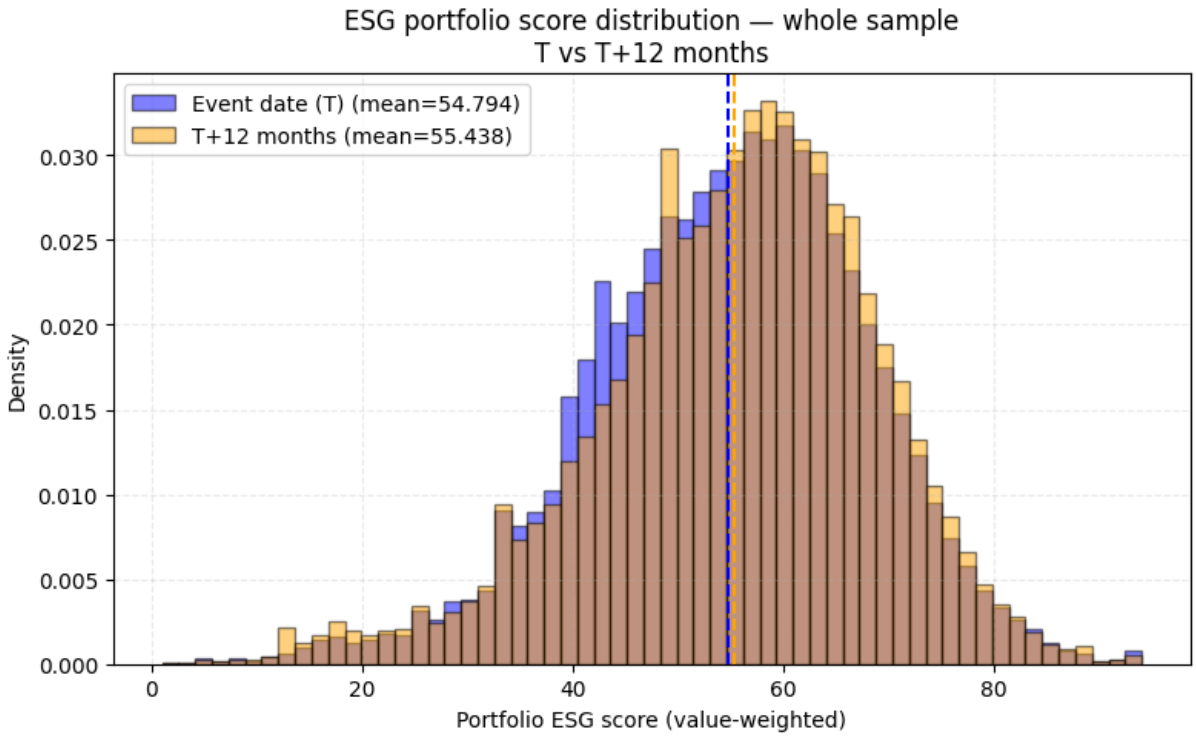


Figure 4: Change in ESGC score distribution: event date vs. twelve months after event date

To examine whether adjustments depend on the first ESG score investors observe, I partition investors into three groups based on their portfolio ESG score at disclosure: low (score lower than 45), middle (scores from 45 to 65), and high (scores higher than 65). This grouping allows me to assess whether responses vary with the initial reference point.

Figure 5 shows that investors with initially low ESG scores shift the distribution of their portfolio scores to the right over the subsequent twelve months, indicating increases in ESG exposure.

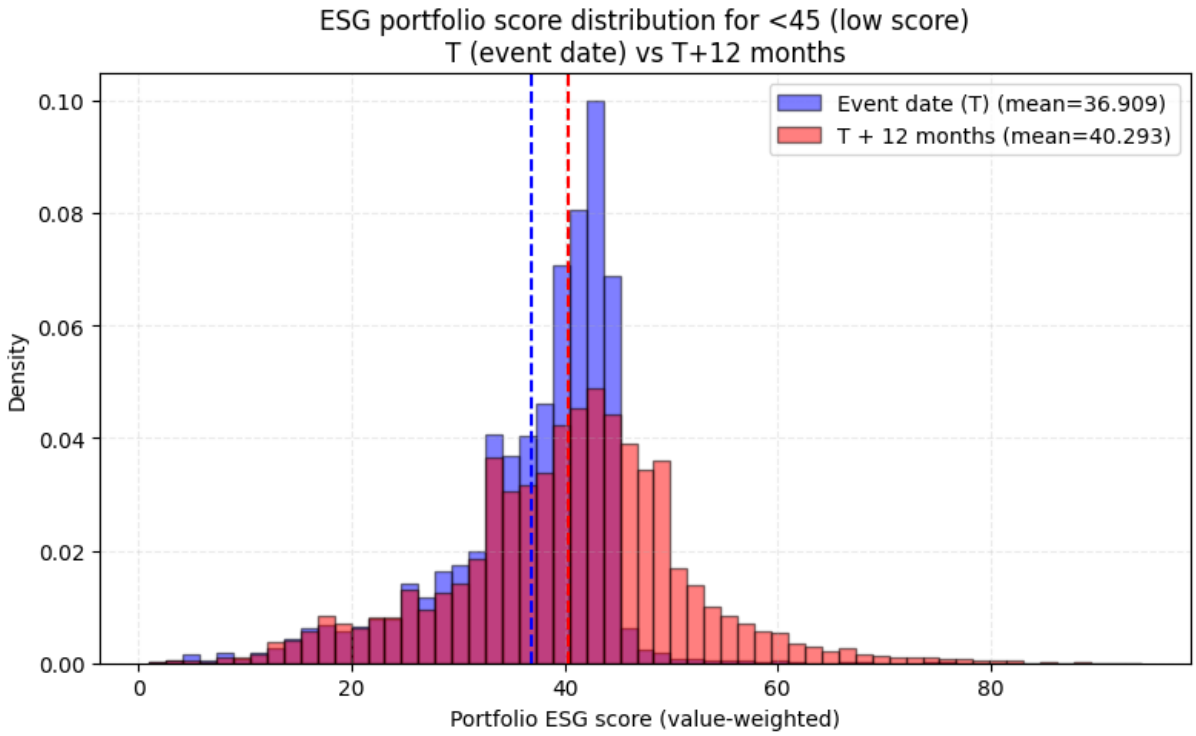


Figure 5: Change in low ESGC score distribution: event date vs. twelve months after event date

Figure 6 shows that investors in the middle group exhibit adjustments in both directions, resulting in a wider distribution with fatter tails and no clear directional shift.

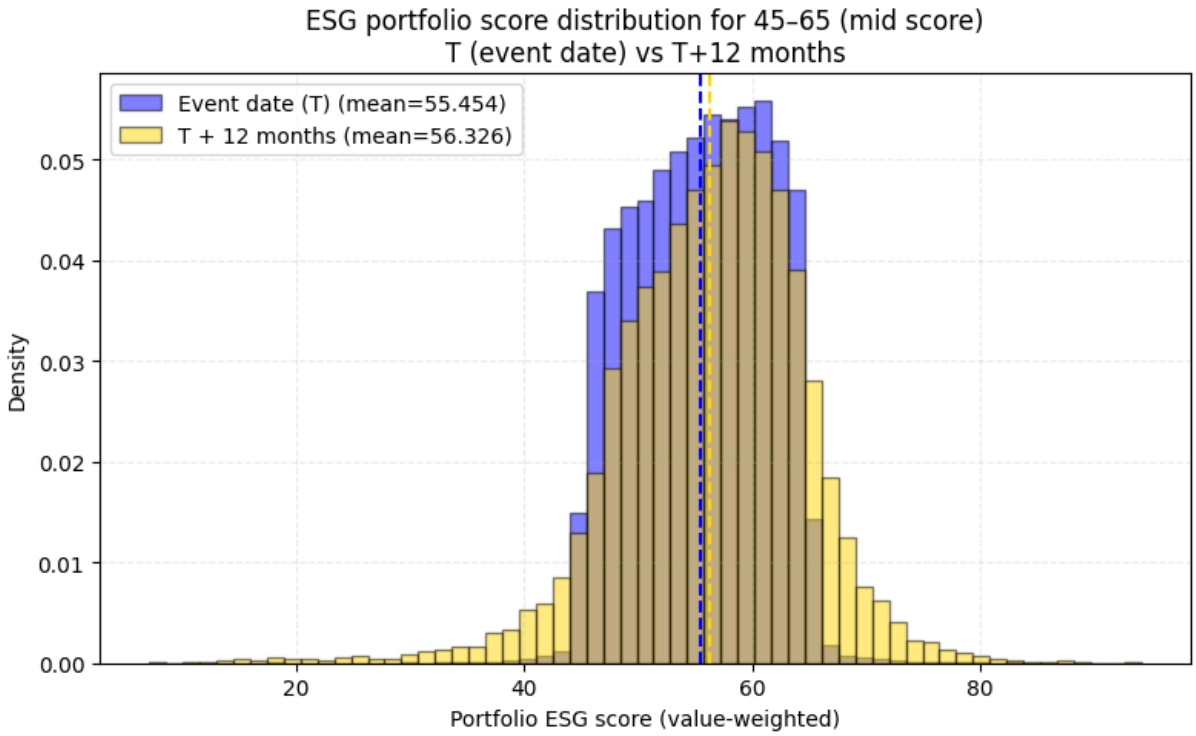


Figure 6: Change in middle ESGC score distribution: event date vs. twelve months after event date

Figure 7 shows the opposite pattern of the low group. Investors with initially high ESG scores shift the distribution to the left, indicating reductions in ESG exposure.

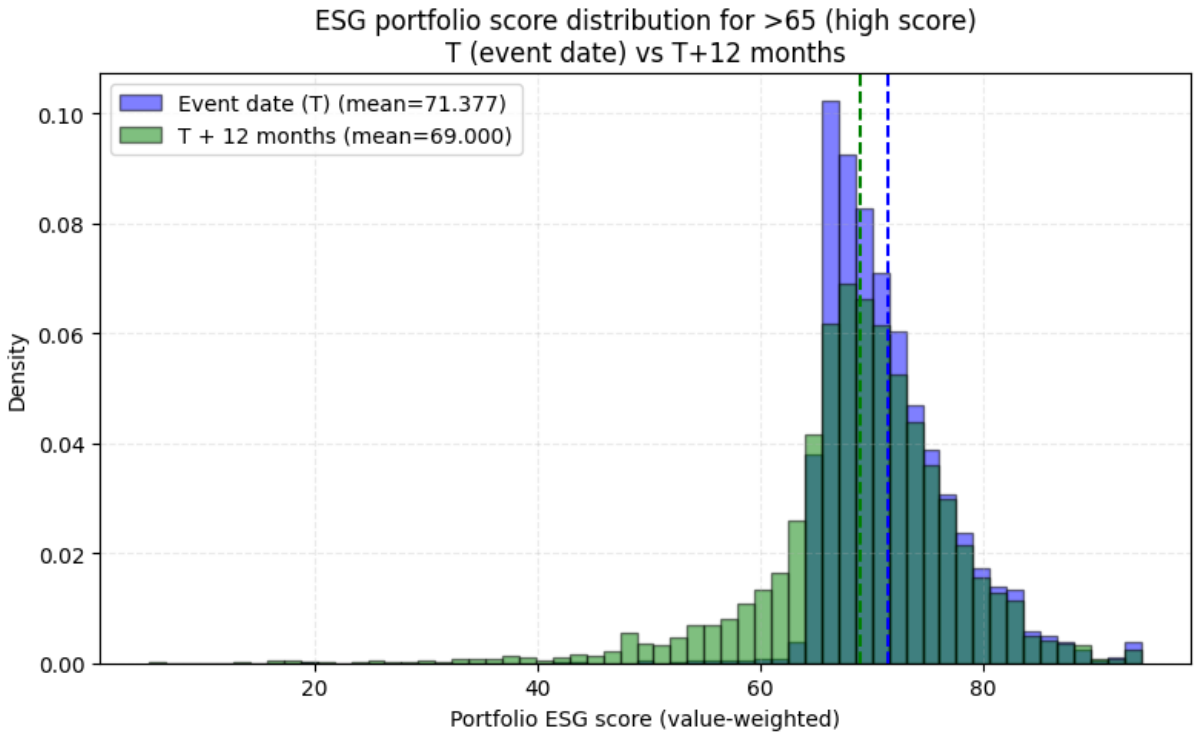


Figure 7: Change in high ESGC score distribution: event date vs. twelve months after event date

Taken together, these patterns indicate that portfolio adjustments depend strongly on the first ESG score observed. Investors with extreme initial scores move their portfolios toward the center of the distribution, consistent with mean reversion and anchoring to the initial disclosure. This heterogeneity also explains the relatively modest shift in the aggregate distribution shown in Figure 4.

While the density plots compare two points in time, they do not show how portfolio ESG scores evolve dynamically after disclosure. I therefore examine the average change in portfolio ESG scores over event time for investors in the low, middle, and high initial ESG groups.

Figure 8 plots the evolution of portfolio ESG scores relative to the disclosure date. The figure shows a clear divergence across groups: investors with initially low ESG scores steadily increase their ESG exposure, investors with initially high scores decrease their exposure, and middle-group investors exhibit smaller net changes. These dynamics provide further evidence that the first disclosed ESG score serves as a reference point that shapes subsequent portfolio adjustments.

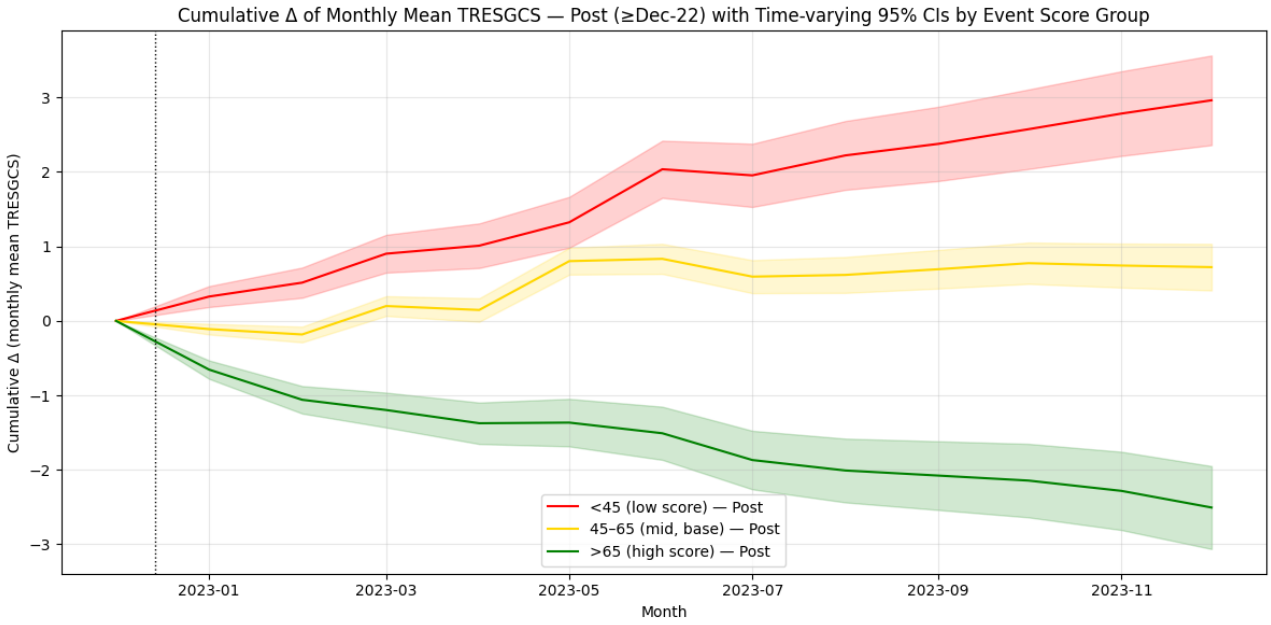


Figure 8: Cumulative change in ESG score: three groups at event date

5.1.2 Regression Evidence on Portfolio-Level

The graphical evidence presented above documents systematic patterns in portfolio ESG adjustments following disclosure, but it does not establish statistical significance or rule out alternative explanations. I therefore turn to regression analysis to quantify the magnitude of these changes and formally test whether investor responses depend on the initial ESG score observed at disclosure.

This setting provides a distinctive opportunity to identify causal responses to ESG disclosure. The introduction of the ESG tool generates an investor-specific post-disclosure indicator, as investors first observe their portfolio ESG score at different points in time depending on when they next become active on the platform. This staggered, investor-level timing allows me to include both investor fixed effects and calendar month fixed effects. Identification therefore comes from within-investor changes around the first disclosure of ESG information, rather than from cross-sectional differences across investors or aggregate time trends in ESG investing. Standard errors are two-way clustered at the investor and month level to account for correlation in behavior within investors and across time.

A key feature of the design is that the initial portfolio ESG score is predetermined by investors' existing holdings and is revealed, rather than chosen, at the time of disclosure. Because the score is individually tailored, computationally complex, and based on ESG data that were not previously available on the platform, investors are unlikely to have precisely anticipated their portfolio ESG exposure prior to disclosure. Cross-sectional differences in initial scores therefore represent differences in newly revealed information rather than contemporaneous changes in preferences or strategy.

To test for heterogeneous responses, I interact the post-disclosure indicator with indicators for low and high initial ESG scores, using investors with middle-range initial scores as the omitted category. This middle group serves as a natural benchmark: these investors are exposed to the same market conditions, time trends, and platform environment as other investors, yet exhibit little systematic adjustment. If the observed changes

were driven by general ESG trends, market movements, or other time-varying confounds, similar adjustments would be expected for this group. The absence of such changes supports the interpretation that responses among low- and high-score investors are driven by the informational content of the first disclosed ESG score.

The regressions further control for portfolio characteristics that may affect the mechanical scope for ESG score changes. I include the share of portfolio holdings without ESG coverage, which captures variation in the informational precision and potential responsiveness of the portfolio ESG score. I also control for the number of investment instruments held, which reflects differences in diversification and the opportunity to rebalance. These controls ensure that the estimated effects are not driven by differences in portfolio composition that mechanically amplify or dampen ESG score movements.

Table 5 presents the results. Column (1) reports estimates for the full sample of investors. Columns (2) and (3) split the sample by trading device. The ESG tool was visible only on the desktop platform at introduction, which allows a comparison between investors who executed trades via computer and those who traded exclusively via mobile devices. This comparison provides an additional way to assess whether responses are driven by direct exposure to the tool interface. The coefficient on the post-disclosure indicator is small, negative and statistically significant for all investors and the once purely trading on mobile devices, indicating that those investor groups with middle-range initial ESG scores slightly decrease their portfolio ESG exposure after disclosure. In contrast, the interaction terms reveal strong heterogeneity for investors with high and low intital ESG portfolio scores. Investors with initially low ESG portfolio scores significantly increase their portfolio ESG exposure following disclosure, while investors with initially high scores significantly reduce their ESG exposure. The coefficients are highly significant across all groups, indicating that investors with extreme initial scores move their portfolios toward the center of the distribution.

The similarity of responses across trading channels suggests that ESG information becomes salient at the investor level even when trades are executed on a device where

the tool is not directly displayed. This pattern is consistent with investors consulting portfolio information on the desktop platform and subsequently implementing trades via mobile devices. Taken together, these results provide regression-based evidence of mean reversion in portfolio ESG scores following disclosure. Because the estimates are identified from within-investor changes around an investor-specific information event, and because the middle-group serves as a benchmark group exposed to the same environment exhibits, the findings are consistent with anchoring on the first observed ESG score and support Hypotheses H1 and H2.

Table 5: Portfolio ESG Score Adjustments After Disclosure

This table reports regressions of changes in investors' value-weighted portfolio ESGC scores on a post-disclosure indicator and its interactions with indicators for the level of the initial portfolio ESG score. *Post cs updated* is an indicator equal to one in months after an investor first observes their portfolio ESG score on the platform. *Score < 45 (low score)* and *Score > 65 (high score)* are indicators for investors whose initial portfolio ESG score at disclosure falls below 45 or above 65, respectively; the omitted category consists of investors with middle-range initial ESG scores. Column (1) includes all investors. Column (2) restricts the sample to investors who executed trades via the desktop platform. Column (3) includes investors who executed trades exclusively via mobile devices. *% Unmatched*, defined as the percentage of portfolio holdings without ESG scores, and *# Instruments*, defined as the number of distinct securities held in the portfolio. *Screening values* are the number of each screening values in the portfolio. Errors are cluster on investor and transaction date level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) All investors	(2) PC investors	(3) Mobile only
Post	-0.118**	0.015	-0.244*
	(-2.08)	(0.16)	(-1.84)
Post × score < 45 (low score)	0.552***	0.805***	0.651***
	(3.32)	(4.27)	(3.20)
Post × score > 65 (high score)	-0.643***	-0.736***	-1.220***
	(-3.36)	(-3.58)	(-5.01)
Constant	51.297***	52.145***	50.475***
	(335.74)	(264.52)	(239.68)
Observations	1,231,865	490,509	416,415
R^2	0.850	0.836	0.835
Year-Month FE	Y	Y	Y
Investor FE	Y	Y	Y
Screening Values	Y	Y	Y
% Unmatched	Y	Y	Y
# Instruments	Y	Y	Y

5.1.3 Regression Evidence on Security-Level

Having established that investors adjust their portfolio-level ESG exposure after disclosure, I next examine how these changes are implemented through security-level trading. Specifically, I analyze whether the ESG characteristics of traded stocks differ before and after investors first observe their portfolio ESG score.

The analysis uses transaction-level data and exploits the same investor-specific event timing as in the portfolio-level regressions. The post-disclosure indicator is defined at the daily level and switches to one starting from the first day an investor becomes active on the platform after the ESG tool is introduced. This captures the first opportunity for the investor to react to the newly disclosed ESG information. Because event timing varies across investors, I can again include investor fixed effects and security controls, so identification comes from within-investor changes in trading behavior around the first disclosure of ESG information.

I estimate regressions where the dependent variable is the ESG score of the traded stock. I examine all trades combined, purchases only, and sales only. All specifications include controls for transaction characteristics such as price and quantity, firm characteristics including size, leverage, profitability, and valuation, as well as industry and country fixed effects. Investor fixed effects absorb time-invariant investor preferences, and errors are clustered at the investor and transaction-date level.

Table 6 reports the results. The coefficient on the post-disclosure indicator alone is small and statistically insignificant across specifications. This indicates that investors with middle-range initial ESG portfolio scores, who form the omitted category, do not systematically change the ESG profile of the stocks they trade after disclosure. This mirrors the portfolio-level results and reinforces the role of the middle group as a behavioral benchmark.

The interaction terms reveal strong heterogeneity consistent with the mean reversion pattern documented earlier. Investors with initially low portfolio ESG scores significantly increase the ESG quality of the stocks they purchase after disclosure. The positive and

statistically significant coefficient in the purchase regression indicates that these investors tilt their buying toward higher-ESG firms. At the same time, they sell stocks with significantly lower ESG scores, as shown by the large negative coefficient in the sales regression. Together, these results imply that low-score investors actively upgrade their portfolios by buying greener stocks and divesting from less sustainable ones.

Investors with initially high portfolio ESG scores exhibit the opposite behavior. After disclosure, they purchase stocks with significantly lower ESG scores and sell stocks with significantly higher ESG scores. This pattern indicates a downward adjustment in ESG exposure at the transaction level, consistent with the reduction in portfolio ESG scores observed in the monthly holdings data.

Taken together, the transaction-level evidence confirms that changes in portfolio ESG exposure are driven by active trading decisions rather than mechanical revaluation or changes in firm-level ESG ratings. The direction of trading across low- and high-initial-score investors closely mirrors the portfolio-level mean reversion results and supports the interpretation that investors anchor on the first observed portfolio ESG score and rebalance accordingly. These findings provide direct evidence for the trading mechanism underlying Hypothesis H3.

5.1.4 Portfolio Reallocation Beyond ESG Characteristics

I next examine whether ESG disclosure affects broader portfolio composition beyond changes in ESG exposure. I study three dimensions: asset allocation across instrument types, portfolio diversification, and the characteristics of firms held in investor portfolios.

Asset Holdings Table 8 examines how investors reallocate across major asset classes when ESG information becomes available. Panel A compares all investors' portfolios before versus after the tool is introduced. The estimates show a clear composition shift concentrated in *company-linked securities*: investors hold more equities after disclosure (Column 1) and modestly more bonds (Column 2). In contrast, structured products do not change statistically (Column 3), and metal holdings slightly decline (Column 4).

Table 6: Trading Activity - Combined ESG score

Table 7: Trading Activity and Stock-Level ESG Scores

This table reports regressions of stock-level ESGC scores of traded securities on a post-disclosure indicator and its interactions with indicators for the investor's initial portfolio ESG score. *Post* is an investor-specific indicator equal to one for trades executed after the investor's first trade following the introduction of the ESG tool, and zero for trades before that date. *Low score* (<45) and *High score* (>65) are indicators for investors whose initial portfolio ESG score at disclosure falls below 45 or above 65, respectively; the omitted category consists of investors with middle-range initial ESG scores. The dependent variable is the combined ESGC score of the traded stock. Column (1) includes all trades. Column (2) includes only purchase transactions. Column (3) includes only sell transactions. Transaction-level controls include unit price and trade quantity. Firm-level controls include leverage, firm size, return on assets (ROA), and Tobin's Q. All specifications include stock industry and stock country fixed effects, investor fixed effects, investor-by-industry fixed effects, and investor-by-country fixed effects. Errors are cluster on investor and transaction date level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) Stock ESGC (all trades)	(2) Stock ESGC (buy)	(3) Stock ESGC (sell)
Post	0.027	-0.215	0.143
	(0.20)	(-1.31)	(0.88)
Post × score< 45 (low score)	-0.117	0.621***	-1.508***
	(-0.71)	(2.91)	(-6.86)
Post × score> 65 (high score)	-1.007***	-1.764***	0.558**
	(-6.09)	(-8.66)	(2.34)
Constant	14.294***	15.226***	12.256***
	(10.54)	(10.27)	(7.98)
Observations	1,152,052	710,895	352,525
R^2	0.658	0.673	0.636
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
Investor x Industry FE	Y	Y	Y
Investor x Country FE	Y	Y	Y

Taken together, the post-disclosure changes are strongest in assets for which firm-level ESG information is directly meaningful (stocks, and to a lesser extent corporate bonds), consistent with investors using the tool as intended rather than broadly expanding exposure across unrelated asset classes.

Panel B splits the post effect by response groups, using the middle-score group as the benchmark. The middle group increases both equity and bond holdings after disclosure. Relative to this benchmark, low-initial-ESG investors reduce equity and bond holdings, consistent with restructuring and pruning rather than simple portfolio expansion. High-initial-ESG investors exhibit little change in equity holdings relative to the middle group and no robust differential response in bonds. Overall, the findings suggest that the tool induces increases in equities and bonds, while low-score investors adjust mainly through rebalancing and consolidation as they react to newly salient ESG information.

Diversification Table 9 studies how diversification changes once ESG information becomes salient. Panel A reports before vs. after differences for the full sample. After disclosure, investors hold (i) more unique equity positions, (ii) a larger overall number of instruments, and (iii) more ESG-rated positions. The findings also indicate modest broadening along observable other diversification criteria. Portfolios span slightly more industries, while the increase in the number of countries is positive but not statistically precise. Taken together, the evidence indicates that the tool is associated with broader portfolios, consistent with diversification benefits that come from expanding the set of securities held and increasing the share of holdings with ESG coverage.

Panel B decomposes these changes by initial ESG exposure, using the middle-score group as the benchmark. The middle group exhibits the strongest broad-based expansion after disclosure. Relative to this benchmark, investors with initially low ESG scores *reduce* the number of unique shares, total instruments, and ESG-rated positions, while showing no clear differential increase in country or industry breadth. This pattern is consistent with selective rebalancing and consolidation rather than portfolio expansion as the main channel through which low-score investors adjust their ESG exposure. In contrast,

Table 8: Portfolio Adjustment Across Asset Classes

This table reports regressions of the number of holdings in different asset classes on a post-disclosure indicator. Panel A compares all investors before versus after ESG score disclosure. Panel B allows the post-disclosure effect to differ by response group, where *Score < 45 (low score)* and *Score > 65 (high score)* classify investors by their initial portfolio ESG score at disclosure and the omitted category is the middle-score group. *Post* equals one in months after an investor first observes their portfolio ESG score. *Score < 45 (low score)* and *Score > 65 (high score)* indicate investors with low and high initial ESG scores; the omitted group consists of middle-range scores. Dependent variables are the number of equity holdings (Column 1), bond holdings (Column 2), structured products (Column 3), metals (Column 4), and investment fund shares (Column 5). All specifications include investor and month-year fixed effects. Errors are cluster on investor and month-year-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) #Shares	(2) #Bonds	(3) #StrProd	(4) #Metals
Panel A: All investors				
Post	0.361**	0.014**	0.021	-0.000*
	(2.19)	(2.51)	(1.10)	(-1.92)
Constant	6.275***	0.182***	0.788***	0.000*
	(5.61)	(10.33)	(14.76)	(1.83)
Observations	1,280,319	1,280,319	1,280,319	1,280,319
R^2	0.978	0.901	0.910	0.743
Panel B: Response Groups				
Post	0.469**	0.020***	0.020	-0.000**
	(2.23)	(2.90)	(0.90)	(-2.48)
Post × score < 45 (low score)	-0.459**	-0.045***	-0.019	0.000*
	(-2.63)	(-5.55)	(-0.68)	(1.72)
Post × score > 65 (high score)	-0.045	0.016	0.022	0.001***
	(-0.64)	(1.64)	(1.17)	(3.11)
Constant	6.235***	0.176***	0.784***	0.000
	(5.63)	(9.87)	(14.56)	(1.68)
Observations	1,280,319	1,280,319	1,280,319	1,280,319
R^2	0.978	0.901	0.910	0.743
ESGC Score	Y	Y	Y	Y
% Unmatched	Y	Y	Y	Y
Screening Values	Y	Y	Y	Y
Month-Year FE	Y	Y	Y	Y
Investor FE	Y	Y	Y	Y

investors with initially high ESG scores also reduce the number of unique shares relative to the benchmark, but they increase industry diversification, while slightly reducing country diversification.

Beyond these post-disclosure shifts, the tables provides further evidence on diversification and information quality from the tool. The portfolio time-varying ESG score ($ESGCScore_t$) is positively related to each diversification outcome, indicating that investors with higher ESG exposure tend to hold more diversified portfolios across positions and observable dimensions. By contrast, the fraction of holdings without ESG coverage (*% Unmatched*) is negatively related to diversification outcomes, consistent with portfolios that are less covered by ESG data also being less diversified.

Overall, the results indicate that the ESG tool is associated with meaningful diversification benefits at the aggregate level. All investors hold more positions, more instruments, and more ESG-covered securities after disclosure while the response-group analysis shows that these benefits are concentrated in the benchmark (middle-score) group. Low-score investors primarily adjust through pruning and targeted reallocations, whereas high-score investors tilt their portfolios toward broader sectoral coverage while modestly narrowing geographic reach.

Company Characteristics Table 10 examines whether ESG disclosure is accompanied by changes in the fundamental and risk profile of portfolio holdings.

Panel A reports before vs. after differences for the full sample. After disclosure, investors tilt toward firms with larger market capitalization and higher Tobin's Q. In contrast, average profitability (ROA), leverage, market beta, and alpha remain economically unchanged. The increase in size and Q suggests a shift toward larger firms with stronger growth opportunities or higher market valuations. The absence of meaningful changes in leverage and beta suggests that this shift does not coincide with higher balance-sheet risk or greater systematic market exposure. In other words, the tool is associated with a shift toward larger and more highly valued firms, without a systematic increase portfolio risk.

Table 9: Portfolio Diversification After ESG Disclosure

This table reports regressions of diversification measures on a post-disclosure indicator and its interactions with indicators for the level of the initial portfolio ESG score. Panel A compares all investors before versus after ESG score disclosure. Panel B allows the post-disclosure effect to differ by response group, where *Score < 45 (low score)* and *Score > 65 (high score)* classify investors by their initial portfolio ESG score at disclosure and the omitted category is the middle-score group. *Post* equals one in months after an investor first observes their portfolio ESG score. *Score < 45 (low score)* and *Score > 65 (high score)* indicate investors with low and high initial ESG scores; the omitted group consists of middle-range scores. Dependent variables are the number of unique equity holdings (Column 1), number of ESG-rated shares (Column 2), number of countries companies are in (Column 3), and number of stock industries (Column 5). All specifications include investor and month-year fixed effects. Errors are cluster on investor and month-year-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) #Uni.Shares	(2) #Instruments	(3) ESG rated	(4) #Countries	(5) #Industries
Panel A: All investors					
Post	0.356**	0.427**	0.322**	0.042	0.042*
	(2.16)	(2.19)	(2.28)	(1.63)	(1.94)
%Unmatched	-0.004	0.018***	-0.042***	-0.000	-0.003***
	(-0.65)	(2.93)	(-9.13)	(-0.46)	(-3.07)
$ESGCScore_t$	0.013***	0.015***	0.012***	0.002**	0.004***
	(4.00)	(4.02)	(4.36)	(2.44)	(4.81)
Constant	6.359***	8.493***	5.978***	2.544***	3.303***
	(5.74)	(7.09)	(6.05)	(17.00)	(17.48)
Observations	1,279,950	1,280,319	1,278,992	1,279,950	1,279,950
R^2	0.977	0.973	0.980	0.950	0.922
Panel B: Response Groups					
Post	0.486**	0.558**	0.373*	0.045	0.024
	(2.32)	(2.29)	(2.06)	(1.41)	(0.85)
Post × < 45 (low score)	-0.372**	-0.585***	-0.268*	0.026	0.038
	(-2.19)	(-3.05)	(-1.71)	(0.97)	(1.37)
Post × > 65 (high score)	-0.213***	-0.034	0.022	-0.036**	0.042***
	(-3.21)	(-0.43)	(0.29)	(-2.68)	(3.46)
% Unmatched	-0.004	0.018***	-0.042***	-0.000	-0.003***
	(-0.67)	(2.87)	(-9.05)	(-0.43)	(-3.02)
$ESGCScore_t$	0.012***	0.016***	0.012***	0.002**	0.004***
	(3.86)	(3.89)	(4.33)	(2.36)	(4.91)
Observations	1,279,950	1,280,319	1,278,992	1,279,950	1,279,950
R^2	0.977	0.973	0.980	0.950	0.922
Screening Values	Y	Y	Y	Y	Y
Month-Year FE	Y	Y	Y	Y	Y
Investor FE	Y	Y	Y	Y	Y

Panel B shows that this average pattern masks heterogeneous adjustments across response groups, using the middle-score group as the benchmark. Investors with initially low ESG scores shift toward smaller firms (consistent with selling large, low-ESG companies), but toward higher profitability, lower-valuation (lower-Q) companies, and lower market risk. This is consistent with rebalancing toward a smaller, higher-quality portfolio, as low-score investors concentrate their portfolios to adjust the ESG score upward. In contrast, investors with initially high ESG scores do not exhibit a statistically meaningful differential change in firm size relative to the benchmark, but tilt toward growth companies while experiencing a decline in portfolio alpha as they decrease their portfolio ESG score.

Taken together, the evidence suggests that ESG-motivated tilters (both low and high initial scores) use the tool differently than the middle-score group who lack a strong initial tilting incentive. Tilters use the tool in a more disciplined manner ESG adjustments coincide with higher profitability and lower market risk. By contrast, investors without a strong ESG adjustment motive predominantly move toward larger, growth firms. Thus, average portfolio characteristics change only modestly, but the underlying reallocations differ substantially across investor groups.

Table 10: Firm Characteristics of Portfolio Holdings After ESG Disclosure

This table reports regressions of value-weighted firm characteristics of portfolio holdings on a post-disclosure indicator and its interactions with indicators for the level of the initial portfolio ESG score. Panel A compares all investors before versus after ESG score disclosure. Panel B allows the post-disclosure effect to differ by response group, where *Score < 45 (low score)* and *Score > 65 (high score)* classify investors by their initial portfolio ESG score at disclosure and the omitted category is the middle-score group. *Post* equals one in months after an investor first observes their portfolio ESG score. *Score < 45 (low score)* and *Score > 65 (high score)* indicate investors with low and high initial ESG scores; the omitted group consists of middle-range scores. Dependent variables are firm market value in millions (Column 1), return on assets (Column 2), Tobin's Q (Column 3), leverage (Column 4), market beta (Column 5), and alpha (Column 6). All specifications include investor and month-year fixed effects. Errors are cluster on investor and month-year-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) Size	(2) ROA	(3) tobinsQ	(4) leverage	(5) Beta	(6) Alpha
Panel A: All investors						
Post	2.105**	-0.000	0.025**	0.001	-0.001	-0.005
	(2.10)	(-0.21)	(2.39)	(1.33)	(-0.36)	(-0.56)
Constant	-14.257*	-0.133***	2.861***	0.263***	1.524***	-1.621***
	(-1.87)	(-16.01)	(32.91)	(40.68)	(52.85)	(-6.41)
Observations	1,277,097	1,277,097	1,277,097	1,277,097	884,597	884,597
R^2	0.916	0.725	0.775	0.738	0.852	0.850
Panel B: Response Groups						
Post	8.262***	-0.003***	0.146***	0.001	0.005**	0.011
	(6.05)	(-4.02)	(10.61)	(0.95)	(2.85)	(1.19)
Post × score < 45(low score)	-33.957***	0.012***	-0.608***	0.001	-0.022***	-0.053
	(-13.11)	(4.81)	(-15.62)	(0.26)	(-3.48)	(-1.24)
Post × score > 65(high score)	3.829	0.003***	0.027**	-0.000	-0.004*	-0.019*
	(1.50)	(2.82)	(2.22)	(-0.15)	(-1.79)	(-2.05)
Constant	-18.113**	-0.132***	2.797***	0.263***	1.524***	-1.623***
	(-2.44)	(-15.94)	(30.93)	(40.34)	(52.55)	(-6.39)
Observations	1,277,097	1,277,097	1,277,097	1,277,097	884,597	884,597
R^2	0.916	0.725	0.779	0.738	0.852	0.850
ESGC Score	Y	Y	Y	Y	Y	Y
% Unmatched	Y	Y	Y	Y	Y	Y
Screening Values	Y	Y	Y	Y	Y	Y
Month-Year FE	Y	Y	Y	Y	Y	Y
Investor FE	Y	Y	Y	Y	Y	Y

5.2 Performance Analysis

This section examines how portfolio ESG exposure relates to realized investment performance and how this relationship changes once investors become aware of their portfolio ESG scores. I compute end-of-month portfolio returns and return volatility from net portfolio values.

5.2.1 Performance Figures

Figure 9 plots cumulative portfolio returns for investors grouped by their initial portfolio ESG score (low, middle, and high) over the full sample period, spanning one year before and one year after the introduction of the ESG tool. Cumulative performance increases monotonically with the ESG score group, indicating a positive relation between ESG exposure and realized returns over this period.

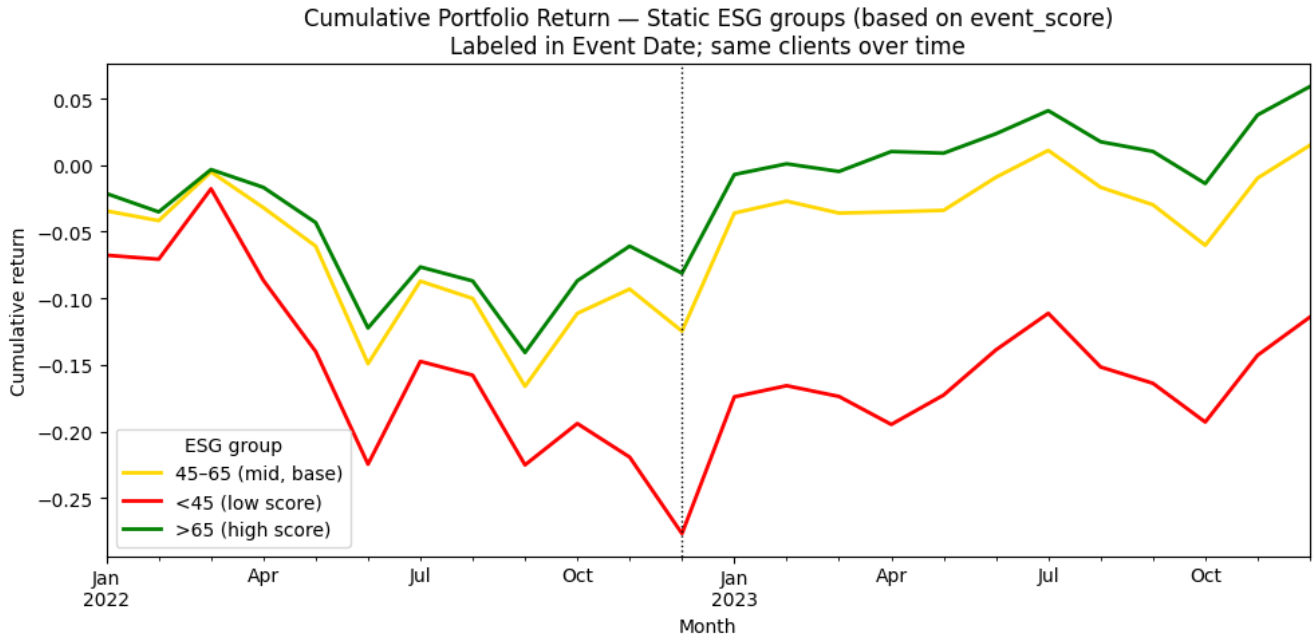


Figure 9: Cumulative portfolio performance low, middle and high initial ESG scores over entire time frame

Figure 10 separates the pre- and post-disclosure periods. In the pre-introduction period, when investors are not yet aware of their portfolio ESG scores, low-ESG portfolios

underperform middle- and high-ESG portfolios after April 2022. The monotonic relation between ESG exposure and performance is clearly visible.

After investors observe their portfolio ESG scores, this relationship reverses. Portfolios with initially low ESG scores, whose owners subsequently increase ESG exposure, outperform portfolios with initially high ESG scores. Conversely, portfolios with initially high ESG scores, whose owners reduce ESG exposure after disclosure, underperform. The benchmark middle group remains between the two tilting groups. This reversal indicates that once ESG exposure becomes salient, portfolio adjustments are associated with a change in the ESG–return relationship.

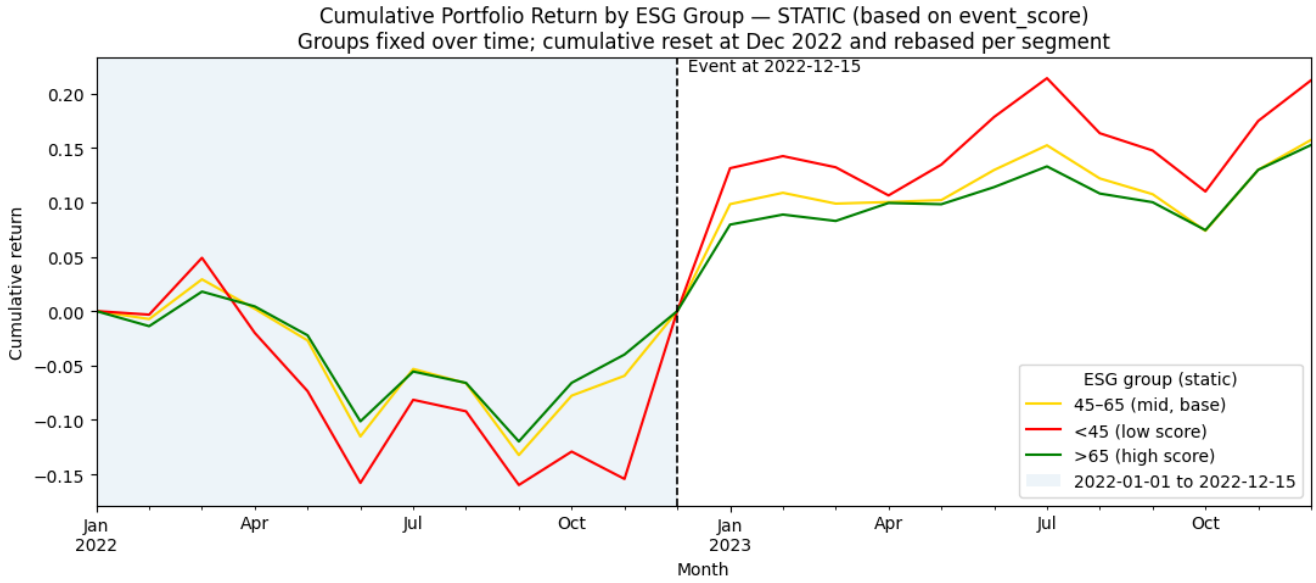


Figure 10: Cumulative portfolio performance low, middle and high initial ESG scores conditional on disclosure

5.2.2 Performance Analysis Regressions

Table 11 formalizes the patterns from the figures in a regression framework and examines how realized portfolio performance changes after investors first observe their portfolio ESG score. The dependent variables are constructed from end-of-month portfolio net asset values (NAV) changes. *Monthly Ret* is the end-of-month portfolio return. *3M Ret* and *6M Ret* are rolling three-month and rolling six-month returns computed at the monthly frequency. *Total Past Ret* captures cumulative realized performance over the total past.

In this setting, *Post* is an investor-specific indicator equal to one in months after the investor's first exposure to the portfolio ESG score. With investor and month fixed effects, the coefficient on *Post* captures the average within-investor change in performance for the omitted group of investors with middle-range initial ESG scores after ESG information becomes salient, net of common time effects. The estimate is small or negative across specifications (2) - (4), indicating that middle-score investors perform slightly worse after disclosure.

The interaction terms show pronounced heterogeneity. The coefficients on $Post \times score < 45$ are positive and statistically significant across all return measures, indicating that investors with initially low ESG portfolio scores, tilting their ESG portfolio scores upwards experience higher realized returns after disclosure relative to the middle group. In contrast, the coefficients on $Post \times score > 65$ are negative in the rolling return specifications and statistically significant for the rolling six-month return, indicating weaker realized performance for investors with initially high ESG scores after disclosure. However, both response groups experience higher returns over the total past period compared to the middle group.

Importantly, these effects are present not only in monthly returns but also in rolling three-month and rolling six-month returns. Because these measures reflect overlapping multi-month performance windows, the results indicate persistent differences in realized returns rather than short-lived price pressure around rebalancing. Taken together, the

findings show that the positive association between ESG exposure and returns observed before disclosure reverses once investors become aware of their ESG exposure and adjust their portfolios. This pattern is consistent with investors shifting portfolios to reflect nonpecuniary ESG preferences rather than short-term return maximization.

Table 11: Portfolio Returns and ESG Disclosure

This table reports regressions of portfolio return measures on a post-disclosure indicator and its interactions with indicators for the level of the initial portfolio ESG score. *Post cs updated* is an indicator equal to one in months after an investor first observes their portfolio ESG score on the platform. *Score < 45 (low score)* and *Score > 65 (high score)* are indicators for investors whose initial portfolio ESG score at disclosure falls below 45 or above 65, respectively; the omitted category consists of investors with middle-range initial ESG scores. The dependent variables are monthly portfolio return (Column 1), rolling three-month return (Column 2), rolling six-month return (Column 3), and cumulative past return (Column 4). Control variables include screening values, the percentage of portfolio holdings without ESG scores (*% Unmatched*), and the number of distinct securities held in the portfolio (*# Instruments*). Errors are cluster on investor and month-year-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) Monthly Ret	(2) 3M Ret	(3) 6M Ret	(4) Total Past Ret
Post	-0.231	-0.271***	-0.154***	-0.035**
	(-1.68)	(-3.93)	(-3.52)	(-2.34)
Post × score <45 (low score)	1.426*	1.246***	0.943***	0.091*
	(1.98)	(3.14)	(4.69)	(1.82)
Post × score > 65 (high score)	-0.209	-0.234	-0.218***	0.068***
	(-0.65)	(-1.45)	(-3.24)	(3.09)
Constant	-0.073	-0.405**	-0.365***	0.493***
	(-0.29)	(-2.71)	(-3.36)	(15.82)
Observations	1,189,381	1,116,758	1,021,682	1,058,544
R^2	0.336	0.358	0.515	0.788
Year-Month FE	Y	Y	Y	Y
Investor FE	Y	Y	Y	Y
Screening Values	Y	Y	Y	Y
% Unmatched	Y	Y	Y	Y
# Instruments	Y	Y	Y	Y

Table 12 shows that this reversal is also reflected in broader performance measures.

After disclosure, the benchmark middle group experience lower 6-month returns, with change in volatility yielding lower Sharpe ration.

Compared to the middle group, investors with initially low ESG scores, tilting upwards, experience higher 6-month-rolling returns, while changes in return volatility are small and with low statistical significance. As a result, improvements in traditional risk-adjusted performance measured in the Sharpe ratio are not consistently statistically significant.

Investors with initially high ESG scores, tilting downwards, exhibit weaker rolling returns after disclosure with no effect on volatility compared to the middle group. The Sharpe-ratio specification yields a positive interaction effect because the omitted middle group experiences a decline in Sharpe post-disclosure. Overall, these results indicate that the post-disclosure reversal in the ESG–return relationship is driven primarily by changes in realized returns and portfolio composition rather than by systematic changes in return volatility.

Tables 13 and 14 examine whether changes in an investor's portfolio ESG score predict subsequent portfolio returns and whether this relationship differs before versus after ESG disclosure on the platform and between response groups (low and high initial ESG versus middle group). The dependent variable, *MonRetWin*, is the investor's monthly portfolio return computed from changes in end-of-month portfolio net asset values (NAV).

I first use lagged changes in the value-weighted portfolio ESG score, $\Delta ESGCScore_{t-1}$, which corresponds to the portfolio ESG score shown to investors and therefore captures the score they directly observe and respond to. I then repeat the analysis with lagged changes in the equally weighted portfolio ESG score, $\Delta EqualScore_{t-1}$, to isolate rebalancing driven ESG changes from mechanical effects of price movements and changes in portfolio weights induced by returns. As ESG scores are fixed over the sample period, changes in portfolio ESG scores do not come from firms' ESG ratings being updated. They steam either from price changes that alter value weights or from active trading that changes portfolio weights or from both.

The results based on the value-weighted score (Table 13) show that, prior to disclosure, increases in the portfolio ESG score are positively associated with subsequent returns.

Table 12: Performance and ESG Event

This table reports regressions of portfolio performance and risk measures on a post-disclosure indicator and its interactions with indicators for the level of the initial portfolio ESG score. *Post cs updated* is an indicator equal to one in months after an investor first observes their portfolio ESG score on the platform. *Score < 45 (low score)* and *Score > 65 (high score)* are indicators for investors whose initial portfolio ESG score at disclosure falls below 45 or above 65, respectively; the omitted category consists of investors with middle-range initial ESG scores. The dependent variables are rolling six-month return (Column 1), rolling six-month return volatility (Column 2), and rolling six-month Sharpe ratio (Column 3). Control variables include screening values, the percentage of portfolio holdings without ESG scores (*% Unmatched*), and the number of distinct securities held in the portfolio (*# Instruments*). Errors are cluster on investor and month-year-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) 6M Return	(2) 6M Vol	(3) 6M SR cap
Post	-0.154***	-0.000	-0.081*
	(-3.52)	(-0.23)	(-2.06)
Post × score < 45 (low score)	0.943***	0.003*	0.051
	(4.69)	(1.80)	(0.44)
Post × score > 65 (high score)	-0.218***	-0.000	0.137***
	(-3.24)	(-0.28)	(3.38)
Constant	-0.365***	0.076***	-2.556***
	(-3.36)	(100.11)	(-28.39)
Observations	1,021,682	1,218,316	1,238,904
R^2	0.515	0.600	0.403
Year-Month FE	Y	Y	Y
Investor FE	Y	Y	Y
Screening Values	Y	Y	Y
% Unmatched	Y	Y	Y
# Instruments	Y	Y	Y

The coefficient on $\Delta ESGCScore_{t-1}$ is positive and statistically significant in the baseline specifications, indicating that upward tilts in the ESG score coincide with higher realized returns. However, after the introduction of the tool, this relation weakens overall, as reflected in the interaction term $Post \times \Delta ESGCScore_{t-1}$.

Importantly, heterogeneity across response groups becomes only evident after disclosure. For investors with initially low ESG scores, the triple interaction term $Post \times score < 45 \times \Delta ESGCScore_{t-1}$ is positive and statistically significant. This implies that upward tilting among low-score investors after disclosure is associated with improved subsequent returns. In contrast, for investors with initially high ESG scores, the corresponding triple interaction term is negative and significant, indicating that downward tilting after disclosure is associated with weaker subsequent performance. There is no systematic difference across groups prior to disclosure as the heterogeneity arises once the ESG score becomes salient.

In contrast, the regressions based on the equally weighted ESG score (Table 14) show no robust relation between $\Delta EqualScore_{t-1}$ and subsequent returns, neither before nor after disclosure, and no consistent heterogeneity across response groups. This suggest that changes in the equally weighted score that capture compositional changes do not predict performance.

One possible interpretation for the results could be that the value-weighted results are purely price driven. This would be true if increases in ESG scores reflect prior price appreciation of high-ESG stocks, which mechanically feeds into measured returns. However, several evidence speaks against a purely mechanical explanation. First, if price movements alone were driving the results, there would be homogeneous pattern across investor groups. Instead, the heterogeneity appears specifically after disclosure and differs between low- and high-initial-score investors. Second, the weakening of the overall ESG–return relation after the tool's introduction suggests that investor rebalancing alters the previous correlation rather than simply reflecting passive exposure to trending stocks.

An alternative interpretation is that investors actively reallocate capital in response

to newly salient ESG information, and that these reallocations interact with firm characteristics. The absence of predictive effects in the equally weighted specification indicates that pure changes in the set of ESG-labeled firms are not sufficient to generate performance differences. This means performance changes arise only together with capital weights changes when investors reallocate money across holdings significantly. This suggests that investors are not simply reshuffling labels but are adjusting portfolio weights in economically significant ways.

A third interpretation is that price considerations form part of the decision process when tilting portfolios. ESG adjustments and expected returns are joint decision drivers. When investors tilt toward higher-ESG firms that may also look for companies with favorable fundamentals or risk characteristics. In this sense, prices are part of the information set used in ESG reallocation decisions rather than an exogenous mechanical driver. The previous findings that volatility does not increase materially and that performance effects differ by initial ESG position is consistent with the tool acting partly as a quality screening tool. Overall, the evidence does not support that all effects are purely price driven. Instead, the results indicate that once ESG exposure becomes salient, investors adjust portfolio weights in ways that reflect their preferences and that these reallocations have economically meaningful return implications. Taken together, the findings suggest that the ESG tool achieves multiple objectives. Investors react to the information and align portfolios more closely with their values. They do not systematically lose money as a consequence of doing so, and in some cases tilting toward higher ESG exposure is associated with improved realized returns.

Table 13: Change in ESGC Score and Return

This table reports regressions of investors' monthly portfolio returns (*MonRetWin*) on lagged changes in the value-weighted portfolio ESG score. $\Delta ESGCScore_{t-1}$ is the change in the value-weighted ESGC portfolio score from month $t-2$ to $t-1$; this value-weighted score corresponds to the portfolio ESG score displayed to investors on the platform. *Post* is an investor-specific indicator equal to one in months after the investor first observes their portfolio ESG score. *Score < 45* and *Score > 65* indicate investors with low and high initial portfolio ESG scores at disclosure; the omitted category consists of investors with middle-range initial scores. Standard errors are clustered at the investor and month levels. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) MonRetWin	(2) MonRetWin	(3) MonRetWin	(4) MonRetWin	(5) MonRetWin	(6) MonRetWin
$\Delta ESGCScore_{t-1}$	0.030***	0.030***	0.020*	0.020*	0.011	0.011
	(3.69)	(3.69)	(1.79)	(1.79)	(0.88)	(0.88)
Post			0.023	0.023	-0.208	-0.208
			(0.25)	(0.25)	(-1.35)	(-1.35)
Post × $\Delta ESGCScore_{t-1}$			0.023*	0.023*	0.030*	0.030*
			(1.81)	(1.81)	(1.90)	(1.90)
Score < 45 (low score) × $\Delta ESGCScore_{t-1}$					0.022*	0.022*
					(1.74)	(1.74)
Score > 65 (high score) × $\Delta ESGCScore_{t-1}$					0.006	0.006
					(0.24)	(0.24)
Post × < 45 (low score)					1.215	1.215
					(1.53)	(1.53)
Post × > 65 (high score)					-0.182	-0.182
					(-0.51)	(-0.51)
Post × score < 45 (low score) × $\Delta ESGCScore_{t-1}$					0.031*	0.031*
					(1.79)	(1.79)
Post × score > 65 (high score) × $\Delta ESGCScore_{t-1}$					-0.073**	-0.073**
					(-2.55)	(-2.55)
Constant	-0.043	-0.043	-0.005	-0.005	0.255	0.255
	(-0.07)	(-0.07)	(-0.01)	(-0.01)	(0.38)	(0.38)
Observations	1,121,535	1,121,535	1,121,535	1,121,535	1,121,535	1,121,535
R^2	0.385	0.385	0.385	0.385	0.386	0.386
Year-Month FE	Y	Y	Y	Y	Y	Y
Investor FE	Y	Y	Y	Y	Y	Y
ESG Scores	Y	Y	Y	Y	Y	Y
Screening Values	Y	Y	Y	Y	Y	Y
% Unmatched	Y	Y	Y	Y	Y	Y
# Instruments	Y	Y	Y	Y	Y	Y

Table 14: Change in ESGC Equally-Weighted Score and Return

This table reports regressions of investors' monthly portfolio returns (*MonRetWin*) on lagged changes in the equally weighted portfolio ESG score. $\Delta EqualScore_{t-1}$ is the change in the equally weighted ESGC score from month $t-2$ to $t-1$, which filters out mechanical changes in value weights due to price movements. *Post* is an indicator equal to one in months after an investor first observes their portfolio ESG score on the platform. *Score < 45* and *Score > 65* indicate investors with low and high initial portfolio ESG scores at disclosure; the omitted category consists of investors with middle-range initial scores. Standard errors are clustered at the investor and month levels. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) MonRetWin	(2) MonRetWin	(3) MonRetWin	(4) MonRetWin	(5) MonRetWin	(6) MonRetWin
$\Delta EqualScore_{t-1}$	-0.007	-0.007	-0.009	-0.009	-0.012*	-0.012*
	(-1.33)	(-1.33)	(-1.32)	(-1.32)	(-1.77)	(-1.77)
Post			0.025	0.025	-0.205	-0.205
			(0.28)	(0.28)	(-1.33)	(-1.33)
Post × $\Delta EqualScore_{t-1}$			0.003	0.003	0.013	0.013
			(0.34)	(0.34)	(1.03)	(1.03)
Score <45 × $\Delta EqualScore_{t-1}$					0.027**	0.027**
					(2.43)	(2.43)
Score > 65 × $\Delta EqualScore_{t-1}$					-0.013	-0.013
					(-1.18)	(-1.18)
Post × score < 45					1.227	1.227
					(1.55)	(1.55)
Post × score > 65					-0.177	-0.177
					(-0.49)	(-0.49)
Post × score < 45 × $\Delta EqualScore_{t-1}$					-0.004	-0.004
					(-0.19)	(-0.19)
Post × score > 65 × $\Delta EqualScore_{t-1}$					-0.020	-0.020
					(-1.61)	(-1.61)
Constant	-0.476	-0.476	-0.484	-0.484	-0.192	-0.192
	(-0.69)	(-0.69)	(-0.69)	(-0.69)	(-0.27)	(-0.27)
Observations	1,121,535	1,121,535	1,121,535	1,121,535	1,121,535	1,121,535
R^2	0.385	0.385	0.385	0.385	0.386	0.386
Year-Month FE	Y	Y	Y	Y	Y	Y
Investor FE	Y	Y	Y	Y	Y	Y
ESG Scores	Y	Y	Y	Y	Y	Y
Screening Values	Y	Y	Y	Y	Y	Y
% Unmatched	Y	Y	Y	Y	Y	Y
# Instruments	Y	Y	Y	Y	Y	Y

5.3 Investor Features and Change

Table 15 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.

Table 15: 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 information disclosure and how these changes relate to portfolio performance. In contrast to previous studies that simulate or replicate portfolios, track indices, or rely on stated preferences, this research draws on actual investment behavior. I analyze realized returns while accounting for transaction costs, portfolio strategies across all asset classes, and observed investment decisions made by retail investors.

This study examines how individual investors respond to the introduction of ESG 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 and investors characteristics explaining those. The findings suggest that the availability of ESG information leads to a significant reallocation of investor portfolios. The adjustments are strongly anchored to the first observed ESG portfolio score. Investors with initially low ESG portfolios increase ESG exposure tilting their ESG portfolio scores upwards, whereas investors with initially high ESG portfolios decrease ESG exposure, tilting their ESG portfolio scores downwards. On average, this generates partial mean reversion in overall portfolio ESG scores. Further, tilting occurs through both purchases and sales where upward tilters buying higher-ESG stocks and sell low-ESG stocks, while downward tilters do the opposite.

The introduction of the ESG tool also affects portfolio structure beyond ESG characteristics. Overall, investors increase the number of equity and bond positions, indicating that company-level ESG information is actively used in security selection.

Regarding diversification, all investors expand the number of unique shares, total instruments, and ESG-rated holdings, alongside modest increases in industry diversification. However, responses differ across investor response groups. ESG tilters (both low and high initial score investors) tend to concentrate their portfolios relative to the benchmark, consistent with targeted ESG-driven reallocation, whereas the middle-score

group benefits primarily through broader diversification, indicating that this group uses the ESG tool primarily as inspiration to broaden its investment universe without facing strong ESG constraints.

Importantly, time-varying ESG portfolio scores are positively associated with diversification measures, while a higher percentage of portfolio holdings without ESG coverage is negatively related to diversification. This suggests that actively using ESG information is associated with measurable diversification benefits.

Looking at changes in stock selection, differences also arise across groups. ESG tilters (low and high initial scores) use the tool in a more disciplined manner, as ESG adjustments coincide with higher profitability and lower market risk. In contrast, investors without a strong ESG adjustment motive predominantly move toward larger, growth-oriented firms. Taken together, non-tilters benefit mainly through enhanced diversification, whereas tilters benefit primarily through more selective stock picking and improved portfolio quality.

In terms of portfolio performance, higher ESG portfolios are associated with higher portfolio returns. Looking at the response groups reveals substantial heterogeneity. Whereas upward tilting investors achieve higher returns over several time horizons compared to the benchmark group, there is evidence that downward tilters experience weaker performance and in some specifications lower returns. However, there is no significant change in portfolio return volatility for any of the groups. Moreover, market beta declines for ESG tilters, suggesting that return improvements are not driven by increased systematic risk exposure. Finally, examining how changes in the value-weighted ESG portfolio score predict portfolio returns reveals that only upward tilters benefit from increases in the value-weighted ESG score after the tool was introduced, whereas downward tilters experience lower returns. In contrast, changes in the equally weighted ESG score are not significantly related to returns, indicating that performance differences are primarily associated with active capital reallocation rather than uniform changes in ESG exposure across holdings.

Positive changes in ESG portfolio scores are especially pronounced among older investors, women, and individuals residing in regions with higher support for green political parties, indicating the importance of values-driven motivations.

This paper contributes to the discussion on 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 align portfolios with their values, improve diversification, and, in several cases, improve return outcomes without increasing risk. Rather than imposing financial trade-offs, ESG disclosure appears to enable disciplined reallocation and more informed investment decisions. 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 in favor of broader ESG transparency and integration in retail financial services.

Appendix

Appendix A: Additional ESG Scores

Table A.1: Trading Activity - ESG score
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 combined ESG 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 transaction date and investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) Stock ESG (all trades)	(2) Stock ESG (buy)	(3) Stock ESG (sell)
Post	0.124*	0.050	0.275***
	(1.84)	(0.58)	(2.94)
Post × <45 (low score)	0.091	0.500***	-0.758***
	(0.73)	(3.15)	(-4.33)
Post × >65 (high score)	-0.578***	-1.007***	0.143
	(-5.85)	(-8.10)	(0.88)
Constant	-60.294***	-60.340***	-60.594***
	(-90.54)	(-83.22)	(-74.03)
Observations	1,152,052	710,895	352,525
R^2	0.827	0.835	0.813
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
Investor x Industry FE	Y	Y	Y
Investor x Country FE	Y	Y	Y

Table A.2: Trading Activity - Controversy score

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 combined ESG 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 transaction date and investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) Stock Cont. (all trades)	(2) Stock Cont. (buy)	(3) Stock Cont. (sell)
Post	0.081	-0.304	0.132
	(0.35)	(-1.07)	(0.50)
Post × <45 (low score)	-0.268	0.681*	-1.823***
	(-0.92)	(1.85)	(-4.67)
Post × >65 (high score)	-1.275***	-2.225***	0.832**
	(-4.76)	(-6.82)	(2.22)
Constant	275.850***	277.746***	272.020***
	(118.08)	(105.90)	(109.54)
Observations	1,152,052	710,895	352,525
R^2	0.792	0.807	0.765
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
Investor x Industry FE	Y	Y	Y
Investor x Country FE	Y	Y	Y

Table A.3: Trading Activity - Environmental Pillar Score

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 environmental pillar 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 transaction date and investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) Stock E Score (all trades)	(2) Stock E Score (buy)	(3) Stock E Score (sell)
Post	0.753***	0.891***	0.789***
	(8.01)	(7.51)	(6.13)
Post × <45 (low score)	-0.054	0.298	-1.080***
	(-0.35)	(1.61)	(-4.57)
Post × >65 (high score)	-0.370***	-0.694***	0.227
	(-2.62)	(-4.06)	(0.97)
Constant	-105.455***	-104.477***	-108.137***
	(-119.02)	(-106.27)	(-100.82)
Observations	1,152,050	710,893	352,525
R^2	0.809	0.815	0.797
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
Investor x Industry FE	Y	Y	Y
Investor x Country FE	Y	Y	Y

Table A.4: Trading Activity - Governance Pillar Score

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 combined ESG 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 transaction date and investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) Stock G Score (all trades)	(2) Stock G Score (buy)	(3) Stock G Score (sell)
Post	-0.107	-0.357***	0.204
	(-1.16)	(-3.18)	(1.44)
Post × <45 (low score)	0.055	0.426**	-0.642***
	(0.34)	(2.08)	(-2.68)
Post × >65 (high score)	-0.539***	-0.999***	0.268
	(-3.96)	(-6.17)	(1.11)
Constant	-33.872***	-34.807***	-32.899***
	(-38.19)	(-36.69)	(-29.13)
Observations	1,152,052	710,895	352,525
R^2	0.721	0.734	0.697
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
Investor x Industry FE	Y	Y	Y
Investor x Country FE	Y	Y	Y

Table A.5: Trading Activity - Social Pillar Score

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 combined ESG 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 transaction date and investor-level. t–statistics in parentheses. (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

	(1) Stock S Score (all trades)	(2) Stock S Score (buy)	(3) Stock S Score (sell)
Post	0.077	0.047	0.155
	(0.98)	(0.48)	(1.29)
Post × <45 (low score)	0.141	0.566***	-0.677***
	(0.83)	(2.65)	(-2.92)
Post × >65 (high score)	-0.614***	-1.064***	0.106
	(-5.31)	(-7.46)	(0.55)
Constant	-54.984***	-54.744***	-55.352***
	(-71.02)	(-64.04)	(-60.15)
Observations	1,152,052	710,895	352,525
R^2	0.786	0.795	0.768
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
Investor x Industry FE	Y	Y	Y
Investor x Country FE	Y	Y	Y

Theoretical Illustration: Attention, ESG Constraints, and Diversification

The empirical results show that retail investors who tilt their portfolio benefit from selecting more profitable and low beta stocks, whereas the middle group primarily 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 selection and 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 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 A.1 and A.2 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.

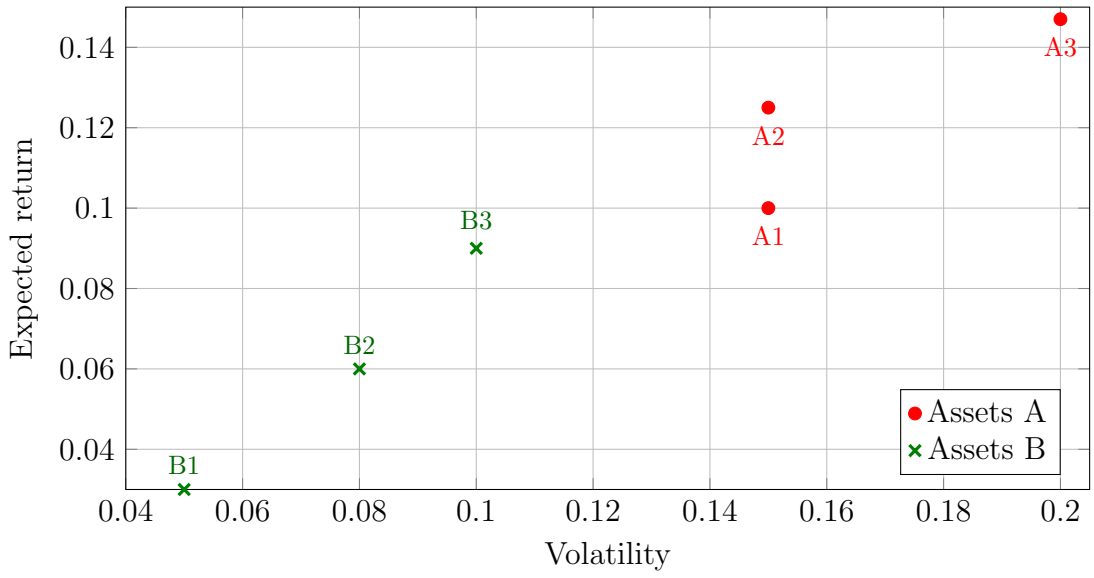


Figure A.1: Return–volatility locations. A assets: higher mean/volatility and high within-A correlation; B assets: lower mean/volatility and weak correlation with A.

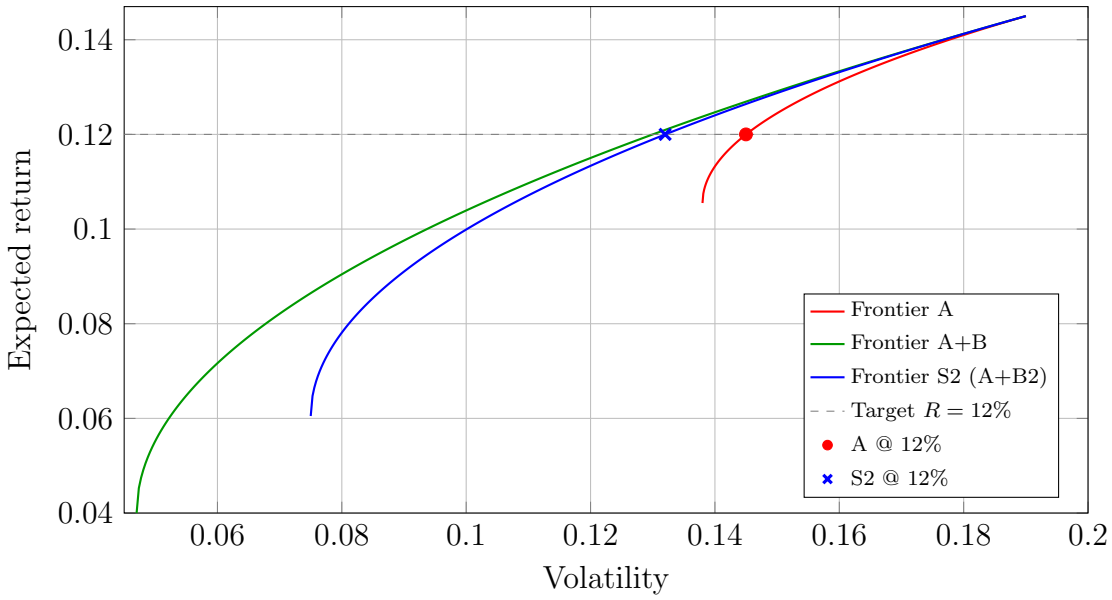


Figure A.2: Efficient frontiers are increasing and concave, and meet at a common endpoint. Adding a high-E, weakly correlated asset expands feasibility and shifts the frontier left; at the same target $R = 12\%$, volatility falls from the A frontier to S2.

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Theoretical Framework: ESG Disclosure, Tilting, and Performance

This section provides a stylized framework that rationalizes two distinct empirical findings. First, ESG disclosure generates heterogeneous tilting responses that are anchored to investors' initially observed portfolio ESG scores. Second, tilting affects portfolio performance through capital reallocation and stock selection rather than through mechanical ESG level effects.

The framework separates a response model from a performance model. The first explains why investors tilt. The second explains how tilting reshapes portfolio risk and return.

1. Response Model

Each investor j holds a portfolio with ESG score $E_{j,0} \in [0, 100]$ at the time of disclosure. Let $\bar{E}$ denote a perceived benchmark ESG level, such as the cross-sectional mean. Define ESG distance:

$$d_j = E_{j,0} - \bar{E}.$$

Disclosure makes this distance salient. The intensity of ESG adjustment is assumed to depend on the magnitude of this distance:

$$\theta_j = \kappa |d_j|, \qquad \kappa > 0.$$

The direction of tilting is determined by the sign of d_j. Define

$$\tilde{\theta}_j = -\theta_j \, \text{sign}(d_j).$$

Hence,

$$\tilde{\theta}_j = \begin{cases} > 0 & \text{if } d_j < 0 \quad \text{(upward tilting)}, \\ < 0 & \text{if } d_j > 0 \quad \text{(downward tilting)}, \\ = 0 & \text{if } d_j \approx 0 \quad \text{(no tilting)}. \end{cases}$$

Investors choose portfolio weights w to maximize

$$\max_w \quad w'\mu - \frac{\gamma}{2} w'\Sigma w + \tilde{\theta}_j E(w),$$

subject to $w \geq 0$ and $\mathbf{1}'w = 1$, where $E(w) = \sum_i w_i E_i$.

This specification generates three response groups: investors far below the benchmark tilt upward, investors far above tilt downward, and investors near the benchmark do not

tilt. The magnitude of tilting increases in $|d_j|$, producing partial mean reversion in portfolio ESG scores.

2. Performance Model

This model examines how tilting affects portfolio performance.

2.1 Middle Group: Diversification Channel

Investors with $\tilde{\theta}_j \approx 0$ solve the standard mean-variance problem

$$\max_w \quad w'\mu - \frac{\gamma}{2} w'\Sigma w.$$

Disclosure expands their attention set from S_1 to $S_2 \supset S_1$, allowing broader security selection. This leads to:

- An increase in the number of holdings,
- Increased exposure to larger firms,
- Higher market beta.

Performance improvements arise primarily through diversification rather than selective stock picking.

2.2 Tilters: Selection Channel

For tilting investors, $\tilde{\theta}_j \neq 0$ alters optimal weights:

$$w_j^* = \frac{1}{\gamma}\Sigma^{-1}(\mu + \tilde{\theta}_j E).$$

Tilting requires active capital reallocation across holdings. This produces:

- Portfolio concentration relative to the middle group,
- Simultaneous purchases and sales,
- Changes in portfolio weights rather than simple asset additions.

Empirically, both upward and downward tilters increase portfolio profitability and reduce market beta. This indicates that ESG disclosure operates as a screening device that redirects attention toward firm fundamentals. ESG tilting therefore coincides with improved stock selection and lower systematic risk.

However, performance effects differ by direction. Upward tilters earn higher returns across horizons, whereas downward tilters experience weaker performance and reduced alpha.

Implications

The framework yields three central implications consistent with the data:

1. ESG disclosure induces anchoring and heterogeneous tilting responses proportional to initial ESG distance.
2. Investors without strong ESG incentives improve diversification.
3. ESG-motivated tilters improve profitability and reduce beta through selective capital reallocation, with upward tilters realizing positive return effects.

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