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Four facts about ESG beliefs and investor portfolios☆

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ABSTRACT

We analyze survey data on ESG beliefs and preferences in a large panel of retail investors linked to administrative data on their investment portfolios. The survey elicits investors' expectations of long-term ESG equity returns and asks about their motivations, if any, to invest in ESG assets. We document four facts. First, investors generally expected ESG investments to underperform the market. Between mid-2021 and late-2023, the average expected 10-year annualized return of ESG investments relative to the overall stock market was −2.1%. Second, there is substantial heterogeneity across investors in their ESG return expectations and their motives for ESG investing: 48% of survey respondents do not see any reason to invest in ESG, 24% are primarily motivated by ethical considerations, 22% are driven by climate hedging motives, and 6% are motivated by return expectations. Third, there is a strong link between individuals' reported ESG investment motives and their actual investment behaviors, with the highest ESG portfolio holdings among individuals who report ethics-driven investment motives. Fourth, financial considerations matter independently of other investment motives: we find meaningful ESG holdings only for investors who expect these investments to outperform the market, even among those investors who reported that their most important ESG investment motives were ethical or hedging reasons.

The last decade has seen a substantial growth in investment approaches that consider assets' environmental, social, and governance (ESG) characteristics, and, by the end of 2022, sustainability-focused funds had more than $2.5 trillion in global assets under management (Bioy et al., 2023). While some proponents of ESG investing extol its societal benefits, critics argue that retail investors might not fully appreciate the possible financial return implications of incorporating ethical considerations into investment decisions. Despite the growing focus on the costs and benefits of ESG investing among researchers and policymakers (see, for example, recent work by Goldstein et al., 2022; Pástor et al., 2021; Pedersen et al., 2021), the actual motives of retail investors for investing in ESG assets—including the relative importance of financial and non-financial considerations—are not well understood.

To inform this ongoing debate, we document four facts about ESG investing by linking survey data on ESG beliefs and preferences with administrative data on investor portfolios for a large panel of U.S. retail investors. The survey includes three questions on ESG investing. The first such question elicits investors' long-run (10-year) return expectations from investing in a diversified ESG equity portfolio. We compare these expectations to the same investors' long-run expected returns

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for the overall stock market, which are also elicited in the survey. The second question asks investors which of the following possible ESG investment motives is most important to them: (i) no reason, (ii) excess financial returns, (iii) non-pecuniary ethical considerations, or (iv) hedging reasons, whereby ESG assets have relatively higher returns when climate risks materialize. These reasons are often cited as rationales for ESG investing in the academic literature and financial press.[1] A third question elicits investors' level of concern about climate change.

The survey is administered by Vanguard, one of the world's largest asset management firms, to its U.S.-based clients. In addition to the three ESG-related questions, the survey also elicits investors' beliefs about stock returns, bond returns, and GDP growth. The survey participants are a random sample of U.S.-based clients of Vanguard, 80% of whom have retail accounts at Vanguard, and 20% of whom have retirement accounts. The original survey has been running every two months since February 2017, and the ESG-related questions were added in June 2021. In this paper, we analyze the sixteen waves of the survey containing the ESG-related questions between June 2021 and December 2023. Each survey wave receives around 2000 responses, and investors often respond to several waves, thus providing a substantial panel dimension to the data.

We collect the results in this paper in four facts. Fact 1 is that investors on average expected returns on ESG equities to be significantly lower than returns on the overall stock market, by about 2.1% per year over a 10-year horizon. This expectation is consistent with several potential explanations. For example, investors may believe that ESG stocks are overpriced and likely to experience low returns going forward. Alternatively, investors may perceive lower expected returns as an equilibrium outcome driven by ESG stocks' attractive hedging properties against future climate disasters or their attractive non-pecuniary benefits to investors with ethical considerations. The gap between expected market returns and (lower) expected ESG returns has widened during our sample period, from −1% in June 2021 to −2.5% in December 2023.

Fact 2 describes the substantial heterogeneity across investors in ESG return expectations and ESG investment motives. The standard deviation of expected excess ESG returns across all investors is an economically meaningful 5%, which is of similar magnitude as the standard deviations of expected overall market returns (4%). While there are some differences in expectations across demographic groups (e.g., male respondents and those who live in more politically conservative areas are relatively more pessimistic about excess ESG returns), observable characteristics explain only a small part of the heterogeneity in these expectations. Interestingly, beliefs about the relative returns of ESG investments are unrelated to beliefs elicited about market returns, GDP growth, the probability of disasters, or bond returns. This suggests that the large heterogeneity in beliefs about ESG returns represents a separate dimension of the investors' beliefs relative to traditional variables that enter the investment decision.

There is also sizeable heterogeneity across investors in terms of motives to invest in ESG assets. About 48% of survey respondents do not see any specific reason to invest in ESG stocks. The remaining respondents are split between different perceived primary reasons to invest in ESG assets: 6% of respondents are primarily motivated by return expectations, 22% perceive ESG stocks as a hedge against climate risk, and 24% are most motivated by ethical arguments for ESG investing. Over time, individuals' assessments of the reasons to invest in ESG can change: while most respondents who believe there are no good reasons to invest in ESG hold this view throughout our sample period, many who initially report return considerations as their most important motivation for ESG investing no longer hold this view later in the sample. Over our 30 months sample, the share of respondents who report that there are no good reasons to invest in ESG increased by 5 percentage points.

The ESG investment motives that an investor perceives as most important are related to that investor's ESG return expectations. Investors who report return considerations as their most important investment motive on average expect ESG investments to outperform the market by 1% per year over the next ten years. Investors reporting each of the other three investment motives on average expect ESG investments to underperform the market. Those investors who do not perceive any reason to invest in ESG hold the most negative views, with average annual long-run expected excess ESG returns of −3.6%.

Our next fact, Fact 3, highlights that ESG beliefs regarding returns, ESG motivations, and concerns for climate change are all related to the actual holdings of ESG investments. To study ESG investments, we focus on investments in ESG-focused mutual funds and ETFs rather than individual securities.[2] While it is not necessarily clear to what extent ESG-focused funds actually hold securities consistent with this stated objective and whether available classifications of funds and stocks as ESG are reliable, we take the practical view that the labeling of a fund as ESG-related is salient to investors, who are not necessarily checking whether the ESG label is meaningful (see Hartzmark and Sussman, 2019). Only about 3.4% of respondents in our sample own at least some ESG-focused funds. This propensity is declining in age and is higher for investors living in politically more liberal areas but does not otherwise vary substantially with investors' demographic characteristics.

We find a statistically strong association between ESG beliefs and investments: investors who report higher expected returns from ESG investments hold a higher share of ESG funds in their portfolios. The relation between ESG holdings and beliefs is stronger in the positive domain (i.e., among investors who expect ESG funds to outperform the market) relative to the negative domain (i.e., among investors who expect underperformance), suggesting that frictions related to shorting might play a role in determining retail investors' ESG investments.

We also find a strong association between ESG holdings and reported motives for such investments. Investors who report perceiving no reason to invest in ESG effectively own no ESG investments. Investors who report return-driven motives to invest in ESG assets and those motivated by ethical reasons are similarly likely to hold ESG investments (with those motivated by ethical reasons holding the larger portfolio share), followed by those motivated to buy ESG funds as climate hedges. Overall, about half of the investors actually holding ESG assets report to be primarily motivated by ethical considerations. Similar patterns hold for the reported level of concern for climate risk: investors who are highly concerned about climate risks hold a larger fraction of their portfolio in ESG funds, and 81% of actual ESG investors report a high level of concern about climate risk.

Finally, we investigate the *trade-off* between reported ESG investment motives and return expectations in determining actual ESG investment behavior. Fact 4 highlights that within each group of investors with the same perceived primary ESG investment motive, actual ESG holdings vary substantially with investors' expected return. For example, even among investors who report ethical considerations as their primary motive for investing in ESG, the share of individuals with actual ESG investments is 4% among those who expect an excess return of less than −0.5%, and 11% among those who expect an excess return of more than 0.5%. This finding suggests that traditional investment motives remain an important driver of portfolio allocation even

[1] For example, Pástor et al. (2021) and Goldstein et al. (2022) emphasize ethical considerations, Engle et al. (2020) and Alekseev et al. (2022) discuss hedging properties, and Baron (2001), Bénabou and Tirole (2010) and Albuquerque et al. (2019) analyze the ability to generate excess returns.

[2] We use a classification by Morningstar to divide the universe of mutual funds and ETFs available to Vanguard retail clients into those that have an ESG focus and those that do not. These include funds managed by both Vanguard and other entities.

among respondents who believe that there are important non-pecuniary reasons for investing in assets with good ESG properties.

Beyond these four main facts, we document several other patterns that characterize the behavior of beliefs about ESG investments in our sample. For example, a variance decomposition of beliefs shows that the large cross-sectional heterogeneity of ESG beliefs is persistent over the 30-month period of our survey, hinting that ESG optimism or pessimism may be a relatively fixed individual characteristic.

Taken together, our results show that expected excess ESG returns, perceived ESG investment motives, and actual ESG investments vary substantially among investors. The fact that ESG beliefs and preferences are actually associated with portfolio allocation—though in a nuanced way—is a relevant step in the transmission of these attitudes into asset prices and ultimately to firm behavior. The heterogeneity that we document (in beliefs, ESG holdings, and climate concerns) has interesting consequences for both theory and policy. On the theory side, it can be used to calibrate and discipline theoretical models that explicitly consider investors who are driven by different motivations for ESG investing (Heinkel et al., 2001; Berk and van Binsbergen, 2021; Goldstein et al., 2022; Pástor et al., 2021). On the policy side, tracking the evolution of investors' ESG attitudes and investments can help policymakers align their regulatory and legislative responses to climate change with corresponding pressures from investors and other market participants. For both policy and economic theory, the heterogeneity in expected returns and perceived ESG investment motives is an important input in deciding whether ESG-oriented investment products should target a broad population (e.g., as a default option in employer-sponsored pension funds) or should best be left to individual decision makers.

Our paper focuses on a sample of investors with accounts at Vanguard. The very substantial size of Vanguard—the universe from whom our sample is drawn holds about $2.5tr of assets—makes this an important group of investors to study. However, as discussed in Giglio et al. (2021c), it is possible that our findings may not generalize to the rest of the U.S. retail investor population. Indeed, while Giglio et al. (2021c) documented that Vanguard investors were very similar to other U.S. retail investors on a number of important dimensions, such as their beliefs about stock returns, they also found that Vanguard investors were older and wealthier than the average retail investor. In this paper, we explore how Vanguard investors differ from other retail investors in terms of their ESG holdings, a dimension that was not considered in prior work and which is particularly relevant to assess the generalizability of our findings. We document that Vanguard investors hold a somewhat lower fraction of assets in ESG investments compared to the average U.S. investor, and argue that this likely reflects the more limited supply of ESG funds offered by Vanguard than a difference in ESG beliefs with the broader population (investors at Vanguard disproportionately hold Vanguard funds). For example, we provide evidence suggesting that our findings are unlikely to be driven by investors who chose Vanguard because of its particular ESG philosophy, and who may thus differ substantially from other investors. Indeed, the facts we document (on both ESG beliefs and holdings) are essentially identical if we focus only on those investors that joined Vanguard before 2016 and prior to any salient public debates around the merits of ESG investments.

Related literature. Our paper contributes to three strands of literature. The first strand explores investors' motivations for ESG investing. An important paper by Riedl and Smeets (2017) matches portfolio holdings of a sample of Dutch investors with a 2012 survey and studies whether social preferences or return expectations determine socially responsible investments. We confirm several of the patterns that they documented among a large sample of wealthy U.S. investors in a recent period of increased focus on ESG investing. We provide new evidence in several important dimensions, for example by directly studying the motivations driving ESG portfolio choices and the trade-offs between those motivations and expected returns.

In related work studying investors' ESG preferences, Baker et al. (2022) explore the fees for ESG funds to conclude that investors are willing to pay an average of 20 basis points to invest in funds with an ESG mandate. Our work suggests that the average ESG investor perceives those investments to outperform the market (even if they may actually be expected to underperform after fees). Our data also allows us to explore more broadly the strength of non-pecuniary investment motives in driving the decisions of ESG investors. Our work also complements recent research that has used a variety of surveys or field and laboratory experiments to explore whether investors have a positive willingness to pay for sustainable or impact investments (Heeb et al., 2023; Humphrey et al., 2021; Bauer et al., 2021; Haber et al., 2022; Engler et al., 2023), and work that has explored investors motivations for ESG investments by studying investment flows (Renneboog et al., 2011; Döttling and Kim, 2024). Li et al. (2023) investigate the aggregate trading patterns of retail investors around ESG news events for U.S. firms and conclude that U.S. retail investor shows interest in firms' ESG activities, primarily when these activities have a significant financial impact on company performance.

Closely related to these studies of investors' ESG investment motives is work that studies those investments' financial performance. This research finds conflicting evidence on the financial returns to ESG investing, thus providing little consistent insight into the importance of either hedging benefits or non-pecuniary payoffs from such investments (Hong and Kacperczyk, 2009; Bolton and Kacperczyk, 2021; Barber et al., 2021; Friede et al., 2015; Khan et al., 2016; Atz et al., 2023). A key challenge for this literature is that ex-post average realized returns are both noisily estimated in short samples and influenced by temporary shifts in investor demand, complicating their interpretation as forward-looking measures of expected return. This contrasts with survey data, which provides an ex-ante measure of expected returns. We find that the average retail investor expects ESG investments to have negative expected returns, but that there is substantial heterogeneity in those expected returns. Among those individuals actually investing in ESG funds, the expected returns of those investments are positive.

More broadly, we add to literature on "climate finance", that studies the role of climate risk in affecting returns and investments in financial markets (Heinkel et al., 2001; Andersson et al., 2016; Broccardo et al., 2022; Hong et al., 2021; Oehmke and Opp, 2020; Pedersen et al., 2021; Alekseev et al., 2022; Alok et al., 2020; Bolton and Kacperczyk, 2021, 2020; Engle et al., 2020; Flammer et al., 2021; Giglio et al., 2021b; Hartzmark and Sussman, 2019; Krueger et al., 2020; Acharya et al., 2023). For recent reviews of this growing field, see Giglio et al. (2021a), Stroebel and Wurgler (2021) and Hong et al. (2020).

1. Survey description

This paper explores data from a panel survey of investor beliefs—the GMSU-Vanguard survey—linked to administrative data on those investors' portfolio holdings. The survey is fielded among U.S.-based retail and retirement clients of Vanguard, one of the world's largest asset management firms. It has been conducted every two months since February 2017, and receives about 2,000 responses per wave. The online survey asks a randomly selected sample of Vanguard retail and retirement clients a short set of questions about short-term and long-term expected stock and bond returns and expected GDP growth. In June 2021, two ESG-related questions were added to the survey; a third such question was added in December 2021. In this section, we describe the new questions in detail. We also provide additional details on the survey sample. For other information on the survey, including details on questions not related to ESG investments, we defer to the descriptions in Giglio et al. (2021c, 2020).

1.1. ESG questions

The newly added ESG questions, which appear at the end of the regular survey, are shown in Fig. 1. While ESG investing has received much attention in recent years—and our relatively sophisticated sample

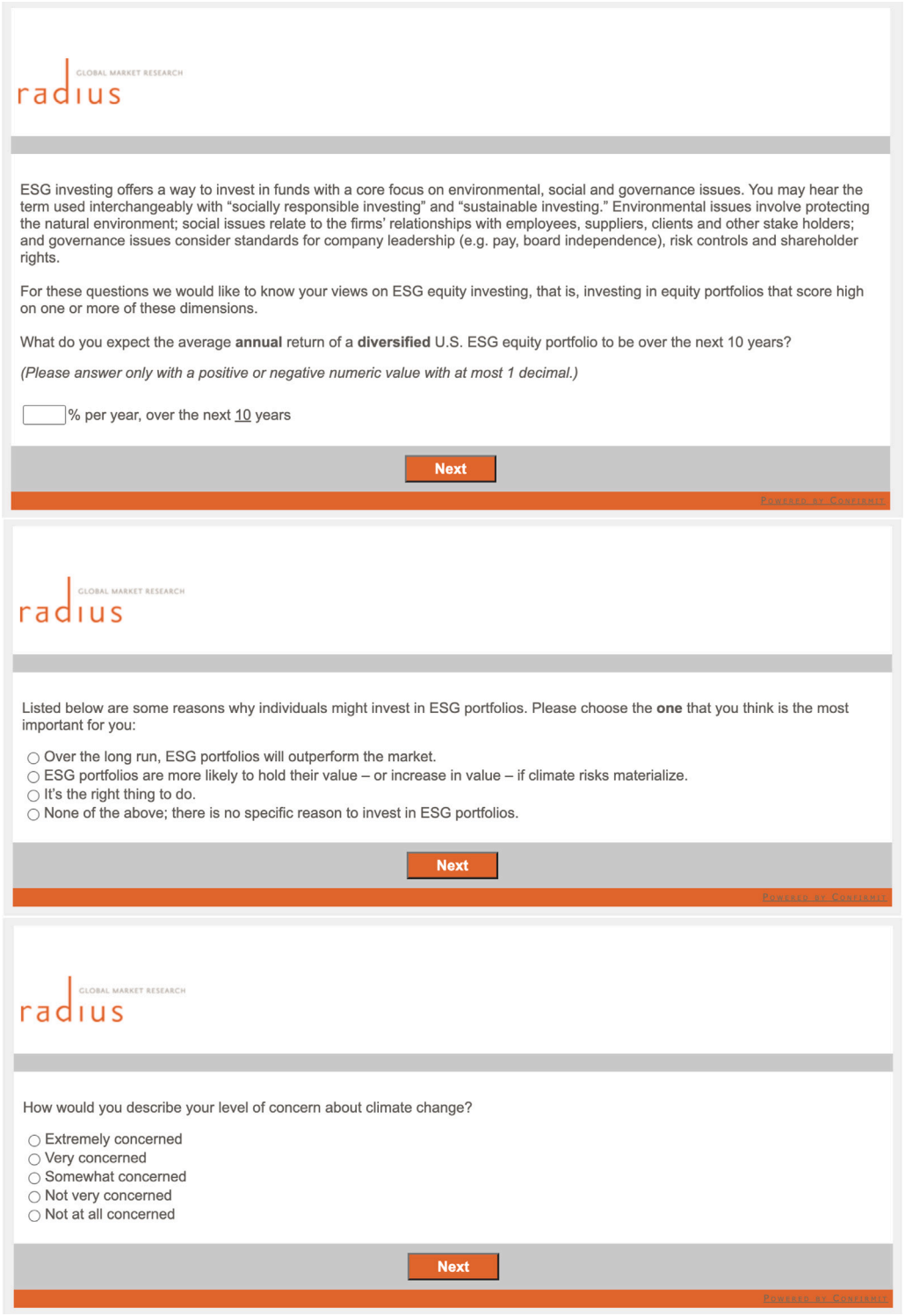


Fig. 1. ESG questions in GMSU-Vanguard survey. Figure shows the three questions on ESG investing in the GMSU-Vanguard survey.

of investors is thus likely to be familiar with the term—we begin by providing a broad definition.

The first question asks respondents about the expected return on a diversified U.S. ESG equity portfolio. The question focuses on the average annualized return over a 10-year horizon. The phrasing of this question is directly comparable to an earlier question in the survey that asks about 10-year expected annual returns of the aggregate stock market. The difference in the answers between expected returns of ESG investments and expected returns of the stock market allows us to measure expected excess returns of ESG investments over the general stock market. We focus on 10-year returns because this longer horizon is more relevant to realizations of climate change, a key force driving the investor focus on ESG issues. The response is entered by survey respondents in a text box that accepts up to 1 decimal point.

The second question aims to characterize the primary motives to invest in ESG portfolios as perceived by the investors, chosen among the main ones discussed in the literature. This question thus exploits a key benefit of surveys, namely that they can provide insight into the

thought process of respondents (Bailey et al., 2019). The survey asks respondents to choose the investment motive that is most important to them among four options. First, investors may perceive ESG funds to have a higher long-run return than the market; this would, for example, capture the beliefs of investors that currently think the market is underpricing ESG investments. Second, investors may believe that ESG portfolios act like climate hedges and would do particularly well when climate risks materialize. Third, investors might view ethical motives for ESG investments as most important to them, stating that such investments are "the right thing to do". Finally, investors may perceive no specific reasons to invest in ESG. While more qualitative in nature, this second survey question helps to contextualize the beliefs about expected returns on ESG investing elicited in the first question, and can help us distinguish between several different views that might be consistent with a given perceived excess return of ESG investments.[3]

The third ESG-related question asks whether investors are concerned about climate change. We generally combine the "Extremely concerned" and "Very concerned" into "High concern" and the "Not very concerned" and "Not at all concerned" into "Low concern". This question allows us to explore whether beliefs and attitudes towards ESG investments are determined by concerns about climate change.

1.2. Survey sample

As described in Giglio et al. (2021c), the random sample for the survey is selected so that 80% of contacted individuals are retail investors and 20% are investors in defined contribution plans, subject to additional requirements (most importantly: that they are 21 years or older, and that they have Vanguard assets of at least $10,000). Overall, the sample of individuals who are potentially contacted represents about $2.5 trillion in assets at Vanguard. The survey has a substantial panel dimension: if individuals respond to the survey in any wave, they are recontacted in each subsequent wave. New potential respondents are additionally contacted in each wave. Individuals who do not respond to the first three waves in which they are contacted, or those who at any point opt out of the survey, are not contacted again. The survey receives around 2,000 responses per wave, a large number of them from re-respondents (see also Appendix Figure B.1).[4] A detailed description of the sample and overall response rates, as well as an analysis of the demographic differences in response rates can be found in Giglio et al. (2021c).

The ESG questions appear at the end of the pre-existing survey and the survey is not branded as ESG-related. Essentially all survey participants provide answers to the ESG questions (see Appendix Table B.1). This minimizes concerns that respondents to the ESG questions are selected based on particular views on this issue.[5] We analyze the sixteen (thirteen) waves of the survey containing the first two (third) ESG-related questions between June 2021 (December 2021) and December 2023. Investors in our sample are relatively wealthy, with an average of total Vanguard portfolio value of about $684k. About 64% of the respondents are male, and the average age is 63 years old. Full summary statistics on the demographics of the respondents, as well as analyses that explore whether and how respondents differ from non-respondents, are presented in Appendix Table B.2.

In Appendix A we explore the differences between the ESG holdings of Vanguard clients and the ESG share among the universe of U.S. funds. We document that the average ESG share of all Vanguard retail investors is around 0.4%. While this is similar to the average ESG portfolio share of our survey respondents, it is lower than the 1.2% ESG share of assets under management of the universe of U.S. funds reported by Morningstar. There are three potential reasons why the ESG holdings of Vanguard investors might be lower than for the broader fund universe.

The first possibility is that holdings in U.S. ESG funds might disproportionately come from non-U.S.-based investors, and that the holdings of our Vanguard sample actually correspond more closely to the ESG holdings of U.S.-based retail investors (we are not aware of any aggregate data on ESG holdings of the universe of retail investors by location).

A second possibility is that Vanguard investors might, on average, view ESG issues less positively than the average U.S. retail investor. In particular, it is possible that following the recent debates about the merits of ESG investment, Vanguard might have attracted relatively more ESG-skeptical investors. However, given that our results are identical when focusing on the sample of investors that joined Vanguard before 2016—that is, long before the recent debate about the merits of ESG investing might have allowed investors to infer the ESG philosophies among the large asset managers—we find this interpretation unlikely.[6]

A third possibility is that the ESG share of Vanguard investors might in part reflect the more limited choice of ESG funds offered by Vanguard to their clients, compared to other asset managers such as BlackRock. In Appendix A we provide evidence consistent with this explanation. Vanguard investors overwhelmingly tend to buy Vanguard funds (specifically, Vanguard retail clients allocate 80% of their investments to Vanguard funds even though they are not generally restricted from purchasing funds of other asset managers); and Vanguard ESG funds have about 0.4% of the AUM of all funds offered by Vanguard, a number that is significantly lower than that of other issuers and close to the average ESG share among Vanguard investors. This explanation

[3] Of course, as with any survey question, there is a risk that both the phrasing of the question and the structure of the allowable answers might somehow influence the responses. In this type of question, for example, respondents have sometimes been shown to be hesitant to select "no reason" (see, e.g., the extensive discussion in Bergman et al., 2020). In this particular case, for example, one may worry that investors that are less positive about ESG may quickly exclude pecuniary and ethical reasons to invest in ESG, and then, among the remaining choices, choose the hedging option as it is the only remaining one that is described with some explanation of why it may make sense (the other being "No reason"). While, in our setting, about 50% of respondents do select "no reason", there might have been some respondents who were discouraged from doing so, and selected hedging motives instead. We leave it to future research to understand the extent such a concern influences our results.

[4] All waves prior to the last final one in December 2023 were administered using the Radius platform. In the last wave, we randomly divided the prior respondents between the Radius and Qualtrics platforms in preparation for transitioning our survey operations to the Qualtrics platform starting in 2024. In the Qualtrics version of the survey, the ESG-related questions were not included, so the entirety of the responses in this paper come from the same (Radius) platform. To ensure we reached our target number of participants in the last wave despite splitting the sample or prior respondents between Radius and Qualtrics, we included a higher volume of initial invitations. As a result, the last wave saw an increase in new respondents and a decrease—by about a half—in the number of re-respondents.

[5] For example, one could be concerned that a survey specifically branded as ESG-related might attract more participation from those investors who specifically care about ESG issues. In our sample, many of the respondents had already responded to the survey at least once before the ESG questions were introduced and their answers are not meaningfully different on average than those provided by newly contacted respondents.

[6] Of course, it could still be that the kind of investors that have Vanguard accounts might on average view ESG issues less positively than other investors, even if they did not select to invest with Vanguard based on their ESG preferences. We cannot rule this possibility out directly, but it is useful to note that the analysis in Giglio et al. (2021c) compares Vanguard investors and U.S. retail investors along multiple non-ESG dimensions, and shows that the two investor groups are generally very similar on important dimensions, such as flow-performance sensitivity, and, importantly, on the level and time-series variation of their (non-ESG) beliefs. There are therefore no strong a-priori reasons to expect Vanguard investors to be particularly more pessimistic about ESG considerations relative to other investors.

Table 1
Expected ESG returns.

	Panel A: Expected 10Y return of ESG investments & stock market (% p.a.)									
	Mean	SD	P5	P10	P25	P50	P75	P90	P95	N
Pooled ESG	5.20	4.88	0	1	3	5	7	10	12	30,425
Pooled market	7.13	3.96	3	3	5	7	8	10	12	30,667
	Panel B: Expected excess 10Y return of ESG investments (% p.a.) by demographic characteristics									
	Mean	SD	P5	P10	P25	P50	P75	P90	P95	N
Pooled	−2.06	5.34	−10	−6.5	−3	−1	0	2	4	30,105
By age										
≤40	−2.11	6.02	−13	−7	−3	−1	0	3	5	1,544
41–50	−2.00	5.45	−10	−7	−3	−1	0	2	4	2,103
51–60	−2.07	5.47	−10.5	−7	−3	−1	0	2	4	5,047
61–70	−2.13	5.37	−11	−7	−3	−1	0	2	3.45	11,640
>70	−1.96	5.10	−10	−6	−3	−1	0	2	4	9,655
By gender										
Female	−1.75	5.53	−10	−6.5	−3	−1	0	3	5	9,434
Male	−2.19	5.25	−10	−6.5	−3	−1	0	1.6	3	20,586
By wealth										
<$100k	−2.03	6.29	−12	−8	−4	−1	0	3	6	5,644
$100k–$500k	−2.06	5.59	−10	−7	−3	−1	0	2	4	10,602
$500k–$1 m	−2.10	5.07	−10	−6	−3	−1	0	2	3	5,872
>$1 m	−2.02	4.37	−8	−6	−3	−1	0	1	2	7,902
By flood risk exposure										
Low	−2.09	5.33	−10	−7	−3	−1	0	2	4	13,037
Medium	−2.05	5.40	−10	−6	−3	−1	0	2	4	14,080
High	−1.96	4.93	−9.5	−6	−3.5	−1	0	2	4	2,257
By political view in location										
Democratic	−1.86	5.09	−10	−6	−3	−1	0	2	4	16,254
Republican	−2.40	5.75	−12	−7	−4	−1.8	0	2	4	7,800
	Panel C: Expected excess 10Y return of ESG investments (% p.a.) by other ESG questions									
	Mean	SD	P5	P10	P25	P50	P75	P90	P95	N
By reasons of ESG investment										
ESG will outperform	1.00	4.68	−5	−2	0	1	2	5	8	1,890
ESG hedges climate risk	−0.65	4.84	−7	−5	−2	0	1	3	6	6,439
It is the right thing to do	−0.98	3.70	−6	−4	−2	−1	0	2	4	7,291
No specific reason	−3.64	5.82	−15	−9	−5	−2	−1	0	1	14,352
By climate change concerns										
Low	−4.82	7.06	−19	−13	−6	−3	−1	0	2	6,310
Moderate	−2.17	4.84	−9	−6	−3.1	−1.9	0	1	3	6,175
High	−1.04	4.47	−7	−5	−2	−0.5	0	2	4	11,901
	Panel D: Expected excess 10Y return of ESG investments (% p.a.) by ESG holdings									
	Mean	SD	P5	P10	P25	P50	P75	P90	P95	N
By ESG investments										
Has no ESG investments	−2.12	5.36	−10	−7	−3	−1	0	2	4	29,076
Has ESG investments	−0.16	4.46	−5	−3	−1	0	1	3	5	1,029

Panel A of the table shows summary statistics of the 10-year annualized expected return of ESG investment and the 10-year annualized expected return on the market portfolio, pooled all responses. Panel B shows summary statistics of the 10-year annualized expected *excess* return of ESG investment (i.e., the difference between the expected returns on ESG investments and the market), pooled all responses and divided by characteristics. Panel C shows summary statistics of the expected excess ESG returns, divided by the other two ESG questions, which are the stated motivations of ESG investments and the level of concern about climate change. Panel D shows summary statistics of the expected excess ESG returns, divided by whether a respondent has any ESG investment. The flood risk exposures are based on the average risk scores of the zip code area where the respondents live (low: <1.5, medium: ≥1.5 & <3, high: ≥3). The average risk scores are measured by the flood risk models of the First Street Foundation. The political views of living areas are based on county-level vote shares (considering only Democrat and Republican) from the 2020 US election.

would then contribute to the lower level of ESG holdings among Vanguard investors, but would not necessarily imply that the ESG beliefs of Vanguard investors, or their portfolio-belief sensitivity, are different from that of the average investors. Of course, one would also expect the offering of funds from Vanguard to be at least somewhat responsive to the clients' preferences, making it hard to separate the demand and supply explanations for the equilibrium set of funds on offer.

In the end, while the empirical evidence is not suggestive of Vanguard investors having particularly different ESG beliefs than the average investor, it is important to keep in mind that given the absolute size of the Vanguard population under investigation (as mentioned above, the potential survey respondents hold around $2.5 trillion in wealth), it is an independently interesting group to study, even if one ought to be somewhat cautious to extrapolate all findings to a broader set of retail investors.

2. Beliefs about ESG investments

In this section, we explore the reported beliefs about ESG returns, motivations, and climate change concerns from our survey, and summarize the results in our first two facts.

2.1. ESG return expectations

Table 1 summarizes the beliefs about ESG returns across survey participants.[7] Panel A shows summary statistics for the 10-year expected

[7] A small number of extreme outlier responses from individuals reporting stock market or ESG returns in excess of 100 percent would potentially have extreme effects on the analysis. Following Giglio et al. (2021c), we therefore

annualized returns on ESG investments and the overall market, pooling together all survey responses. The average expectation of long-run returns on the market is about 7.1% per year—broadly consistent with historical average returns of the U.S. stock market—with a standard deviation across responses of 4%. Average expected 10-year returns for ESG investments are lower—about 5.2% per year—and there is more dispersion in beliefs about ESG returns than about market returns, with a standard deviation across responses of 4.9% (see also Appendix Figure B.2).

Panel B of Table 1 focuses on the difference between the expected returns on ESG investments and the market, the expected *excess* ESG return. As discussed in Pástor et al. (2021) and Alekseev et al. (2022), data limitations including short time spans and structural breaks complicate estimating the relative performance of ESG investments from time series data. A survey such as ours can thus complement the existing evidence by giving a direct insight into the ex-ante returns expected by investors.

The first row of Panel B shows the results when pooling all responses. Consistent with Panel A, we find the expected excess return to be negative for the average investors' answer, at about −2.1% per year over the next ten years. We collect this result on expected ESG returns in our first fact.

Fact 1. *Between mid-2021 and late-2023, investors on average expected the 10-year return on ESG investments to underperform the market by about 2.1% per year.*

Several economic theories are consistent with a negative expected return on ESG investments. First, investors could perceive ESG investments to be more of a hedge (i.e., providing some systematic insurance against aggregate risk factors such as climate risk) than the market. Alternatively, some investors may, for ethical reasons, be willing to pay a premium for ESG funds, which could lower the equilibrium return of those investments. In both of these mechanisms, lower expected returns from ESG investments would be compensated by other pecuniary or non-pecuniary benefits to the investors who hold the assets. Finally, investors might expect low excess returns because they believe that the market value of ESG funds is temporarily overpriced, a market state sometimes referred to as a "green bubble".

Table 1 also documents substantial across-individual dispersion in the beliefs about excess ESG returns. About 10% of responses expect ESG investments to underperform the market by at least 6.5% per year over the next 10 years, and 10% expect them to outperform by 2% or more. About 22% of responses expect the annualized 10-year return on ESG investments to fall within 0.5 percentage points of the corresponding market return. Overall, only 20% of the responses expect positive excess ESG returns.

Panel B also explores the distribution of ESG excess return expectations by investor characteristics. Differences across groups are relatively modest, though they do display some meaningful patterns: female respondents and those living in areas with higher Democratic vote shares tend to be more optimistic about relative ESG returns.[8] Importantly, each of these groups on average still expects lower returns on ESG funds than on the market. Expectations of excess ESG returns do not vary systematically with age, wealth, and the flood risk exposure in the area where respondents live based on zip code-level data provided by the First Street Foundation. Appendix Table B.3 provides additional sample splits, and Appendix Table B.4 shows that these univariate patterns generally survive a multivariate analysis, though the low levels of R^2 in those regressions also show that observable demographic characteristics only explain a small share of the across-investor variation in expected excess ESG returns.

set extreme outlier responses (below the bottom percentile, and above the top percentile) for each unbounded expectation question to missing.

[8] Political views are attributed using the respondent location, based on the county-level vote shares from the 2020 election.

2.2. ESG investment motives

An important advantage of our survey is that we can investigate investors' motives for making ESG investments. To do this, we next explore the second and third ESG-related questions in the GMSU-Vanguard survey. Table 2 summarizes the responses to these questions, first pooled across all investors, and then by investor characteristics. The columns report the share of investors in each group that selected a given ESG investment motive or level of concern about climate change.

Different investors perceive different ESG investment motives as the most important. About 48% of investors do not see any specific reason to invest in ESG stocks; about 22% of investors perceive the most important investment motive to be that ESG investments hedge climate risk; another 24% make an ethical argument for investing in ESG stocks; and about 6% of investors perceive the most important motivation for ESG investments to be that these investments will outperform the market.

The perceived primary ESG investment motives differ across demographic groups. Richer, older, and male investors are more likely to see no specific reason to invest in ESG portfolios. Ethical motivations are more important for female and younger investors. The belief that ESG portfolios are primarily attractive because they provide climate hedges varies by wealth, with wealthier investors placing less importance on the hedging aspect. There is no variation across wealth in the perception that ESG investing is the right thing to do. Respondents in more Republican-leaning areas are less likely to perceive ESG investing as the right thing to do, and more likely to find no particular reason for such investments. There are no large differences across investors' perceived motivations for ESG investment based on the flood risk exposure in their areas of residence. Appendix Tables B.5 and B.6 show that these univariate patterns are similar in multivariate specifications that jointly control for all characteristics. The low levels of R^2 in those regressions highlight that observable demographic characteristics explain only a small share of the variation across investors in their reported investment motives.

Survey respondents also differ in their level of concern about climate risk, with about a quarter indicating low concern, a quarter moderate concern, and half indicating high concern. Concern for climate change increases markedly for younger investors, as well as for female investors and those living in areas with a larger vote share for the Democratic party. There are at most small differences in concerns about climate change by wealth and flood risk exposure.

We collect the results on the heterogeneity in expected excess ESG returns, perceived motives for ESG investing, and concerns about climate risk in our Fact 2:

Fact 2. *There is substantial across-investor heterogeneity in (i) beliefs about excess ESG returns, with a cross-sectional standard deviation of expectations of 5%; in (ii) the perceived most important motive for ESG investing, with at least some investors mentioning each of financial performance (6% of investors), hedging of climate risk (22%), ethical reasons to invest (24%), and no reason at all (48%); and in (iii) the level of concern about climate risk, with about half of investors reporting high concern.*

Panel B of Table 2 also explores the relationship between investors' perceived primary reasons to invest in ESG assets and their concerns about climate change. Increases in climate risk concerns are associated with investors more likely reporting ethical or hedging reasons as the primary motives for ESG investing. Nevertheless, about 25% of investors who report high concerns about climate change do not see a specific reason to invest in ESG. One possible explanation for such views is that these investors might not view ESG investments as a sufficiently useful tool to reduce or hedge the effects of climate change due to the fear of 'greenwashing' or because ESG mandates may be too broad to address climate change.

Panel C of Table 1 explores how expected excess ESG returns differ across investors who report different ESG investment motives

Table 2
Motivations for ESG investments.

	Panel A: Share of investors by demographic characteristics						
	Reasons of ESG investments				Level of concerns		
	ESG will outperform	ESG hedges climate risk	It is the right thing to do	No specific reason	Low	Moderate	High
Pooled	0.06	0.22	0.24	0.48	0.26	0.25	0.49
By age							
≤40	0.10	0.23	0.29	0.38	0.19	0.22	0.58
41–50	0.07	0.19	0.28	0.45	0.25	0.26	0.49
51–60	0.07	0.22	0.25	0.46	0.25	0.27	0.48
61–70	0.06	0.21	0.23	0.50	0.28	0.25	0.47
>70	0.05	0.23	0.23	0.49	0.26	0.25	0.49
By gender							
Female	0.07	0.25	0.28	0.41	0.23	0.23	0.54
Male	0.06	0.20	0.22	0.52	0.28	0.26	0.46
By wealth							
<$100k	0.08	0.25	0.25	0.42	0.27	0.25	0.48
$100k–$500k	0.07	0.23	0.24	0.46	0.27	0.24	0.49
$500k–$1 m	0.05	0.21	0.25	0.49	0.27	0.25	0.48
>$1 m	0.06	0.17	0.23	0.54	0.24	0.26	0.50
By flood risk exposure							
Low	0.06	0.21	0.24	0.48	0.26	0.26	0.48
Medium	0.06	0.21	0.24	0.48	0.26	0.25	0.49
High	0.07	0.24	0.22	0.47	0.25	0.25	0.50
By political view in location							
Democratic	0.07	0.22	0.27	0.44	0.21	0.25	0.54
Republican	0.06	0.21	0.19	0.55	0.34	0.28	0.38
	Panel B: Share of investors by other ESG questions						
	Reasons of ESG investments				Level of concerns		
	ESG will outperform	ESG hedges climate risk	It is the right thing to do	No specific reason	Low	Moderate	High
By reasons of ESG investment							
ESG will outperform					0.08	0.19	0.73
ESG hedges climate risk					0.09	0.29	0.62
It is the right thing to do					0.04	0.17	0.79
No specific reason					0.46	0.29	0.25
By climate change concerns							
Low	0.02	0.07	0.04	0.87			
Moderate	0.04	0.24	0.16	0.56			
High	0.09	0.27	0.39	0.25			
	Panel C: Share of investors by ESG holdings						
	Reasons of ESG investments				Level of concerns		
	ESG will outperform	ESG hedges climate risk	It is the right thing to do	No specific reason	Low	Moderate	High
By ESG investments							
Has no ESG investments	0.06	0.21	0.23	0.49	0.27	0.26	0.48
Has ESG investments	0.15	0.25	0.48	0.13	0.06	0.13	0.81

Table summarizes the fraction of respondents that selected each answer to the second (i.e., motivations for ESG investments) and third (i.e., level of concern about climate change) ESG questions. Note that the third question was added in Dec 2021. Panel A shows the share of investors, pooled all responses and divided by demographic characteristics of the respondents. Panel B shows the share of investors divided by another ESG question, such as the share of each stated motivation of ESG investments in relation to the level of concern about climate change, and vice versa. Panel C reports the share of investors by whether a respondent has any ESG investment. The flood risk exposures are based on the average risk scores (measured by the First Street Foundation) of the zipcodes where respondents are located. The political views of living areas are based on county-level vote shares (considering only Democrat and Republican votes) from the 2020 US election.

and different levels of concern about climate change. On average, investors who believe the best reasons for ESG investing are that such investments will outperform the market indeed expect positive excess ESG returns of about 1% per year.[9] Investors who believe the best ESG investment motive is to view ESG assets as climate hedges expect negative excess returns of about 0.7% per year. Similarly, investors who highlight ethical reasons to invest in ESG assets expect negative excess returns of 1% per year on average. Finally, investors who report not seeing any reason to invest in ESG expect significant underperformance relative to the market (more than 3% per year). We also find strong relationships between climate concerns and expected excess ESG returns, with unconcerned investors expecting the largest ESG underperformance at −4.8 percentage points per year.

Importantly, since the expected excess returns of each investor take existing stock prices as given, they do not need to be aligned with the investors' own willingness to accept lower returns for non-pecuniary or hedging benefits. Nevertheless, it is interesting that those investors with hedging or moral motives—investors who would presumably be willing to give up some returns to hold ESG assets—reported expected excess returns that are consistent with perceiving the *other* investors (reflected in the equilibrium prices of ESG investments) also being willing to accept lower returns. Alternatively, investors might be confusing partial and general equilibrium in their thinking, failing to infer what motives and information might already be reflected in current prices.

[9] A small number of respondents who report that market outperformance is the ESG investment motive most important to them also report expected ESG returns that imply negative excess expected return relative to the market. This could either be the result of differences in the investment horizon considered for these two questions, or it could be driven by measurement error in one or both of the expected return series used to calculate excess expected return.

Table 3
Expected excess ESG returns and other beliefs.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Expected excess 10Y return of ESG investments (% p.a.)	1.00								
(2) Expected 1Y stock return (%)	0.06	1.00							
(3) Probability 1Y stock return <−30% (%)	−0.07	−0.25	1.00						
(4) St.D. expected 1Y stock return (%)	0.01	−0.02	0.36	1.00					
(5) Expected 3Y GDP growth (% p.a.)	0.06	0.24	−0.06	0.08	1.00				
(6) Expected 10Y GDP growth (% p.a.)	−0.05	0.09	0.01	0.07	0.64	1.00			
(7) Probability p.a. 3Y GDP growth <−3% (%)	−0.10	−0.32	0.43	0.25	−0.26	−0.08	1.00		
(8) St.D. expected 3Y GDP Growth (% p.a.)	0.05	0.04	0.17	0.59	0.25	0.23	0.25	1.00	
(9) Expected 1Y return of 10Y zero coupon bond (%)	0.03	0.17	−0.04	0.03	0.15	0.16	−0.07	0.08	1.00

Table shows within-survey correlations across questions eliciting beliefs about different objects.

Table 3 shows the correlation of expectations about excess ESG returns with expectations about stock market returns and GDP growth that are also elicited in the survey. Excess ESG return expectations are essentially uncorrelated with these other beliefs (Appendix Table B.7 confirms this fact within groups of investors split by characteristics such as wealth). This suggests that the expectations of the relative performance of ESG investments are not capturing information related to beliefs about the market return or economic growth, either at short or long horizons. ESG return expectations are also not related to people's risk perceptions (as captured, for example, by the perceived probability of crashes in the stock market or in GDP). The low correlation instead suggests that ESG beliefs capture a different dimension of the investment process relative to the variables typically elicited in surveys of investor beliefs.

3. ESG beliefs and portfolio allocation

As explained in Giglio et al. (2020, 2021c), a key advantage of the GMSU-Vanguard survey is that it can be (anonymously) linked to administrative data that includes the portfolio composition of the respondents in their Vanguard accounts. Our next analysis exploits this aspect of the data to document a strong association between ESG beliefs and the actual ESG portfolio allocations of each respondent.

We compute the ESG portfolio share as the share of risky assets that is allocated to ESG funds. Risky assets exclude money-market funds and Vanguard settlement accounts, but contain bond and balanced funds.[10] We use the "Sustainable Investment Overall" indicator from Morningstar to identify ESG funds.[11] We do not categorize individual bonds or stocks as ESG investments, motivated by the substantial disagreement across firm-level ESG ratings of different providers (Berg et al., 2022) and the fact that survey respondents predominantly invest through funds rather than direct stock or bond holdings (Appendix Table B.2). Similarly, we do not take a stand on whether ESG funds are truly holding ESG stocks or whether the criteria used by Morningstar to assign fund ESG labels are appropriate. Instead, our approach is motivated by the observation that the designation of a fund as ESG related is highly salient to investors seeking to follow ESG strategies (Hartzmark and Sussman, 2019).

Table 4 reports summary statistics on ESG holdings, pooled and by demographic characteristics in Panel A, and by ESG investment motives and level of concern about climate change in Panel B (see Appendix Table B.10 for further sample splits). The first column reports the extensive margin (i.e., what proportion of investors hold any ESG funds), and the remaining columns the mean and percentiles of the ESG portfolio share among investors with ESG investments. Several interesting patterns emerge. First, only about 3.4% of respondents actually invests in ESG funds, and even when they do, the portfolio share is relatively low. For example, the 90th percentile of ESG investors holds only about one third of their portfolio in ESG funds. This suggests that even investors that actively choose ESG funds prefer to only slightly tilt their portfolio in that direction rather than holding a concentrated portfolio with only (or mostly) ESG funds. This is perhaps unsurprising, since the prominence of ESG funds is a relatively new phenomenon and sluggish portfolio adjustment means that some investors who might eventually allocate money to these funds have not yet done so. Also, given that ESG considerations are just one of many dimensions of investments, it should not be a surprise that ESG funds would represent only a fraction of the overall portfolio.

ESG portfolio holdings also vary across demographic groups. Participation in ESG investments is higher for younger investors relative to older investors. Less wealthy investors are less likely to invest in ESG funds, but when they do, they tend to invest a larger share of their portfolio in them. There is also much higher ESG participation by investors resident in predominately Democratic areas compared to Republican ones. Despite the meaningful gender differences in ESG motivations and expectations documented in prior sections, actual ESG investment behavior is very similar across genders. Table 5 and Appendix Table B.11 generally confirm the findings from Table 4 in a multivariate analysis.

We next document how individual ESG portfolio shares are associated with perceived ESG investment motives, expected excess ESG returns, and concerns about climate change. Then, we examine the trade-off between ESG motivations and financial performance in determining ESG investments.

ESG investments and investment motives. Panel B of Table 4 links ESG portfolio holdings to investors' preferred ESG investment motives and their levels of concern about climate change, documenting that survey respondents invest in a way consistent with the views expressed in the survey.

The highest average portfolio share in ESG funds is observed among investors who report primarily ethical motivations for such investments. About 6.8% of such investors hold some ESG funds, and on average investors with ESG investments and those beliefs hold about 16.2% of their assets in ESG funds. Indeed, some investors who believe that ESG investments are the right thing to do hold sizeable positions in such funds, with ESG portfolio shares of more than 50% at the 95th percentile. A complementary way to describe the relationship between ESG investments and investment motives is by considering only the subset of investors that actually hold ESG investments. Panel C of Table 2 shows that nearly 50% of investors who actually hold ESG funds in their portfolios perceive moral considerations to be their most compelling ESG investment motive, relative to 24% among all investors.[12]

[10] Appendix Table B.8 and Appendix Figure B.3 shows the results if we only focus on equity portfolios.

[11] Appendix Table B.9 shows the 100 largest of these funds by assets under management. In Appendix A, we explore an alternative approach to identify ESG funds (i.e., fund or strategy names containing ESG-related terms) and find that Morningstar's definition is relatively comprehensive.

[12] Conditional on investing in ESG, the perceived primary reasons for doing so generally often does not vary substantially across demographics, though the estimates are somewhat noisy (Appendix Table B.12). An exception is that younger ESG investors generally perceive moral reasons as the primary motivation for such investments.

Table 4
ESG holdings.

	Panel A: ESG holdings (Pooled and by demographic characteristics)								
	% Has any ESG	ESG portfolio share (%) - Conditional on having ESG investments							
		Mean	P5	P10	P25	P50	P75	P90	P95
Pooled	3.4	13.8	0.5	0.9	2.3	7.0	17.5	38.7	54.8
By age									
≤40	5.9	14.6	0.6	0.9	3.1	7.7	19.6	32.2	60.4
41–50	4.5	15.0	0.2	0.3	1.2	6.0	19.4	54.0	72.2
51–60	3.4	13.9	0.8	1.2	2.7	7.2	16.4	44.1	51.0
61–70	3.3	16.0	0.6	0.9	2.7	8.4	23.6	47.0	62.2
>70	2.9	10.3	0.4	0.7	2.0	4.6	11.7	24.5	39.8
By gender									
Female	3.4	14.8	0.4	0.8	2.1	6.8	19.8	44.3	55.5
Male	3.4	13.4	0.6	0.9	2.3	7.1	16.6	35.1	53.2
By wealth									
<$100k	1.9	25.7	0.2	1.1	4.8	12.6	40.4	62.6	85.7
$100k–$500k	3.7	14.0	0.9	1.6	3.5	7.8	18.8	32.1	47.2
$500k–$1m	3.5	14.5	0.4	0.7	2.0	7.1	14.0	48.8	64.6
>$1 m	4.1	9.2	0.4	0.8	1.2	3.2	9.7	26.3	35.1
By flood risk exposure									
Low	3.2	13.7	0.5	0.9	1.9	6.9	20.1	34.3	48.8
Medium	3.6	15.2	0.5	0.9	2.9	7.5	18.2	44.3	63.0
High	3.4	6.9	0.6	0.7	1.2	2.8	8.8	10.1	33.7
By political view in location									
Democratic	4.2	14.4	0.5	0.9	2.5	7.7	18.5	39.1	55.9
Republican	2.0	9.7	0.6	0.8	1.7	4.8	9.8	22.9	45.9
	Panel B: ESG holdings by other ESG questions								
	% Has any ESG	ESG portfolio share (%) - Conditional on having ESG investments							
		Mean	P5	P10	P25	P50	P75	P90	P95
By reasons of ESG investment									
ESG will outperform	8.0	12.1	0.9	1.8	3.2	7.2	16.4	26.8	32.1
ESG hedges climate risk	3.9	12.2	0.4	0.8	1.9	5.4	11.4	39.5	63.0
It is the right thing to do	6.8	16.2	0.5	0.9	2.6	8.3	23.8	45.2	55.9
No specific reason	0.9	8.4	0.4	0.7	1.4	4.0	10.6	20.6	35.3
By climate change concerns									
Low	0.8	10.1	0.5	0.8	1.8	7.5	11.1	23.7	35.3
Moderate	1.7	10.3	0.3	0.5	1.3	3.6	12.4	30.3	44.1
High	5.6	14.9	0.6	1.0	2.6	7.4	20.0	44.9	61.3

Panel A shows the distribution of ESG holdings as a fraction of Vanguard investments, pooled and separately by groups according to their demographic characteristics. Panel B splits groups according to their answers to ESG questions, which are the stated motivations of ESG investments and the level of concern about climate change. The first column reports the extensive margin (whether the investor holds any ESG in the portfolio), and the remaining columns report summary statistics of the ESG portfolio share among investors with ESG investments. We compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds. Appendix Table B.8 shows a version where we compute the ESG portfolio share based on investments in equities. The flood risk exposures are based on the average risk scores (measured by the First Street Foundation) of the zipcodes where respondents are located. The political views of living areas are based on county-level vote shares (considering only Democrat and Republican votes) from the 2020 US election.

Among investors who report outperformance of ESG portfolios as their primary ESG investment motive, about 8% hold ESG funds; the average investor with ESG investments and those beliefs holds about 12.1% of their wealth in ESG funds. Investors who highlight the hedging property of ESG investments as their preferred ESG investment motive also invest at a relatively high rate in ESG funds: 3.9% of them hold at least one ESG fund in the portfolio, and the average share of ESG assets in their portfolios (conditional on having at least some ESG investments) is about 12.2%. Finally, very few investors who report "no specific reason" to invest in ESG hold any ESG funds in their portfolios.

Concerns about climate risks also vary substantially with actual ESG portfolio holdings. The proportion of investors holding any ESG investments increases from 0.8% for individuals with low concerns to about 5.6% for individuals with higher concerns (see Table 4). As a result, about 80% of all investors with ESG funds in their portfolios have high levels of concern about climate change (see Table 2).

ESG investments and return expectations. We next explore the relationship between ESG return expectations and ESG investments. Before interpreting our findings, it is worth noting that in the context of ESG investments, we do not have a clear quantitative benchmark on the relationship between expected excess ESG returns and optimal ESG portfolio share. In particular, for the aggregate market, simple models like that of Merton (1969) represent a good, if stylized, benchmark of what relationship between beliefs and holdings we should expect. In the case of ESG assets, which are plausibly just a fraction of any investor's optimal portfolio, it is harder to calibrate a quantitative benchmark, as it involves making assumptions on elements such as the rest of the investment opportunity set, the covariance of ESG returns with other assets, liquidity, and the presence and magnitude of possible non-pecuniary benefits.

Fig. 2 explores the relationship between expected excess ESG returns and the extensive and intensive margins of ESG investment. Three clear patterns emerge. First, there is a positive relationship between beliefs about excess ESG returns and ESG holdings: investors who are more optimistic about ESG returns invest more in ESG funds. Consistent with this finding, Panel D of Table 1 shows that, among those investors who

Table 5
Holdings by demographics & beliefs.

	Has any ESG			ESG portfolio share (%)		
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Wealth)	0.007***	0.007***	0.008***	−0.016	−0.006	0.007
	(0.002)	(0.002)	(0.002)	(0.033)	(0.033)	(0.034)
Age ∈ (40,50]	−0.021*	−0.025*	−0.023*	−0.128	−0.230	−0.197
	(0.013)	(0.013)	(0.013)	(0.268)	(0.269)	(0.268)
Age ∈ (50,60]	−0.032***	−0.032***	−0.029**	−0.374*	−0.411*	−0.360
	(0.012)	(0.012)	(0.012)	(0.214)	(0.222)	(0.221)
Age ∈ (60,70]	−0.038***	−0.040***	−0.036***	−0.280	−0.378*	−0.318
	(0.011)	(0.011)	(0.011)	(0.218)	(0.225)	(0.226)
Age > 70	−0.039***	−0.040***	−0.036***	−0.519***	−0.585***	−0.525**
	(0.011)	(0.011)	(0.011)	(0.200)	(0.207)	(0.206)
Male	−0.003	−0.002	0.002	−0.024	0.031	0.091
	(0.005)	(0.005)	(0.005)	(0.106)	(0.107)	(0.111)
Flood risk exposure: Medium	0.008	0.008	0.007	0.230*	0.228*	0.214*
	(0.005)	(0.005)	(0.005)	(0.122)	(0.125)	(0.124)
Flood risk exposure: High	0.009	0.008	0.007	−0.078	−0.060	−0.077
	(0.009)	(0.009)	(0.009)	(0.089)	(0.091)	(0.091)
Political view in location: Republican	−0.023***	−0.021***	−0.016***	−0.449***	−0.416***	−0.332***
	(0.004)	(0.004)	(0.004)	(0.096)	(0.096)	(0.089)
Expected excess 10Y ESG return (% p.a.)		0.002***	0.001***		0.041***	0.023***
		(0.000)	(0.000)		(0.009)	(0.009)
Reason: Outperform			0.071***			0.902***
			(0.011)			(0.211)
Reason: Hedge			0.028***			0.387**
			(0.005)			(0.164)
Reason: Right thing			0.057***			0.909***
			(0.006)			(0.162)
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.81	1.26	3.09	0.48	0.74	1.56
Observations	24,813	23,644	23,540	23,660	22,579	22,485

Regressions (1) and (3) show coefficients of regressing a dummy variable, which indicates any ESG investment, and the ESG portfolio share (%) on various demographic characteristics, controlling for wave fixed effect. Regressions (2) and (4) show coefficients of regressing the two dependent variables on several demographic characteristics and the expected excess 10Y ESG return (% p.a.), controlling for wave fixed effect. Regressions (3) and (6) further control for the stated motivations of ESG investment. We compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds. The flood risk exposures and political views are dummy variables based on the average risk scores (measured by the First Street Foundation) of respondents' living areas (zip code level) and the county-level vote shares (considering only Democrat and Republican votes) from the 2020 US election respectively. Standard errors are clustered at the respondent level.

* Significance levels: ($p < 0.10$).

** Significance levels: ($p < 0.05$).

*** Significance levels: ($p < 0.01$).

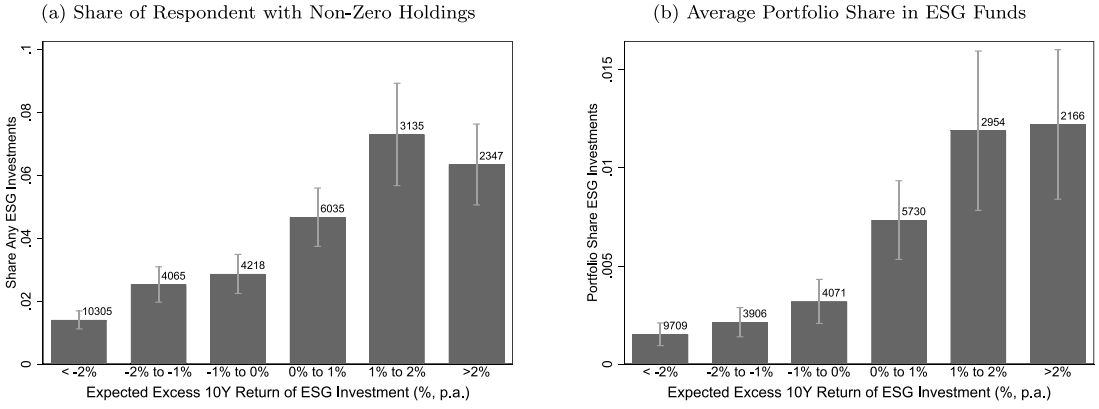


Fig. 2. Holdings of ESG Funds Broken Down by Expected Excess Return. Panel A shows the fraction of respondents who hold at least one ESG-focused fund in their portfolio (y-axis) broken down by the survey-elicited expected returns of an ESG portfolio over the market over a 10-year horizon (annualized). Panel B uses the same breakdown on the *x*-axis, but instead plots the average portfolio share invested in ESG-focused funds. This figure plots the unconditional relationship. We compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds. Numbers at the top of the bars report the number of observations and the error bars report the 95% confidence intervals. Standard errors are clustered at the respondent level. Appendix Figure B.4 shows binscatter plots with controls for investor characteristics.

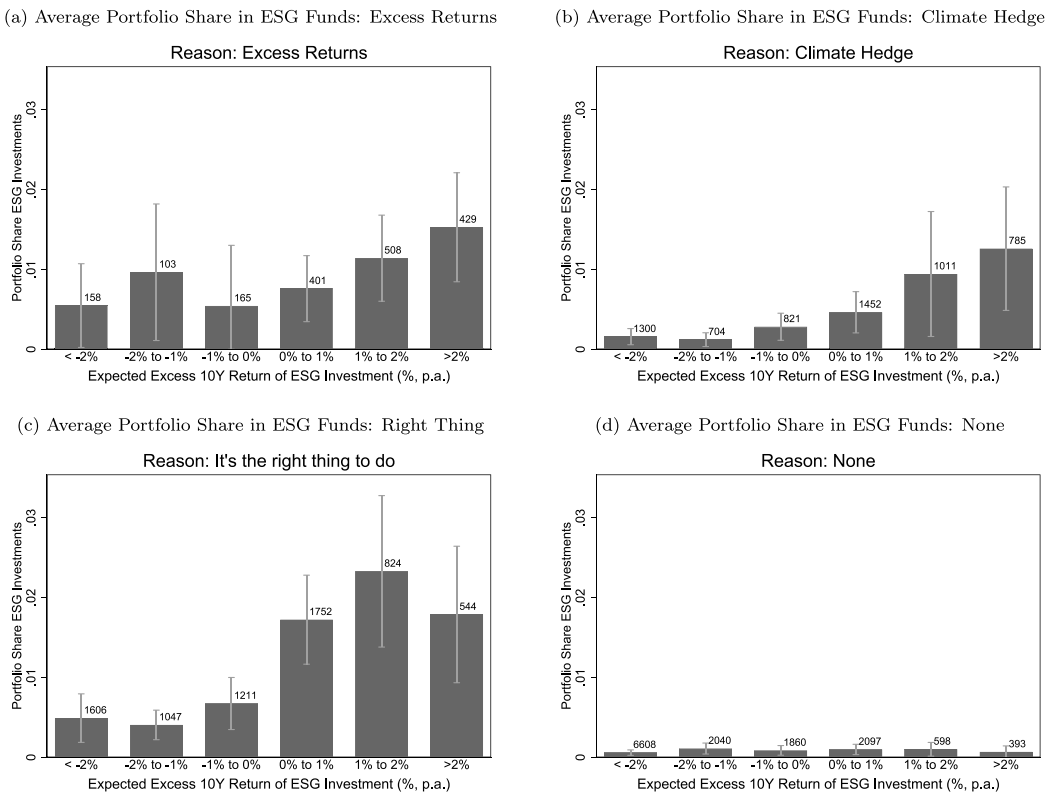


Fig. 3. Portfolio Shares in ESG Funds by Expected Excess Return and Motivation for ESG Investing. Figure construction follows Panel (b) of Fig. 2, but additionally breaks down the data by the stated motivation for investing in ESG funds separately in each panel. Note that we compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds. Appendix Figure B.3 shows a version where we compute the ESG portfolio share based on investments in equities. Numbers at the top of the bars report the number of observations and the error bars report the 95% confidence intervals.

hold ESG assets, the average expected excess return is substantially higher than those who have no ESG investments.[13]

Second, the relationship between ESG beliefs and portfolio holdings is nonlinear, with a stronger effect in the domain of positive expected excess ESG returns. The lower sensitivity in the domain of negative expected excess ESG returns is possibly due to the fact that, for a variety of reasons explored widely in the literature, shorting occurs relatively rarely, in particular among retail investors.

Third, investments in ESG funds are nonzero on average even when investors expect negative excess returns. For example, Panel D of Table 1 shows that while the median ESG investor expects ESG portfolios to perform similarly to the market, at the 25th percentile of the belief distribution, ESG investors expect those investments to underperform the market by about 1 percentage point annually over the next 10 years. Such investments are consistent, for example, with investors perceiving pecuniary (hedging) or non-pecuniary benefits from such investments. We summarize these findings in Fact 3:

Fact 3. *ESG beliefs are important drivers of actual portfolio allocation to ESG investments. ESG holdings are the largest for investors with ethical ESG investment motives and high concerns about climate change. ESG portfolio holdings are also increasing in expected excess ESG returns.*

3.1. The trade-off between expected ESG returns and other ESG investment motives

In this section, we further explore investors' willingness to trade off expected returns against other perceived benefits of ESG investments such as moral considerations or their ability to provide hedges against climate change. To do this, Fig. 3 plots the relationship between ESG portfolio shares and expected excess ESG returns separately by the stated motivation for investing in ESG.[14] The plot also reports 95% confidence intervals and, above each bar, the raw number of responses in each subgroup. Fig. 4 shows a corresponding plot exploring the extensive margin of ESG investments.

Panel A focuses on investors who report financial returns as their primary motivation to hold ESG investments. Most of these investors indeed expect positive excess returns: the number of responses within that group that report negative expected excess returns is small, and standard errors on portfolio holdings are large and include zero (see also Panel C of Table 1). Within the range of positive expected returns, where most respondents are, ESG holdings increase with investors' expected ESG returns.

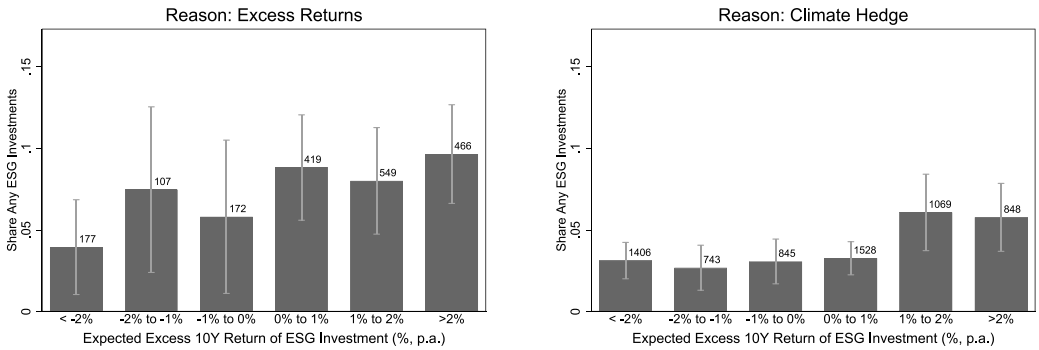
Panel B of Fig. 3 focuses on investors who report the hedging of climate risk as their key ESG investment motive. The panel shows two interesting patterns. First, a nontrivial (and significantly different from zero) number of these investors hold ESG investments in their portfolios despite expecting negative excess ESG returns. This is consistent with

[13] We expect the sensitivity of portfolios to beliefs to vary with measures of investor involvement with the stock markets (Giglio et al., 2021c). Appendix Figures B.5 and B.6 explore how the patterns in Fig. 2 vary if we group investors by their monthly turnover and by the number of different funds held in their portfolios. The figures show that investors with low turnover and only a few individual positions tend to participate little in ESG investments. All three patterns highlighted above continue to hold within each group.

[14] Appendix Figures B.7, B.8 and B.9 explore how the patterns in Fig. 3 vary among first-time survey respondents, first-time ESG questions respondents and repeated ESG questions respondents. Additionally, a version focusing solely on positions in retail accounts is shown in Appendix Figure B.10. The documented patterns are generally consistent across these various subgroups.

(a) Share of Respondent with Non-Zero Holdings: Excess Returns

(b) Share of Respondent with Non-Zero Holdings: Climate Hedge



(c) Share of Respondent with Non-Zero Holdings: Right Thing

(d) Share of Respondent with Non-Zero Holdings: None

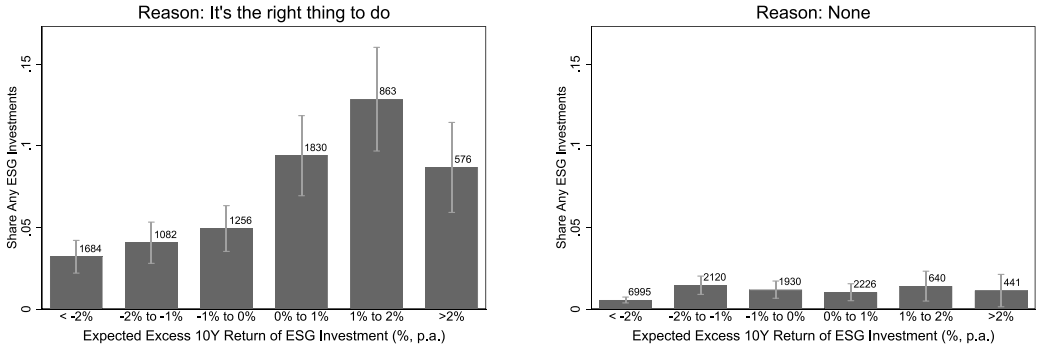


Fig. 4. Holdings of ESG Funds by Expected Excess Return and Motivation for ESG Investing. Figure construction follows that of the panel (a) of Fig. 2 but additionally breaks down the data by the stated motivation for ESG investment separately in each panel. Numbers at the top of the bars report the number of observations, and the error bars demonstrate the 95% confidence intervals.

the prediction that those investors might value those funds for their covariance properties, viewing the negative excess expected returns akin to an equilibrium insurance premium for assets that pay out disproportionately when climate disasters materialize (Weitzman, 2012; Giglio et al., 2021b). Second, even among these investors, there is a clear positive relation between expected excess ESG returns and the share of ESG holdings, at least when investors expect ESG to perform better than the market and limits to shorting are less important.

Panel C focuses on investors who select moral reasons as their primary ESG investment motive. Among this group of investors, a large number hold ESG investments despite expecting financial underperformance. This suggests that the ethical motivations might induce a willingness to give up financial returns. However, even among these investors, we find a positive relation between ESG holdings and expected excess ESG returns, with a much larger share held by investors who expect ESG to outperform the market compared to those who expect underperformance. Complementary evidence is presented in Appendix Table B.13, which reports the expected excess returns for different groups of investors conditioning on actually having ESG funds in their portfolios. Among investors with hedging or ethical concerns for ESG investments, those who actually invest in ESG on average expect those investments to perform similarly to the market (whereas those who do not invest in ESG, as noted in the previous section, expect larger underperformance). These findings suggest that financial return considerations play an important role in determining participation in ESG investments above and beyond the ethical motivations, even among investors who state these motivations as the most important reason to invest in ESG. Table 5 also confirms this finding. Even after accounting for ESG motivations, we observe a rise in ESG portfolio holdings corresponding to expected excess ESG returns.

Lastly, Panel D of Fig. 3 focuses on investors who do not see any specific reason to invest in ESG and shows that they hold essentially no ESG investments, independent of their expectations for excess returns of such investments. We summarize the above results in Fact 4:

Fact 4. *Both pecuniary and non-pecuniary considerations jointly drive portfolio allocation to ESG. Financial considerations (expectation of excess ESG returns) are an important driver of ESG allocations for all groups of investors, including those who mention hedging or ethical motivations as key reasons for investing in ESG. At the same time, morally motivated investors hold some ESG investments even when they expect negative excess returns, showing that the non-pecuniary considerations also play a role alongside financial performance.*

4. Additional patterns in the panel of ESG beliefs

In this section we further explore two related dimensions of our panel data. First, we study the time-series dynamics of beliefs at both the aggregate and individual levels. Second, we explore the determinants of the overall panel variation in beliefs.

4.1. The time-series of ESG beliefs and motivations

While our data has a large cross-section and a relatively short time-series of 30 months, our survey was collected during a period of rapid change in the ESG investmenting environment. In this section, we thus discuss some aggregate time-series developments that occurred during our sample period and then zoom in to study the dynamics of ESG beliefs at the individual level.

Panel A of Fig. 5 reports the average expected excess return of ESG investments over the market in each survey period. The graph

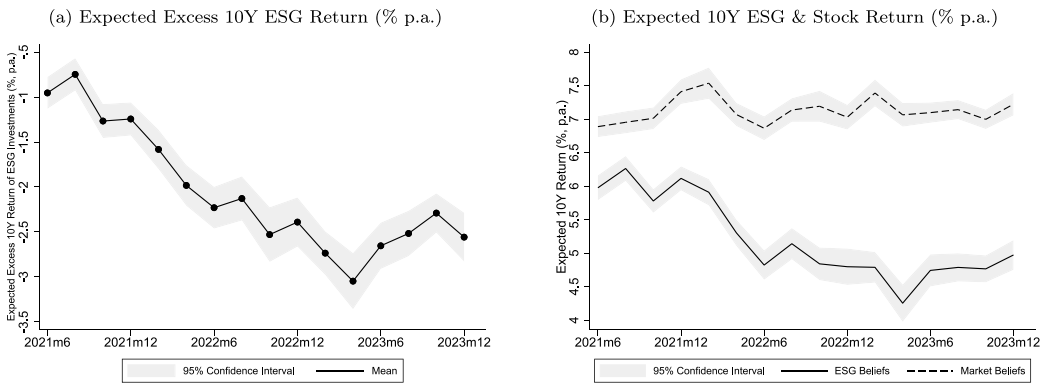


Fig. 5. Time Series - ESG & Market Beliefs. Figure reports the time series of the average beliefs from the GMSU-Vanguard survey. The left panel visualizes the 10-year annualized expected excess return of ESG investment (i.e., the difference between the expected returns on ESG investments and the market). The right panel decomposes the expected excess returns into ESG and stock beliefs. The shaded areas represent the 95% confidence interval.

Table 6
Dynamics of ESG beliefs.

	Expected excess 10Y return of ESG investment (% p.a.)			ESG portfolio share (%)			Answer proportion		
	Avg. Start	Avg. End	Diff	Avg. Start	Avg. End	Diff	Avg. Start	Avg. End	Diff
Pooled	−0.95	−2.56	−1.60	0.44	0.56	0.12			
By reasons of ESG investments									
ESG will outperform	1.48	0.11	−1.37	1.03	2.26	1.22	0.08	0.05	−0.03
ESG hedges climate risk	0.05	−0.78	−0.83	0.60	0.60	0.01	0.22	0.21	−0.01
Right thing to do	−0.54	−0.94	−0.40	0.81	0.95	0.14	0.26	0.25	−0.02
No specific reason	−2.12	−4.41	−2.28	0.05	0.15	0.11	0.44	0.50	0.05
By climate change concerns									
Low	−2.51	−5.54	−3.03	0.19	0.16	−0.03	0.23	0.25	0.02
Moderate	−1.42	−2.37	−0.95	0.05	0.24	0.19	0.25	0.25	0.00
High	−0.56	−1.12	−0.55	0.85	0.91	0.05	0.51	0.49	−0.02

The table reports dynamics (from the first to the last wave of ESG-related questions) of the 10-year expected excess return of ESG investment (% p.a.), ESG portfolio share (%), and the answer proportions of two ESG questions, which are the stated motivations for ESG investments and the level of concern about climate change respectively. We compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds.

shows a downward trend from mid-2021 to early-2023, which seems to align with the general underperformance of ESG investments in 2022 (Quinson, 2022). Panel B shows that the reduction in expected ESG returns over the market is entirely driven by investors becoming more pessimistic about ESG returns (rather than an increase in market expected returns).

This differential behavior of ESG and market expectations is interesting. During the sample period, financial markets tended to perform poorly, with the S&P 500 down almost 20% over the year 2022. Yet, 10-year market return expectations barely moved, consistent with the findings in Giglio et al. (2021c), who showed that while short-term market expectations moved with realized market returns, long-term expectations were more stable. In the case of ESG returns expectations, though, even long-horizon expectations moved substantially over time, in this case together with the realized underperformance of the investment. These patterns are consistent with the fact that ESG considerations are relatively new to investors, and investors have a much shorter history to learn from; it is less surprising then that they update more strongly on new information.

We next study the dynamics of beliefs for different groups of investors. The left panel of Table 6 shows the average expected excess return at the beginning of the sample and at the end of the sample, as well as the difference between the two, for investors who report different reasons to invest in ESG and different levels of concerns for climate risk. Consistent with Fig. 5, investors' expected excess ESG returns fell by about 1.6 percentage point over the sample. The trends are markedly different across investors. The drop in expected excess ESG returns is most significant for those who do not see specific reasons to invest in ESG, and those with low concern about climate change. Investors who primarily perceive moral ESG investment motives and investors with high concerns for climate change have the smallest decline in expected excess ESG returns over the sample period.[15]

Throughout our sample, the share of investors who report financial returns, climate hedges, or moral considerations as their primary ESG investment motive fell somewhat, while the share of investors reporting that they viewed no specific ESG investment motive increased by five percentage points.

Overall ESG portfolio shares increased by a modest 0.12 percentage points over the sample, but this average masks substantial across-investor heterogeneity (some of these changes are driven by the same investors reporting different investment motives over time, and some by portfolio changes of a given investor). Among investors with moral ESG investment motives, the ESG portfolio share increased by 0.14 percentage point to 0.95% by the end of 2023. Those motivated by the financial returns of ESG investments saw the largest increase of 1.22 percentage points, while the segment focusing on hedging benefits had an essentially flat ESG portfolio share throughout our sample.

Table 7 further explores how individuals change their ESG investment motives and excess ESG return expectations. Panel A presents a transition matrix of the probability that an investor would switch their reported motive between consecutive responses of the survey. Overall, the reasons behind investing in ESG are quite persistent, but the degree

[15] These results do not keep the set of investors fixed across time. We see similar results if we fix investors to their primary ESG investment motive as of the beginning of the sample, and track their expected excess ESG returns over time. This alternative analysis is reported in Appendix Table B.14.

Table 7
Transition matrix.

	Panel A: Probability of switching			
	ESG will outperform	ESG hedges climate risk	Right thing to do	No specific reason
ESG will outperform	0.37	0.29	0.20	0.14
ESG hedges climate risk	0.08	0.52	0.19	0.22
Right thing to do	0.05	0.17	0.63	0.15
No specific reason	0.01	0.08	0.06	0.85
	Panel B: Average changes in expected excess 10Y return of ESG investment (% p.a.)			
	ESG will outperform	ESG hedges climate risk	Right thing to do	No specific reason
ESG will outperform	−0.34	−1.04	−1.47	−2.71
ESG hedges climate risk	0.59	−0.24	−0.54	−1.30
Right thing to do	1.07	0.01	−0.02	−0.48
No specific reason	1.35	0.62	−0.02	−0.31

Panel A of the table reports the transitions of the motivation of ESG investment between two consecutive responses from the same respondent. Panel B reports the average changes in expected excess returns of ESG investment associated with the transitions of ESG investment motivation in panel A, again between two consecutive responses from the same respondent.

of persistence varies across groups of investors with different initial ESG investment motives. Those investors who do not see a specific reason to invest tend to persist in their views; on the other hand, those who initially were motivated by the return properties of ESG investments are most likely to have adjusted their views by the end of the sample period (this may partly be due to the specific time period we examine, in which ESG investment did not perform well).

Panel B of Table 7 has a similar structure to Panel A, but reports, in each cell of the table, the average change in ESG expected excess returns that occur concurrently with the corresponding transition in ESG investment motives. When investors who are initially motivated by the return properties of ESG investments abandon that view, this is associated with a marked decline in their reported expected excess ESG returns. Correspondingly, the small number of investors who change their preferred ESG investment motive towards financial returns from a different initial perspective all report increased expected excess ESG returns. Those who change their position towards reporting primarily moral ESG investment motives also tend to lower their reported expected excess ESG returns.

Overall, our analyses show that the dynamics of investors' beliefs about ESG are complex even within a relatively short sample. The evolution of the motivations is closely tied to the evolution of the expectations about future performance.

4.2. Decomposing the panel variance of beliefs

In the final section, we explore in greater depth the panel variation in expected excess ESG returns. We start by decomposing the panel variation into its cross-sectional and time-series dimensions. We estimate a regression of the responses of investor i at time t, $B_{i,t}$, on time fixed effects, investor fixed effects, and on both, and report the corresponding R^2s in Table 8. To ensure that the individual fixed effects are sufficiently well estimated, we only perform our analysis using responses for individuals that have responded at least three times in our panel (Appendix Table B.15 shows that the results are similar if we vary this threshold). Time fixed effects explain only a small fraction of the total panel variance, while individual fixed effects have large explanatory power: investors seem to have persistent views about ESG returns that are well captured by the individual fixed effects.

Despite some average differences in expected excess ESG returns across demographic groups, most of the panel variation in beliefs occurs within rather than across these groups. To formally show this, we take the individual belief fixed effects estimated in Table 8, and regress those on the various demographic characteristics we observe (age, wealth, location, etc.). Table 9 shows the R^2s of regressions of the fixed effect onto the various demographic characteristics (see Appendix Table B.16 for the coefficients on these demographics). The columns of Table 9 correspond to fixed effects estimated using at least one, two, and up to five responses per individual.

All columns yield a consistent message: observable individual characteristics do a poor job of explaining the cross-sectional dispersion of ESG expectations across investors. These findings suggest that more work is required to better understand the sources of belief formation about the broader market in general and ESG investments in particular.

5. Conclusion

Retail investors' recent demand for ESG investment options has been an important force driving the financial sector to consider its role in transitioning towards a lower-carbon economy. Understanding the drivers of this investment demand is thus crucial to assessing the ability of finance to facilitate a range of sustainability objectives. In this paper, we explore these drivers by analyzing a new survey of investor beliefs that asked about the expected returns of ESG portfolios and investor motivations behind ESG investment, combined with administrative data on respondents' portfolio holdings. We document large heterogeneity in investors' beliefs about ESG asset returns and motivations for holding such assets. We also show a significant relationship between ESG belief and motivations and ESG holdings. Finally, we highlight that both pecuniary and non-pecuniary motives play an important role in determining asset allocations to ESG assets.

CRediT authorship contribution statement

Stefano Giglio: Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Conceptualization. **Matteo Maggiori:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Conceptualization. **Johannes Stroebel:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Conceptualization. **Zhenhao Tan:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Conceptualization. **Stephen Utkus:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Conceptualization. **Xiao Xu:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.jfineco.2024.103984.

Table 8
Decomposing the variation in beliefs: Individual and time fixed effects.

	R^2 (percent) of panel regression			Observations
	Time FE	Individual FE	Time + Individual FE	
Expected 10Y stock return (% p.a.)	0.27	53.09	53.27	3,001
Expected 10Y return of ESG investments (% p.a.)	1.94	60.59	61.60	2,974
Expected excess 10Y return of ESG investments (% p.a.)	2.05	50.79	51.76	2,941

Table reports the R^2 values corresponding to the following three regressions, and the number of individual respondents' observations. We only include respondents who have responded to at least three waves.

$B_{i,t} = \chi_t + \epsilon_{1,i,t}$,

$B_{i,t} = \phi_i + \epsilon_{2,i,t}$,

$B_{i,t} = \phi_{3,i} + \chi_{3,t} + \epsilon_{3,i,t}$.

We denote the belief expressed by individual i at time t as $B_{i,t}$ and estimate a set of time (i.e., survey wave) fixed effects χ_t and individual fixed effects ϕ_i. We also jointly estimate both individual and time fixed effects. Each row corresponds to a different survey question that is used as the dependent variable.

Table 9
Belief heterogeneity and demographics.

R^2	#Resp ≥ 1	#Resp ≥ 2	#Resp ≥ 3	#Resp ≥ 4	#Resp ≥ 5
Expected 10Y stock return (% p.a.)	0.78	1.27	0.94	1.72	2.18
Expected 10Y return of ESG investments (% p.a.)	2.14	2.02	1.82	2.79	3.18
Expected excess 10Y return of ESG investments (% p.a.)	0.61	0.83	1.05	1.29	0.74

Table reports the R^2 statistics corresponding to the following regression,

$\phi_{3,i} = \alpha + \Gamma \mathbf{X}_i + \epsilon_i$,

where $\phi_{3,i}$ are the individual fixed effects estimated in regression $B_{i,t} = \phi_{3,i} + \chi_{3,t} + \epsilon_{3,i,t}$ (i.e., the third regression in Table 8) and $\mathbf{X}_i$ are the following individual characteristics: log wealth and dummy variables for age group, gender, flood risk exposure and political view in location. The flood risk exposures are based on the average risk scores (measured by the First Street Foundation) of the zipcodes where respondents are located. The political views of living areas are based on county-level vote shares (considering only Democrat and Republican votes) from the 2020 US election. In each column, going from left to right, we increase the minimum number of responses for an individual to be included in the sample from 1 to 5. Each row corresponds to a different question in the survey.

Data availability

Replication Package (Original data) (Mendeley Data)

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