DISCUSSION PAPER SERIES

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-2022, the average expected 10-year annualized return of ESG investments relative to the overall stock market was −1.4%. Second, there is substantial heterogeneity across investors in their ESG return expectations and their motives for ESG investing: 45% of survey respondents do not see any reason to invest in ESG, 25% are primarily motivated by ethical considerations, 22% are driven by climate hedging motives, and 7% are motivated by return expectations. Third, there is a 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.

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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-2022, the average expected 10-year annualized return of ESG investments relative to the overall stock market was -1.4%. Second, there is substantial heterogeneity across investors in their ESG return expectations and their motives for ESG investing: 45% of survey respondents do not see any reason to invest in ESG, 25% are primarily motivated by ethical considerations, 22% are driven by climate hedging motives, and 7% are motivated by return expectations. Third, there is a 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 dramatic 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 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 retail investors. The survey includes three questions on ESG investing. The first elicits investors' long-run (10-year) return expectations from investing in diversified ESG stock portfolios. We compare these expectations to the same investors' long-run expected returns 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 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 ten waves of the survey containing the ESG-related questions between June 2021 and December 2022. Each survey wave receives around 2,000 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 lower than returns on the overall equity market, by about 1.4% 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% in December 2022.

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

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

economically meaningful 4%, which is about same magnitude as the standard deviations of expected overall market returns (3.5%). While there are some differences in expectations across demographic groups (e.g., older 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 sizable heterogeneity across investors in which motives to invest in ESG are most important to them. About 45% 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: 7% of respondents are primarily motivated by return expectations, 22% perceive ESG stocks as a hedge against climate risk, and 25% 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, many respondents who initially report return considerations as their most important motivation for ESG investing no longer hold this view later in the sample. Over our 18 months sample, the share of respondents who report that there are no good reasons to invest in ESG increased by 6 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 1.4% 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 are the most negative, with average long-run expected excess ESG returns of -2.7% per year.

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 whether ESG-focused funds actually hold securities consistent with this stated objective or 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 3.5% 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

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[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.

expect underperformance), suggesting that challenges with 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 80% 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 primary perceived 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 12% among those of expect an excess return of more than 0.5%. This finding suggests that traditional investment motives remain an important driver of portfolio allocation even 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 18-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 necessary step in the transmission of these attitudes into asset prices and ultimately to the actual firms' decisions. 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.

Related Literature.   Our paper contributes to three strands of literature. The first explores investors' motivations for ESG investing. Closest to our application is the work by Riedl and Smeets (2017), who match portfolio holdings of a sample of Dutch investors with a 2012 survey, and study whether social preferences or return expectations determine socially responsible investments (SRI). Our quantitative panel survey of U.S. investors during a period of increased focus on ESG investing allows us to provide new insights into investor behaviors, for example by studying their persistence and covariance with other beliefs. We also elicit investors' preferred motivation for ESG investing directly, and are able to obtain explicit measures of expected excess returns. This allows us to quantify differences in expected returns across individuals with different investment motives as well as individuals with differential holdings of SRI funds. Where our analysis overlaps, we sometimes obtain qualitatively different findings, most likely due to the important changes in the ESG investment space over the past decade.[3]

Haber et al. (2022) find that young investors are more willing to support environmental and social issues (e.g., by giving up part of their retirement savings) than older investors, and that returns are an important consideration for the willingness to invest. Consistent with these conclusions, we find that a higher proportion of young investors selected moral reasons as their primary motivation for ESG investments. However, we also document that even among this group, actual ESG investments only become substantial when investors expected positive excess returns.

In related work studying investors' ESG preferences, Baker et al. (2022) interpret the fees for ESG funds using a revealed preference approach 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). We can also explore more broadly how strong non-pecuniary investment motives are 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 show that investors have a positive willingness to pay for sustainable or impact investments (Heeb et al., 2022; Humphrey et al., 2021; Bauer et al., 2021), and work that has explored investors motivations for ESG investments by studying investment flows (Renneboog et al., 2011; Döttling and Kim, 2022).

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; Whelan et al., 2021). Ex-post average realized returns of investment strategies are noisily estimated in short samples, which makes the interpretation more difficult. 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 the small fraction of

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[3]For example, Riedl and Smeets (2017) conclude that in 2012, Dutch SRI investors were relatively pessimistic about the performance of these SRI funds; their findings also suggest that return expectations were at most a small determinant of ESG investment decisions. In contrast, we find that the average investor in ESG funds expects those funds to outperform the market in the long run (even as the average survey respondent expected them to underperform); we also document that expected returns are a key determinant of actual ESG investment decisions, even among individuals who are motivated by ethical considerations for such investments.

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., 2020; 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., 2021c; 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 linked to administrative data on those investors' portfolio holdings. The GMSU-Vanguard 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 ESG-related 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. (2021b) and Giglio et al. (2020).

1.1 ESG Questions

The newly added ESG questions, which appear at the end of the regular survey, are shown in Figure 1. While ESG investing has received much attention in recent years—and our relatively sophisticated sample 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 the user in a text box that accepts up to 1 decimal point.

The second question aims to characterize the key motivations to invest in ESG portfolios as perceived by the investors (chosen among the main ones discussed in the literature). The survey presents four options and asks the respondents to choose the one that is most important to them. 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

Figure 1: ESG Questions in GMSU-Vanguard Survey

Note: Figure shows the three questions on ESG investing in the GMSU-Vanguard survey.

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. In general, one advantage of surveys is that they can provide insight into the thought process of respondents (e.g., Bailey et al., 2019). In this case, understanding ESG investment motives can help us distinguish between several different views that might be consistent with a given perceived excess return of ESG investments.

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. (2021b), 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. 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. (2021b).

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 A.1). This minimizes concerns that respondents to the ESG questions are selected based on particular views on this issue.[4] We analyze the ten (seven) waves of the survey containing the first two (third) ESG-related questions between June 2021 (December 2021) and December 2022. Investors in our sample are relatively wealthy, with an average of total Vanguard portfolio value of about $689k. About 65% of the respondents are male, and the average age is 63 years old. Full summary statistics on the demographics of the respondents are presented in Appendix Table A.2.

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[4]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.

2 Beliefs About ESG Investments

In this section, we explore the 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. Panel A shows summary statistics for the 10-year expected 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% per year—broadly consistent with realized average returns of the U.S. stock market—with a standard deviation across responses of 3.5%. Average expected 10-year returns for ESG investments are lower—about 5.6% per year—and there is more dispersion in beliefs about ESG returns than about market returns, with a standard deviation across responses of 5.6% (see also Appendix Figure A.1).

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 -1.4% 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-2022, investors on average expected the 10-year return on ESG investments to underperform the market by about 1.4% 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 with 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.

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 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: respondents that are younger, less wealthy, female, and living in areas with higher Democratic vote shares

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	5.60	5.58	0.1	2	3	5	7	10	12	18,232
Pooled Market	6.98	3.53	2.5	3	5	7	8	10	12	18,090

	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	-1.41	4.05	-8	-5	-3	-1	0	2	4	17,770
By Age										
≤40	-1.25	4.57	-9	-6	-3	-1	0.6	3	5	905
41-50	-1.36	3.96	-8	-6	-3	-1	0	2	4	1,250
51-60	-1.36	4.19	-8	-5	-3	-1	0	2	4	3,000
61-70	-1.46	4.01	-8	-5	-3	-1	0	2	4	6,835
>70	-1.42	3.95	-8	-5	-3	-1	0	2	4	5,780
By Gender										
Female	-1.08	4.42	-8	-5	-3	-1	0	3	5	5,495
Male	-1.56	3.87	-8	-5	-3	-1	0	2	3	12,237
By Wealth										
<$100k	-1.25	4.95	-10	-6	-3	-1	1	3	7	3,225
$100k-$500k	-1.37	4.22	-8	-6	-3	-1	0	2	5	6,228
$500k-$1m	-1.47	3.76	-7	-5	-3	-1	0	2	3	3,488
>$1m	-1.53	3.28	-7	-5	-3	-1	0	1	2	4,791
By Flood Risk Exposure										
Low	-1.38	3.84	-8	-5	-3	-1	0	2	4	7,179
Medium	-1.42	3.90	-8	-5	-3	-1	0	2	4	7,584
High	-1.41	3.87	-8	-5	-3	-1	0	2	4	1,240
By Political View in Location										
Democratic	-1.27	3.76	-7	-5	-3	-1	0	2	4	9,082
Republican	-1.62	3.99	-8	-6	-3	-1	0	2	4	4,081

	Panel C: Expected Excess 10Y Return of ESG Investments (% p.a.) by Other Questions									
	Mean	SD	P5	P10	P25	P50	P75	P90	P95	N
By Reasons of ESG Investment										
ESG will outperform	1.39	4.23	-4	-2	0	1	3	5	9	1,214
ESG hedges climate risk	-0.40	4.12	-6	-4	-2	0	1	3	6	3,986
It's the right thing to do	-0.82	3.40	-5	-4	-2	-1	0	2	4	4,503
No specific reason	-2.68	3.87	-10	-7	-4	-2	0	0	2	7,989
By Climate Change Concerns										
Low	-3.35	4.67	-13	-9	-5	-3	-1	0.5	2	2,985
Moderate	-1.64	3.70	-8	-5	-3	-1	0	1.1	3	3,137
High	-0.76	3.77	-6	-4	-2	-0.5	0.5	2	5	6,044

	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	-1.48	4.04	-8	-5.3	-3	-1	0	2	4	17,137
Has ESG Investments	0.30	3.75	-5	-3	-1	0	2	4	6.5	633

Note: 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.

tend to be more optimistic about relative ESG returns.[5] 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 the flood risk exposure in the area where respondents live based on zip code-level data provided by the First Street Foundation. Appendix Table A.3 shows that these univariate patterns generally survive a multivariate analysis (the exception is that, after controlling for other demographics, the relationship between age and expected excess ESG returns essentially disappears). 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.

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 turn to the exploration of 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.

Investors differ in their primary perceived ESG investment motive. Across all responses, about 45% of investors do not see any specific reason to invest in ESG stocks. About 22% of investors report that they perceive the most important investment motive to be that ESG investments hedge climate risk; another 25% make an ethical argument for investing in ESG stocks. About 7% of investors report that their preferred motivation for ESG investments is 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 Table A.4 shows that these univariate patterns are similar in multivariate specifications that jointly control for all characteristics. The low levels of R^2 in those regression 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:

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

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's the right thing to do	No specific reason	Low	Moderate	High
Pooled	0.07	0.22	0.25	0.45	0.25	0.26	0.49
By Age							
≤40	0.11	0.23	0.31	0.35	0.18	0.20	0.62
41-50	0.08	0.20	0.29	0.43	0.22	0.26	0.52
51-60	0.08	0.23	0.27	0.42	0.23	0.28	0.49
61-70	0.07	0.21	0.24	0.48	0.27	0.25	0.48
>70	0.05	0.24	0.24	0.46	0.25	0.26	0.49
By Gender							
Female	0.07	0.26	0.29	0.38	0.22	0.24	0.55
Male	0.07	0.21	0.23	0.49	0.27	0.26	0.47
By Wealth							
<$100k	0.09	0.26	0.26	0.39	0.26	0.25	0.49
$100k-$500k	0.07	0.24	0.25	0.43	0.25	0.25	0.50
$500k-$1m	0.05	0.22	0.26	0.47	0.26	0.26	0.48
>$1m	0.06	0.18	0.24	0.51	0.24	0.27	0.50
By Flood Risk Exposure							
Low	0.07	0.22	0.26	0.45	0.24	0.26	0.51
Medium	0.06	0.21	0.26	0.46	0.26	0.25	0.50
High	0.07	0.25	0.24	0.44	0.23	0.26	0.51
By Political View in Location							
Democratic	0.07	0.22	0.29	0.42	0.20	0.25	0.55
Republican	0.06	0.22	0.20	0.52	0.32	0.29	0.39

Panel B: Share of Investors by Other Questions

	Reasons of ESG Investments				Level of Concerns		
	ESG will outperform	ESG hedges climate risk	It's the right thing to do	No specific reason	Low	Moderate	High
By Reasons of ESG Investment							
ESG will outperform					0.10	0.21	0.70
ESG hedges climate risk					0.10	0.30	0.60
It's the right thing to do					0.04	0.17	0.79
No specific reason					0.45	0.29	0.26
By Climate Change Concerns							
Low	0.02	0.09	0.04	0.84			
Moderate	0.05	0.25	0.17	0.53			
High	0.09	0.27	0.40	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's the right thing to do	No specific reason	Low	Moderate	High
By ESG Investments							
Has no ESG Investments	0.07	0.22	0.24	0.47	0.26	0.26	0.48
Has ESG Investments	0.13	0.27	0.49	0.11	0.07	0.12	0.80

Note: 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.

Fact 2: *There is substantial across-investor heterogeneity in (i) beliefs about excess ESG returns, with a cross-sectional standard deviation of expectations of 4%; in (ii) the perceived most important motive for ESG investing, with at least some investors mentioning each of financial performance (7% of investors), hedging of climate risk (22%), ethical reasons to invest (25%), and no reason at all (45%); 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 reasons to invest in ESG and their concerns about climate change. Increases in climate risk concerns are associated with investors being more likely to report 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 average expected excess ESG returns differ across investors who report different ESG investment motives 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, by about 1.4% per year.[6] Investors who believe the best ESG investment motive is to view ESG assets as climate hedges expect negative excess returns, by about 0.4% per year. Similarly, investors who highlight ethical reasons to invest in ESG assets expect negative excess returns of about 0.8% 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 2% per year). We also find strong relationships between climate risk concerns and expected excess ESG returns, with unconcerned investors expecting the strongest ESG underperformance, at -3.3 percentage points.

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 and moral motive, 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.

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 A.5 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. It is also not related to people's risk perceptions (as

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[6]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 (%)	0.02	1.00							
(3) Probability 1Y Stock Return < -30% (%)	-0.02	-0.24	1.00						
(4) St.D. Expected 1Y Stock Return (%)	0.03	-0.04	0.46	1.00					
(5) Expected 3Y GDP Growth (% p.a.)	0.10	0.24	-0.06	0.05	1.00				
(6) Expected 10Y GDP Growth (% p.a.)	-0.00	0.07	0.02	0.05	0.62	1.00			
(7) Probability p.a. 3Y GDP Growth < -3% (%)	-0.06	-0.29	0.38	0.29	-0.28	-0.09	1.00		
(8) St.D. Expected 3Y GDP Growth (% p.a.)	0.06	0.03	0.22	0.58	0.22	0.21	0.28	1.00	
(9) Expected 1Y Return of 10Y zero coupon bond (%)	0.05	0.13	-0.01	-0.00	0.14	0.17	-0.04	0.06	1.00

Note: Table shows the correlation between responses to various questions in the survey.

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, 2021b), 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 allocation 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.[7] We use the "Sustainable Investment Overall" indicator from Morningstar to identify ESG funds. Table A.6 shows the 100 largest of these funds by assets under management. 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). 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, who are not necessarily independently checking whether the ESG label is meaningful (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. The table reports in the first column the extensive margin (i.e., what proportion of investors hold any ESG funds), and in the remaining columns the mean and percentiles of the ESG portfolio share among investors.

The table shows several interesting patterns. First, only a small fraction of investors (3.5%) in our panel actually invests in ESG funds, and even when they do, the portfolio share is relatively low. For example, the 99th percentile of investors holds less than 15% of their portfolio in ESG funds. This sug-

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[7]Appendix Table A.7 and Figure A.6 shows the results if we also drop bonds and bond funds and only focus on equity portfolios.

Table 4: ESG Holdings

	Panel A: ESG Holdings (Pooled and by Demographic Characteristics)				
		ESG Portfolio Share			
	Has Any ESG	Mean	P95	P99	P99.5
Pooled	3.5%	0.4%	0.0%	14.3%	27.8%
By Age					
≤40	6.3%	0.8%	2.7%	27.4%	32.9%
41-50	4.8%	0.7%	0.0%	24.6%	48.5%
51-60	3.3%	0.4%	0.0%	12.6%	21.3%
61-70	3.4%	0.5%	0.0%	15.1%	31.1%
>70	3.2%	0.3%	0.0%	7.7%	22.0%
By Gender					
Female	3.5%	0.5%	0.0%	12.9%	29.4%
Male	3.6%	0.4%	0.0%	14.7%	27.4%
By Wealth					
<$100k	2.2%	0.5%	0.0%	14.3%	34.0%
$100k-$500k	3.6%	0.5%	0.0%	17.1%	25.2%
$500k-$1m	3.7%	0.4%	0.0%	10.0%	32.4%
>$1m	4.2%	0.3%	0.0%	8.0%	17.5%
By Flood Risk Exposure					
Low	3.6%	0.4%	0.0%	15.6%	28.1%
Medium	3.9%	0.5%	0.0%	15.9%	32.2%
High	3.4%	0.2%	0.0%	4.0%	10.0%
By Political View in Location					
Democratic	4.6%	0.6%	0.0%	19.7%	31.5%
Republican	2.1%	0.2%	0.0%	4.6%	9.6%

	Panel B: ESG Holdings by Other Questions				
		ESG Portfolio Share			
	Has Any ESG	Mean	P95	P99	P99.5
By Reasons of ESG Investment					
ESG will outperform	7.0%	0.8%	4.5%	23.8%	26.8%
ESG hedges climate risk	4.2%	0.4%	0.0%	11.3%	29.6%
It's the right thing to do	6.9%	1.0%	2.8%	32.2%	46.1%
No specific reason	0.9%	0.1%	0.0%	0.0%	2.0%
By Climate Change Concerns					
Low	1.0%	0.1%	0.0%	0.6%	3.7%
Moderate	1.7%	0.1%	0.0%	2.6%	11.2%
High	5.7%	0.8%	1.0%	26.9%	44.9%

Note: 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 rest of the columns report summary statistics of the share of ESG investments. We compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds. Appendix Table A.7 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.

gests 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.

There are also interesting patterns in ESG portfolio holdings across demographic groups. Participation in ESG investments is significantly 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. Appendix Table A.8 confirms these findings 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 6.9% of such investors hold some ESG funds, and on average investors with those beliefs hold about 1% of their assets in ESG funds. Indeed, some investors who believe that ESG investments are the right thing to do hold very sizable positions in such funds, with ESG portfolio shares of more than 30% at the 99th percentile. Another way to look at the relationship between ESG investments and investment motives is by considering the motivations for ESG investments only among 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 25% among all investors.[8]

Among investors who report outperformance of ESG portfolios as their primary ESG investment motive, about 7% hold ESG funds; the average investor with those beliefs holds about 0.8% of their wealth in ESG stocks. Investors who highlight the hedging property of ESG investments as their key investment motive also invest at a relatively high rate in ESG funds: the average share of ESG in their portfolios is about 0.4%, and 4.2% of them hold at least one ESG fund in the portfolio. 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 1% for individuals with low concerns

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[8]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 A.9). An exception is that younger ESG investors generally perceive moral reasons as the primary motivation for such investments.

to about 5.7% for individuals with higher concerns (see Table 4). As a result, about 80% of all investors with ESG funds in their potfolios 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 (see Giglio et al., 2021b). 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.

Figure 2: Holdings of ESG Funds Broken Down by Expected Excess Return

(a) Share of Respondent with Non-Zero Holdings (b) Average Portfolio Share in ESG Funds
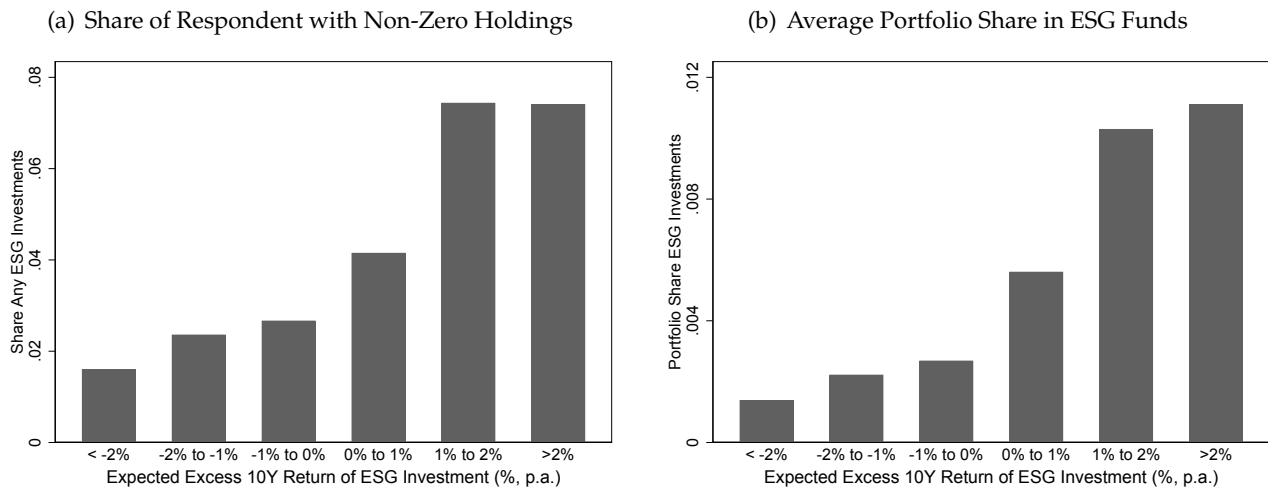
Note: Panel A shows the fraction of respondents who hold at least one ESG-focused fund in their portfolio (y-axis) broken down by the survey-elicited expected returns of an ESG portfolio over the market over a 10-year horizon (annualized). Panel B uses the same breakdown on the x-axis, but instead plots 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. Appendix Figure A.2 shows binscatter plots with controls for investor characteristics.

Figure 2 explores the relationship between expected excess ESG returns and the extensive (Panel A) and intensive (Panel B) 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 hold ESG assets, the average expected excess return is positive.[9]

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[9]We expect the sensitivity of portfolios to beliefs to vary with measures of investor involvement with the stock markets (Giglio et al., 2021b). Appendix Figures A.3 and A.4 explore how the patterns in Figure 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.

Second, the relationship between ESG beliefs and portfolio holdings is nonlinear, with a much 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, investment in ESG funds is 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, Figure 3 plots the relationship between ESG portfolio shares and expected excess ESG returns separately by the stated motivation for investing in ESG. The plot also reports 95% confidence intervals and, above each bar, the raw number of responses in each subgroup. Appendix Figure A.5 shows a corresponding plot exploring the extensive margin of ESG investments.

Panel A focuses on investors who report performance 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 Figure 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 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 (Giglio et al., 2021c; Weitzman, 2012). 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

Figure 3: Portfolio Shares in ESG Funds by Expected Excess Return and Motivation for ESG Investing

(a) Average Portfolio Share in ESG Funds: Excess Returns   (b) Average Portfolio Share in ESG Funds: Climate Hedge
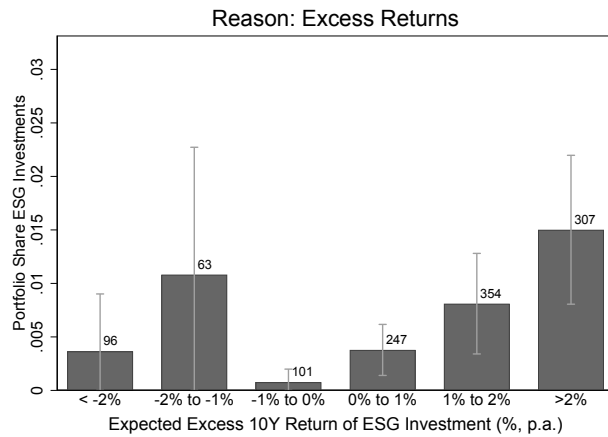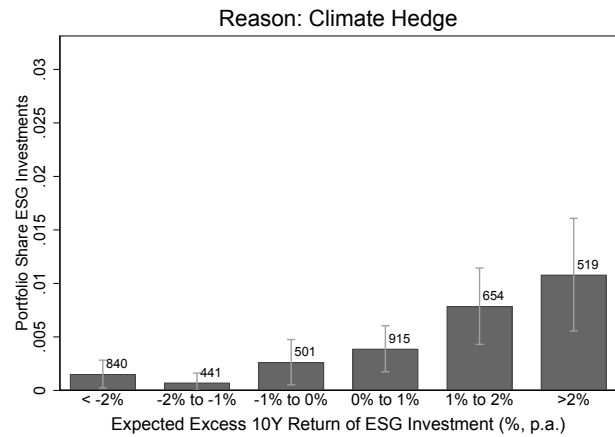
(c) Average Portfolio Share in ESG Funds: Right Thing   (d) Average Portfolio Share in ESG Funds: None
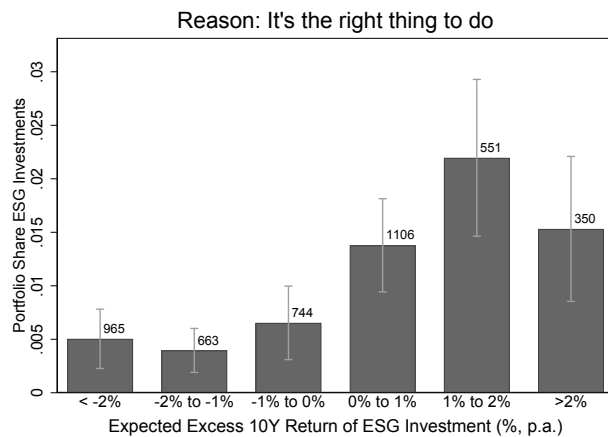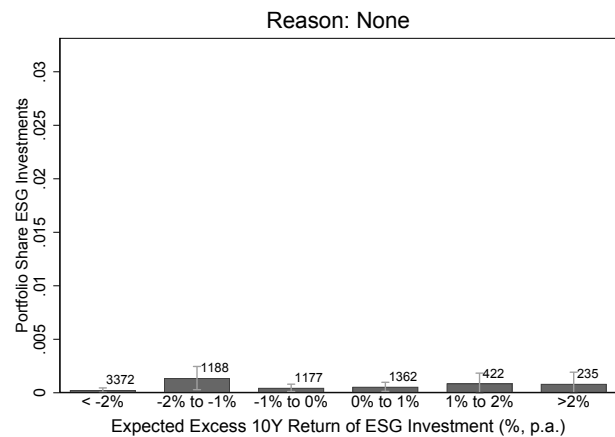
Note: Figure construction follows Panel (b) of Figure 2, but additionally breaks down the data by the stated motivation for investing in ESG funds separately in each panel. Note that we compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds. Appendix Figure A.6 shows 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.

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 A.10, 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 outperform the market (whereas those who do not invest in ESG, as noted in the previous section, expect 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.

Lastly, Panel D of Figure 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 nonpecuniary 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 Motviations

While our data has a large cross-section and a relatively short time-series of 18 months, our survey was collected during a period of rapid change in the ESG investment world. 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 Figure 4 reports the average expected excess return of ESG investments over the market in each survey period. The graph shows a marked downward trend over the sample period, 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. (2021b), 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 5 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 Figure 4, investors expected excess ESG returns fell by about 1 percentage point over the sample. The trends are markedly different across

Figure 4: Time Series - ESG & Market Beliefs

(a) Expected Excess 10Y ESG Return (% p.a.)

(b) Expected 10Y ESG & Stock Return (% p.a.)
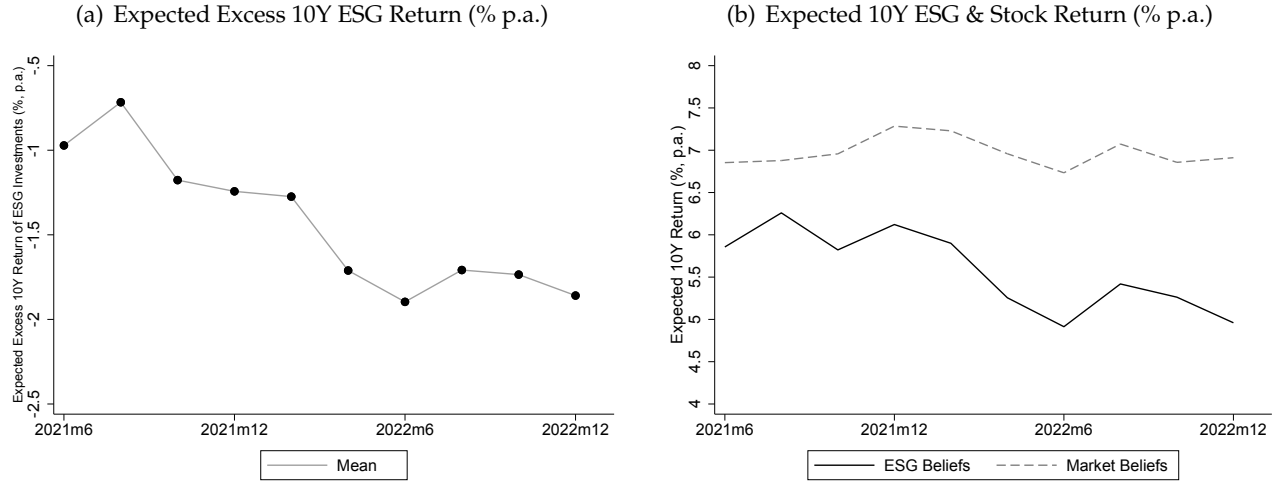
Note: Figure reports the time series of the average beliefs from the GMSU-Vanguard survey. The left panel visualizes the 10-year annualized expected excess return of ESG investment (i.e., the difference between the expected returns on ESG investments and the market). The right panel decomposes the expected excess returns into ESG and stock beliefs.

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.[10]

Table 5: 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	-0.97	-1.86	-0.89	0.40	0.49	0.09			
By Reasons of ESG Investments									
ESG will outperform	1.59	0.87	-0.72	1.01	0.95	-0.05	0.08	0.05	-0.03
ESG hedges climate risk	0.03	-0.50	-0.53	0.51	0.38	-0.13	0.21	0.22	0.00
Right thing to do	-0.59	-0.88	-0.29	0.77	1.51	0.74	0.26	0.23	-0.03
No specific reason	-2.14	-3.24	-1.09	0.04	0.05	0.01	0.44	0.50	0.06
By Climate Change Concerns									
Low	-2.59	-3.97	-1.38	0.14	0.01	-0.13	0.23	0.26	0.03
Moderate	-1.38	-1.85	-0.47	0.04	0.17	0.12	0.25	0.25	0.00
High	-0.54	-0.79	-0.24	0.67	0.94	0.28	0.51	0.48	-0.03

Note: The table reports dynamics (from the first wave of ESG-related questions to the latest wave) 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. Note that we compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds.

Throughout our sample, the share of investors who report financial returns or moral considerations as their primary ESG investment motive fell somewhat, while the share of investors reporting that they

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[10]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 Table A.11.

viewed no specific ESG investment motive increased by six percentage points.

Overall ESG portfolio shares remained relatively constant over the sample, but this average masks substantial across-investor heterogeneity. Among investors with moral ESG investment motives, the ESG portfolio share actually increased by three-quarters a percentage point to 1.51% by the end of our sample. In contrast, the ESG investment share among respondents motivated by return or hedging properties of ESG investments each fell by about 0.1 percentage point. Similarly, the ESG investment share increased among individuals with high concerns about climate risk and fell among individuals with low concerns. As a result, the population of ESG investors has shifted over time towards those primarily motivated by non-pecuniary motives, while the share of ESG investors primarily motivated by more traditional financial motives, such as the investments' return and covariance properties, declined.

Table 6 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 waves of the survey. Overall, the reasons behind investing in ESG are quite persistent, but the degree 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).

Table 6: Transition Matrix

| | Panel A: Probability of Switching | | | |
	ESG will outperform	ESG hedges climate risk	Right thing to do	No specific reason
ESG will outperform	0.36	0.29	0.20	0.15
ESG hedges climate risk	0.08	0.52	0.19	0.22
Right thing to do	0.05	0.16	0.63	0.16
No specific reason	0.01	0.09	0.06	0.83

| | 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	-0.26	-1.14	-1.04	-2.62
ESG hedges climate risk	0.37	-0.27	-0.55	-0.99
Right thing to do	0.80	0.44	-0.12	-0.48
No specific reason	1.79	0.64	-0.23	-0.19

Note: 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.

Panel B of Table 6 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 ex-

cess 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 7. 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 A.12 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.

Table 7: Decomposing the Variation in Beliefs: Individual and Time Fixed Effects

	R^2 (percent) of panel regression			
	Time FE	Individual FE	Time + Individual FE	Observations
Expected 10Y stock return (% p.a.)	0.33	60.02	60.21	1,874
Expected 10Y Return of ESG Investments (% p.a.)	1.07	59.55	60.22	1,906
Expected Excess 10Y Return of ESG Investments (% p.a.)	1.10	48.88	49.78	1,849

Note: 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.

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 7, and regress those on the various demographic characteristics we observe (age, wealth, location, etc). Table 8 shows the R^2s of regressions of the fixed effect onto the various demographic characteristics (see Appendix Table A.13 for the coefficients on these demographics). The columns of Table 8 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.

Table 8: Belief Heterogeneity and Demographics

R^2	#Resp$\geq$1	#Resp$\geq$2	#Resp$\geq$3	#Resp$\geq$4	#Resp$\geq$5
Expected 10Y stock return (% p.a.)	1.43	1.24	1.93	1.98	3.25
Expected 10Y Return of ESG Investments (% p.a.)	2.29	1.84	3.01	2.75	3.07
Expected Excess 10Y Return of ESG Investments (% p.a.)	0.82	0.92	1.48	1.43	1.22

Note: 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 7) 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.

5   Conclusion

We analyzed a new survey of investor beliefs that asked about the expected returns of ESG portfolios and investor motivations behind ESG investment together with more general questions about the stock market and economic growth expectations. We combine the survey responses with administrative data on respondents' portfolio holdings, including holdings of ESG-focused funds. We summarize our findings in 4 facts, two of which describe the behavior of ESG beliefs and motivations in our panel, the other describe how portfolio allocations to ESG vary with ESG motivations and financial return expectations.

ESG investing is a relatively new phenomenon that has attracted much attention and is likely to be responsible for important changes in both government policy and industry. Survey evidence can provide interesting real-time insight into how investors form beliefs about these new investment categories and how they act on these beliefs.

In addition, many theoretical models studying the effect of ESG considerations on asset prices are based on the presence of investors with heterogeneous expectations and preferences about ESG investing. Our panel survey, joint with administrative data on individual investment behavior, can provide important granular inputs useful to calibrating these models.

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" Four Facts About ESG Beliefs and Investor Portfolios" — Online Appendix

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Table A.1: Response Rate of Each Question

	Response Rate (%)		
	All Resp	1st Resp since Jun 2021	#Resp≥3
Expected Stock Returns			
Expected 1Y stock return (%)	98.02	97.70	98.51
Expected 10Y stock return (% p.a.)	97.12	96.74	97.86
Probability 1Y stock return in bucket (%)			
Less than -30%	99.08	98.54	99.82
-30% to -10%	99.08	98.54	99.82
-10% to 30%	99.08	98.54	99.82
30% to 40%	99.08	98.54	99.82
More than 40%	99.08	98.54	99.82
Expected GDP Growth			
Expected 3Y GDP growth (% p.a.)	97.58	96.74	98.72
Expected 10Y GDP growth (% p.a.)	96.41	95.56	97.83
Probability p.a. 3Y GDP growth in bucket (%)			
Less than -3%	98.89	98.15	99.85
-3% to 0%	98.89	98.15	99.85
0% to 3%	98.89	98.15	99.85
3% to 9%	98.89	98.15	99.85
More than 9%	98.89	98.15	99.85
Expected Bond Returns			
Expected 1Y return of 10Y zero coupon bond (%)	97.08	96.03	98.45
Difficulty			
Expected stock returns	99.68	99.56	99.86
Expected GDP growth	99.67	99.43	99.97
Expected bond returns	99.09	98.68	99.72
Confidence			
Expected stock returns	97.33	97.19	97.80
Expected GDP growth	97.35	97.16	97.87
Expected bond returns	97.05	96.53	97.86
ESG Beliefs			
Expected 10Y Return of ESG Investments (% p.a.)	97.88	96.92	99.20
Motivations for ESG Investment	98.17	97.31	99.31
Level of Concern about Climate Change	98.66	97.86	99.44
# Observation (Jun 2021 - Dec 2022)	18,627	9,579	9,141
# Observation (Dec 2021 - Dec 2022)	12,840	5,289	6,410

Note: Table shows the response rate of each of the questions in the GMSU-Vanguard survey. Note that the question, which asks about the level of concern about climate change, is only available from December 2021. The response rate of this question is computed based on the total number of observations from December 2021. The first column pooled all observations, the second column only considered observations that are the first responses to the survey since June 2021 (i.e., the date on which the first two ESG questions appear in the survey), and the last column only considered observations from individuals who have answered the survey at least three times since June 2021.

Table A.2: Demographics: Survey Respondents and Nonrespondents

	Survey respondents				Non-respondents	
	Mean	P10	P50	P90	Mean	Difference
Age (years)	63.2	45	66	76	53.5	9.68***
Male	0.65	0	1	1	0.45	0.20***
Region - Northeast	0.23	0	0	1	0.24	-0.010*
Region - Midwest	0.21	0	0	1	0.20	0.0099*
Region - South	0.31	0	0	1	0.31	0.0051
Region - West	0.24	0	0	1	0.25	-0.0046
Total Vanguard wealth (k$)	688.5	37.6	338.6	1738.9	318.3	370.2***
Length of Vanguard relationship (years)	19.8	7	20	31	16.2	3.62***
Active trades/month	2.09	0	0.60	4.38	1.14	0.95***
Monthly portfolio turnover (percent)	1.70	0	0.46	4.09	1.33	0.37***
Days with log-ins/month	2.08	0	0.072	7.40	0.89	1.20***
Total time spent/month (minutes)	19.5	0	0.94	49.8	6.62	12.9***
Portfolio shares (percent) - Equity	69.4	33.9	73.1	99.9	73.7	-4.28***
Portfolio shares (percent) - Fixed income	20.3	0	15.4	47.7	16.4	3.95***
Portfolio shares (percent) - Cash	9.70	0	1.93	29.0	9.46	0.24
Portfolio shares (percent) - Other/Unk	0.58	-0.014	0	0.92	0.49	0.089*
Portfolio shares (percent) - ESG	0.40	0	0	0	0.31	0.095*
Number of unique assets	9.15	1	5	20	5.31	3.84***
Number of mutual funds	5.19	1	4	11	3.48	1.70***
Number of ETFs	1.25	0	0	4	0.65	0.60***
Number of stocks	2.59	0	0	6	1.14	1.45***
Number of bonds	0.13	0	0	0	0.031	0.094***
Flood Risk Exposure - High	0.078	0	0	0	0.069	0.0091**
Flood Risk Exposure - Low	0.44	0	0	1	0.45	-0.011
Political View in Location - Republican	0.30	0	0	1	0.26	0.043***

Note: Table shows summary statistics on both the survey respondents and nonrespondents. Age, gender, location, total wealth at Vanguard, length of Vanguard relationship, and the number of assets are measured as of December 2022. 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 two rows of flood risk exposure report the proportions of respondents living in areas with different levels of flood risk exposure respectively. The political views are based on county-level vote share from the 2020 US election. The number reports the proportion of respondents living in an area with a majority Republican vote share (we only consider Democrat and Republican). Other variables are presented as monthly averages between January 2021 and December 2022. Significance levels: * (p<0.10), ** (p<0.05), *** (p<0.01).

Table A.3: Beliefs by Demographics (Expected Excess 10Y Return of ESG Investments, % p.a.)

	Expected 10Y Stock Return	Expected 10Y ESG Return	Expected Excess 10Y ESG Return
	(1)	(2)	(3)
log(Wealth)	-0.137***	-0.247***	-0.106***
	(0.023)	(0.040)	(0.029)
Age $\in$ (40,50]	-0.279*	0.282	0.364*
	(0.167)	(0.270)	(0.215)
Age $\in$ (50,60]	-0.222	0.097	0.289
	(0.146)	(0.232)	(0.198)
Age $\in$ (60,70]	-0.670***	-0.438**	0.318*
	(0.137)	(0.218)	(0.188)
Age > 70	-0.418***	0.106	0.354*
	(0.139)	(0.220)	(0.189)
Male	-0.287***	-0.828***	-0.370***
	(0.071)	(0.108)	(0.080)
Flood Risk Exposure: Medium	-0.135**	-0.229**	0.003
	(0.060)	(0.093)	(0.069)
Flood Risk Exposure: High	0.152	-0.089	-0.036
	(0.116)	(0.197)	(0.131)
Political View in Location: Republican	0.029	-0.410***	-0.364***
	(0.064)	(0.100)	(0.074)
Wave FE	Yes	Yes	Yes
R^2	1.36	2.43	1.61
Observations	13,149	13,224	12,906

Note: Table shows coefficients of regressing expected excess 10Y return of ESG investments (% p.a.) on the various demographic characteristics. We control for wave fixed effect. 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 corrected for heteroskedasticity. Significance levels: * ($p<0.10$), ** ($p<0.05$), *** ($p<0.01$).

Table A.4: Beliefs by Demographics (Reasons to Invest in ESG)

	Reasons to Invest in ESG			
	ESG will Outperform	ESG Hedges Climate Risk	It's the Right Thing to Do	No Specific Reason
	(1)	(2)	(3)	(4)
log(Wealth)	-0.006***	-0.021***	-0.002	0.029***
	(0.002)	(0.003)	(0.003)	(0.003)
Age $\in$ (40,50]	-0.017	-0.038*	-0.004	0.059**
	(0.015)	(0.022)	(0.025)	(0.025)
Age $\in$ (50,60]	-0.018	0.003	-0.042*	0.056**
	(0.014)	(0.020)	(0.022)	(0.022)
Age $\in$ (60,70]	-0.016	-0.004	-0.055***	0.075***
	(0.013)	(0.019)	(0.021)	(0.021)
Age > 70	-0.039***	0.031	-0.048**	0.056***
	(0.013)	(0.019)	(0.021)	(0.021)
Male	-0.003	-0.024***	-0.063***	0.090***
	(0.005)	(0.008)	(0.009)	(0.009)
Flood Risk Exposure: Medium	-0.001	-0.005	0.008	-0.002
	(0.005)	(0.007)	(0.008)	(0.009)
Flood Risk Exposure: High	0.010	0.024*	-0.005	-0.030*
	(0.009)	(0.014)	(0.014)	(0.016)
Political View in Location: Republican	-0.011**	-0.007	-0.085***	0.103***
	(0.005)	(0.008)	(0.008)	(0.009)
Wave FE	Yes	Yes	Yes	Yes
R^2	0.69	1.01	1.58	3.27
Observations	13,266	13,266	13,266	13,266

Note: Table shows coefficients of regressing stated motivations of ESG investment on the various demographic characteristics. We control for wave fixed effect. 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 corrected for heteroskedasticity. Significance levels: * ($p<0.10$), ** ($p<0.05$), *** ($p<0.01$).

A.4

Table A.5: Expected ESG Return and Other Beliefs (Different Subsets)

	Correlations between ESG Belief and Other Beliefs							
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Pooled	0.02	-0.02	0.03	0.10	-0.00	-0.06	0.06	0.05
By Age								
≤40	0.03	-0.02	-0.00	0.01	-0.08	-0.04	-0.02	0.05
41-50	0.00	-0.02	0.05	0.03	-0.05	-0.03	0.06	-0.03
51-60	0.00	-0.02	0.01	0.08	-0.00	-0.08	0.04	0.05
61-70	0.03	-0.04	0.04	0.13	0.02	-0.07	0.07	0.08
>70	0.02	-0.01	0.03	0.11	-0.00	-0.05	0.07	0.04
By Gender								
Female	0.01	-0.02	0.05	0.11	0.03	-0.05	0.08	0.07
Male	0.03	-0.03	0.02	0.09	-0.03	-0.06	0.05	0.04
By Wealth								
$100k	0.03	-0.03	0.05	0.13	0.07	-0.04	0.08	0.12
$100k-$500k	0.01	-0.02	0.04	0.08	-0.03	-0.05	0.06	0.07
$500k-$1m	0.03	-0.00	0.04	0.08	-0.05	-0.06	0.06	-0.01
>$1m	0.02	-0.05	0.00	0.10	-0.01	-0.09	0.04	0.01
By Flood Risk Exposure								
Low	0.02	-0.02	0.02	0.09	-0.02	-0.04	0.05	0.04
Moderate	0.05	-0.04	0.03	0.11	-0.00	-0.07	0.05	0.05
High	-0.04	0.05	0.12	0.07	-0.01	-0.01	0.14	0.07
By Political View in Location								
Democratic	0.02	-0.03	0.03	0.10	0.01	-0.06	0.05	0.04
Republican	0.03	0.01	0.05	0.09	-0.06	-0.04	0.07	0.03

Note: Table shows the correlation between responses to the expected excess 10-year return of ESG investment (% p.a.) and responses to various other questions in the survey within several subsets. Each column represents a question, and the numbers are associated with Table 3. The flood risk exposures are based on the average risk scores (measured by the First Street Foundation) of respondents' living areas (zip code level). The political views of living areas are based on county-level vote shares (considering only Democrat and Republican votes) from the 2020 US election.

Table A.6: ESG Fund List

Fund Name	Fund ID	AUM ($m)	Fund Name	Fund ID	AUM ($m)
Parnassus Core Equity	FSUSA001WD	23,911	iShares ESG Aware MSCI USA Small-Cap ETF	FS0000DM36	1,334
iShares ESG Aware MSCI USA ETF	FS0000CP0D	19,587	Neuberger Berman Sustainable Eq	FSUSA000GZ	1,289
CREF Social Choice	FSUSA00C5O	17,693	First Trust Water ETF	FSUSA089GL	1,250
Vanguard FTSE Social Index	FSUSA003PD	12,774	USAA Sustainable World	FSUSA002O2	1,140
iShares ESG Aware MSCI EAFE ETF	FS0000CG5J	6,722	TIAA-CREF Social Choice LwCrbn Eq	FS0000BVON	1,058
Pioneer	FSUSA001ZX	6,540	Calvert Balanced	FSUSA000AW	1,038
Parnassus Mid-Cap	FSUSA06P37	6,083	Boston Trust Walden Small Cap	FSUSA06IQP	1,003
Calvert Equity	FSUSA000AZ	5,989	Domini Impact International Equity	FSUSA07L1X	986
TIAA-CREF Social Choice Eq	FSUSA00I37	5,809	iShares ESG 1-5 Year USD Corp Bd ETF	FS0000D707	953
TIAA-CREF Core Impact Bond	FS00009OB8	5,780	Nuveen ESG Small-Cap ETF	FS0000CSFB	894
Vanguard ESG US Stock ETF	FS0000DVU7	5,659	Mirova Global Sustainable Equity	FS0000CBLE	869
Brown Advisory Sustainable Growth	FS00009LFB	5,650	DFA Em Mkts Sustnby Cor 1 Instl	FS0000DIEY	857
iShares Global Clean Energy ETF	FSUSA08TMM	5,124	iShares Paris-Aligned Clmt MSCI USA ETF	FS0000H5PE	848
Putnam Sustainable Leaders	FSUSA00250	4,890	GMO Climate Change	FS0000D0PF	846
DFA US Sustainability Core 1	FSUSA08HSM	4,785	iShares MSCI ACWI Low Carbon Target ETF	FS0000B65I	830
Parnassus Value Equity	FSUSA06P39	4,604	American Century Balanced	FSUSA002LW	828
American Century Sustainable Equity	FSUSA067IH	4,053	Impax International Sust Econ	FSUSA09MFM	826
Calvert US Large Cap Core Rspnb Idx	FSUSA002Y7	3,838	Calvert International Equity	FSUSA000AI	826
iShares ESG Aware MSCI EM ETF	FS0000CG5F	3,746	Domini Impact Equity	FSUSA000KS	815
iShares MSCI KLD 400 Social ETF	FSUSA07KX3	3,582	Calvert Ultra-Short Duration Income	FSUSA07430	812
Eventide Gilead	FSUSA08T98	3,269	iShares ESG USD Corporate Bond ETF	FS0000D708	808
iShares MSCI USA ESG Select ETF	FSUSA067J9	3,248	Impax Core Bond Fund	FS0000CSRW	798
Invesco Floating Rate ESG	FSUSA00437	3,197	Nuveen ESG Large-Cap Growth ETF	FS0000CSFP	790
CCM Community Impact Bond	FSUSA003DE	3,116	Vanguard Global ESG Select Stk	FS0000F6SK	787
Vanguard ESG International Stock ETF	FS0000DVU6	3,011	Trillium ESG Global Equity Fund	FSUSA004DN	781
Xtrackers MSCI USA ESG Leaders Eq ETF	FS0000E831	2,961	iShares ESG Advanced Ttl USD Bd Mrkt ETF	FS0000FYRY	780
DFA Intl Sustainability Core 1	FSUSA08HSN	2,882	Impax Ellevate Global Women's Ldr	FSUSA002BA	771
iShares ESG MSCI USA Leaders ETF	FS0000F5VZ	2,878	DFA Global Sustainability Fixed Inc Ins	FS0000DX9K	767
Calvert Small-Cap	FSUSA06531	2,585	Invesco WilderHill Clean Energy ETF	FSUSA067X7	758
Calvert Bond	FSUSA000AY	2,546	Calvert Green Bond	FS0000AA69	733
Invesco Solar ETF	FSUSA08SUE	2,388	AB Sustainable Intl Thematic	FSUSA000LF	720
Calvert Short Duration Income	FSUSA00E70	2,295	Access Capital Community Investment	FSUSA07YWB	685
Calvert Emerging Markets Equity	FS00009OF6	2,267	Calvert International Responsible Idx	FS0000C13O	682
iShares ESG U.S. Aggregate Bond ETF	FS0000DQHM	2,239	Virtus Duff & Phelps Water	FSUSA08QRU	681
Impax Global Environmental Markets	FSUSA08NBE	2,208	1919 Socially Responsive Balanced	FSUSA002EH	679
Impax Sustainable Allocation	FSUSA001XO	2,144	Xtrackers S&P 500 ESG ETF	FS0000E9TC	677
PIMCO Total Return ESG	FSUSA001ZI	2,061	Praxis Impact Bond	FSUSA000KC	669
Fidelity® U.S. Sustainability Index	FS0000D38F	2,007	Calvert Income	FSUSA000AU	663
AB Sustainable Global Thematic	FSUSA0001Q	1,813	Parnassus Mid Cap Growth	FSUSA001XC	660
Calvert US Large Cap Value Rspnb Idx	FS0000BOXB	1,746	VALIC Company I U.S. Socially Rspnb	FSUSA06UJ2	658
BlackRock ESG Capital Allocation	FS0000H63U	1,736	BlackRock Sustainable Adg Lg Cp Cr	FS0000C0EV	644
Invesco Water Resources ETF	FSUSA06IGJ	1,707	SPDR® S&P 500® ESG ETF	FS0000G0NA	643
Eventide Healthcare & Life Sciences	FS00009TA6	1,607	Global X Conscious Companies ETF	FS0000CGOD	640
First Trust NASDAQ® Cln Edge® GrnEngyETF	FSUSA07YW9	1,574	First Trust NASDAQ® Cln Edge®StGidIfsETF	FSUSA0A6TJ	638
Nuveen ESG Large-Cap Value ETF	FS0000CSFQ	1,548	Goldman Sachs International Eq ESG	FSUSA0015N	634
BlackRock Sustainable Balanced	FSUSA001KP	1,476	iShares® ESG Advanced MSCI USA ETF	FS0000FYHB	599
BlackRock US Carbon Transition Rdnss ETF	FS0000GK0A	1,362	Impax Small Cap	FSUSA08NBD	593
Impax Large Cap Fund	FS0000CSRV	1,348	Nuveen Winslow Large-Cap Growth ESG	FSUSA09Q6S	591
TIAA-CREF Social Choice Intl Eq	FS0000BVOM	1,339	Impax High Yield Bond	FSUSA004U1	585
Northern Global Sustainability Index	FSUSA08GBJ	1,339	AMG Boston Common Global Impact	FSUSA0009F	578

Note: Table reports the top 100 funds (based on fund size as of Dec. 31, 2022) that are labeled as "Sustainable Investment Overall" by Morningstar. This list does not contain money market funds. The fund sizes reported include all classes.

Table A.7: ESG Holdings (Equity-Focused Funds Only)

| | Panel A: ESG Holdings (Pooled and by Demographic Characteristics) | | | | |
| | | ESG Portfolio Share | | | |
	Has Any ESG	Mean	P95	P99	P99.5
Pooled	3.5%	0.8%	0.0%	26.3%	48.5%
By Age					
≤40	6.3%	1.6%	8.5%	31.3%	87.2%
41-50	4.8%	1.3%	0.8%	50.0%	100.0%
51-60	3.2%	0.7%	0.0%	26.1%	30.5%
61-70	3.3%	1.0%	0.0%	30.5%	71.6%
>70	3.0%	0.5%	0.0%	19.1%	39.1%
By Gender					
Female	3.4%	0.9%	0.0%	27.0%	48.8%
Male	3.5%	0.8%	0.0%	25.9%	48.5%
By Wealth					
<$100k	2.2%	1.2%	0.0%	39.8%	100.0%
$100k-$500k	3.5%	0.9%	0.0%	26.3%	45.6%
$500k-$1m	3.6%	0.9%	0.0%	36.6%	61.8%
>$1m	4.2%	0.5%	0.0%	11.6%	31.0%
By Flood Risk Exposure					
Low	3.6%	0.9%	0.0%	28.1%	48.0%
Medium	3.8%	0.9%	0.0%	27.7%	53.2%
High	3.4%	0.4%	0.0%	12.8%	16.4%
By Political View in Location					
Democratic	4.5%	1.0%	0.3%	30.7%	51.7%
Republican	2.1%	0.4%	0.0%	7.8%	17.8%

| | Panel B: ESG Holdings by Other Questions | | | | |
| | | ESG Portfolio Share | | | |
	Has Any ESG	Mean	P95	P99	P99.5
By Reasons of ESG Investment					
ESG will outperform	7.0%	1.7%	7.6%	33.6%	100.0%
ESG hedges climate risk	4.2%	0.9%	0.1%	28.5%	50.2%
It's the right thing to do	6.7%	2.0%	6.4%	54.7%	100.0%
No specific reason	0.8%	0.1%	0.0%	0.0%	4.9%
By Climate Change Concerns					
Low	1.0%	0.2%	0.0%	1.5%	7.9%
Moderate	1.7%	0.2%	0.0%	6.1%	14.9%
High	5.6%	1.5%	2.6%	46.6%	88.0%

Note: 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. In this table, we compute the ESG portfolio share as the proportion of investments in equities that have been allocated to ESG funds. Funds with an equity allocation exceeding 90% are treated as equity-focused funds. The first column reports the extensive margin (whether the investor holds any ESG in the portfolio), and the rest of the columns report summary statistics of the share of ESG investments. 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.

Table A.8: Holdings by Demographics & Beliefs

	Has Any ESG		ESG Portfolio Share (%)	
	(1)	(2)	(3)	(4)
log(Wealth)	0.006***	0.007***	-0.052**	-0.043
	(0.001)	(0.001)	(0.026)	(0.027)
Age ∈ (40,50]	-0.022*	-0.027**	-0.104	-0.128
	(0.013)	(0.013)	(0.239)	(0.246)
Age ∈ (50,60]	-0.040***	-0.038***	-0.420**	-0.417**
	(0.011)	(0.012)	(0.175)	(0.180)
Age ∈ (60,70]	-0.044***	-0.043***	-0.247	-0.259
	(0.011)	(0.011)	(0.173)	(0.179)
Age > 70	-0.044***	-0.042***	-0.398**	-0.389**
	(0.011)	(0.011)	(0.175)	(0.180)
Male	-0.002	0.005	0.042	0.178**
	(0.004)	(0.004)	(0.074)	(0.072)
Flood Risk Exposure: Medium	0.008**	0.008**	0.131*	0.125*
	(0.003)	(0.004)	(0.070)	(0.070)
Flood Risk Exposure: High	0.007	0.004	-0.088	-0.106
	(0.006)	(0.006)	(0.089)	(0.091)
Political View in Location: Republican	-0.025***	-0.017***	-0.389***	-0.284***
	(0.003)	(0.003)	(0.061)	(0.060)
Expected Excess 10Y ESG Return (% p.a.)		0.003***		0.047***
		(0.000)		(0.011)
Reason: Outperform		0.064***		0.705***
		(0.010)		(0.154)
Reason: Hedge		0.034***		0.361***
		(0.004)		(0.071)
Reason: Right Thing		0.059***		0.876***
		(0.005)		(0.100)
Wave FE	Yes	Yes	Yes	Yes
R^2	0.82	3.35	0.46	1.90
Observations	13,516	12,848	13,320	12,664

Note: 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, the expected excess 10Y ESG return (% p.a.) and the stated motivations of ESG investment, controlling for wave fixed effect. 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 corrected for heteroskedasticity. Significance levels: * (p<0.10), ** (p<0.05), *** (p<0.01).

Table A.9: Motivations for ESG Investments (Conditional on Investing in ESG)

Panel A: Share of Investors by Demographic Characteristics

	Reasons of ESG Investments				Level of Concerns		
	ESG will outperform	ESG hedges climate risk	It's the right thing to do	No specific reason	Low	Moderate	High
Pooled	0.13	0.27	0.49	0.11	0.07	0.12	0.80
By Age							
≤40	0.17	0.07	0.73	0.03	0.00	0.03	0.97
41-50	0.16	0.31	0.50	0.03	0.00	0.18	0.82
51-60	0.15	0.25	0.50	0.10	0.07	0.15	0.78
61-70	0.12	0.24	0.48	0.15	0.12	0.08	0.80
>70	0.12	0.35	0.40	0.12	0.07	0.15	0.78
By Gender							
Female	0.11	0.27	0.57	0.05	0.03	0.09	0.87
Male	0.15	0.26	0.45	0.14	0.09	0.13	0.77
By Wealth							
<$100k	0.09	0.28	0.55	0.08	0.06	0.17	0.77
$100k-$500k	0.18	0.21	0.51	0.09	0.07	0.14	0.79
$500k-$1m	0.05	0.37	0.42	0.16	0.13	0.12	0.75
>$1m	0.15	0.26	0.47	0.11	0.04	0.08	0.88
By Flood Risk Exposure							
Low	0.15	0.28	0.46	0.11	0.09	0.12	0.79
Medium	0.14	0.26	0.50	0.09	0.04	0.12	0.84
High	0.07	0.26	0.57	0.10	0.07	0.11	0.82
By Political View in Location							
Democratic	0.13	0.28	0.51	0.08	0.04	0.11	0.85
Republican	0.21	0.21	0.42	0.16	0.14	0.17	0.69

Panel B: Share of Investors by Other Questions

	Reasons of ESG Investments				Level of Concerns		
	ESG will outperform	ESG hedges climate risk	It's the right thing to do	No specific reason	Low	Moderate	High
By Reasons of ESG Investment							
ESG will outperform					0.04	0.14	0.82
ESG hedges climate risk					0.05	0.16	0.78
It's the right thing to do					0.01	0.07	0.93
No specific reason					0.40	0.24	0.36
By Climate Change Concerns							
Low	0.06	0.19	0.06	0.69			
Moderate	0.13	0.34	0.28	0.25			
High	0.11	0.24	0.59	0.06			

Note: 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. This table is the same as table 2 but only focuses on respondents with holdings in ESG portfolios. The flood risk exposures are based on the average risk scores (measured by the First Street Foundation) of respondents' living areas (zip code level). The political views of living areas are based on county-level vote shares (considering only Democrat and Republican votes) from the 2020 US election.

Table A.10: ESG Portfolio Properties, ESG Beliefs, and Portfolios (Conditional on Investing in ESG)

	Expected Excess 10Y Return of ESG Investments (% p.a.)				ESG Portfolio Share			
	Mean	P10	P50	P90	Mean	P10	P50	P90
Pooled	0.30	-3	0	4	12.0%	0.7%	5.8%	32.3%
By Reasons of ESG Investments								
ESG will outperform	2.18	-1	2	6.5	11.2%	1.4%	7.5%	25.1%
ESG hedges climate risk	0.60	-3	0	5	9.9%	0.7%	4.9%	32.4%
It's the right thing to do	0.09	-3	0	3	14.8%	0.7%	7.5%	37.7%
No specific reason	-1.78	-6	-1.15	1	6.0%	0.6%	2.6%	15.3%
By Climate Change Concerns								
Low	-2.38	-7	-2	2	8.4%	0.7%	3.5%	24.3%
Moderate	0.02	-4	0	3.5	8.6%	0.5%	3.6%	19.3%
High	0.19	-3	0	3	13.7%	0.8%	6.2%	41.6%

Note: This table only considers respondents with holdings in ESG portfolios. The left side of the table reports the distribution of expected excess return of ESG investments over the market. The right side of the table reports information about ESG portfolio holdings: the share of ESG investments. We compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds. The first row pooled all responses, the second to fifth rows of the table group investors by their motivations for ESG investments, and the last three rows group investors by their level of concern about climate change.

Table A.11: Dynamics of Beliefs within Conditional Subsets

	# Respondents	Expected Excess 10Y ESG Return (% p.a.)			ESG Portfolio Share (%)		
		First 3 Waves	Last 3 Waves	Diff	First 3 Waves	Last 3 Waves	Diff
ESG will outperform	317	1.05	-0.32	-1.37	0.82	1.19	0.37
ESG hedges climate risk	850	-0.21	-0.84	-0.63	0.41	0.67	0.26
Right thing to do	903	-0.39	-0.95	-0.56	0.79	1.18	0.39
No specific reason	1,390	-1.99	-2.78	-0.79	0.05	0.03	-0.02

Note: Table reports dynamics of expected excess 10-year return of ESG investment (% p.a.) and ESG portfolio share (%) within conditional subsets. Individuals are included in the same subset if they have the same answers to the stated motivation for ESG investment in at least one of the first two waves. The "# Respondents" shows the number of respondents in each subset. The "First 3 Waves" and the "Last 3 Waves" columns show the average beliefs and portfolio holdings in the first three waves and the last three waves respectively. Note that we compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds.

Table A.12: Decomposing the Variation in Beliefs: Robustness

	R^2 (total, percent)			Number of individuals		
	#Resp≥3	#Resp≥4	#Resp≥5	#Resp≥3	#Resp≥4	#Resp≥5
Expected 10Y stock return (% p.a.)	60.02	59.10	60.74	1,874	1,130	752
Expected 10Y Return of ESG Investments (% p.a.)	59.55	58.27	55.52	1,906	1,150	770
Expected Excess 10Y Return of ESG Investments (% p.a.)	48.88	44.84	43.01	1,849	1,117	744

Note: The left panel reports the R^2 values corresponding to regression $B_{i,t} = \phi_i + \epsilon_{2,i,t}$ (the same as the second regression in table 7), which estimates a set of individual fixed effects ϕ_i absorbing the average belief over time of each respondent. The right panel reports the number of individuals that responded the required number of times. Across columns, we increase the minimum number of responses for an individual to be included in the sample from 3 to 5. Each row corresponds to a different survey question that is used as the dependent variable.

Table A.13: Beliefs by Demographics

	Expected 10Y Stock Return	Expected 10Y ESG Return	Expected Excess 10Y ESG Return
	(1)	(2)	(3)
log(Wealth)	-0.175***	-0.348***	-0.153***
	(0.031)	(0.049)	(0.036)
Age ∈ (40,50]	-0.246	0.501	0.400
	(0.227)	(0.358)	(0.260)
Age ∈ (50,60]	-0.047	0.261	0.230
	(0.201)	(0.317)	(0.231)
Age ∈ (60,70]	-0.499***	-0.113	0.357
	(0.189)	(0.298)	(0.217)
Age > 70	-0.206	0.450	0.365*
	(0.192)	(0.303)	(0.220)
Male	-0.372***	-0.922***	-0.359***
	(0.090)	(0.142)	(0.103)
Flood Risk Exposure: Medium	-0.139	-0.239*	0.022
	(0.088)	(0.137)	(0.100)
Flood Risk Exposure: High	0.162	-0.099	-0.091
	(0.158)	(0.247)	(0.181)
Political View in Location: Republican	-0.018	-0.513***	-0.388***
	(0.092)	(0.144)	(0.105)
R^2	1.43	2.29	0.82
Observations	6,641	6,625	6,503

Note: Table shows coefficients of regressing respondent fixed effects for answers to the various survey questions on demographic controls (i.e., the detailed coefficients on the various demographic characteristics from regressions in table 8). We include fixed effects for all individuals for whom we have observed at least one response. 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), ** (p<0.05), *** (p<0.01).

Table A.14: ESG Holdings (By Motivation of ESG Investment and Expected Excess ESG Return)

	Has Any ESG (%)			ESG Portfolio Share (%)		
	Expected Excess 10Y Return of ESG Investments (% p.a.)					
	<-0.5%	[-0.5%, 0.5%)	≥0.5%	<-0.5%	[-0.5%, 0.5%)	≥0.5%
ESG will outperform	3.89	6.20	8.39	0.45	0.40	1.09
ESG hedges climate risk	3.17	3.53	6.32	0.15	0.39	0.89
Right thing to do	4.00	7.99	12.01	0.52	1.34	1.88
No specific reason	0.82	0.99	1.38	0.05	0.05	0.08

Note: Table reports (left panel) the fraction of respondents who hold at least one ESG-focused fund in their portfolio and (right panel) the average portfolio share invested in ESG-focused funds for the interactions between the motivations of ESG investments in rows and the expected excess 10-year returns of ESG in columns. Note that we compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds.

Table A.15: Standard Deviations of ESG & Market Beliefs

	#Resp$\geq$3	#Resp$\geq$4	#Resp$\geq$5
Expected 10Y Return of ESG Investments (% p.a.)	4.78	4.70	4.29
Expected 10Y Stock Return (% p.a.)	3.06	3.07	3.02

Note: Table reports the standard deviations of two survey questions, which are the expected 10-year return of ESG investments (% p.a.) and the expected 10-year stock return (% p.a.), for individuals who responded several times. 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 3 to 5.

Table A.16: Reasons and Concerns by Demographics (Conditional on Investing in ESG)

	Reasons to Invest in ESG				Level of Concerns		
	ESG will outperform	ESG hedges climate risk	It's the right thing to do	No specific reason	Low	Moderate	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
log(Wealth)	0.005	-0.004	-0.024	0.023**	-0.003	-0.031**	0.034**
	(0.015)	(0.023)	(0.025)	(0.009)	(0.007)	(0.015)	(0.016)
Age $\in$ (40,50]	-0.045	0.216***	-0.079	-0.092	-0.002	0.117	-0.115
	(0.096)	(0.080)	(0.122)	(0.068)	(0.028)	(0.077)	(0.080)
Age $\in$ (50,60]	-0.019	0.266***	-0.163	-0.085	0.067	0.086	-0.153*
	(0.096)	(0.070)	(0.119)	(0.074)	(0.044)	(0.068)	(0.080)
Age $\in$ (60,70]	-0.027	0.291***	-0.160	-0.104	0.078**	0.056	-0.134**
	(0.089)	(0.064)	(0.115)	(0.066)	(0.032)	(0.060)	(0.068)
Age > 70	-0.096	0.376***	-0.218*	-0.062	0.050	0.135**	-0.185***
	(0.088)	(0.065)	(0.112)	(0.066)	(0.032)	(0.061)	(0.069)
Male	0.028	-0.004	-0.073	0.048	0.015	0.018	-0.033
	(0.041)	(0.054)	(0.060)	(0.030)	(0.022)	(0.040)	(0.045)
Flood Risk Exposure: Medium	-0.025	-0.075	0.132**	-0.032	-0.037	0.035	0.002
	(0.041)	(0.050)	(0.058)	(0.033)	(0.025)	(0.041)	(0.045)
Flood Risk Exposure: High	-0.170***	0.017	0.128	0.025	-0.052	-0.005	0.057
	(0.039)	(0.099)	(0.108)	(0.064)	(0.042)	(0.062)	(0.072)
Political View in Location: Republican	0.107*	-0.065	-0.054	0.012	0.077*	0.007	-0.084
	(0.057)	(0.059)	(0.073)	(0.048)	(0.045)	(0.048)	(0.059)
Reason: Outperform					-0.266***	-0.117	0.382***
					(0.082)	(0.093)	(0.103)
Reason: Hedge					-0.266***	-0.129	0.396***
					(0.080)	(0.082)	(0.094)
Reason: Right Thing					-0.283***	-0.189**	0.472***
					(0.076)	(0.077)	(0.088)
Level of Concerns: Moderate	0.079	0.129	0.159	-0.367***			
	(0.105)	(0.122)	(0.112)	(0.133)			
Level of Concerns: High	0.046	0.097	0.398***	-0.542***			
	(0.090)	(0.103)	(0.087)	(0.116)			
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	4.79	6.27	11.1	21.9	20.6	7.81	18.4
Observations	346	346	346	346	346	346	346

Note: This table only considers respondents with holdings in ESG portfolios. Table shows coefficients of regressing stated motivations of ESG investments and level of concern about climate change on the various demographic characteristics. We control for wave fixed effect. 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 corrected for heteroskedasticity. Significance levels: * (p<0.10), ** (p<0.05), *** (p<0.01).

Table A.17: Beliefs by Demographics (Reasons to Invest in ESG)

	Reasons to Invest in ESG							
	ESG will Outperform		ESG Hedges Climate Risk		It's the Right Thing to Do		No Specific Reason	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(Wealth)	-0.004**		-0.019***		-0.004		0.028***	
	(0.002)		(0.003)		(0.003)		(0.003)	
Age ∈ (40,50]	-0.017		-0.067**		0.041		0.043	
	(0.017)		(0.027)		(0.029)		(0.027)	
Age ∈ (50,60]	-0.008		-0.003		0.003		0.008	
	(0.016)		(0.026)		(0.026)		(0.024)	
Age ∈ (60,70]	-0.002		-0.004		-0.021		0.027	
	(0.015)		(0.024)		(0.025)		(0.023)	
Age > 70	-0.026*		0.024		-0.015		0.016	
	(0.015)		(0.024)		(0.025)		(0.023)	
Male	0.005		-0.015		-0.038***		0.048***	
	(0.006)		(0.010)		(0.010)		(0.010)	
Flood Risk Exposure: Medium	-0.004		0.009		0.009		-0.014	
	(0.005)		(0.009)		(0.009)		(0.010)	
Flood Risk Exposure: High	0.002		0.049***		-0.038**		-0.014	
	(0.010)		(0.018)		(0.016)		(0.018)	
Political View in Location: Republican	0.001		0.018*		-0.038***		0.019*	
	(0.005)		(0.010)		(0.009)		(0.010)	
Expected Excess 10Y ESG Return (% p.a.)	0.011***	0.006***	0.011***	0.003**	0.000	-0.002	-0.022***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
Level of Concerns: Moderate	0.014***	-0.006	0.143***	0.038*	0.125***	-0.025*	-0.283***	-0.008
	(0.005)	(0.008)	(0.011)	(0.021)	(0.009)	(0.013)	(0.013)	(0.021)
Level of Concerns: High	0.042***	0.011	0.157***	-0.016	0.350***	-0.034*	-0.549***	0.039
	(0.005)	(0.012)	(0.010)	(0.026)	(0.009)	(0.020)	(0.011)	(0.025)
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	No	Yes	No	Yes	No	Yes	No	Yes
R^2	4.56	54.9	5.21	58.7	12.9	68.3	28.9	77.9
Observations	8,733	7,575	8,733	7,575	8,733	7,575	8,733	7,575

Note: The left regression of each panel shows coefficients of regressing stated motivations of ESG investments on the various demographic characteristics, the expected excess 10Y ESG return (% p.a.) and the stated level of concern about climate change, controlling for wave fixed effect. The right regression of each panel shows coefficients of regressing stated motivations of ESG investments on the expected excess 10Y ESG return (% p.a.) and stated level of concern about climate change, controlling for both individual and wave fixed effects. 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 corrected for heteroskedasticity. Significance levels: * ($p<0.10$), ** ($p<0.05$), *** ($p<0.01$).

Table A.18: Beliefs by Demographics (Level of Concern about Climate Change)

	Level of Concerns		
	Low	Moderate	High
	(1)	(2)	(3)
log(Wealth)	-0.003	-0.001	0.004
	(0.003)	(0.004)	(0.004)
Age ∈ (40,50]	0.013	0.081***	-0.093***
	(0.026)	(0.027)	(0.032)
Age ∈ (50,60]	0.037	0.090***	-0.127***
	(0.023)	(0.024)	(0.028)
Age ∈ (60,70]	0.063***	0.058***	-0.121***
	(0.022)	(0.022)	(0.027)
Age > 70	0.043**	0.066***	-0.110***
	(0.022)	(0.022)	(0.027)
Male	0.048***	0.044***	-0.091***
	(0.010)	(0.010)	(0.011)
Flood Risk Exposure: Medium	0.016*	-0.023**	0.007
	(0.009)	(0.010)	(0.011)
Flood Risk Exposure: High	-0.032**	-0.015	0.047**
	(0.016)	(0.018)	(0.020)
Political View in Location: Republican	0.122***	0.039***	-0.161***
	(0.010)	(0.010)	(0.011)
Wave FE	Yes	Yes	Yes
R^2	2.36	0.60	3.25
Observations	9,114	9,114	9,114

Note: Table shows coefficients of regressing the level of concern about climate change on the various demographic characteristics. We control for wave fixed effect. 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 corrected for heteroskedasticity. Significance levels: * (p<0.10), ** (p<0.05), *** (p<0.01).

Figure A.1: Histograms of Answers to ESG Expected 10-y Returns

(a) 10-y Expected ESG Returns

(b) 10-y Expected ESG Excess Returns Over Market
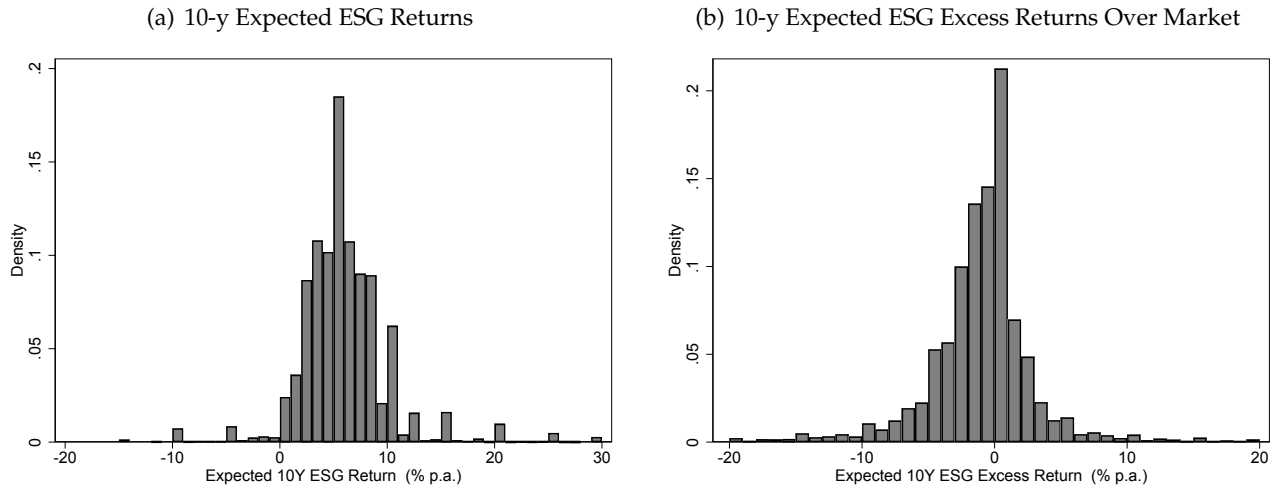
Note: Figure reports the histograms of the answers from the GMSU-Vanguard survey about the 10-year (average annualized) expected returns of an ESG portfolio (left) and excess returns of this portfolio over the stock market (right).

Figure A.2: Binscatter Plots (with controls)

(a) Any ESG Investments

(b) Portfolio Share in ESG Funds
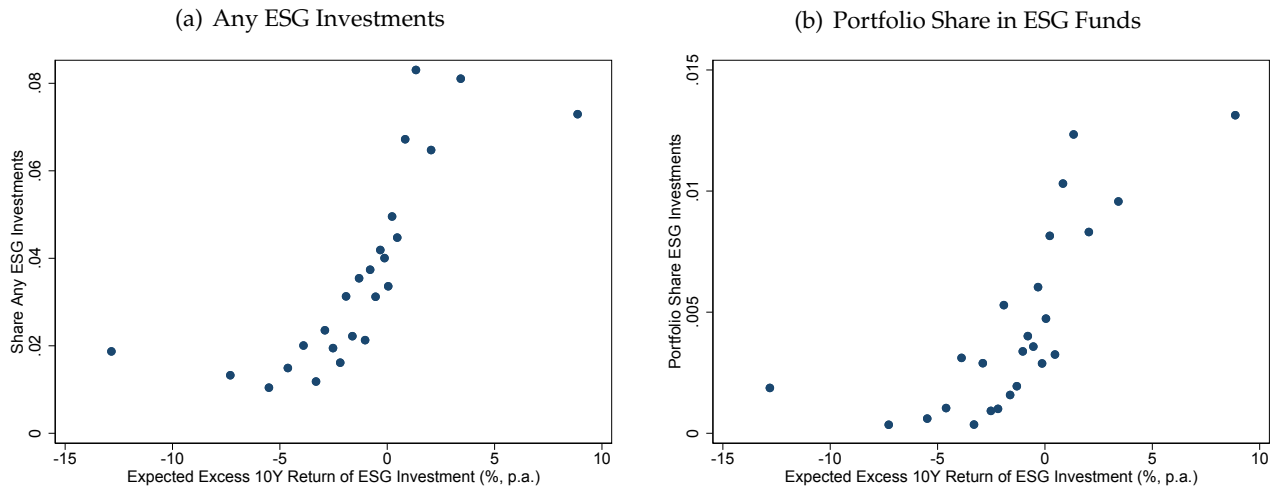
Note: Panel (A) shows a conditional binscatter plot of survey respondents' expected excess 10-year ESG returns and the fraction of respondents who hold at least one ESG-focused fund in their portfolio, conditional on the respondents' age, gender, region, wealth, length of Vanguard relationship and equity share. Panel (B) plots instead the average portfolio share invested in ESG-focused funds among the respondents. We compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds.

Figure A.3: Holdings of ESG Funds Broken Down by Expected Excess Return and Monthly Turnover
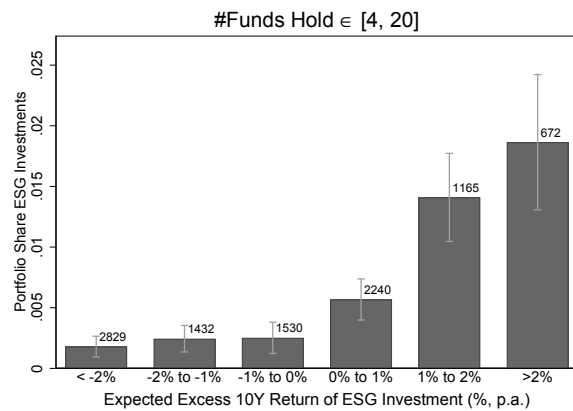
(a) Share of Respondent with Non-Zero Holdings: Turnover < 0.5%
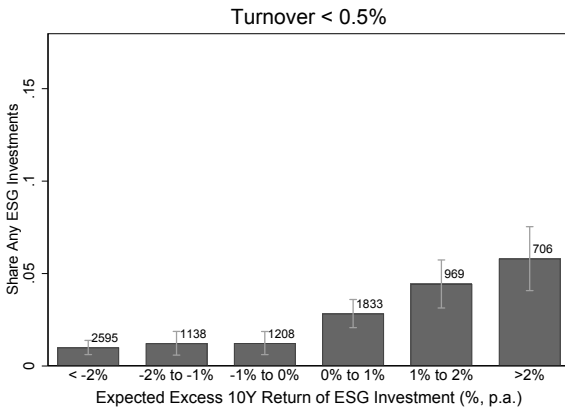
(b) Average Portfolio Share in ESG Funds: Turnover < 0.5%
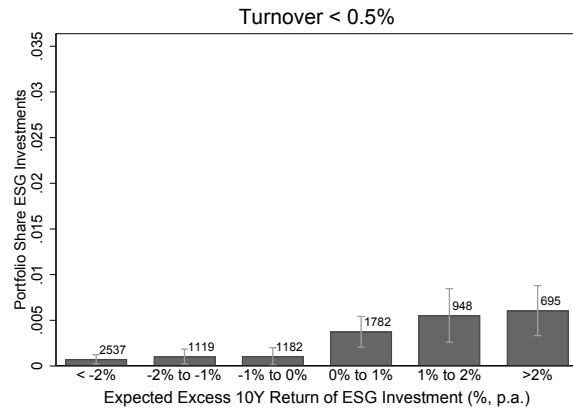
(c) Share of Respondent with Non-Zero Holdings: Turnover ∈ [0.5%, 4%]
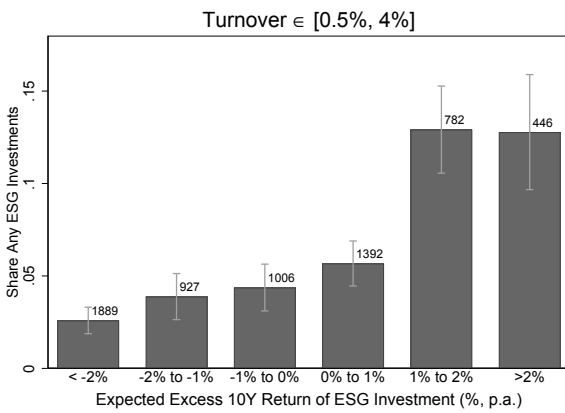
(d) Average Portfolio Share in ESG Funds: Turnover ∈ [0.5%, 4%]
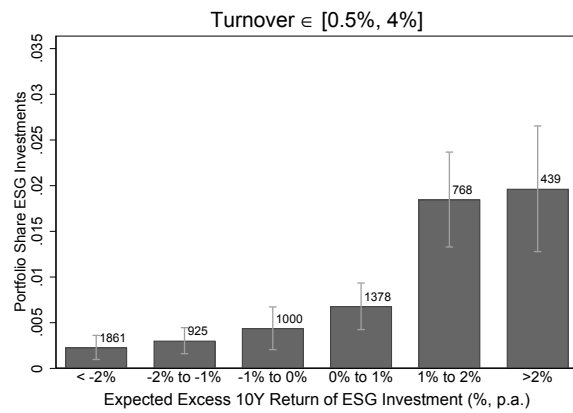
(e) Share of Respondent with Non-Zero Holdings: Turnover > 4%
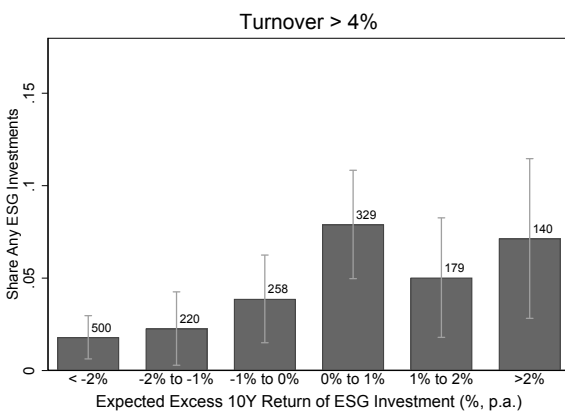
(f) Average Portfolio Share in ESG Funds: Turnover > 4%
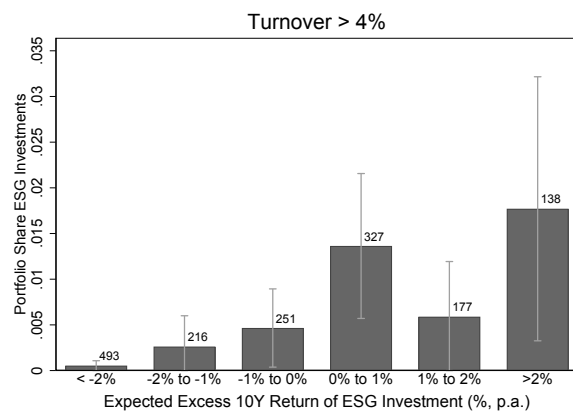
Note: Figure construction follows that of Figure 2 but additionally breaks down the data by the monthly turnover separately in each panel. The turnover computes as total trading volume/portfolio share. We compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds. Numbers at the top of the bars report the number of observations, and the error bars demonstrate the 95% confidence intervals.

Figure A.4: Holdings of ESG Funds Broken Down by Expected Excess Return and No. Funds Held

(a) Share of Respondent with Non-Zero Holdings:
Number of Funds < 4
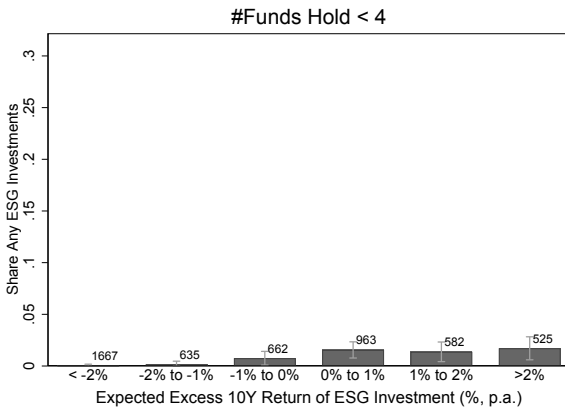
(b) Average Portfolio Share in ESG Funds:
Number of Funds < 4
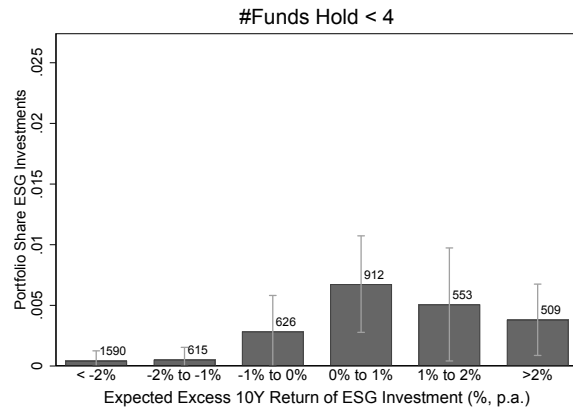
(c) Share of Respondent with Non-Zero Holdings:
Number of Funds ∈ [4, 20]
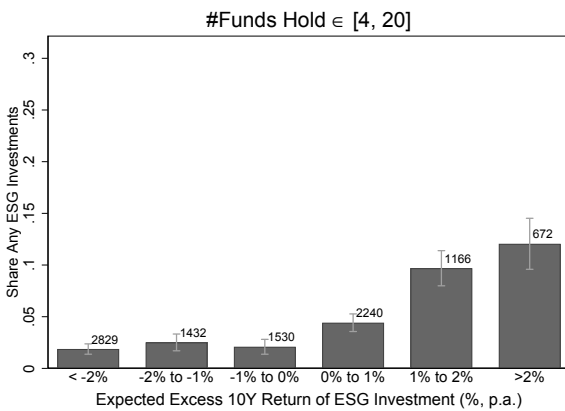
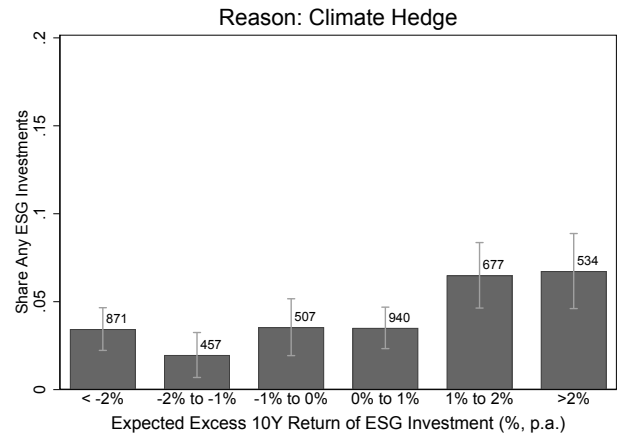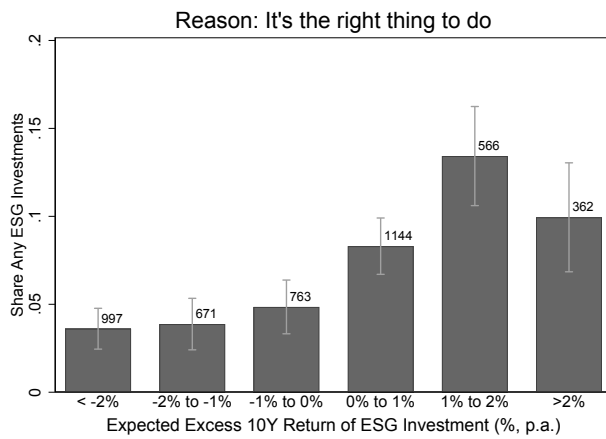(d) Average Portfolio Share in ESG Funds:
Number of Funds ∈ [4, 20]

(e) Share of Respondent with Non-Zero Holdings:
Number of Funds > 20
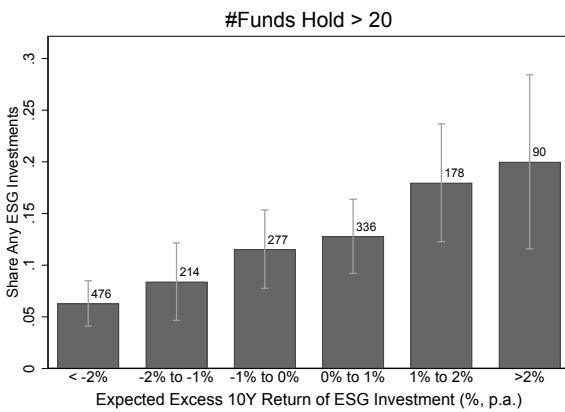
(f) Average Portfolio Share in ESG Funds:
Number of Funds > 20
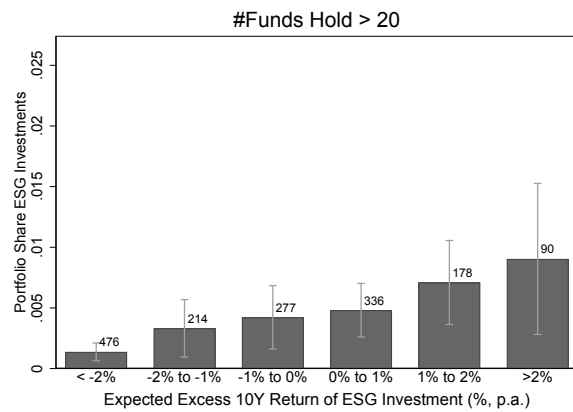
Note: Figure construction follows that of Figure 2 but additionally breaks down the data by the number of different funds held in investors' portfolios separately in each panel. We compute the ESG portfolio share as the share of risky assets that are allocated to ESG funds. Numbers at the top of the bars report the number of observations, and the error bars demonstrate the 95% confidence intervals.

A.17

Figure A.5: Holdings of ESG Funds by Expected Excess Return and Motivation for ESG Investing

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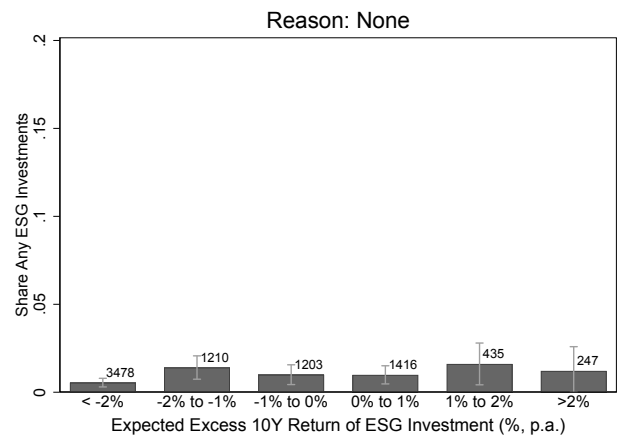Excess Returns
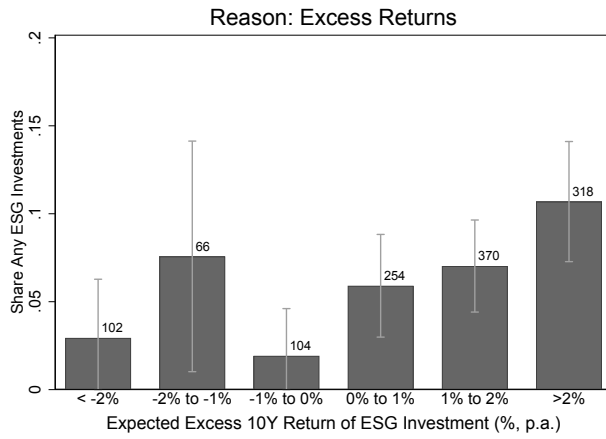
(b) Share of Respondent with Non-Zero Holdings:
Climate Hedge

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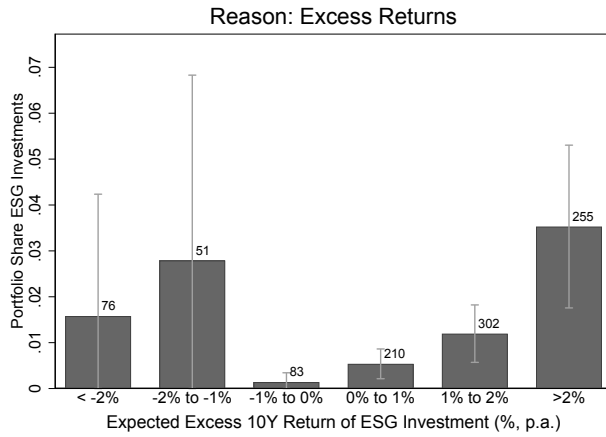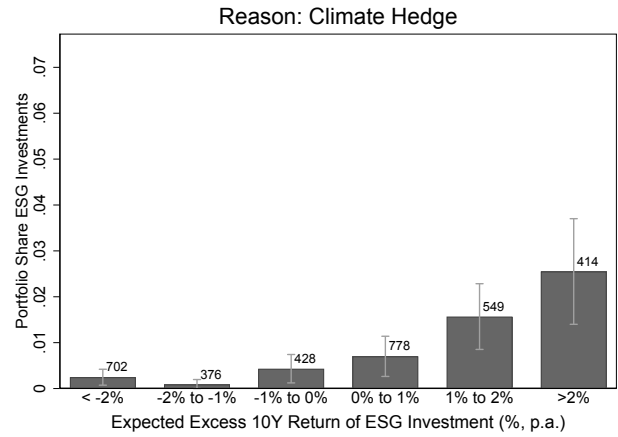
(d) Share of Respondent with Non-Zero Holdings: None

Note: Figure construction follows that of the panel (a) of Figure 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.

Figure A.6: Portfolio Shares in ESG Funds by Expected Excess Return and Motivation for ESG Investing (Equity-Focused Funds Only)
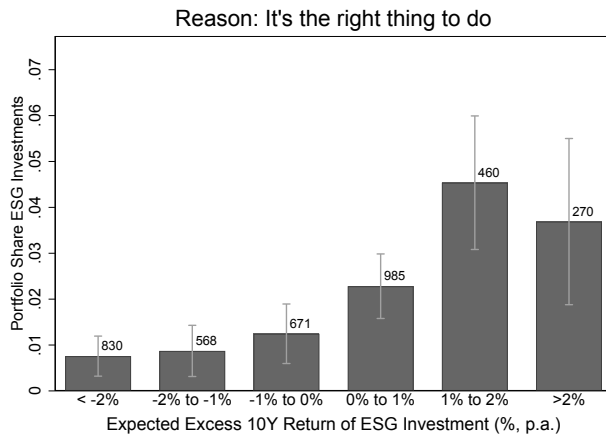
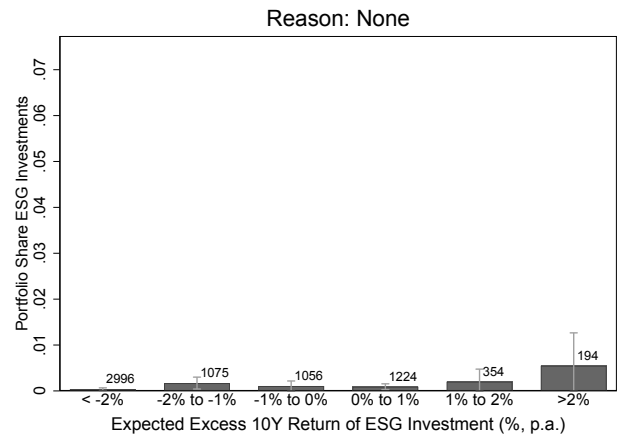(a) Average Portfolio Share in ESG Funds: Excess Returns

(b) Average Portfolio Share in ESG Funds: Climate Hedge

(c) Average Portfolio Share in ESG Funds: Right Thing

(d) Average Portfolio Share in ESG Funds: None

Note: Figure construction follows Panel (b) of Figure 2, but additionally breaks down the data by the stated motivation for investing in ESG funds separately in each panel. In this figure, we compute the ESG portfolio share as the proportion of investments in equities that have been allocated to ESG. Funds with an equity allocation exceeding 90% are treated as equity-focused funds. Numbers at the top of the bars report the number of observations and the error bars report the 95% confidence intervals.

Figure A.7: Time Series - Expected Excess 10Y Return of ESG Investments
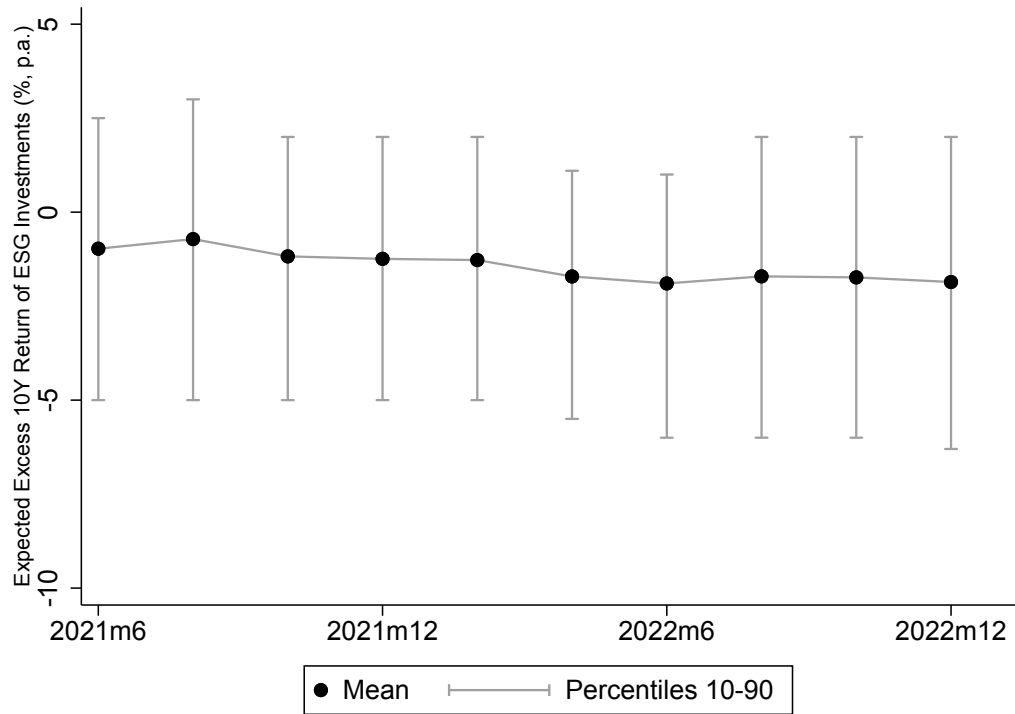
Note: Figure plots the tenth and ninetieth percentiles of the expected excess 10Y return of ESG investments in addition to the left panel of figure 4.