

# Sustainable investment preferences and how they are delegated

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Doctoral thesis

**SUSTAINABLE INVESTMENT PREFERENCES  
AND HOW THEY ARE DELEGATED**

Marten Laudi

2023

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# **SUSTAINABLE INVESTMENT PREFERENCES AND HOW THEY ARE DELEGATED**

Dissertation

To obtain the degree of Doctor at Maastricht University,  
on the authority of the Rector Magnificus, Prof. Dr. P. Habibović,  
in accordance with the decision of the Board of Deans,  
to be defended in public  
on November 15, 2023 at 10:00

by

Marten Laudi

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*“ ‘You see, Momo,’ he [Beppo Roadsweeper] told her one day, ‘it’s like this. Sometimes, when you’ve a very long street ahead of you, you think how terribly long it is and feel sure you’ll never get it swept.’ He gazed silently into space before continuing. ‘And then you start to hurry,’ he went on. ‘You work faster and faster, and every time you look up there seems to be just as much left to sweep as before, and you try even harder, and you panic, and in the end you’re out of breath and have to stop - and still the street stretches away in front of you. That’s not the way to do it.’ He pondered a while. Then he said, ‘You must never think of the whole street at once, understand? You must only concentrate on the next step, the next breath, the next stroke of the broom, and the next, and the next. Nothing else.’ Again he paused for thought before adding, ‘That way you enjoy your work, which is important, because then you make a good job of it. And that’s how it ought to be.’ There was another long silence. At last he went on, ‘And all at once, before you know it, you find you’ve swept the whole street clean, bit by bit. What’s more, you aren’t out of breath.’ He nodded to himself. ‘That’s important, too,’ he concluded.”*

from Michael Ende’s novel Momo from 1973



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Between the inception of this dissertation and its defense lie 1869 days. A lot has happened in this time, both bad and good. For example, *Werder Bremen* was relegated to the second league and then promoted again to the first league. Also, I got to travel the world and to meet and spend time with a lot of great people, without whom I would not have been able to complete this dissertation.

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---

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Marten Laudi

Aachen, October 2023

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*Für meine Eltern, Annkatrin und Peter*

*Für meine Frau Janine*



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# Chapter 1

## Introduction

Concerns for sustainability have had a strong impact on the finance industry in recent years. In the United States (US) alone, at the beginning of 2022, professionally managed funds amounting to \$7.6 trillion were invested under the consideration of environmental, social, and governance (ESG) criteria (USSIF, 2022). Households with sustainable investment preferences play an important role in this growth. It is increasingly common for retail investors to communicate a sustainable investment mandate to their financial advisor (USSIF, 2020). Further, Bauer et al. (2021) show that the majority of households in the Netherlands prefers its pension money to be invested under the consideration of ESG criteria, even if this leads to a lower financial return.

Stating that “the financial sector has a key role to play in reaching [...] fundamental environmental and social goals” (p.13), the European Commission has formulated an action plan to further increase the volume of funds invested sustainably (European Commission, 2018). However, designing and evaluating policies to increase flows towards sustainable investments necessitates an understanding of what motivates household demand for sustainability.

Edmans and Kacperczyk (2022) identify three motivations that drive investor demand for sustainability. First, sustainable investors are financially motivated. Specifically, investors may hold the belief that sustainable business practices are related to firm profitability in a way that is currently not priced in the market. As a result, individuals may

expect higher risk-adjusted returns from sustainable investments.

Second, sustainable investments have been shown to be partially driven by non-financial motives, where investors with social preferences want to invest in a way that produces positive externalities for society.<sup>1</sup>

The third motivation to invest sustainably is taste, which represents an aversion to hold unsustainable investments independent of societal outcomes. As such, tastes are distinct from the non-financial preferences like social preferences, where investors care about the implications of their investment decisions for society. Sustainable investment behavior driven by taste is demonstrated, for example, in Heeb et al. (2023), who show that individuals are willing to forego financial returns to invest sustainably, independent of the magnitude of the societal benefits of these investments. Irrespective of outcomes, investors feel an improvement in mood when selecting sustainable investments and may experience a decrease in mood when selecting unsustainable investments.

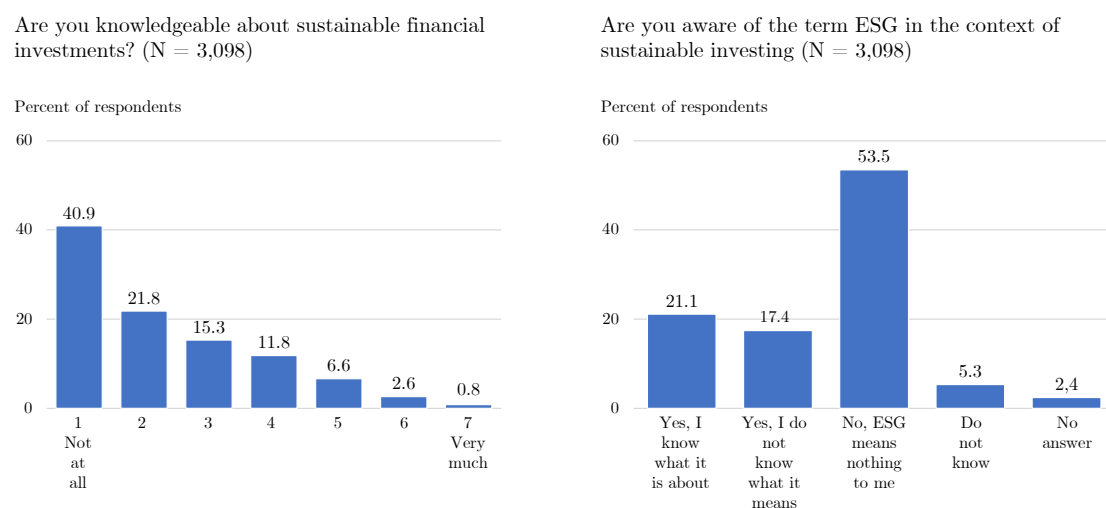
Evidence on whether sustainable investments generate abnormal returns is mixed. A recent meta analysis that includes 153 empirical studies reports that, on average, sustainable investments neither outperform nor underperform the market portfolio (Hornuf & Yüksel, 2022). Moreover, in the presence of investors who enjoy holding sustainable investments, Pástor et al. (2022) predict sustainable investors to receive lower financial returns in equilibrium. This suggests that the most promising avenue for policy makers whose goal it is to increase sustainable investing may be to appeal to investors' non-pecuniary preferences, rather than their desire to make money.

Currently, these non-pecuniary preferences do not translate well into action on the stock market. In a large sample of Swedish households, Anderson and Robinson (2022) find that pro-environment households are not more likely to hold pro-environment portfolios. This can be explained by the fact that the pro-environment households have a lower average financial literacy and as a result are less likely to own stocks. Similarly, in a survey with  $N = 3,098$  German retail investors, I find that sustainable investment

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<sup>1</sup>See for example Anderson and Robinson (2022), Barber et al. (2021), Gibson Brandon et al. (2022), Hartzmark and Sussman (2019), Krueger et al. (2020), and Riedl and Smeets (2017).

knowledge is relatively low.<sup>2</sup> Figure 1.1 shows a striking 40.9% stating to be not at all knowledgeable about sustainable financial investments, while only 0.8% claim to be very knowledgeable. Further, more than half of the participants of the survey are not familiar with the term "ESG" in the context of sustainable investing.



**Figure 1.1:** Investor knowledge about environmental, social, and governance (ESG) criteria in investing

*Notes: The figure shows the outcome of a survey with German retail investors. Refer to Chapter 3 for more details on the sample.*

Closing this knowledge gap should hence be an important policy goal, if the aim is to increase sustainable investments. A solution to this knowledge gap that quickly comes to mind is financial advice. Indeed, as part of their action plan to foster sustainable investments, the European Commission aims to utilize financial advisors. Specifically, the action plan includes an amendment to the Markets in Financial Instruments Directive II (MiFID II<sup>3</sup>), requiring financial advisors to talk to their clients about sustainability and to elicit their clients' sustainability preferences. This amendment has been heavily debated, with investor protection authorities and consumer organizations voicing concerns that financial advisors may exploit the knowledge about the sustainable investment preferences

<sup>2</sup>See Chapter 3 for more information on the context of the survey, as well as characteristics of the sample.

<sup>3</sup>Markets in Financial Instruments Directive 2014 (2014/65/EU) commonly known as MiFID II (Markets in financial instruments directive II), is a legal act of the European Union. Together with Regulation (EU) No. 600/2014, it provides a legal framework for securities markets, investment intermediaries, and trading venues for the member states of the European Economic Area.



of their clients, for example by selling more expensive products or by charging higher fees.

In this dissertation, I address some general questions that arise from this debate. In three self-contained chapters, I contribute to the academic literature and policy debate on the merit of sustainability-related financial advice as a policy tool to better translate households' preferences for sustainability into investment behavior. On the one hand, I show that information that is provided at the right moment can increase sustainable investments. On the other hand, I show that financial advisors also turn their clients' sustainability preferences to their advantage through price discrimination that may threaten the long-term attractiveness of sustainable investments. I hence investigate *sustainable investment preferences and how they are delegated*. To clarify, investors that I observe do not really delegate their preferences. What they really do is to give an investment mandate, while communicating their preferences for sustainability. As such, I observe the effect of preferences on behavior in a delegated setting.

In Chapter 2, I address the concern of price discrimination against sustainable investors by considering two general questions. First, do financial professionals charge a premium for sustainable investment mandates? Second, if advisors charge a premium, is this compensation for the higher costs and effort that go into sustainability screening, or do advisors use knowledge about their clients' preferences to extract additional profits from sustainable investors?

I conduct two online lab-in-the-field experiments with a total of  $N = 415$  professional advisors in the US and Europe. Advisors manage investment portfolios on behalf of clients with an investment budget of \$1,000. The advisors have access to basic information about their client's profile, including age, gender, income bracket, and risk appetite, as well as the client's investment mandate (conventional or socially responsible). The main outcome variable is the fee that advisors set for their service as a percentage (between 0% and 4%) of the total invested amount. In the second stage of the experiment, the clients decide whether to take the advisor's advice and pay the fee set by the advisor or to make their own investment decision. The results show that financial advisors charge additional fees of between 5.0 and 6.6 basis points to sustainable investors. This fee premium is

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similar to fee differences that can be observed in the field. Wursthorn (2021) shows that among passively managed exchange-traded funds (ETFs), those that are labeled as socially responsible charge around 6 basis points higher fees, on average. Aragon et al. (2022) show that university endowment funds that invest sustainably pay 7.7 basis points higher fees. Finally, Baker et al. (2022) show that financial intermediaries capture around 5.9 basis points higher fees from sustainable index funds.

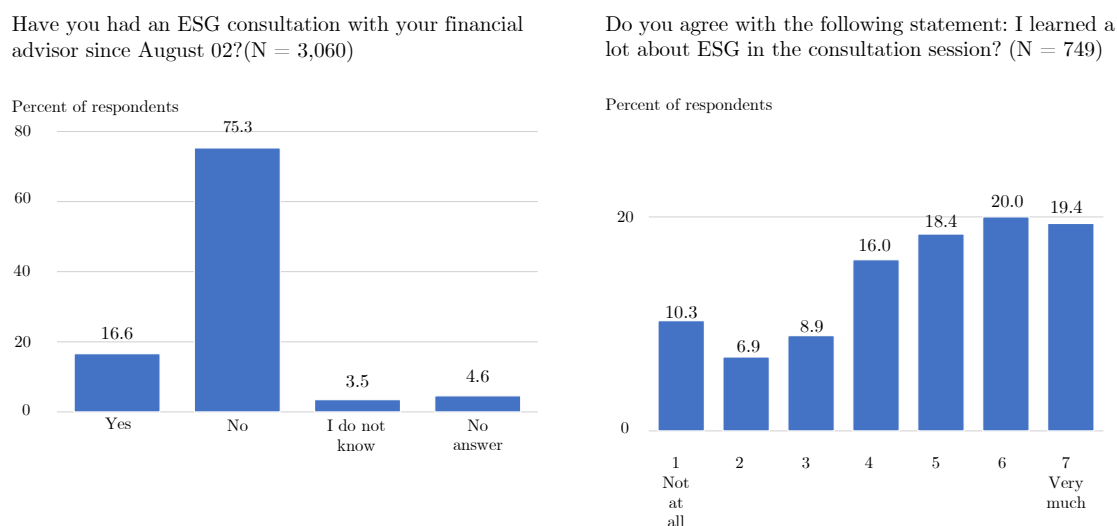
The experimental design rules out effort, skill, and cost differences as drivers of the observed dispersion in fees. Advisors do not spend more time or effort on selecting portfolios for sustainable investment clients versus conventional clients. Strikingly, advisors in the second experiment even spend significantly less time and click through information significantly fewer for sustainable investment clients. Further, the within-subject experimental design rules out differences due to individual advisor skill, as every advisor in the experiment advises both types of clients in (balanced) random order. The experiment is designed such that firm-level sustainability information is free to advisors, which eliminates cost differences related to buying ESG ratings in the experiment and there are no transaction costs. Therefore, I interpret the premium as price discrimination that financial advisors use to extract additional profits from clients' sustainable investment preferences.

I also find that advisors primarily charge sustainable investment clients with low or unknown financial literacy a premium. The premium disappears when a sustainable client's financial literacy is known to be high. Finally, in the experiment, giving advice to sustainable investment clients is a realistic opportunity for advisors to earn higher fees. US sustainable investors are as likely as conventional clients to pay for advice, even if they are charged a premium. In Europe, clients with preferences for sustainability are even 30 percentage points more likely to pay for financial advice.

To get a sense of the policy implications of these results, I collect survey data from  $N = 53$  professionals who work in regulation, policymaking, compliance, and supervision in the financial sector (henceforth, regulators). The regulators do not expect the findings. Once the regulators learn about the findings, they indicate that policy interventions are

necessary. They provide some potential starting points for policy interventions, including standardization of fees, transparency, and consumer education.

Apart from implications for pricing, can financial advisors be utilized to decrease the knowledge gap of sustainably-minded households in order to foster sustainable investments? Figure 1.2 shows additional outcomes of a survey with German retail investors, revealing that only around 16.6% of investors report to have had an ESG consultation with their financial advisor since the MiFID II amendment came into effect. However, those who did have a consultation reported learning a lot about ESG, which indicates a narrowing of the knowledge gap.



**Figure 1.2:** The role of financial advice to close the ESG knowledge gap

*Notes: The figure shows the outcome of a survey with German retail investors. Refer to Chapter 3 for more details on the sample. The first question queries whether investors have had an ESG consultation with their financial advisor since August 2nd 2022. This day marks the point at which the MiFID II amendment came into effect, according to which financial advisors are required to elicit the sustainability preferences of their clients.*

In Chapter 3 of this dissertation, I collaborate with a universal bank in Germany and administer a field experiment with a representative sample of the bank’s clients to show that information provided at the right moment can indeed increase sustainable investments. Specifically, I examine whether providing retail investors with just-in-time peer information increases the share of funds that they invest under the consideration of ESG

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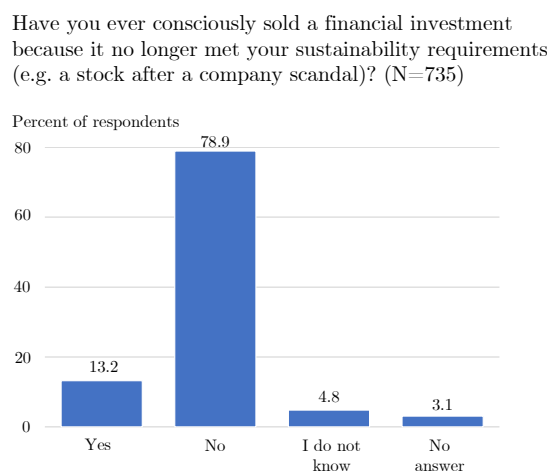
criteria. Participants make a real investment decision, where they allocate an investment budget between a sustainable and a conventional fund. Participants are randomly allocated to either a control group or one of three treatment groups, each receiving different information about peers' behavior and attitudes towards sustainable investments. The *social treatment* group receives a message that most Germans want to invest in sustainable assets in the future. The *impact treatment* group is told that most Germans expect sustainable investments to have a positive societal impact. The *return treatment* group receives information that most German investors believe that sustainable investments yield equal or higher returns, compared to traditional investments. All treatment information that I provide is based on openly accessible information, and we provide the source of this information to participants. The results show that, compared to the control group, retail investors in the impact, social, and return treatment groups on average allocate an additional EUR 429, EUR 293, and EUR 267, respectively, of their EUR 10,000 experimental budget to the sustainable fund. I therefore provide evidence that just-in-time peer information treatments increase sustainable investments among retail investors in a statistically and economically significant way.

Further, the social treatment successfully increases sustainable investments only among retail investors whose prior belief about peers' propensity to invest sustainably was lower than the information provided in the provided peer information. Similarly, the return treatment only increases sustainable investments among those whose prior belief regarding peers' expectations about the return of sustainable investments was lower than the provided information. For those participants in the impact treatment, the second order belief on the impact of sustainable investments does not matter for the effect of the treatment on the investment decision. Taken together, these results suggest that policymakers can use peer information, communicated through financial institutions, as a potentially cost-effective policy intervention to promote sustainable investments.

Finally, over the months following the experiment, we observe participants' portfolio holdings in their accounts of the collaborating bank. We find that although just-in-time peer information impacts sustainable investment behavior, it does not influence long-

term trading behavior, as participants in the peer information treatment groups do not significantly increase the sustainability of their fund holdings, relative to participants in the control group.

The findings presented in Chapter 3 show that providing information in the process of a buying decision may spark an increase in flows towards sustainable investments. But what about selling decisions? That is, how do investors react to news exposing unsustainable business practices of firms in their portfolios? Do retail investors sell their stocks after such scandals? According to evidence from the survey that I conducted with German retail investors, the vast majority has never sold an investment after negative ESG news, as shown in Figure 1.3.



**Figure 1.3:** Selling behavior in response to ESG scandals

*Notes: The figure shows the outcome of a survey with German retail investors. Refer to Chapter 3 for more details on the sample.*

In Chapter 4, I exploit a large dataset from a European bank to gain deeper insights into how retail investors react to negative ESG news concerning companies in their portfolios. The dataset connects investor trading records, dividend income, and consumption-saving behavior at the individual level. The sample consists of  $N = 18,566$  individual investors and covers a 24-month period from July 2017 to July 2019, with information on demographics, categorized transactions, portfolio holdings, and trading

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records. I merge this customer data with scores from Truvalue Labs (TVL), which uses artificial intelligence techniques to aggregate public sentiment towards firms' ESG performance. TVL uses unstructured textual data to derive daily firm-level scores. TVL does not rely on communication issued by companies, but external communication, such as local, national, and international news, reports from NGOs, trade blogs, or social media.

I find that retail investors indeed do not sell in response to scandals that expose socially irresponsible business practices of firms in their portfolio. However, investors do react to these news by showing an emotional consumption response. Specifically, investors consume approximately twice as much out of dividends associated with negative ESG news sentiment, compared to income from companies without negative ESG news. This behavior is in line with emotion regulation theory, which posits that people increase their consumption when experiencing negative emotions. In the laboratory, studies have documented an emotional consumption response, whereby people consume out of income that evokes negative emotions to improve their emotional state. Chapter 4 of this dissertation is the first study that shows behavior in line with emotion regulation theory in the financial market, which represents a real-life decision context with high stakes.

In summary, throughout the three chapters, this dissertation unveils some crucially important aspects when evaluating the efficacy of financial advice in fostering sustainable investments. First, when retail investors communicate sustainable investment preferences, financial advisors charge a premium that is not driven by additional effort, skill, or costs. I also detect a tendency of advisors to spend less time and click fewer through information, indicating that financial advisors use a smaller information set for sustainable investing mandates. When clients can signal high financial literacy, the premium is eliminated, but sustainable investment clients who cannot signal high financial literacy bear the burden of higher fees. Second, financial advisors may foster sustainable investing by providing information to clients during the buying decision. However, selling behavior is less influenced by new information on the sustainability of firms.

As such, the dissertation has implications for policy makers with the concern to increase sustainable investments. As the results show, an unintended consequence of the

amendment to the MiFID II regulation may be that financial advisors may take knowledge about their clients' sustainability preferences in order to extract additional profits from those who do communicate these preferences. However, investors are receptive to peer information concerning sustainable investing and change their investment behavior accordingly, even though this behavior change can only be observed when the information is provided at the time of the investment decision. Finally, the results indicate that the buying decision is indeed the point in time when investors are most susceptible to new information on sustainable investments. After this decision, my results show that retail investors' portfolios are relatively sticky, which leads them to do few adjustments their portfolios, even after news of ESG scandals concerning companies in their portfolios.

# Chapter 2

## Do financial advisors charge sustainable investors a premium?

### Abstract

Despite growing concerns from regulators about potential price discrimination against sustainable investors, empirical evidence is lacking. To address this gap, we conduct two lab-in-the-field experiments with 415 professional financial advisors from the US and Europe. Our results show that these advisors impose a premium on sustainable investors compared to conventional investors. This premium persists even when differences in effort, skill, and costs, as well as higher gains from trade are ruled out. Notably, advisors charge the highest fees to sustainable investors with low financial literacy, while sustainable investors with high financial literacy pay no premium at all. These results are consistent with price discrimination.

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Adapted from: Laudi, M., Smeets, P., & Weitzel, U. (2022). Do Financial Advisors Charge Sustainable Investors a Premium?. *Tinbergen Institute Discussion Paper No. 2021-070/IV*. This chapter is accompanied by an internet appendix, which can be accessed here: <https://tinyurl.com/2mxhur7h>



# 1 Introduction

The question of whether financial advisors engage in price discrimination against sustainable investors has been debated in the United States (US) and Europe. In the European Union (EU), the discussion has gained momentum due to a recent amendment to the Markets in Financial Instruments Directive II (MiFID II). This amendment mandates financial advisors to elicit their clients' socially responsible investing (SRI) preferences.<sup>1</sup>

Investor protection authorities like the European Securities and Markets Authority (ESMA) and consumer organizations are concerned that financial advisors may exploit the knowledge about their clients' sustainability preferences (ESMA, 2019). Specifically, financial advisors might target investors who are willing to pay a premium for sustainable investments and benefit through fee structures that allow them to engage in price discrimination<sup>2</sup> against these sustainable investors.

Prominent media outlets like *The Economist* and *The Wall Street Journal* have already implied price discrimination, where sustainable investors are charged a premium that cannot be justified by higher costs of managing sustainable investments.<sup>3</sup> However, professional asset managers argue that these fee differences do not represent price discrimination. They attribute them to higher management costs for sustainable investment products, such as expenses related to screening firms for sustainability (ESMA, 2019, p. 14).

This paper addresses two general aspects of this debate, which are relevant to any mandate for sustainable investment. Firstly, we examine whether financial advisors impose a premium for sustainable investment mandates. Secondly, and crucially, we investigate the driving force behind these potentially higher fees. It could be the case that advisors want

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<sup>1</sup><https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0097&from=EN>

<sup>2</sup>In Europe, Bucher-Koenen et al. (2021) show that financial advisors engage in price discrimination by selectively offering discretionary rebates on upfront loads. In the US, Badoer et al. (2020) highlight how 12b-1 fees that serve as commissions paid to financial advisors for selling a fund's shares can result in price discrimination. Funds with high fees that benefit advisors are sold to less knowledgeable clients who struggle to understand the concept of indirect fees.

<sup>3</sup>*The Wall Street Journal* proclaimed sustainable investing the new cash cow, in which additional fees of around 6 basis points can be earned from passively managed sustainable exchange traded funds (ETFs) at no extra costs (Wursthorn, 2021). *The Economist* made similar claims that "although [sustainable investing practices] emerged in response to the preferences of investors, [...] asset managers have turned this to their advantage" (Tricks, 2022).

to be compensated for higher costs and effort that go into sustainability screening, or for a higher required expertise. It could also be the case that advisors create more value when advising SRI clients, compared to conventional clients. In this case, the higher gains from trade may be equally split between the advisor and the client, which would justify a higher fee (see Gennaioli et al. (2015) and Chalmers and Reuter (2020) for a related discussion). Alternatively, a fee premium on sustainable investments may represent price discrimination, where advisors use knowledge about their clients' preferences to extract additional profits from sustainable investors.

We administered two pre-registered online lab-in-the-field experiments with a total of 415 professional advisors in the US and Europe. Experiments offer some key advantages in our setting. Firstly, experiments allow us to exogenously manipulate whether clients give a sustainable or a conventional investment mandate, which allows us to causally identify the effect of these mandates on fees. Secondly, the experimental setting allows us to observe variables that are unobservable in the field, such as advisors' effort levels in providing portfolio advice.

Moreover, previous research has demonstrated the capacity of experiments to accurately predict financial decisions and sustainable investment behavior in the field (Karlan, 2005; Riedl & Smeets, 2017). To enhance the external validity of our experiments, we incorporate important contextual elements from the natural decision-making environment of advisors (Harrison & List, 2004). To ensure the relevance of these contextual elements, we pre-tested them with a different group of financial professionals. Further, we recruited real professional financial advisors as participants, as their behavior has been shown to differ from that of student participants.<sup>4</sup>

We ran the first experiment in the US and the experimental design consisted of two stages. In the first stage, advisors managed a stock portfolio for their client with an investment budget of \$1,000. Advisors had access to basic information about their client's profile, including age, gender, income bracket, and risk appetite, as well as the client's investment mandate (conventional or socially responsible). The primary outcome variable

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<sup>4</sup>See Alevy et al. (2007), Haigh and List (2005), Kaustia et al. (2008), Kirchler et al. (2018), Roth and Voskort (2014), and Weitzel et al. (2020)

of interest is the fee that advisors set for their service as a percentage (ranging from 0% to 4%) of the total invested amount.

In the second stage of the experiment, clients decided whether to take the advisor's advice and pay the fee determined by the advisor or to independently select their own portfolio of stocks with the same information as advisors. We implemented the chosen portfolio by purchasing the selected stocks on the market for an investment period of one year. Clients earned either the raw portfolio return (self-selected portfolio) or a net return after fees (advisor's portfolio). Therefore, all participants' decisions in the experiment held real consequences.

Our experimental design allows us to interpret a potentially higher fee for sustainable investors as price discrimination. Clients who did not pay for financial advice selected their own stocks based on the same information and the same decision screens as advisors. Hence, the value that advisors provided to clients was their time, effort, and expertise, which we measured and incorporated in our analyses. Clients who wanted to satisfy their sustainability preferences had to interpret straightforward, color-coded sustainability indicators, which was a trivial task and did not require industry-specific expertise. Therefore, SRI clients were able to satisfy their sustainability preferences without advice. As such, there is no room for significantly higher gains from trade for sustainable compared to conventional investment clients. Further, we employed a within-subject experimental design, in which every advisor in the experiment advised both types of clients in (balanced) random order, which rules out differences due to individual advisor skills. Finally, the experiment was designed such that firm-level sustainability information was free to advisors, which eliminated cost differences related to buying ESG ratings<sup>5</sup> in the experiment. There were no transaction costs in the experiment.

Our results show that financial advisors impose a premium for SRI mandates. Further, we detect no disparity in the time and effort invested by advisors when selecting portfolios for sustainable investment clients versus conventional clients. These results align with the notion of price discrimination, whereby advisors leverage clients' sustainable investment

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<sup>5</sup>The term ESG rating refers to a data-based classification of firms' sustainability in terms of their Environmental-, Social-, and Governance performance.

preferences to generate additional profits.<sup>6</sup>

To completely rule out alternative explanations, namely advisors providing a better service or generating higher gains from trade for sustainable investors, we simplified the investment task and sustainability information even more in a second experiment. European financial advisors selected one of six pre-allocated stock funds on behalf of their client. We designed an ESG rating for the funds, which ranged from the lowest rating of one leaf to the most sustainable rating of five leaves (cf. Hartzmark and Sussman (2019)). Thus, to satisfy clients' preferences for sustainability, advisors only had to count the number of green leaves of investment funds. This marginal effort is easily replicable by clients without any industry-specific expertise.

Additionally, in the second experiment, we expanded the client information available to advisors by incorporating the client's performance on three financial literacy questions (Lusardi & Mitchell, 2008, 2011). These questions assessed fundamental knowledge in finance and gave advisors an indication about how well their clients understood the impact of fees.

Again, we find that advisors charge a premium for sustainable investment mandates. Strikingly, advisors spend significantly less time and click through information significantly less when serving SRI clients. This suggests that advisors focus almost exclusively on the relatively simple leaf ratings for sustainable mandates, while they consider a broader set of financial information for conventional investment mandates.

Notably, we find that it is the SRI clients with low or unknown financial literacy who are charged a premium. The premium disappears when SRI client's financial literacy is known to be high. These results provide further support for the presence of price discrimination.

A strong indication for the external validity of our findings is the fact that the SRI premium that we observe (between 5.0 to 6.6 basis points in the first experiment and between 7.7 and 8.3 basis points in the second experiment) is similar to the SRI pre-

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<sup>6</sup>We run several empirical tests, which support the internal validity of our findings. All reported results are robust and often become even stronger when considering alternative model specifications and subsamples. Throughout the paper, we report the most conservative results of the full sample.

mium observed in archival data (Aragon et al., 2022; Baker et al., 2022). Therefore, our experiments predict fee differences charged in real-world scenarios, while allowing us to causally attribute the premium to price discrimination. The observed premium is economically significant, with an estimated premium of at least \$2.275 billion for individual/retail sustainable investment clients in the US alone in 2020.<sup>7</sup> The premium is not evenly distributed among clients, but a subset of clients is charged a relatively high premium. SRI mandates increase the probability of paying a premium by 6.4 percentage points and 19 percentage points for experiment 1 and 2 respectively. If an advisor charges an SRI client a premium, it is substantial at 47.8 and 42.4 basis points for experiment 1 and 2 respectively. Notably, SRI clients with high financial literacy pay no premium at all, while sustainable investors with low or unknown financial literacy bear the burden of high fees.

To address the question of whether the premium would persist in a market where clients have the choice to reject advice, we examined acceptance rates. In the US, sustainable clients were equally likely as conventional clients to purchase the advice, even when charged a premium. In Europe, clients were 30 percentage points more likely to purchase financial advice if it was based on an SRI mandate. These results highlight that providing advice to sustainable investment clients presents a realistic opportunity for advisors to earn higher fees.

Lab-in-the-field experiments have been shown to be a powerful tool for informing public policy (Gneezy & Imas, 2017; Levitt & List, 2009). However, results are often dismissed due to hindsight bias (“I knew this already”) (DellaVigna et al., 2019). To explore whether our results were in fact novel to policy experts, we conducted a prediction study before communicating our experimental outcomes. We recruited 53 professionals who work in regulation, policymaking, compliance, and supervision in the financial sector (henceforth, regulators).<sup>8</sup> The prediction study included a detailed description of

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<sup>7</sup>This is based on a back-of-the-envelope analysis, in which we multiply our most conservative premium (5.0 basis points) with US SIF’s 2020 estimate of SRI funds that were invested by money managers on behalf of individual/retail investors (\$4.55 trillion) and on behalf of all US SRI investors (\$17.1 trillion).

<sup>8</sup>The regulators in our sample include members of the European Commission’s high-level expert group on sustainable finance, who were involved in formulating the MiFID II amendment that requires financial advisors to elicit clients’ sustainability preferences. The regulators also work at the Dutch Central Bank,

the main experiment (see internet appendix for the full instructions). We then asked regulators to predict the outcome of our experiment (incentivized). While the majority of regulators correctly predicted that advisors would charge higher fees to SRI clients, a significant majority incorrectly predicted that advisors would exert more effort for SRI clients, contradicting our findings (See Table A14). Therefore, our results are novel to policy makers in our sample. Moreover, the novelty of our results can be demonstrated by the fact that, as previously highlighted, a consensus has not yet been reached among the press, investor protection authorities, and asset managers concerning the presence of discriminatory pricing against sustainable investors.

Our paper contributes to the expanding body of literature on sustainable finance,<sup>9</sup> particularly in the realm of examining fee differentials between sustainable and conventional funds.<sup>10</sup> Previous studies have shown that a group of investors holds sustainable investment products because of their social preferences (Baker et al., 2022; Barber et al., 2021; Heeb et al., 2023; Riedl & Smeets, 2017). We show that this translates into a premium charged to sustainable investment clients, not because of higher effort, skill, or costs but because the advisors use price discrimination.

The findings also provide insights into potential advisor misconduct in bilateral advisor—client relationships, especially in a setting where clients have low financial literacy. On the one hand, conflicts of interests may cause advisors to extract additional profits to the detriment of less sophisticated investors. As investors with low financial literacy are more likely to pay high fees (Choi et al., 2010), some financial advisors specialize in misconduct that extracts additional profits from clients with low financial literacy (Egan et al., 2019). Moreover, asset managers have been found to charge premiums when they anticipate that

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the Authority for Financial Markets (AFM), and the compliance departments of several European banks. Table A11 shows the demographics and job descriptions of the regulators in our sample. The occupation of most of the regulators in our sample is policy work. On a five-point Likert scale, the participants rated their experience in SRI at 3.15, where 3 refers to “average.” Thus, the regulators in our sample have slightly above-average experience with SRI-related projects and topics. The average number of years of experience in regulation is 7.83 years.

<sup>9</sup>See Anderson and Robinson (2022), Bauer et al. (2021), Benson and Humphrey (2008), Berk and van Binsbergen (2021), Białkowski and Starks (2016), Ceccarelli et al. (2023), Gibson Brandon et al. (2022), Gollier and Pouget (2022), Heinkel et al. (2001), Hong and Kacperczyk (2009), Krueger et al. (2020), and Pedersen et al. (2021)

<sup>10</sup>See Aragon et al. (2022), Cao et al. (2020), Gil-Bazo et al. (2010), Raghunandan and Rajgopal (2022), and Shanker (2019)

retail clients lack understanding of complex fee structures and their impact on investment outcomes (Carlin, 2009). In over-the-counter financial markets, advisors have been shown to engage in price discrimination against smaller, less sophisticated clients (Duffie et al., 2005; Hau et al., 2021).

On the other hand, less sophisticated investors may gain more from financial advice, for example because they have higher search costs (Roussanov et al., 2021). As argued by Gennaioli et al. (2015) and Chalmers and Reuter (2020), financial advisors may create, rather than destroy value for less sophisticated clients, who would forego the equity risk premium by abstaining from the stock market in the absence of advice. In turn, financial advisors may split the higher gains from trade by charging a higher fee. Our contribution to this literature is demonstrating that advisors engage in price discrimination for SRI mandates, particularly when they perceive that SRI mandates come from clients with low financial literacy. The higher fees that are charged cannot be justified by additional value created or higher gains from trade

Our research holds important implications for policies surrounding the elicitation of sustainable investment preferences, which the European Commission mandates since 2022. Our findings highlight potential unanticipated consequences of the regulation. In equilibrium, sustainable investors are already expected to receive lower financial returns (Pástor et al., 2022). In addition, the potential impact of dominant sustainable investing in public markets has recently come under scrutiny (Berk & van Binsbergen, 2021; Hartzmark & Shue, 2023; Kölbel et al., 2020). When combined with higher fees, the attractiveness of sustainable investments is put at risk in the long-term.

## 2 General setup

This paper is based on two lab-in-the-field delegated choice experiments.<sup>11</sup> These experiments involved professional financial advisors and clients. As advisors, we recruited financial professionals, whom we selected based on two screenings.

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<sup>11</sup>Both studies were pre-registered at the AEA RCT Registry (see <https://www.socialscienceregistry.org/trials/6026>) and ethically approved by the Ethical Review Committee of one of the authors' university under the reference: ERCIC 173 27 01 2020.

In the first screening, we asked the participants to report the industry sector in which they were working. We included only those who selected financial services (e.g., banks and insurance companies).

In the second screening, we filtered out all participants whose jobs did not involve managing or brokering financial assets on behalf of clients in their professional lives. We included, for example, private bankers, investment advisors, and portfolio managers, but not IT support, auditors, or those in corporate finance.

We administered the first experiment with US financial advisors who selected single stocks on behalf of their clients, based on either an SRI mandate or a conventional investment mandate. We administered the second experiment with European financial advisors who selected stock funds on behalf of their clients. In the following, we separately explain each experimental design, followed directly by the respective results.

## 3 US Experiment

### 3.1 Advisor stage

In this stage, the advisors saw a client profile, selected stocks on behalf of that client with a \$1,000 investment budget. They also had to determine a fee for their service. Complete instructions for advisors can be found in the internet appendix.

#### **Client profiles**

For each client, advisors received information on gender, income, age, risk preferences, and investment mandate. Figure 2.1 shows an example of the information we provided for each client. The primary treatment variable was the investment mandate, which could be either conventional or socially responsible. We included a pop-up window with further explanation for each investment mandate. Each advisor saw the profile of one socially responsible female client, one socially responsible male client, one conventional female client, and one conventional male client. The order in which we showed the client profiles was randomized and balanced across advisors. For each client profile, the age



was shown to be either between 35 and 44 years old or between 45 and 54 years old. Gross income was randomized for each client profile, ranging from \$40,000 to \$59,999 or \$60,000 to \$79,999 per year. To ensure that the advisors could allocate all funds to equity and that the advisors' assumptions about clients' risk preferences did not drive the results, we recruited only clients who stated that they were willing to invest 100% of their experimental investment budget in stocks, which we referred to as the aggressive risk profile in our experiment.

**Client 1 out of 4**

Please **select a portfolio** for a client with the following profile:

- **Gender:** Female
- **Age:** 35 - 44 years old
- **Gross Income:** \$60,000 - \$79,999 per year
- **Risk Profile:**
  - ☐ Conservative
  - ☐ Moderate
  - ☒ **Aggressive**
- **Investor Mandate:** [More Info](#)
  - ☐ Conventional
  - ☒ **Socially Responsible**

**Client questionnaire Info** ✕

We ask clients whether they want to give you, the advisor, a mandate for socially responsible investing. We tell clients that you have access to sustainability indicators for each stock.

**Figure 2.1:** Client profile screenshot (Advisor stage)

## Stock information and selection

Below the client profile information, on the same screen, we asked advisors to select a portfolio for the client by assigning weights ranging from 0% to 100% to the 30 stocks in the Dow Jones Industrial Average. We provided advisors with two ESG ratings for each stock, accompanied by detailed explanations through pop-up windows (see Figure 2.2).

One of the ESG ratings was a firm's MSCI ESG score, a commonly used rating in both academic publications<sup>12</sup> and practice. The MSCI ESG score is a letter rating ranging from AAA to CCC. In line with the classification on the MSCI ESG website, we color-coded

<sup>12</sup>See for example Aragon et al. (2022), Avramov et al. (2022), Berg et al. (2022), Pástor et al. (2022), and Pedersen et al. (2021)


and named the letter classifications as follows: CCC and B were shown in gray (labeled “laggard”), BB, BBB, and A were shown in yellow (labeled “average”), and AA and AAA were shown in green (labeled “leader”).

Additionally, we included a binary indicator to denote whether a firm participated in the United Nations Global Compact (GC). Companies that join the United Nations GC commit to implementing sustainable and socially responsible practices and reporting on their progress. These participants also pledge to operate responsibly in accordance with the United Nations’ sustainability principles concerning human rights, labor, the environment, and anti-corruption. We color-coded United Nations GC participating companies with a green letter “Y” (for yes) or a black letter “N” (for no). The ESG ratings that we show have the advantage that they are easy to understand and interpret, and advisors do not need any previous knowledge of sustainable investing to select sustainable portfolios.

**Select stocks for your client:**

- Please select your client's portfolio by weighting the 30 stocks of the Dow Jones below **(To increase the weight on one stock, first reduce the weight of another stock)**.
- The maximum weight per stock is 25%, so the portfolio must include at least 4 stocks.
- Per default, the weights are set as in the Dow Jones Industrial Average.
- Click on a stock's name for more financial information.
- Next to each company name, you see two indicators of social responsibility:
  - MSCI ESG Score (● means laggard; ● means average; ● means leader) More Info
  - Whether the company pledged to follow the principles of the UN Global Compact (**Y if yes, N if no**) More Info

United Nations Global Compact



**United Nations**  
Global Compact

Participation in the UN Global Compact requires a commitment from a company's chief executive with support from the Board. This commits an organization to meet fundamental responsibilities in four areas: human rights, labour, environment and anti-corruption. All participants are required to produce an annual communication on progress that outlines a company's efforts to operate responsibly and support society.

MSCI ESG Score

MSCI ESG rate companies on a 'AAA to CCC' scale according to their exposure to Environmental, Social, and Governance risks and how well they manage those risks relative to peers.

**Figure 2.2:** Portfolio screenshot 1 (Advisor stage)

We also provided key financial information for each stock. To create a representative decision environment and, at the same time, prevent information overflow, we ran a pre-test to determine what financial information to show. In this pre-test, we asked financial professionals who were not part of the main experiment what information they primarily used in their decision-making processes.<sup>13</sup> On the decision screen, we displayed the six most important financial indicators. As an example, Figure 2.3 shows the pop-up window with the financial information that appeared when clicking on *Verizon*.

Based on this information, the advisors weighted all 30 stocks in the Dow Jones Industrial Average for the client. The order in which the 30 stocks were listed was randomized across advisors. By default, the weight per stock was set as in the Dow Jones Industrial Average, which the advisors were able to adjust with a slider (or by entering the weight directly). At the bottom of the table, we displayed the total for all weights. The advisors were able to proceed only if that total was exactly 100. The example in Figure 2.3 shows the weighting of 11 stocks at the bottom of the list of 30.

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<sup>13</sup>Specifically, we asked 20 respondents to rank 22 distinct indicators that are most commonly and prominently displayed on platforms such as *Morningstar*, *Yahoo! Finance*, *Fidelity*, and *CNN Money* according to their importance in selecting portfolios of stocks. See internet appendix for full instructions and Table A1 for the importance ranking of indicators according to the financial professionals in our sample.

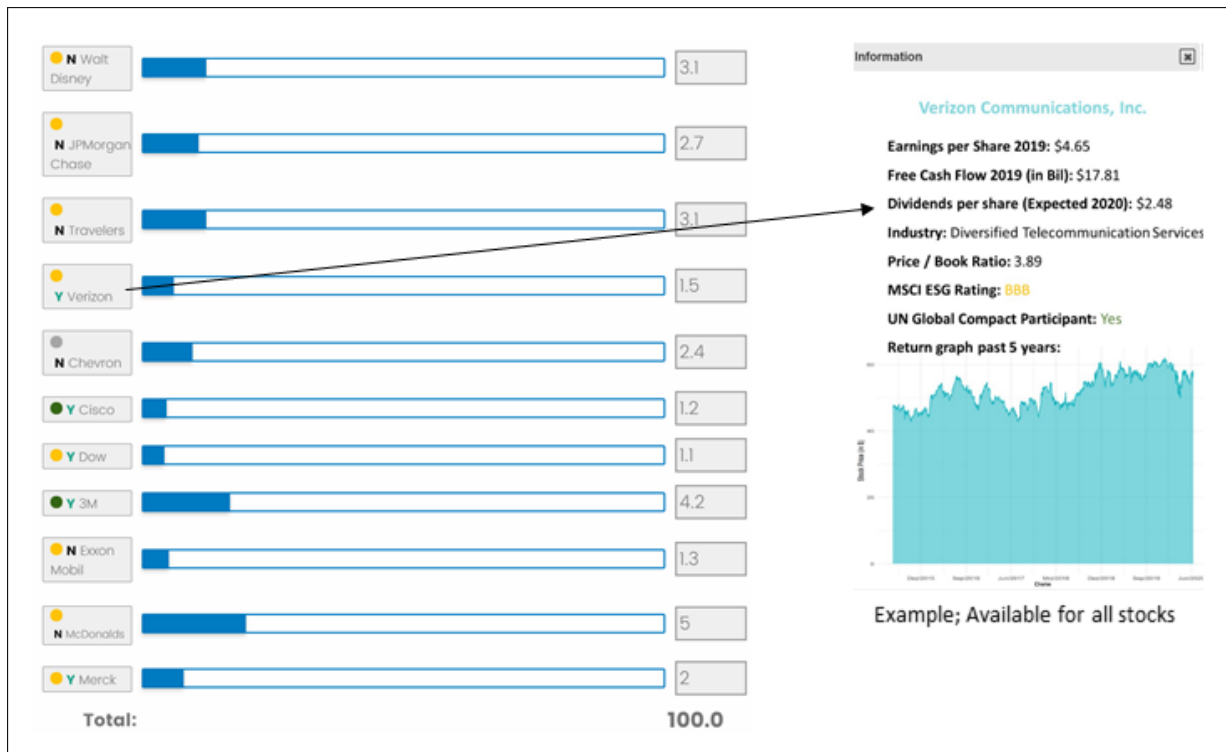


Figure 2.3: Portfolio screenshot 2 (Advisor stage)

### Fee and payment relevance

After selecting stocks for a specific client profile, we asked advisors to set a fee for this service. They set the fee using a slider without an anchor (see Figure 2.4). They could set the fee to any percentage between 0% and 4% for each of the four client profiles. At the end of this stage, we randomly selected one of the four client profiles that was relevant for the advisor payment. The portfolio allocation and fee for this client profile were shown to a real client in the second experimental stage.

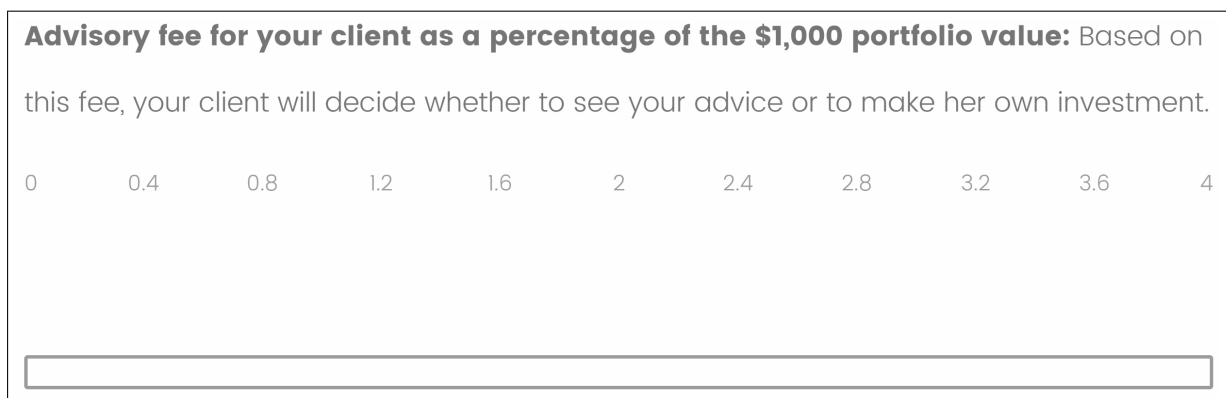


Figure 2.4: Fee setting screenshot (Advisor stage)

### 3.2 Client stage

Following the completion of the advisor stage, we proceeded to sample clients who matched the randomly selected client profiles from the advisor stage. To ensure appropriate matching, we administered screening questions regarding age, gender, income, risk tolerance, and investor mandate (please refer to Section 3.5 for further details). We informed participants that they would receive an experimental budget of \$1,000 to invest in the stock market and that a financial advisor had already selected a portfolio of stocks on their behalf. The clients saw the instructions that were given to the advisors, along with an example portfolio selection screen from the advisor stage. Subsequently, we assessed the clients' comprehension of the advisor stage through comprehension questions.

Next, the clients saw the fee that their respective advisor had set for selecting the portfolio (see Figure 2.5) and decided to either pay the fee and take the advice or not to pay the fee and select their own portfolio of stocks. In the latter case, the clients went through the same stock selection process as the advisors. The advisors' compensation was determined based on the decision made by their matched client.

**Investment Decision**

A financial professional put together a portfolio for a client with your profile. He or she set the following advisory fee for creating this stock portfolio.

**Advisory Fee:** 1.4%

Would you like to invest in the stock portfolio that your advisor constructed on your behalf?

☐ Yes, I will take the advice

☐ No, I will select stocks myself

**Figure 2.5:** Investment decision screenshot (Client stage)

### 3.3 Payment

All participants received a show-up fee plus a variable payment that was contingent on their decisions in the experiment.<sup>14</sup> For the advisors, the additional payment depended on whether the client took the advice. Advisor  $j$  received the following:

$$\Pi_j = \begin{cases} \rho + Fee_i, & \text{if client } i \text{ selects the advisor portfolio} \\ \rho, & \text{otherwise,} \end{cases} \quad (2.1)$$

where  $\Pi_j$  refers to the payoff to advisor  $j$ , and  $\rho$  refers to the show-up fee. The fee was set as a percentage of the clients' \$1,000 investment budgets; thus, so a fee of 1.4% corresponded to a payment of \$14. The advisor payment was sufficiently large to ensure that the advisors took the task seriously. Disregarding outliers, participants spent around 14 minutes, on average, to complete the experiment and received an average payment of \$12.57, which means that the average hourly payoff was \$53.87. Participants reported a gross annual income of \$110,637, which allows us to estimate participants' hourly net wage at \$31.39.<sup>15</sup> This means that the experimental payoff was around 1.7 times professionals' average net income per hour.

For clients, the variable payment depended on the performance of the selected investment. Every 10<sup>th</sup> client (randomly selected) received a variable payment. Clients who were not randomly selected received the show-up fee  $\rho$ . If randomly selected, client  $i$  received the following:

$$\Pi_i = \begin{cases} \rho + \$150 - Fee_i + r_j, & \text{if client } i \text{ selects the advisor portfolio} \\ \rho + \$150 + r_i, & \text{otherwise.} \end{cases} \quad (2.2)$$

The variable payment included a base payment of \$150. If the clients chose to view the advice, the fee was deducted from this payment. Additionally, we recorded the return of

<sup>14</sup>The show-up fee of \$2 was equal for advisors and clients and was offered on top of an undisclosed show-up fee that the market research company pays to all its clients for completed surveys.

<sup>15</sup>In line with Kirchler et al. (2018), we assume an income tax of 40% and that advisors work 45 hours per week and 47 weeks per year.

their chosen investment over the coming year. If a client took the advice, their payment depended on the performance of the advisor portfolio  $r_j$ . If a client did not take the advice, their payment depended on the performance of the portfolio they selected themselves,  $r_i$ . Although the overall earnings could not be lower than 0, the clients participated in gains as well as losses of selected stock portfolios due to the \$150 base payment.

### 3.4 External consequences of decisions

We took measures to ensure that the experiment carried real consequences for participants. Previous experimental studies have highlighted the differences in behavior between real and hypothetical situations (List & Gallet, 2001). This is especially relevant in our setting, where socially responsible investors care about the societal impact of purchasing stocks. To achieve this, we made actual stock purchases in the market based on participants' choices. For 1 in 10 participants, we purchased and held stocks according to the participant's selection until the end of the investment horizon, which lasted for one year. Participants were fully informed about this process and were assured that they would receive documentation of all stock transactions made to implement their portfolios. We aggregated and anonymized all participant data to make it impossible to trace back any decisions made in the experiment.

### 3.5 Implementation

The data collection took place in the second half of 2020, with the implementation of the stock portfolios on December 11, 2020. All experimental stages were administered online with Qualtrics. We collected the data in collaboration with the market research agency Dynata.<sup>16</sup>

As advisors, we recruited financial professionals in the US, whom we selected based on the two screenings, as outlined in Section 2. As clients, we recruited a sample of individuals from the US who were not financial professionals. To match clients to the

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<sup>16</sup>Dynata has access to more than 62 million consumers and business professionals and is specialized in B2B surveys, with over 40 years of experience in this area.

profiles that we presented to the advisors, we screened out clients whose annual household income was below \$40,000 or above \$79,999 or whose age was below 35 or above 54. In addition, we asked the clients about their risk preferences in investing and selected only those who were willing to invest their entire experimental investment budget in stocks.<sup>17</sup> Finally, we asked the clients about their investor mandate to create a match with the respective profile shown to the advisor. Specifically, we asked clients: “Do you want to give your advisor a mandate for socially responsible investing?”

The sample included 345 professional financial advisors from 45 different states in the US (see Figure A1). As every advisor created a portfolio and set a fee on behalf of four different clients, we observed a total of 1,380 client—advisor relationships. An overview of the characteristics of the sample is provided in Table A3.

Before we discuss the results of the experiment, we first investigate whether the treatment was successfully implemented in the sense that the advisors catered to the sustainability preferences of their clients. Table A2 shows the outcome of four OLS regressions. Each column has a different sustainability indicator as a dependent variable. The dependent variable of the first regression, *United Nations GC* of client  $i$ , is defined as follows:

$$United\ Nations\ GC_i = \sum (Weight\ of\ stock\ k\ (in\ \%) * United\ Nations\ GC_k), \quad (2.3)$$

where  $United\ Nations\ GC_k \in \{0; 1\}$  is equal to 1 if firm  $k$  participated in the United Nations GC and 0 otherwise. Thus, the maximum value that this variable could take for a client was 100, which means that 100% of the portfolio value is invested in companies that participate in the United Nations GC. The minimum value that this variable could take for a client was 0. The MSCI ESG (Letter Coded) dependent variable of the regression

<sup>17</sup>Clients did not know what characteristics we were screening on. Therefore, clients could not game the survey to increase their chances of being able to participate.



shown in column 2 was defined as follows:

$$MSCI\ ESG\ (Letter\ Coded)_i = \sum (Weight\ of\ stock\ k\ (in\ \%) * MSCI\_ESG\_Letter_k), \quad (2.4)$$

where  $MSCI\_ESG\_Letter_k \in \{0; \frac{1}{6}; \frac{1}{3}; \frac{1}{2}; \frac{2}{3}; \frac{5}{6}; 1\}$ . This variable represents the quantified MSCI ESG letter rating of stock k, which corresponds to CCC, B, BB, BBB, A, AA, and AAA, respectively. Similarly, MSCI ESG (Color Coded), the dependent variable of the regression shown in column 3, is defined as follows:

$$MSCI\ ESG\ (Color\ Coded)_i = \sum (Weight\ of\ stock\ k\ (in\ \%) * MSCI\_ESG\_Color_k), \quad (2.5)$$

where  $MSCI\_ESG\_Color_k \in \{0; 0.5; 1\}$  corresponds to the MSCI ESG color ratings gray, yellow, and green, respectively. Both quantifications of the MSCI ESG scores take a value between 0 and 100 as the dependent variable in column 1. Finally, column 4 shows a regression with an overall ESG rating, defined as

$$Overall\ ESG\ Rating_i = \frac{United\ Nations\ GC_i + MSCI\ ESG\ (Letter\ Coded)_i}{2}. \quad (2.6)$$

Table A2 shows that irrespective of the rating considered, advisors create more sustainable portfolios under an SRI mandate. Therefore, we are confident that our treatment was administered successfully.

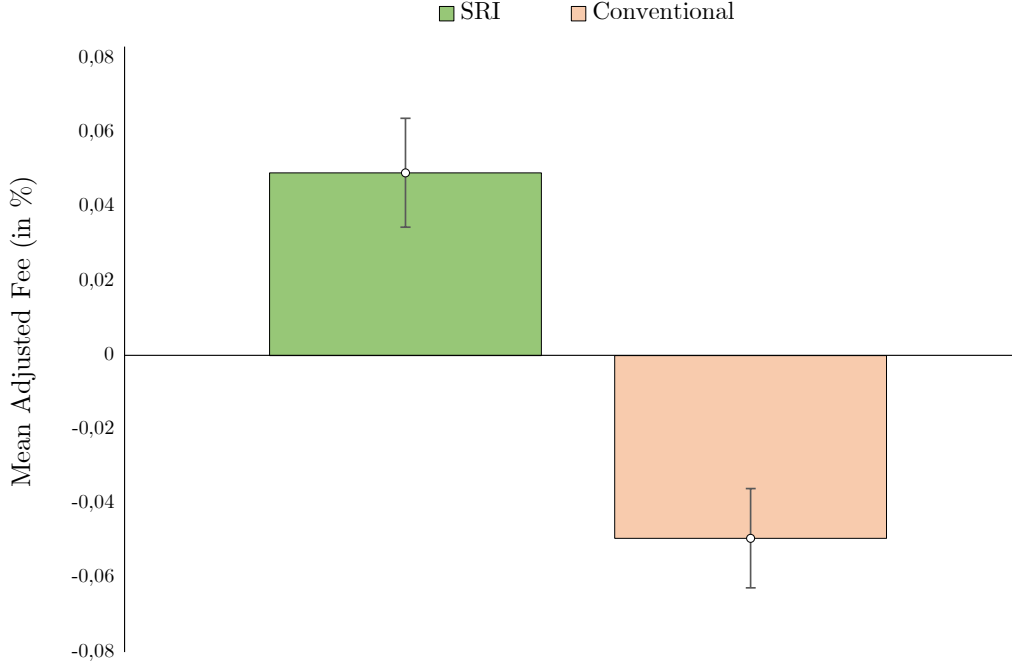
## 3.6 Results

### SRI mandates lead to a premium

**Result 1:** *US financial advisors charge SRI clients a premium.*

**Support:** The average fee charged by advisors to clients in our sample is  $\mu = 1.92\%$  (SD = 0.97), which is slightly lower than fees reported in recent studies on retail financial advice (Foerster et al., 2017; Linnainmaa et al., 2021). Figure 2.6 shows the average mean

adjusted fee charged by investor mandate. The whiskers in the figure indicate that advisors charge a significantly higher fee when a client communicates sustainable investment preferences compared to a client who communicates conventional investment preferences.



**Figure 2.6:** Average mean adjusted fee charged by investment mandate

*Notes: The figure shows the average mean adjusted fee in % charged by investor mandate. We form pairs of clients, who have the same gender and the same advisor, but who differ in their investment mandate. For client  $i$ , the mean adjusted fee is the fee that is charged by advisor  $j$  to client  $i$  minus the average fee charged by advisor  $j$  to both clients in this client pair. The whiskers represent  $\pm$  one standard error.*

We formally test this using the following model:

$$\begin{aligned}
 Fee_i = & \alpha + \beta_1 * \psi + \beta_2 * \theta + \beta_3 * SRI\_Mandate_i + \beta_4 * Female_i + \beta_5 * High\_Age_i \\
 & + \beta_6 * High\_Income_i + \beta_7 * Round_i + \epsilon_i,
 \end{aligned}
 \tag{2.7}$$

where client  $i$ 's fee is determined by  $\psi$  (a vector of advisor fixed effects),  $\theta$  (a vector of round fixed effects),  $SRI\_Mandate_i \in \{1 \text{ if a client gave an SRI mandate, } 0 \text{ otherwise}\}$ ,  $Female_i \in \{1 \text{ if a client identified as female, } 0 \text{ if a client identified as male}\}$ ,  $High\_Age_i \in \{1 \text{ if a client was between 45 and 54 years old, } 0 \text{ if a client was between 35 and 44 years}\}$

old}, and  $High\_Income_i \in \{1 \text{ if a client had a gross annual income between } \$60,000 \text{ and } \$79,999, 0 \text{ if a client had a gross annual income between } \$40,000 \text{ and } \$59,999\}$ .

Table 2.1 presents the results of two Tobit regressions.<sup>18</sup> In Column 1, we examine the effect of a client's investment mandate on the fee charged by advisors, without including any control variables. The results indicate that advisors impose a premium of 5.1 basis points ( $p = 0.003$ ) when a client mandates SRI. Column 2 shows the outcome of regression equation 2.7. The estimated effect size remains significant at 5.0 basis points ( $p = 0.004$ ) when all control variables are included. Although we see that the coefficient on *Female* is negative, indicating a lower fee charged to women, this difference is not significant at conventional levels ( $p = 0.063$ ). Furthermore, none of the other client characteristics have explanatory power in fee differences.

These results demonstrate that advisors charge sustainable investors a premium at the aggregate level. We further explore the heterogeneity of these premiums. Specifically, we investigate whether the aggregate fee difference is driven by a moderate premium for SRI clients charged by all advisors or by a substantial premium charged to a subset of clients. To examine this, we create pairs of clients with the same gender and advisor but differing investment mandates. We assign a binary indicator to each client, equal to 1 if they were charged a higher fee than the other client in the pair, and 0 otherwise. We then perform a probit regression using this binary indicator as the dependent variable. Column 1 of Table 2.2 presents the marginal effects of this probit regression, revealing that SRI mandates increase the probability of being charged a premium by 6.4 percentage points.

Additionally, we consider the magnitude of the premium when it is charged. We re-estimate our main model using the subset of client pairs in which the SRI client was charged a higher fee. This reduces the sample size to 504 clients, which represents 36.5% of the full sample. Column 2 of Table 2.2 shows the coefficient estimates of the Tobit regression. The dependent variable is the fee (in percent) charged to clients by advisors. The coefficient estimates indicate that when advisors impose a premium on SRI clients,

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<sup>18</sup>The dependent variable  $Fee_i$  is censored on the right side, as it is bound between 0 and 4%.

**Table 2.1:** Advisors charge higher fees to SRI clients

Dependent Variable:	(1)	(2)
	Fee (in%)	
SRI Mandate	0.051*** (0.017)	0.050*** (0.017)
Female		-0.032 (0.017)
High Age		-0.001 (0.022)
High Income		0.014 (0.021)
$\alpha$	1.975*** (0.015)	1.980*** (0.034)
Advisor FE	Yes	Yes
Round FE	No	Yes
Observations	1,380	1,380
Uncensored Observations	1,328	1,328
Log Likelihood	-398.2	-392.4

*Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. Column 1 and 2 show the coefficient estimates of Tobit regressions. Both regressions have the fee (in percent) charged by an advisor to a client as the dependent variable. SRI Mandate is equal to 1 if a client gives a mandate for SRI and 0 otherwise. Female is equal to 1 if a client is female and 0 if a client is male. High Age is equal to 1 if a client is between 45 and 54 years old, 0 if a client is between 35 and 44 years old. High Income is equal to 1 if a client has a gross annual income between \$60,000 and \$79,999, 0 if a client has a gross annual income between \$40,000 and \$59,999.*

it is substantial, amounting to 47.8 basis points.

### **SRI mandates do not require more time and effort**

**Result 2:** *US financial advisors neither spend more time on nor exert more effort for SRI clients.*

**Table 2.2:** Fee premium to SRI clients

Dependent Variable:	(1) Probit Premium charged	(2) Tobit Fee (in %)
SRI Mandate	0.063** (0.089)	0.478*** (0.026)
Female	0.011 (0.035)	-0.091** (0.042)
High Age	-0.006 (0.073)	0.040 (0.039)
High Income	0.026 (0.074)	0.005 (0.031)
$\alpha$	-0.628*** (0.015)	1.937*** (0.137)
Advisor FE	No	Yes
Round FE	Yes	Yes
Observations	1,380	504
Uncensored Observations		494
Pseudo- $R^2$	0.02	
Log Likelihood		-71.73

Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. Column 1 shows the marginal effects of a Probit regression. We form pairs of clients, who have the same gender and the same advisor, but who differ in whether they give an SRI mandate or a conventional investment mandate. The dependent variable is a binary indicator that is equal to 1, if a client was charged a higher fee than the other client in this pair and 0 otherwise. Column 2 shows the coefficient estimates of a Tobit regression on the subset of client pairs, among which the SRI client was charged a higher fee. The dependent variable is the fee (in percent) charged by an advisor to a client. SRI Mandate is equal to 1 if a client gives a mandate for SRI and 0 otherwise. Female is equal to 1 if a client is female and 0 if a client is male. High Age is equal to 1 if a client is between 45 and 54 years old, 0 if a client is between 35 and 44 years old. High Income is equal to 1 if a client has a gross annual income between \$60,000 and \$79,999, 0 if a client has a gross annual income between \$40,000 and \$59,999.

**Support:** The first two columns of Table 2.3 present the results of OLS regressions, where the natural logarithm of the time spent constructing a client's portfolio is the

dependent variable. In both specifications, we find no significant difference in the time spent by advisors on SRI clients compared to conventional clients. This suggests that advisors allocate a similar amount of time to constructing portfolios for both types of clients.

Columns 3 and 4 show the outcome of OLS regressions, with the natural logarithm of the number of clicks that advisors spend on constructing a client’s portfolio as the dependent variable. This variable serves as a proxy for the effort exerted by advisors when constructing portfolios on behalf of clients. The findings indicate no significant difference in how often advisors click when a client mandates SRI versus when a client mandates conventional investment. Moreover, once round fixed effects are included, no other client characteristics provide explanatory power for the number of advisor clicks.

Taken together, these results suggest that advisors do not differ in the time spent or effort exerted when constructing portfolios for SRI clients compared to conventional clients.

### **SRI clients are not more likely to reject advice**

**Result 3:** *US sustainable investors are as likely (as conventional investors) to pay for advice, even when asked to pay a premium.*

**Support:** An important question is whether SRI clients are more likely to reject advice. If this were the case, clients ultimately would not end up paying the premium. However, SRI clients are as likely to accept the advice as conventional clients were.

Overall, 66.83% of the clients took the advice, while the remaining 33.17% selected stocks for themselves. Table 2.4 shows the marginal effects of two probit regressions. Column 1 shows a regression of client SRI preference on a binary variable indicating whether the advice was taken without including any controls. Column 2 shows the regression results of the same model, while controlling for other client characteristics, including gender, age, and income. In both model specifications, we see a tendency for SRI clients to accept advice more often, which, however, is not statistically significant.

**Table 2.3:** Advisors do not exert more effort for SRI clients

Dependent Variable:	(1) Log(Time)	(2) Log(Time)	(3) Log(Clicks+1)	(4) Log(Clicks+1)
SRI Mandate	0.046 (0.057)	0.046 (0.045)	0.027 (0.044)	0.024 (0.039)
Female	0.110 (0.058)	0.070 (0.046)	0.063 (0.042)	0.042 (0.038)
High Age	-0.051 (0.063)	0.030 (0.054)	-0.092** (0.047)	-0.042 (0.041)
High Income	0.079 (0.072)	0.061 (0.053)	0.006 (0.052)	-0.010 (0.046)
$\alpha$	1.303*** (0.049)	2.122*** (0.055)	-0.023 (0.035)	0.461 (0.051)
Advisor FE	Yes	Yes	Yes	Yes
Round FE	No	Yes	No	Yes
Observations	1,380	1,380	1,380	1,380
Adjusted $R^2$	0.64	0.78	0.80	0.84

Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. All columns show the coefficient estimates of OLS regressions. The dependent variable in columns 1 and 2 is the logarithm of time in seconds that advisors take to create a portfolio for a client (Obtained from metadata). The dependent variable in columns 3 and 4 is the logarithm of the number of clicks (+1) that advisors take to create a portfolio for a client (Obtained from metadata). One is added to the number of clicks, as it is possible to allocate a portfolio with zero clicks, in which case the default weights are applied to stocks. SRI Mandate is equal to 1 if a client gives a mandate for SRI and 0 otherwise. Female is equal to 1 if a client is female and 0 if a client is male. High Age is equal to 1 if a client is between 45 and 54 years old, 0 if a client is between 35 and 44 years old. High Income is equal to 1 if a client has a gross annual income between \$60,000 and \$79,999, 0 if a client has a gross annual income between \$40,000 and \$59,999.

The fee charged cannot explain any variation in propensity to take advice.

### Additional checks

In additional analyses, we exclude all advisors who take less than five minutes to complete the experiment. We also exclude advisors who make more than one mistake in the

**Table 2.4:** SRI clients are not more likely to reject advice

Dependent Variable:	(1)	(2)
	Was the Advice Taken?	
SRI Mandate	0.035 (0.180)	0.041 (0.184)
Fee		0.018 (0.094)
Female		0.035 (0.183)
High Age		0.030 (0.186)
High Income		-0.010 (0.182)
$\alpha$	0.389*** (0.123)	0.319 (0.261)
Observations	208	208
Pseudo- $R^2$	0.00	0.01

Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors in brackets. Columns 1 and 2 show the marginal effects of probit regressions, where the dependent variable is 1 if a client took the advice and 0 otherwise. SRI Mandate is equal to 1 if a client gives a mandate for SRI and 0 otherwise. High Literacy is equal to 1 if a client answered all financial literacy questions correctly and 0 if a client has answered one or more financial literacy questions incorrectly. Fee is the fee (in %) charged by the advisor. Female is equal to 1 if a client is female and 0 if a client is male. High Age is equal to 1 if a client is between 45 and 54 years old, 0 if a client is between 35 and 44 years old. High Income is equal to 1 if a client has a gross annual income between \$60,000 and \$79,999, 0 if a client has a gross annual income between \$40,000 and \$59,999.

comprehension questions. We refer to this sample as the REDUCED sample. Table A4 provides an overview of the characteristics of the REDUCED sample. When running our analyses with the REDUCED sample, our findings remain the same qualitatively and effect sizes often even increase. Table A5 shows that under all definitions of social responsibility, advisors in the REDUCED sample create more sustainable portfolios when a client mandates SRI. Table A6 shows an estimation of the regression equation 2.7 with



the REDUCED sample. Although the results remain the same qualitatively, the effect of an SRI mandate on the charged fee increases from 5.0 basis points to 5.5 basis points. Table A7 shows that among advisors in the reduced sample, an SRI mandate increases the probability of being charged a premium by 7.1 percentage points and if an advisor charges an SRI client a premium, it was 47.2 basis points. Finally, Table A8 shows that in the REDUCED sample, advisors do not exert significantly more time or effort to construct portfolios for SRI clients. This is in line with our finding when using the full sample.

### 3.7 Interim conclusion

Taken together, our results from the US experiment show that US financial advisors charge sustainable investors a premium, and that this premium is also accepted and paid. Outside of our experimental setting, skill, effort, and costs could play a role and even increase fees further, but we show that even when they do not play a role, fees are higher for sustainable investors.

## 4 European Experiment

We expand upon our initial findings by conducting a second experiment in Europe, aiming to address important questions that provide deeper insights into the conditions under which financial advisors charge sustainable investors a premium.

Firstly, we examine whether our original findings hold for European financial advisors. Previous research on institutional investors has indicated potential differences in the behavior of sustainable investors across countries (Dyck et al., 2019; Gibson Brandon et al., 2022). Additionally, regulatory variations exist in terms of the extent to which advisors personally benefit from client fees<sup>19</sup> These factors justify an investigation into the reproducibility of our initial findings with European financial advisors.

Secondly, we investigate whether our findings hold in a fund selection setting. Many

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<sup>19</sup>For example, some European countries like the Netherlands and the UK ban kickbacks to financial advisors.

financial advisors recommend pre-allocated financial products, such as mutual funds, to their clients, rather than selecting individual stocks. Thus, we explore whether a premium is charged in the context of fund selection.

Thirdly, we examine whether our findings hold in a setting that eliminates the additional effort associated with sustainable investing. In our initial experiment, we infer the effort put in by advisors by analyzing metadata, such as the number of clicks that advisors take to put together stock portfolios on behalf of clients, and we do not find a difference between clients by mandate. We additionally explore whether we can detect a sustainability premium in a setting in which we do not have to proxy for higher advisor effort but rule it out by design.

Fourthly, we investigate whether client financial literacy influences the premium that sustainable investors are charged. Specifically, we consider the possibility that one driver of fee differences is the assumption made by advisors that SRI clients have lower financial literacy, which allows them to charge a premium. This implies that advisors do not impose a premium on SRI clients when they can signal high financial literacy.

## 4.1 Experimental setup

As in the US experiment, our experimental design consisted of two stages.<sup>20</sup> In the first stage, advisors saw a client profile, invested €1,000 on behalf of that client, and set a fee for their service. We implemented two major design changes in the advisor stage. Firstly, we showed the clients' financial literacy to the advisors. Secondly, we had a fund selection task instead of a stock selection task.

### Client financial literacy

The advisors again received information about their clients' gender, income, age, risk preferences, and investment mandate. In addition, we provided information on clients' financial literacy. We defined financial literacy in terms of their clients' relative performance in the big three financial literacy questions, first suggested by Lusardi and Mitchell

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<sup>20</sup>We provide the full experimental instructions in the internet appendix.

(2008). Advisors received information about their clients' relative scores<sup>21</sup> on this quiz. In total, each advisor saw six different client profiles: three SRI clients (with high financial literacy, low financial literacy, or unknown financial literacy) and three conventional clients (with high financial literacy, low financial literacy, or unknown financial literacy). The advisors first selected funds for the two clients with unknown financial literacy in random order and then for the remaining four clients in random order.

### **Fund information and selection**

We made several adjustments to the selection task for advisors when choosing funds on behalf of their clients. Instead of selecting individual stocks, we asked advisors to choose one of six funds. We designed the fund selection task in such a way that the SRI clients would not require any additional effort.

We informed the advisors that all stocks in the funds were among the largest 200 stocks in the MSCI World index, based on market capitalization. We created artificial funds to have more control over their characteristics and to avoid any influence from existing real-world fees. We assigned a number as an identifier to each fund, rather than naming them, to minimize noise caused by framing effects. If advisors asked for more information, they could open pop-up windows containing fund-level indicators, such as the portfolio beta, the forward dividend yield, the price/book value, and the fund's investment style (proportion invested in value-, core-, and growth stocks; see Figure 2.7). We slightly adjusted the factors from the US experiment to those most relevant for mutual funds.

Crucially, we aggregated sustainability information into a simple ESG rating that was trivial for advisors to understand. This form of fund-level sustainability information is common in the field. On platforms like Morningstar, mutual funds' sustainability is given in terms of sustainability globes, where a rating of one to five globes is assigned to funds. In our experiment, a fund was awarded one leaf if between 0% and 20% of companies in the fund participate in the United Nations GC. Two, three, four, and five leaves were awarded if more than 20%, 40%, 60%, and 80% of companies in the fund participate in the

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<sup>21</sup>Whether a client performed above or below the median client in the sample

United Nations GC, respectively. We provided advisors with an explanation of how this ESG rating was calculated in a pop-up window. Figure 2.7 illustrates an example screen for the fund selection task. With the aggregated ESG rating, selecting a sustainable fund became as straightforward as counting to five. We randomized and counterbalanced the order in which funds were shown.



**Figure 2.7:** Fund selection screenshot (Advisor stage)

## 4.2 Implementation

We administered the European experiment in the first half of 2022. We recruited only financial professionals in Europe and selected them based on the screenings outlined in Section 2. Our sample includes 70 advisors who passed all screenings. As every advisor selected a fund and set a fee on behalf of six different clients, our data set includes a total of 420 client—advisor relationships. As clients, we recruited a sample of individuals from Europe who are not financial professionals in the same way as in the US experiment.

We first evaluate whether our treatment (i.e., SRI mandates) had any effect on financial advice. If advisors cater to the sustainability preferences of their clients, we expect them to select funds with higher ESG ratings on behalf of SRI clients. To assess this question, we run a set of Tobit regressions<sup>22</sup> with the number of leaves associated

<sup>22</sup>The dependent variable, the amount of sustainability leaves of the selected portfolio, is censored on

with the selected funds as the dependent variable. The results are shown in Table A10. Advisors select funds with a higher ESG rating (on average, 2.3 more leaves) for SRI mandates. Thus, we can be confident that our treatment was recognized by the advisors and translated into action.

## 4.3 Results

### SRI mandates lead to a premium in a fund selection setting

**Result 4:** *European financial advisors charge a premium for SRI fund selection.*

**Support:** To examine whether our main finding replicates in the new experimental setting, we first consider only fees for clients whose financial literacy is not known to advisors, as this was also the case in the US experiment. We conduct a Tobit regression with the charged fee as the dependent variable, controlling for all client characteristics that were communicated to advisors and including advisor and round fixed effects. The results, presented in Table 2.7, demonstrate that in both model specifications, the coefficient for SRI Mandate is positive and statistically significant. Moreover, the coefficient size is larger than that observed for US advisors, indicating that European advisors charge SRI clients a premium ranging from 7.7 to 8.3 basis points. No other client characteristic has explanatory power on the charged fee.

As in Section 3.6, we also explore whether the probability of being charged a premium increases for SRI clients. For that purpose, we form client pairs with identical financial literacy levels and the same advisor but differing investment mandates. Each client is then assigned a binary indicator, taking a value of 1 if they were charged a higher fee than the other client in the pair, and 0 otherwise. The marginal effects from a probit regression with this binary indicator as the dependent variable are shown in Column 1 of Table 2.6. The results reveal that SRI mandates increase the probability of being charged a premium by 19 percentage points.

We then estimate our main model for the subset of client pairs, among which the SRI

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the right side, as it is bound between 0 and 5.

**Table 2.5:** Advisors charge higher fees to SRI clients

Dependent Variable:	(1)	(2)
	Fee (in%)	
SRI Mandate	0.083*** (0.029)	0.077*** (0.028)
Female		-0.043 (0.033)
High Age		-0.050 (0.031)
High Income		0.004 (0.032)
$\alpha$	2.058*** (0.102)	2.074*** (0.081)
Advisor FE	Yes	Yes
Round FE	No	Yes
Observations	140	140
Uncensored Observations	139	139
Log Likelihood	44.28	48.86

*Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. Column 1 and 2 show the coefficient estimates of Tobit regressions. Both regressions have the fee (in percent) charged by an advisor to a client as the dependent variable. SRI Mandate is equal to 1 if a client gives a mandate for SRI and 0 otherwise. Female is equal to 1 if a client is female and 0 if a client is male. High Age is equal to 1 if a client is between 45 and 54 years old, 0 if a client is between 35 and 44 years old. High Income is equal to 1 if a client has a gross annual income between \$60,000 and \$79,999, 0 if a client has a gross annual income between \$40,000 and \$59,999.*

client was charged a higher fee. Column 2 of Table 2.6 shows the coefficient estimates of a Tobit regression that we run on this subset. The dependent variable is the fee (in percent) charged by an advisor to a client. The coefficient estimates show that if an advisor charges a premium to an SRI client, this premium lies at 42.4 basis points, on average.

**Table 2.6:** Fee premium to SRI clients

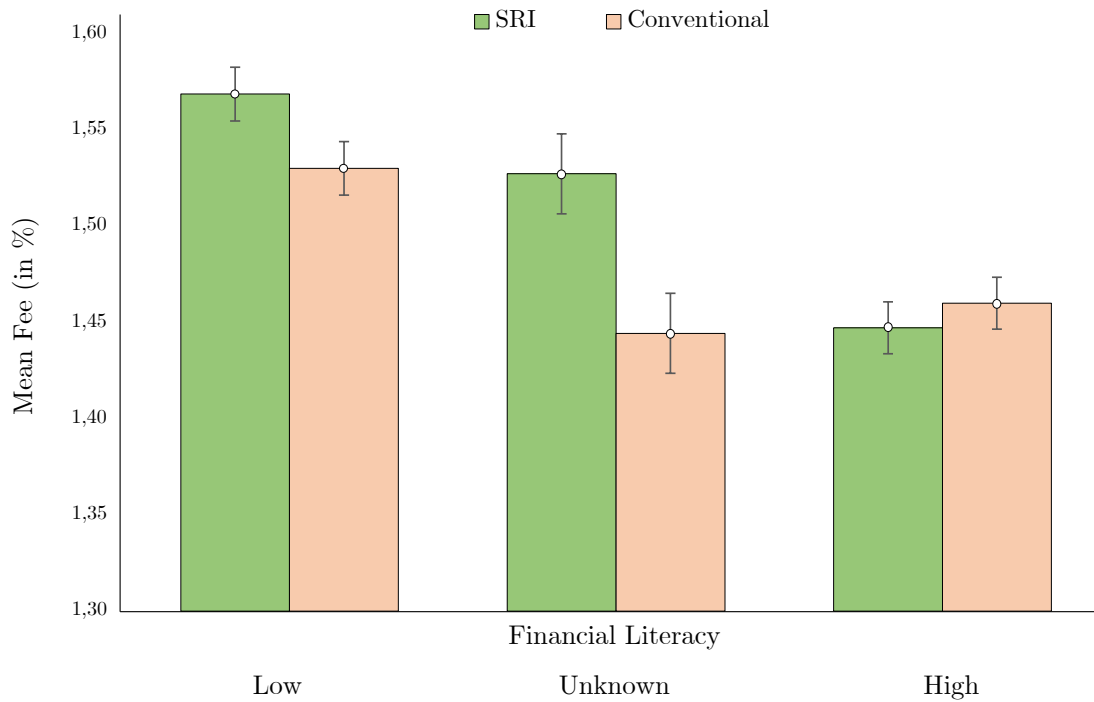
Dependent Variable:	(1) Probit Premium charged	(2) Tobit Fee (in %)
SRI Mandate	0.185*** (0.068)	0.424*** (0.052)
Female	-0.063 (0.069)	-0.086 (0.054)
High Age	-0.067 (0.068)	-0.035 (0.068)
High Income	-0.025 (0.067)	-0.014 (0.076)
$\alpha$	0.132 (0.083)	1.639*** (0.135)
Advisor FE	Yes	Yes
Round FE	Yes	Yes
Observations	140	40
Uncensored Observations		39
Pseudo- $R^2$	0.12	
Log Likelihood		10.87

*Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. Column 1 shows the marginal effects of a Probit regression. We form pairs of clients, who have the same financial literacy and the same advisor, but who differ in whether they give an SRI mandate or a conventional investment mandate. The dependent variable is a binary indicator that is equal to 1, if a client was charged a higher fee than the other client in this pair and 0 otherwise. Column 2 shows the coefficient estimates of a Tobit regression on the subset of client pairs, among which the SRI client was charged a higher fee. The dependent variable is the fee (in percent) charged by an advisor to a client. SRI Mandate is equal to 1 if a client gives a mandate for SRI and 0 otherwise. Female is equal to 1 if a client is female and 0 if a client is male. High Age is equal to 1 if a client is between 45 and 54 years old, 0 if a client is between 35 and 44 years old. High Income is equal to 1 if a client has a gross annual income between \$60,000 and \$79,999, 0 if a client has a gross annual income between \$40,000 and \$59,999.*

## The role of financial literacy

**Result 5:** *Advisors charge sustainable investors with unknown or low financial literacy a premium, but do not charge sustainable investors with high financial literacy a premium.*

**Support:** We next consider how advisors set fees when they know their clients' financial literacy. Looking at descriptives, the mean fee in the entire sample charged to clients is  $\mu = 1.50\%$  (SD = 0.76), in which clients with low financial literacy are charged the most ( $\mu = 1.55\%$ ; SD = 0.78), clients with high financial literacy are charged the least ( $\mu = 1.45\%$ ; SD = 0.74), and clients whose financial literacy is not revealed are charged a fee that lies between the two ( $\mu = 1.49\%$ ; SD = 0.75).



**Figure 2.8:** Average fee charged by investment mandate and financial literacy

*Notes:* The first and second bar show the average fee charged to SRI / conventional investment clients with low financial literacy, respectively. The third and fourth bar show the average fee charged to clients with unknown financial literacy who give an SRI-/conventional mandate, respectively. The fifth and sixth bar show the average fee charged to SRI / conventional investment clients with high financial literacy, respectively. The whiskers represent  $\pm$  one standard error of the mean adjusted fee.

Figure 2.8 graphically shows the mean fee that advisors charge by investor mandate



for each financial literacy subset. The figure reveals some interesting patterns. Advisors charge the highest fee to SRI clients with low financial literacy. Furthermore, advisors charge clients with high financial literacy a relatively low fee, with no significant fee difference by investor mandate. Therefore, only those clients who cannot signal high financial literacy bear the burden of an SRI premium.

To test fee differences by client financial literacy, we run a Tobit regression for the subset of clients whose financial literacy is shown to be low (column 2 of Table 2.7), for the subset of clients whose financial literacy is shown to be high (column 3 of Table 2.7), and for a combined subset (column 1 of Table 2.7). The coefficient for High Financial Literacy in Column 1 shows that clients with low financial literacy are charged an additional 9.8 basis points. Column 2 shows that when client financial literacy is low, advisors charge a premium of around 4.8 basis points to SRI clients. Column 3 shows a coefficient that is statistically zero for SRI Mandate when client financial literacy is high.

### **SRI mandates require less time and effort in a fund selection setting**

**Result 6:** *European financial advisors spend less time and exert less effort when selecting funds for SRI clients.*

**Support:** Our experimental design rules out effort, skill, and cost differences as drivers of the premium charged to sustainable clients in this setting. Nevertheless, it is interesting to explore whether any differences in time and effort exist by mandate. Table 2.8 shows that the European advisors in our sample spend significantly less time and click significantly less through fund-level information when selecting funds for sustainable clients. Specifically, the clicking behavior suggests that advisors focus almost exclusively on ESG ratings for SRI clients but consider a much broader set of fund-level information for conventional investment mandates. This makes the premium charged to SRI clients even more noteworthy and supports the notion that the premium can be interpreted as extraction of additional profits from clients' sustainable investment preferences.

**Table 2.7:** Fees charged by client financial literacy

Dependent Variable:	(1)	(2)	(3)
	Fee (in %)		
Financial literacy:	Low & High	Low	High
SRI Mandate	0.018 (0.026)	0.048** (0.021)	-0.007 (0.019)
High Financial Literacy	-0.098*** (0.027)		
Female	-0.005 (0.033)	0.017 (0.020)	-0.025 (0.023)
High Age	-0.013 (0.033)	0.013 (0.023)	-0.055** (0.025)
High Income	-0.025 (0.035)	-0.015 (0.021)	-0.065*** (0.024)
$\alpha$	1.933*** (0.046)	1.981*** (0.034)	2.037*** (0.045)
Advisor FE	Yes	Yes	Yes
Round FE	Yes	Yes	Yes
Observations	280	140	140
Uncensored Observations	279	140	139
Log Likelihood	25.64	109.8	112.6

*Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. Column 1, 2, and 3 show the coefficient estimates of Tobit regressions. All regressions have the fee (in percent) charged by an advisor to a client as the dependent variable. We run the regressions separately for client subgroups by financial literacy, as shown to advisors. SRI Mandate is equal to 1 if a client gives a mandate for SRI and 0 otherwise. High Financial Literacy is equal to 1 if a client's financial literacy was reported to be high to advisors and 0 otherwise. Female is equal to 1 if a client is female and 0 if a client is male. High Age is equal to 1 if a client is between 45 and 54 years old, 0 if a client is between 35 and 44 years old. High Income is equal to 1 if a client has a gross annual income between €60,000 and €79,999, 0 if a client has a gross annual income between €40,000 and €59,999.*

### SRI clients are more likely to pay for advice

**Result 7:** *Sustainable investors in Europe are more likely to pay for advice, even when they are asked to pay a premium.*

**Table 2.8:** European advisors exert less effort for SRI clients

Dependent Variable:	(1)	(2)	(3)	(4)
	Log(Time)		Log(Clicks)	
SRI Mandate	-0.202*** (0.068)	-0.263*** (0.060)	-0.289*** (0.068)	-0.320*** (0.066)
Female	-0.011 (0.069)	0.026 (0.053)	-0.043 (0.067)	-0.018 (0.064)
High Age	-0.158** (0.070)	-0.038 (0.051)	-0.138 (0.072)	-0.080 (0.064)
High Income	0.054 (0.075)	0.020 (0.059)	0.021 (0.063)	0.007 (0.063)
$\alpha$	3.725*** (0.096)	4.554*** (0.101)	2.614*** (0.082)	3.056*** (0.101)
Advisor FE	Yes	Yes	Yes	Yes
Round FE	No	Yes	No	Yes
Observations	420	420	420	420
Adjusted $R^2$	0.45	0.70	0.51	0.59

Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. All columns show the coefficient estimates of OLS regressions. The dependent variable in columns 1 and 2 is the logarithm of time in seconds that advisors take to create a portfolio for a client (Obtained from metadata). The dependent variable in columns 3 and 4 is the logarithm of the number of clicks that advisors take to create a portfolio for a client (Obtained from metadata). SRI Mandate is equal to 1 if a client gives a mandate for SRI and 0 otherwise. Female is equal to 1 if a client is female and 0 if a client is male. High Age is equal to 1 if a client is between 45 and 54 years old, 0 if a client is between 35 and 44 years old. High Income is equal to 1 if a client has a gross annual income between €60,000 and €79,999, 0 if a client has a gross annual income between €40,000 and €59,999.

**Support:** To test whether clients' SRI preferences affect their propensity to pay for financial advice, we run two probit regressions with a binary indicator for whether a client took the advice as the dependent variable. We report the marginal effects in Table 2.9. The results show that SRI clients are around 31 percentage points more likely to pay for advice. As in the first experiment, the fee that is charged does not have explanatory

power on the propensity to take advice.

**Table 2.9:** SRI clients are more likely to pay for advice

Dependent Variable:	(1)	(2)
	Was the advice taken?	
SRI Mandate	0.311*** (0.221)	0.316*** (0.230)
High Financial Literacy		-0.080 (0.262)
Fee		-0.026 (0.128)
Female		0.070 (0.229)
High Age		0.042 (0.229)
High Income		-0.102 (0.227)
$\alpha$	0.086 (0.147)	0.145 (0.371)
Observations	157	157
Pseudo- $R^2$	0.16	0.20

*Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors in brackets. Columns 1 and 2 show the marginal effects of probit regressions, where the dependent variable is 1 if a client took the advice and 0 otherwise. SRI Mandate is equal to 1 if a client gives a mandate for SRI and 0 otherwise. High Literacy is equal to 1 if a client answered all financial literacy questions correctly and 0 if a client has answered one or more financial literacy questions incorrectly. Fee is the fee (in %) charged by the advisor. Female is equal to 1 if a client is female and 0 if a client is male. High Age is equal to 1 if a client is between 45 and 54 years old, 0 if a client is between 35 and 44 years old. High Income is equal to 1 if a client has a gross annual income between €60,000 and €79,999, 0 if a client has a gross annual income between €40,000 and €59,999.*

#### 4.4 Interim conclusion

Our results show that European financial advisors charge SRI clients a premium in a fund selection setting while spending less time and exerting less effort. Financial advi-

sors do not price discriminate against SRI clients who signal high financial literacy, but against SRI clients who cannot signal high financial literacy. Educating consumers may therefore be an effective policy intervention to counteract premiums charged because of SRI mandates. We discuss policy interventions in more detail in the next section.

## 5 Conclusion

Despite the increasing popularity of sustainable investment mandates and the regulatory requirements for financial institutions to elicit clients' sustainability preferences, the question about discriminatory pricing in this context has remained unanswered. This is concerning considering the global surge in SRI investments and the potential impact on fees paid to advisors. To address this gap, we conducted two lab-in-the-field experiments with financial advisors, controlling for various factors that could explain fee differences. Our consistent findings reveal that advisors charge a premium to clients who express sustainable investment preferences. Importantly, our experimental design rules out effort, skill, and cost differences as drivers of this fee disparity. In fact, we even observed that advisors spend less time and exert less effort for SRI mandates, suggesting that they rely on a narrower information set.

Interestingly, when clients can signal high financial literacy, the premium disappears. However, SRI clients without the ability to signal high financial literacy bear the burden of higher fees. It is noteworthy at this point that client financial literacy is available to financial advisors in the European Union, as the elicitation of client sophistication in financial matters is mandated by the MiFID II directive. However, in combination with the requirement to elicit sustainability preferences, this may be detrimental to clients. Charging higher fees to clients with sustainability preferences and low financial literacy is a form of discriminatory pricing that raises concerns, as it can negatively impact consumer welfare and the long-term appeal of sustainable investing.

To derive policy implications from our results, we conducted a survey with regulators (see Section 1 for more detail on the regulators sample). After presenting them with our

findings, a significant majority of the regulators (81%) believes that our results warranted attention from policymakers (see Table A13). We asked regulators to name suitable policy interventions. Two research assistants independently categorized the responses. The most frequently mentioned policy intervention was transparency (30%), followed by standardized fees (25%) and consumer education (17%).

Increased transparency in fee compositions have already been shown to reduce price discrimination. For example, Badoer et al. (2020) show that the implementation of disclosure requirements aimed at enhancing the transparency of indirect fees and facilitating the comparison of fund expenses lead to a reduction in the success of price discrimination strategies.

Signaling high financial literacy can also serve as a remedy for pricing differences, highlighting the importance of enhancing consumer education efforts. While the impact of consumer education interventions on financial literacy has shown mixed results in previous studies (Fernandes et al., 2014), recent research has reported more effective programs (Kaiser et al., 2022). Future research should focus on developing and testing field interventions based on promising consumer education initiatives to address and mitigate discriminatory pricing of sustainable preferences.

## A Appendix

**Table A1:** Information ranked to be most important by participants

Information	Average Rating (1-22)	Importance Ranking
Earnings per share (last year)	9.38	1
Price chart (last 5 years)	9.71	2
Free cash flow (last year)	9.71	2
Dividends (expected next year)	9.86	4
Industry	10.10	5
Price / book ratio	10.10	5
Price / Earnings Ratio (last year's earnings)	10.19	5
Volatility (last year)	10.48	6
Dividends (last year)	10.67	7
Annual Profit (last year)	10.95	8
Revenue Growth (last 3 years)	11.33	9
Earnings per share (expected next year)	11.38	10
Market Capitalization	11.57	11
Risk/return ratio, e.g., Sharpe ratio (last year)	11.76	12
Annual Revenue (last year)	12.14	13
Trade volume	12.48	14
Average price (last year)	12.52	15
Average price (expected by analysts next year)	12.71	16
Price range (last year)	13.24	17
Previous day's trading volume	13.71	18
Previous year's trading volume	14.05	19
Beta (last year)	14.95	20

**Table A2:** Advisors create more socially responsible portfolios for SRI clients

	(1)	(2)	(3)	(4)
Dependent Variable:	United Nations GC	MSCI ESG (Letter Coded)	MSCI ESG (Color Coded)	Overall ESG Rating
SRI Mandate	4.266*** (0.814)	1.388*** (0.297)	1.351*** (0.342)	2.827*** (0.501)
$\alpha$	22.967*** (0.407)	60.989*** (0.148)	25.175*** (0.171)	41.978*** (0.250)
Advisor FE	Yes	Yes	Yes	Yes
Observations	1,380	1,380	1,380	1,380
Adjusted $R^2$	0.59	0.55	0.50	0.62

Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. All columns show the coefficient estimates of OLS regressions. The dependent variables in column 1, 2, 3, and 4 are defined in equation 4.3, 4.4, 2.5, and 2.6, respectively. SRI Mandate is equal to 1 if a client gave a mandate for SRI and 0 otherwise.

**Table A3:** Summary statistics advisors study 1

	Mean	Median	SD	N
Age	43.51	39.50	11.00	345
Female	0.45	0.00	0.50	345
Experience	11.16	10.00	6.42	345
Annual Income	110,637	105,000	54,071.53	345

Notes: Age was given in brackets (18–24, 25–34, 35–44, 45–54, 55–64, 65 and older), which we converted to rounded midpoints per bracket (21, 29.5, 39.5, 49.5, 59.5, 65, respectively). Female is a categorical variable (1 = female, else 0) for the gender of participants. Experience was given in years, where “Less than 1 year” was re-coded to 1 and “More than 20 Years” was re-coded to 20. Annual Income (Gross in \$) was given in brackets (under 20,000, 20,000–29,999, 30,000–39,999, 40,000–49,999, 50,000–59,999, 60,000–69,999, 70,000–79,999, 80,000–89,999, 90,000–99,999, 100,000–109,999, 110,000–119,999, 120,000–129,999, 130,000–139,999, 140,000–149,999, 150,000–199,999, 200,000 or higher), which we converted to rounded midpoints per bracket (20,000; 24,999.5; 34,999.5; 44,999.5; 54,999.5; 64,999.5; 74,999.5; 84,999.5; 94,999.5; 104,999.5; 114,999.5; 124,999.5; 134,999.5; 144,999.5; 174,999.5; 200,000; respectively).



**Table A4:** Summary statistics advisors study 1 (REDUCED sample)

	Mean	Median	SD	N
Age	43.20	39.50	11.38	208
Female	0.49	0.00	0.50	208
Experience	10.69	10.00	6.40	208
Annual Income	108,028	100,000	56,294.35	208

*Notes: Age was given in brackets (18-24, 25-34, 35-44, 45-54, 55-64, 65 and older), which we converted to rounded midpoints per bracket (21, 29.5, 39.5, 49.5, 59.5, 65, respectively). Female is a categorical variable (1 = female, else 0) for the gender of participants. Experience was given in years, where "Less than 1 year" was re-coded to 1 and "More than 20 Years" was re-coded to 20. Annual Income (Gross in \$) was given in brackets (under 20,000, 20,000-29,999, 30,000-39,999, 40,000-49,999, 50,000-59,999, 60,000-69,999, 70,000-79,999, 80,000-89,999, 90,000-99,999, 100,000-109,999, 110,000-119,999, 120,000-129,999, 130,000-139,999, 140,000-149,999, 150,000-199,999, 200,000 or higher), which we converted to rounded midpoints per bracket (20,000; 24,999.5; 34,999.5; 44,999.5; 54,999.5; 64,999.5; 74,999.5; 84,999.5; 94,999.5; 104,999.5; 114,999.5; 124,999.5; 134,999.5; 144,999.5; 174,999.5; 200,000; respectively).*

**Table A5:** Advisors create more socially responsible portfolios for SRI clients (REDUCED sample)

	(1) United Nations Global Compact	(2) MSCI (Letter Coded)	(3) MSCI (Color Coded)	(4) Overall ESG Rating
SRI Mandate	5.148*** (1.111)	1.497*** (0.431)	1.587*** (0.512)	3.322*** (0.686)
$\alpha$	23.676*** (0.555)	61.152*** (0.216)	25.619*** (0.256)	41.980*** (0.342)
Advisor FE	Yes	Yes	Yes	Yes
Observations	832	832	832	832
Adjusted R2	0.63	0.56	0.52	0.65

*Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. All columns show the coefficient estimates of OLS regressions. The dependent variables in column 1, 2, 3, and 4 are defined in equation 4.3, 4.4, 2.5, and 2.6, respectively. SRI Mandate is equal to 1 if a client gave a mandate for SRI and 0 otherwise.*

**Table A6:** Advisors charge higher fees to SRI clients (REDUCED sample)

Dependent Variable:	(1)	(2)
	Fee (in%)	
SRI Mandate	0.066*** (0.023)	0.064*** (0.023)
Female		-0.045** (0.023)
High Age		0.014 (0.029)
High Income		0.006 (0.027)
$\alpha$	2.117*** (0.204)	2.101*** (0.191)
Advisor FE	Yes	Yes
Round FE	No	Yes
Observations	832	832
Uncensored Observations	803	803
Log Likelihood	-267.1	-259.5

Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. Column 1 and 2 show the coefficient estimates of Tobit regressions. Both regressions have the fee (in percent) charged by an advisor to a client as the dependent variable. SRI Mandate is equal to 1 if a client gives a mandate for SRI and 0 otherwise. Female is equal to 1 if a client is female and 0 if a client is male. High Age is equal to 1 if a client is between 45 and 54 years old, 0 if a client is between 35 and 44 years old. High Income is equal to 1 if a client has a gross annual income between \$60,000 and \$79,999, 0 if a client has a gross annual income between \$40,000 and \$59,999.

**Table A7:** Fee premium to SRI clients (REDUCED sample)

Dependent Variable:	(1) Probit Premium charged	(2) Tobit Fee (in %)
SRI Mandate	0.071** (0.090)	0.472*** (0.027)
Female	0.005 (0.036)	-0.078 (0.043)
High Age	-0.008 (0.073)	0.055 (0.040)
High Income	0.036 (0.075)	0.010 (0.032)
$\alpha$	-0.696*** (0.120)	1.922*** (0.139)
Advisor FE	No	Yes
Round FE	Yes	Yes
Observations	1,308	480
Uncensored Observations		470
Pseudo- $R^2$	0.01	
Log Likelihood		-71.51

*Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. Column 1 shows the marginal effects of a Probit regression. We form pairs of clients, who have the same gender and the same advisor, but who differ in whether they give an SRI mandate or a conventional investment mandate. The dependent variable is a binary indicator that is equal to 1, if a client was charged a higher fee than the other client in this pair and 0 otherwise. Column 2 shows the coefficient estimates of a Tobit regression on the subset of client pairs, among which the SRI client was charged a higher fee. The dependent variable is the fee (in percent) charged by an advisor to a client. SRI Mandate is equal to 1 if a client gives a mandate for SRI and 0 otherwise. Female is equal to 1 if a client is female and 0 if a client is male. High Age is equal to 1 if a client is between 45 and 54 years old, 0 if a client is between 35 and 44 years old. High Income is equal to 1 if a client has a gross annual income between \$60,000 and \$79,999, 0 if a client has a gross annual income between \$40,000 and \$59,999.*

**Table A8:** Advisors do not exert more effort for SRI clients (REDUCED sample)

Dependent Variable	(1) Log(Time)	(2) Log(Time)	(3) Log(Clicks+1)	(4) Log(Clicks+1)
SRI Mandate	0.063 (0.077)	0.100 (0.058)	0.002 (0.060)	0.021 (0.052)
Female	0.116 (0.080)	0.065 (0.064)	0.089 (0.058)	0.064 (0.052)
High Age	-0.067 (0.089)	0.046 (0.071)	-0.135** (0.067)	-0.063 (0.057)
High Income	0.076 (0.100)	0.036 (0.075)	0.026 (0.070)	-0.007 (0.063)
$\alpha$	4.338*** (0.125)	5.243*** (0.096)	3.446*** (0.087)	3.976*** (0.093)
Advisor FE	Yes	Yes	Yes	Yes
Round FE	No	Yes	No	Yes
Observations	832	832	832	832
Adjusted $R^2$	0.59	0.75	0.78	0.82

Notes: \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. All columns show the coefficient estimates of OLS regressions. The dependent variable in columns 1 and 2 is the logarithm of time in seconds that advisors take to create a portfolio for a client (Obtained from metadata). The dependent variable in columns 3 and 4 is the logarithm of the number of clicks (+1) that advisors take to create a portfolio for a client (Obtained from metadata). One is added to the number of clicks, as it is possible to allocate a portfolio with zero clicks, in which case the default weights are applied to stocks. SRI Mandate is equal to 1 if a client gives a mandate for SRI and 0 otherwise. Female is equal to 1 if a client is female and 0 if a client is male. High Age is equal to 1 if a client is between 45 and 54 years old, 0 if a client is between 35 and 44 years old. High Income is equal to 1 if a client has a gross annual income between \$60,000 and \$79,999, 0 if a client has a gross annual income between \$40,000 and \$59,999.

**Table A9:** Summary statistics advisors study 2

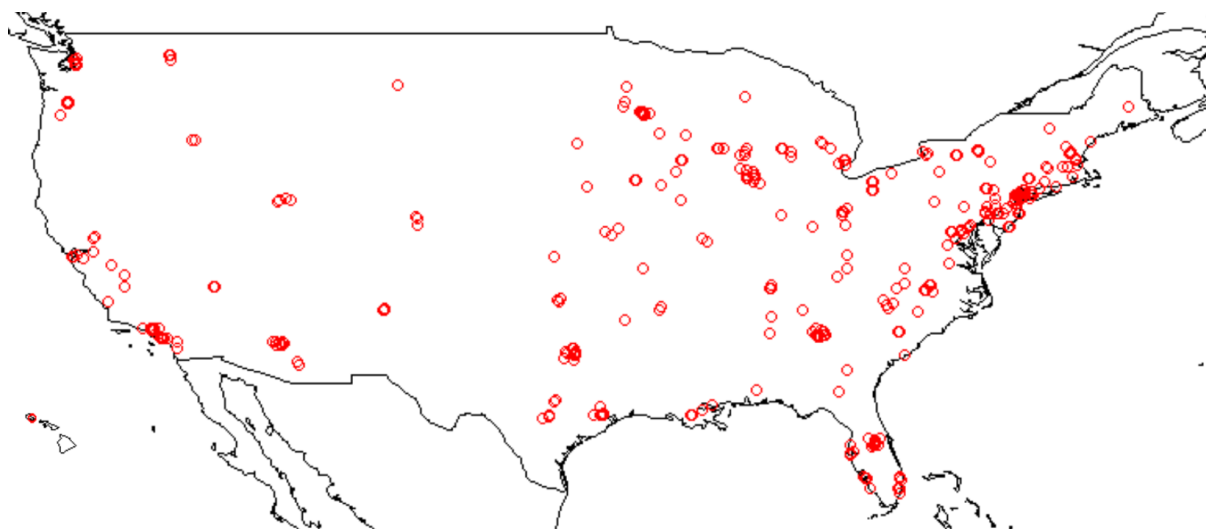
	Mean	Median	SD	N
Age	42.79	39.50	9.44	70
Female	0.04	0.00	0.20	70
Experience	14.81	16.00	5.68	70
Annual Income	121,285	115,000	503,08.46	70

*Notes:* Age was given in brackets (18–24, 25–34, 35–44, 45–54, 55–64, 65 and older), which we converted to rounded midpoints per bracket (21, 29.5, 39.5, 49.5, 59.5, 65, respectively). Female is a categorical variable (1 = female, else 0) for the gender of participants. Experience was given in years, where “Less than 1 year” was re-coded to 1 and “More than 20 Years” was re-coded to 20. Annual Income (Gross in EUR) was given in brackets (under 20,000, 20,000–29,999, 30,000–39,999, 40,000–49,999, 50,000–59,999, 60,000–69,999, 70,000–79,999, 80,000–89,999, 90,000–99,999, 100,000–109,999, 110,000–119,999, 120,000–129,999, 130,000–139,999, 140,000–149,999, 150,000–199,999, 200,000 or higher), which we converted to rounded midpoints per bracket (20,000; 24,999.5; 34,999.5; 44,999.5; 54,999.5; 64,999.5; 74,999.5; 84,999.5; 94,999.5; 104,999.5; 114,999.5; 124,999.5; 134,999.5; 144,999.5; 174,999.5; 200,000; respectively).

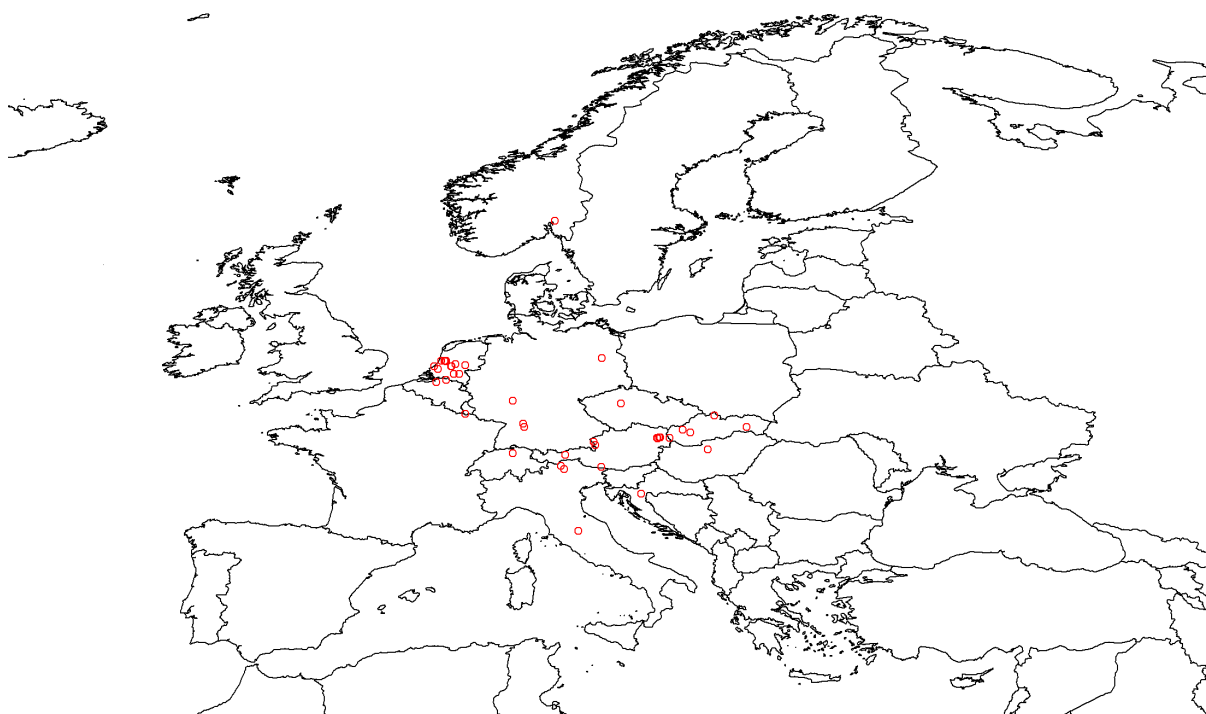
**Table A10:** Advisors select more socially responsible funds for SRI clients

	(1)	(2)
Dependent Variable:	Number of sustainability leaves	
SRI Mandate	2.329*** (0.180)	2.366*** (0.143)
$\alpha$	2.898*** (0.127)	2.677*** (0.552)
Advisor FE	No	Yes
Observations	420	420
Uncensored Observations	257	257
Log Likelihood	-634	-529.5

*Notes:* \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Standard errors, clustered at the advisor level, in brackets. Columns 1 and 2 show coefficient estimates from two separate Tobit regressions. The dependent variables in both columns is the number of sustainability leaves of the portfolio that was selected on behalf of a client. SRI Mandate is equal to 1 if a client gave a mandate for SRI and 0 otherwise.



**Figure A1:** Location of advisors Experiment US



**Figure A2:** Location of advisors Experiment Europe

**Table A11:** Summary statistics regulators

	Mean	Median	SD	N
Female	0.43	0.00	0.50	53
Age	38.75	39.50	11.72	53
Experience in SRI (5-pt Likert)	3.15	3.00	1.25	53
Experience in Regulation (in Years)	7.83	5.00	8.47	53
Policy Work	0.23			53
Research	0.13			53
Supervision	0.11			53
Analysis	0.15			53
Other	0.36			53

*Notes: Female is a categorical variable (1 = female, else 0) for the gender of participants. Age was given in brackets (18–24, 25–34, 35–44, 45–54, 55–64, 65 and older), which we converted to rounded midpoints per bracket (21, 29.5, 39.5, 49.5, 59.5, 65, respectively). Experience in SRI represents the response to the question: “Compared to the average colleague in your organization, how much work experience do you have with projects/topics that are related to our experiment?” (1 = “Far below average”, 2 = “Somewhat below average”, 3 = “Average”, 4 = “Somewhat above average”, 5 = “Far above average”). Experience in Regulation represents the answer given to the question: “How much work experience do you have related to regulation and/or policy work in general? (Please enter years of experience).” Policy Work, Research, Supervision, Analysis, and Other represent the current job of participants (multiple answers per participant are possible).*

**Table A12:** External validity assessment regulators

	Mean	Median	SD	N
Assessed external validity US	3.79	4.00	0.79	53
Assessed external validity Europe	3.25	3.00	1.05	53

*Notes: Regulators' responses to the questions: "Do you believe that the findings from our research study are informative about the behavior of financial advisors in the field in the US?" and "Do you believe that the findings from our research study are informative about the behavior of financial advisors in the field in the European Union?". Respondents gave an answer on a scale ranging from 1 ("not informative") to 5 ("very informative").*

**Table A13:** Policy implications

	Share of Regulators
Do you think that the results from our research study require attention from regulators?	0.81
What do you think would be a suitable policy intervention?	
Transparency	0.30
Standardized Fees	0.25
Consumer Education	0.17
Other	0.21

*Notes: The question "Do you think that the results from our research study require attention from regulators?" was asked with possible responses "Yes" or "No." The share of regulators refers to the proportion of regulators who selected "Yes." The question "What do you think would be a suitable policy intervention?" was asked as an open question. The responses given by the regulators were coded independently by two research assistants (RAs). Disagreements between the two RAs were resolved by the researchers. Some regulators' responses fit into multiple categories. A total of 21% of the respondents either did not believe that our research study requires attention from regulators or did not fill out the text box.*



**Table A14:** Predictions by mandate

	Higher for SRI	Higher for Conventional	No Difference	p
Fee	0.92	0.02	0.06	0.00***
Effort	0.60	0.17	0.23	0.00***

*Notes: The table shows the proportions of responses given to the questions: “Who do you believe financial advisors charged a higher fee to in the research study?” and “Who do you believe financial advisors exerted more effort for in the research study?”, respectively. The final column shows the p-values of a  $\chi^2$  goodness-of-fit test against the null-hypothesis that all responses were given equally frequently (\*\* $p < 0.05$ ; \*\*\* $p < 0.01$ ).*

## Chapter 3

# Conform to the norm. Peer information and sustainable investments

### Abstract

We administer a field experiment with clients of a European universal bank to examine the impact of perceived social norms on sustainable retail investments. We provide retail investors with information about peers' inclination towards sustainable investing during an investment decision. Our results show that peer information raises the amount allocated to stock funds labeled as sustainable. This effect is primarily driven by participants initially underestimating peers' propensity to invest sustainably. Further, treated individuals indicate an increased interest in additional information on sustainable investments, primarily on risk and return expectations. However, by analyzing account-level portfolio holding data over time, we find that peer information does not affect the sustainability of investor portfolios over the months following the experiment.

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Adapted from: Grossmann, M., Hackethal, A., Laudi, M., & Pauls, T. (2023). Conform to the norm. Peer information and sustainable investments. *Working Paper*.

# 1 Introduction

People care about what their peers do or think and adjust their behavior accordingly. Building on this, previous research has shown the efficacy of providing peer information that communicates beliefs and behavior of peers as a cost-effective policy tool to alter individual behavior with the aim of reaching policy goals. For example, Allcott (2011) shows that informing households in the US<sup>1</sup> about their energy consumption, relative to peers, causes an increase in overall energy conservation levels in the short-term. However, this effect tapers off in the long-term, unless the information treatment is repeated (Allcott & Rogers, 2014).

It is intriguing to transfer these findings to design behavioral interventions in other domains. For instance, the European Commission has set out to redirect investments towards sustainable growth.<sup>2</sup> Informing retail investors about their peers' propensity to invest sustainably could be a cost-effective tool to bring about the behavior change required to reach this policy goal. However, the question of whether evidence on the effectiveness of peer information in bringing about behavior change can be transferred to an investment context is not so clear. Peer effects have been shown to be ineffective in altering financial decision-making in other domains, such as retirement saving or life insurance purchase (Lieber & Skimmyhorn, 2018). When applied in a financial decision-making context, peer information can even have counterproductive effects by decreasing savings rates of pension plan participants (Beshears et al., 2015). It may hence well be the case that peer information is not fit to alter behavior in an investment context.

In this paper, we test the effect of peer information on sustainable investment behavior. We collaborate with a universal bank and administer a field experiment with a sample of retail investors.

We allocate participants to either a control group, or to one of three treatment groups, which we expose to peer information. The (1) social treatment group receives the infor-

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<sup>1</sup>This study has been replicated outside of the US, even though lower treatment effects were reported, casting doubt on the cost-effectiveness (Andor et al., 2020).

<sup>2</sup><https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0097&from=EN>

mation that most Germans<sup>3</sup> *want to invest* in sustainable assets in the future. The (2) impact treatment group receives the information that most Germans believe that sustainable investments *can have a positive impact*, and the (3) return treatment group is exposed to the information that most German investors believe that sustainable investments *yield the same or higher returns*, compared to traditional investments. Since most investors in our sample expect the returns of sustainable investments to be low but the impact of sustainable investing to be high, it could be the case that investors react more strongly to peers' optimism on the returns of sustainable investments than to peers' optimism about the impact of sustainable investments. All treatment information that we provide is based on openly accessible information and we provide the source of this information to participants.

After receiving the information treatment, participants make a consequential investment decision, where we ask them to allocate an experimental budget of EUR 10,000 between two globally investing equity funds. While both funds are comparable in terms of investment style, the first invests conventionally without restrictions in its investment universe and the second screens out stocks of firms with unsustainable business practices. To avoid the effects of framing and participants conducting online searches for more information on the funds, we do not provide the real names of the funds during the allocation decision but give them generic names (Fund 1 and Fund 2).

In experimental studies, real decisions differ from hypothetical ones (List & Gallet, 2001). If participants expect their fund allocation to have an impact on society, it is important to realize their selection, making their choice consequential. Specifically, we invest EUR 10,000 for one randomly selected participant based on their allocation choice. This investment lasts for 6 months, and any positive return is paid out to the participant. If there is a negative return, the participant receives nothing, ensuring they can only benefit financially from participation. As shown by Charness et al. (2016), realizing the incentive of only one randomly selected participants does not bias behavior in experiments, compared to a setting in which the incentives of all participants are realized.

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<sup>3</sup>The peer group that we use are Germans, as the universe of the bank's clients mostly consists of Germans.

Our results show that peer information influences investor behavior at the aggregate level. Controlling for a wide range of demographics, preferences, and beliefs, we find that compared to the control group, retail investors in the impact, social, and return treatment groups allocate an additional EUR 429, EUR 293, and EUR 267 of their EUR 10,000 experimental budget to the sustainable fund, respectively. We therefore provide evidence that just-in-time peer information increases the willingness to purchase sustainable funds among retail investors in a statistically and economically significant way. However, the effect size is statistically the same for all three treatment groups. In summary, our results indicate that investors react to peer information while being less sensitive to the motivation of peers' inclination towards sustainable investments.

We rule out attention to sustainability as an alternative mechanism of the increased allocation to the sustainable fund in the treatment groups. All participants, including those in the control group are provided with an explanation of the concept of sustainable investing, and are asked about their general experience, knowledge, and beliefs regarding sustainable investments. Therefore, all participants receive information on sustainable investing, which shows that it is indeed the peer information component that drives the differences in allocations that we observe.

To further verify that it is a change in beliefs about peers that drives additional investments in sustainable funds, rather than attention to sustainability or experimenter demand effects (see Zizzo (2010)), we consider heterogeneity between investors. Specifically, we test whether prior beliefs about peers affect participants' response to the treatments. Before providing the peer information, we ask participants to predict peers' propensity to invest sustainably, peers' beliefs about the return of sustainable investments, and peers' beliefs about the impact of sustainable investments. We find that participants in the impact treatment group allocate more to the sustainable fund compared to the control group, regardless of their prior belief. However, the social treatment successfully increases sustainable investments only among retail investors who estimated peers' propensity to invest sustainably to be lower than stated in the provided peer information. Similarly, the return treatment only increases sustainable investments among those whose prior belief

regarding peers' expectations about the return of sustainable investments was lower than the provided information. In general, our results show that investors are more responsive to peer information if it changes their prior about the beliefs and behavior of peers. These results are in line with those of Andre et al. (2021), who show that peer information interventions only encourage pro-environmental donations, when the provided information changes the prior belief of the receiver.

We consider further implications of the provided peer information by assessing participants' motivation to seek more information on the subject of sustainable investing. As insufficient investment knowledge has been identified as a factor limiting sustainable investments (Anderson & Robinson, 2022), the increased knowledge resulting from the information search may in turn lead to more investments in sustainable funds. We therefore give investors the opportunity to ask for more information on sustainable investments (beyond the information provided in the experiment) at the end of the study. Our results show that participants across treatment groups are significantly more likely to request additional information about sustainable investments compared to the control group. Specifically, a majority of participants expresses interest in information regarding the risk and return of sustainable investments.

Over the months following the experiment, we observe participants' portfolio holdings in their accounts of the collaborating bank. Specifically, we observe changes in the sustainability of fund holdings between October 2022 (prior to the survey launch), and January 2023. We employ two sustainability definitions for investors' fund holdings. First, we make use of the definition of the Sustainable Finance Disclosures Regulation (SFDR), which has been introduced by the European Commission in order to standardize the definition of sustainable funds. Specifically, we define a fund as "sustainable", if it can be categorized as article 8 or article 9 fund according to the SFDR and as "conventional" otherwise. Second, we use the *Morningstar* globe rating. Investors with preferences for sustainability have been shown to invest a larger share into those funds that have five globes (Hartzmark & Sussman, 2019). Therefore, we define a fund as sustainable if it has five *Morningstar* globes. We find that although just-in-time peer information im-

pacts sustainable investment behavior, it does not influence long-term trading behavior, as participants in the peer information treatment groups do not significantly increase the sustainability of their fund holdings, relative to participants in the control group.

Our results have implications for theory and practice. First, we contribute to the literature on retail sustainable investments. A growing stream of literature identifies non-pecuniary factors as drivers of sustainable investments, where retail investors derive utility from investing in line with their social preferences (Bauer et al., 2021; Białkowski & Starks, 2016; Heeb et al., 2023; Humphrey et al., 2020; Riedl & Smeets, 2017). Investors are willing to pay more for sustainable investments by accepting higher fees (Anderson & Robinson, 2022; Laudi et al., 2022; Riedl & Smeets, 2017) or by accepting lower expected returns (Barber et al., 2021; Pástor et al., 2022). We identify the utility of aligning one’s behavior with the planned actions of peers as another non-pecuniary factor driving sustainable investments.

Second, we contribute to the literature on the efficacy of providing peer information to alter behavior. People derive negative utility from acting against social norms (Levitt & List, 2007). As a result, researchers have explored to what extent peer information can be used to alter financial behavior such as retirement saving (Bauer et al., 2022; Beshears et al., 2015; Duflo & Saez, 2002, 2003; Lieber & Skimmyhorn, 2018) as well as non-financial behavior such as energy conservation (Allcott, 2011), offsetting the CO<sub>2</sub> emissions of a flight (Bernard et al., 2022), the provision of useful reviews to retailers (Burtch et al., 2018), and political voting (Gerber & Rogers, 2009). We show that disclosing related others’ tendencies to invest sustainably as well as peers’ beliefs about the impact and return of sustainable investments during an investment decision increase retail investors’ likelihood to invest more sustainably themselves. However, this information does not increase sustainable investments outside of this decision environment.

Finally, our results have implications for practice and policy making. Results from field experiments are often applied to inform public policy (Gneezy & Imas, 2017; Levitt & List, 2009). Our results provide a policy tool for the European Commission’s action plan

to increase sustainable investments. Following a recent amendment to MiFID II,<sup>4</sup> financial advisors are required to advise their clients on the sustainability of their investments and peer information can be integrated into this conversation.

## 2 Experimental design

### 2.1 Invitation to our experiment

We cooperate with a German universal bank that offers a large variety of retail products and services. We invite current clients of the bank via e-mail to participate in an online experiment. The invitation e-mail includes a direct link to the experiment. To be invited to the study, participants must (i) be clients at the bank, (ii) be older than 18 years, and (iii) have given permission to be contacted via email. Before being administered in the fall of 2022, the study was pre-registered<sup>5</sup> and granted ethics approval at the ethics committee of one of the authors' university. Upon completion of the experiment, subjects received a participation fee.

### 2.2 Experimental setup

The experimental instructions were provided in German. The study starts with some general questions about participants' prior knowledge about investing, investment preferences, and investment behavior. We then provide all participants with an explanation of the concept of sustainable investing and elicit participants' experience, knowledge, and beliefs regarding sustainable investments.

We then randomly allocate participants to one of three treatment groups or a control group. The treatment groups are provided with a graphic containing one of the following sentences:

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<sup>4</sup>Markets in Financial Instruments Directive 2014 (2014/65/EU) commonly known as MiFID II (Markets in financial instruments directive II), is a legal act of the European Union. Together with Regulation (EU) No. 600/2014 it provides a legal framework for securities markets, investment intermediaries, and trading venues for the member states of the European Economic Area. Its main objectives are to increase competition and investor protection, and level the playing field for market participants in investment services.

<sup>5</sup>At the AEA RCT registry under the ID AEARCTR-0010353.



- **Impact treatment:** “About 70 % of Germans say that sustainable investments can have an impact.”
- **Social treatment:** “About 70 % of Germans say that they intend to invest in sustainable investments in the future.”
- **Return treatment:** “About 70 % of Germans say that sustainable investments yield the same or higher returns.”

That is, while all participants receive information on sustainable investments, all participants, except those in the control group are additionally exposed to peer information with varying content. The peer information is provided in a single sentence, which has been shown to be sufficient to alter individual financial behavior (Bott et al., 2020). Further, the information that is provided is based on openly available results from surveys conducted by Allianz Global Investors (2019), Forsa (2015), and LBBW Research (2021) and we provide participants with links to these sources if they wish to verify the information. The wording and appearance of the peer information messages is consistent, allowing us to isolate the effect of the content of the provided information, similar to Andre et al. (2021).

## 2.3 Fund allocation lottery

Participants allocate an experimental investment budget of EUR 10,000 between two funds. We select both funds such that they differ solely in whether or not they screen companies by sustainability ratings. Both funds invest globally in high-dividend-yield stocks, belong to the same risk class, and are managed by the same firm. However, while the conventional fund considers all companies world-wide, the sustainable fund only invests in companies that have an above-average ESG score. Further, certain industries that do not meet the sustainability criteria, such as arms manufacturers or tobacco companies, are excluded.

In experimental studies, participants’ behavior has been shown to differ when making real versus hypothetical decisions (List & Gallet, 2001). Since having a positive impact is

an important decision criterion to sustainable investors, we make the investment decision consequential. Specifically, we invest the amount of EUR 10,000 for one randomly selected participant after the closure of the survey according to his/her allocation choice in the lottery question for a 6-month period. We pay out any positive return on investment at the end of the holding period net of the principal endowment and any transaction costs or fund management fees accrued over the holding period. In case of a negative return, the payout to the randomly selected participant is zero such that participants only have the chance to financially gain from their participation.

## 3 Sample and methodology

### 3.1 Sample

We reach out to approximately 200,000 customers of the collaborating German universal bank to participate in our survey. We invite both clients who already invest in the stock market and those who have expressed interest in investing in the stock market to the bank. 5,198 start our survey and 3,586 (69.0%) complete it.

We exclude 375 participants who fail to answer both comprehension questions correctly.<sup>6</sup> Further, we exclude 66 survey respondents from our sample that belong to either the fastest or slowest 1% of respondents to complete the survey. Finally, we exclude 148 survey respondents who take less than 25 seconds on the fund allocation survey question. Our final sample comprises 3,089 complete survey responses.

Table B2 reflects the summary statistics of the final sample after the aforementioned exclusions. On average, participants allocate more than half of the EUR 10,000 principal endowment to the sustainable fund in the corresponding allocation decision question. The average participant is 49 years old. 63% of the participants are male and 55% are married. 47% of the participants hold a college degree, 33% have children, 19% are retired, and 2% are unemployed. The mean household size amounts to roughly 2.4 people.

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<sup>6</sup>See Table B1 for the description and wording of the comprehension questions.

## 3.2 Empirical strategy

To test whether our treatments affect retail investors' allocation decisions, we estimate a set of three OLS regression models in the following form:

$$\text{Allocation to sustainable fund}_i = \alpha + \beta_i * \text{Treatment Group}_i + \gamma_{i,j} * \chi_{i,j} + \epsilon_i, \quad (3.1)$$

where *Allocation to sustainable fund<sub>i</sub>* represents the EUR value which participant *i* allocates to the sustainable fund. *Treatment Group<sub>i</sub>* represents one of three dummy variables which is equal to one if respondent *i* is in the (i) impact, (ii) social, or (iii) return treatment group and zero for a member of the control group.

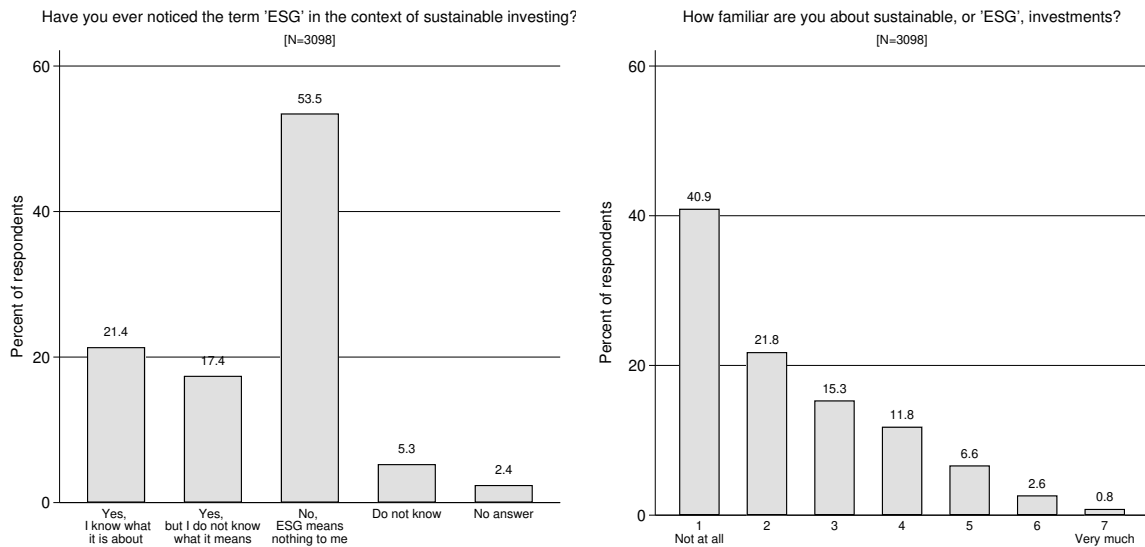
$\chi_{i,j}$  represents a vector of control variables. First, we include a comprehensive set of the participants' preferences that have been shown to be related to individual (sustainable) investment decisions. In particular, we include measures for the participants', investment horizon, risk attitude (Dohmen et al., 2010), general trust (Guiso et al., 2008), patience (Becker et al., 2012), altruism (Falk et al., 2018, 2023), self-control (Falk et al., 2018, 2023), and a dummy that indicates whether an individual engages in charitable behavior. Further, we include a set of investment motives, i.e., what participants look for when conducting investment decisions. Here, we include measures on how important high returns, diversification, dividends, low risk, low fees, and sustainability are for the participants' investment decisions. Finally, we add a comprehensive set of demographic variables, i.e., the participants' age, age-squared, gender, marital status, household size, parental status, education level, and employment status. For variable definitions, please refer to Table B1.

## 4 Results

### 4.1 General knowledge and beliefs about sustainable investments

In a first descriptive analysis, we examine the level of participants' knowledge about sustainable investments. Figure 3.1 shows the respondents' answers to two survey questions.

The first question elicits whether respondents know the term ‘ESG’. 53.5% of the respondents are not familiar with it while 17.4% have heard it but do not know its meaning and only 21.4% state that they know what it means. The second question elicits how participants rate their own knowledge of sustainable investments. While most respondents consider their knowledge to be poor, only around 10.0% consider themselves familiar with sustainable investments.

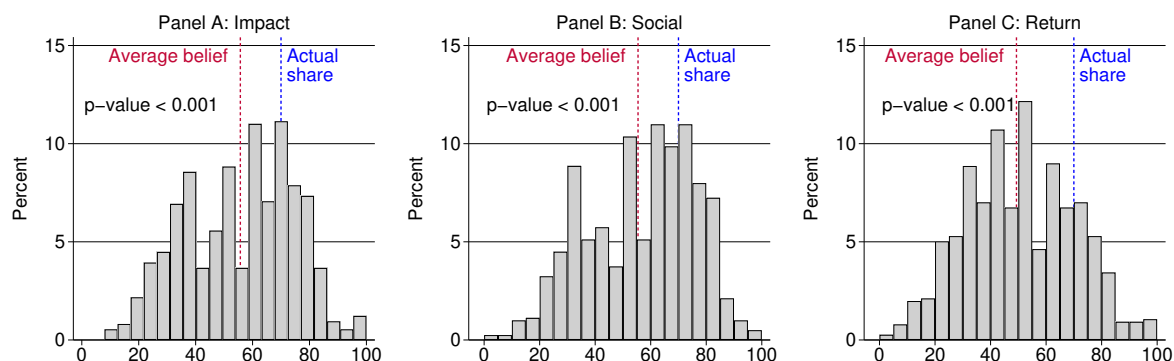


**Figure 3.1:** Respondents' ESG knowledge

*Notes: This figure shows the results of two survey questions which assess the respondents' knowledge of the term 'ESG and sustainable investments.*

Figure 3.2 presents respondents' prior beliefs about their peers' attitudes towards sustainable investments. On average, members of the impact treatment group estimate that about 55.7% of their peers believe that sustainable investments can have an impact. Similarly, members of the social treatment group underestimate the share of their peers' willingness to invest sustainably at 55.4%. Members of the return treatment group underestimate their peers' assessment of sustainable investment returns even more intensely. On average, participants believe that only 49.3% of their peers believe that sustainable investments yield the same or higher returns. Hence, participants in all three treatment groups on average initially underestimate their peers' inclinations towards sustainable investments, where the difference to the true value of 70% is statistically significant at

the 0.1% level in all cases.



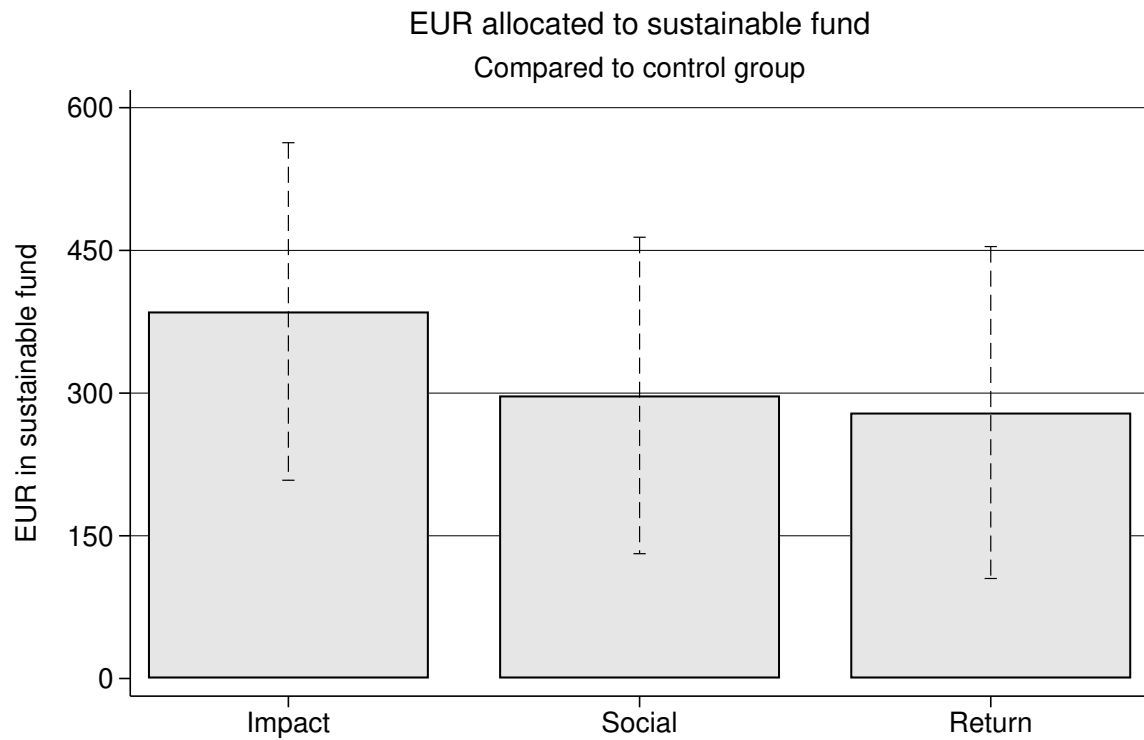
**Figure 3.2:** Respondents' priors in sustainable investments

*Notes: The red dotted lines in this figure show the results of our survey questions assessing the respondents' priors with respect to the impact, social and return treatment dimensions. Panel A shows the average response of those in the impact treatment group to the question "What percentage of respondents do you think indicated that sustainable investments make an important contribution, e.g., to environmental and climate protection?". Panel B shows the average response of those in the social treatment group to the question "What percentage of respondents do you think indicated that they would like to invest in sustainable investments in the future?". Panel C shows the average response of those in the return treatment group to the question "What do you estimate, what percentage of respondents indicated that you would get the same or higher returns with sustainable investments?". All information treatments indicate a share of 70% in all three cases, which is indicated by the blue dotted line.*

## 4.2 Peer information increases sustainable investments

We now investigate whether the treatments have the predicted effect on investor behavior. Overall, investors in our sample allocate EUR 5,816 of their EUR 10,000 experimental budget to the sustainable fund (see Table B2). We run a series of two-sided t-tests where we compare the allocations to the sustainable fund across the three treatment groups with the corresponding allocations in the control group. Figure 3.3 presents the results and shows that on average all three treated groups allocate more of the EUR 10,000 principal endowment to the sustainable fund than the control group. The observation of higher allocations compared with the control group is most pronounced for the impact treatment group followed by the social treatment group and the return treatment group. To check the statistical significance of the deltas vis-à-vis the control group, we conduct a series of two-tailed t-tests. The results are documented in Table 3.1. Participants in the

“impact”, “social”, and “return” treatment groups invest significantly higher amounts in the sustainable fund compared to the control group, whereby the differences are statistically significant at the 1% level for the impact treatment group and at the 5% level for the latter two.



**Figure 3.3:** Allocation to the sustainable fund, by treatment

*Notes: This figure shows the EUR amount allocated to the sustainable fund, relative to the control group for all three treatment groups (“impact”, “social” or “return”). The error bars represent the 95% confidence intervals.*

**Table 3.1:** Allocation to the sustainable fund, by treatment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Allocation to the sustainable fund in EUR	Treatment Mean	SD	Control Mean	SD	Diff	t-Stat	p
Treatment: Impact	5,964.67	2,451.46	5,578.88	2,604.59	385.79	2.99	0.00***
Treatment: Social	5,876.40	2,398.11	5,578.88	2,604.59	297.52	2.38	0.02**
Treatment: Return	5,858.47	2,443.50	5,578.88	2,604.59	279.58	2.18	0.03**

*Notes: This table shows the average EUR amount allocated to the sustainable fund out of the principal endowment of EUR 10,000, by treatment group. Columns 1 and 2 show the mean and standard deviation of the allocation to the sustainable fund in EUR, by treatment. Columns 3 and 4 show the mean and standard deviation of the control group's allocation to the sustainable fund in EUR. Column 5 reports the allocation to the sustainable fund in EUR, relative to the control group, by treatment. Columns 6 and 7 show the outcome of a t-test that reports whether the EUR differences shown in column 5 are significantly different from 0. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively.*

To check whether our results hold in a multivariate setup, we run a series of linear regressions where we employ the EUR amount allocated to the sustainable fund as the dependent variable as described in section 3.2. Table 3.2 presents the results of these regressions and confirms the univariate results. The positive coefficients imply that all three treated groups of participants invest a larger proportion of the EUR 10,000 principal endowment in the sustainable fund than members of the control group. Members of the impact treatment group invest EUR 429 more in the sustainable fund than members of the control group, members of the social treatment group EUR 293 and members of the return treatment group EUR 267. Altogether, the results show that peer information increases allocations to sustainable investments.

### 4.3 The efficacy of peer information depends on investors' priors

Peer information interventions have been shown to encourage pro-environmental behavior only when the provided information changes the prior of the receiver (Andre et al., 2021). In our case, if participants' beliefs about related others are in line with the information provided as part of the intervention, the information treatment is unlikely to change individual behavior. When participants have overestimated the propensity of related others to invest sustainably, the treatment may even work in the opposite direction, as investors decrease the share invested sustainably to conform to a social norm.

To test whether the treatment works differently for participants with different prior beliefs, we elicit participants' expectations about the presented peer information before showing the treatments. That is, we inform participants that we will show them the outcome of a survey with over 1,000 participants, who are from all over Germany and thus reflect the views and attitudes of Germans well. We then ask those in the impact treatment group: "What percentage of respondents do you think indicated that sustainable investments make an important contribution, e.g., to environmental and climate protection?". We ask those in the social treatment group: "What percentage of respondents do you think indicated that they would like to invest in sustainable investments in the



**Table 3.2:** Just-in-time peer information increases sustainable investments

	(1)	(2)	(3)
Dependent variable:	Allocation to the sustainable fund in EUR		
Treatment: Impact	429.187*** (116.721)		
Treatment: Social		293.257*** (112.366)	
Treatment: Return			267.045** (118.617)
Preferences	Yes	Yes	Yes
Investment motives	Yes	Yes	Yes
Demographics	Yes	Yes	Yes
$\alpha$	2,441.652*** (803.385)	3,051.300*** (757.741)	2,608.077*** (803.038)
Observations	1,471	1,531	1,485
R <sup>2</sup>	0.243	0.253	0.223

*Notes: This table shows the outcome of three iterations of regression specification 3.1. The EUR amount (out of the principal endowment of EUR 10,000) allocated to the sustainable fund constitutes the dependent variables. Dummy variables that are equal to 1 if a participant is in the “impact”, “social”, or “return” treatment group and 0 if a participant is in the control group represent our main explanatory variables. We add control variables on preferences, investment motives and participant demographics. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust standard errors are given in parentheses.*

future?”. We ask those in the return treatment group: "What percentage of respondents do you think indicated that you would get the same or higher returns with sustainable investments?”. In all cases, the response was given on a scale from 0 to 100 in one-unit steps.

We categorize participants into those who underestimated the presented information (response  $< 70$ ) and those who correctly estimated or overestimated the presented information (response  $\geq 70$ ). We then re-run regression specification 3.1 separately for these two categories.

The results are shown in Table 3.3. Those in the impact treatment group allocate more to the sustainable fund, relative to the control group, irrespective of their prior. For participants in the other treatment groups, the treatment only affects those participants who underestimated the presented information. The most pronounced coefficient difference by prior group can be observed for the return treatment group. For investors with a low prior belief regarding peers’ return expectations on sustainable investments, the provided information increases the allocated amount to the sustainable fund by EUR 314. For investors who already had a high prior belief about peers’ return expectations on sustainable funds, the peer information treatment does not change the allocation. Similarly, for those with a low prior belief, the social treatment significantly increases the amount allocated to the sustainable fund by EUR 283, while the treatment does not influence the allocation of those with a high prior belief.

#### **4.4 Peer information increases investor demand for information on sustainable investments**

So far, we have established that peer information has an effect on investor behavior in the short-term. That is, when peer information is shown right before an allocation decision, retail investors allocate a larger share to a sustainable fund, compared to an otherwise similar conventional fund.

We now consider further implications of peer information on individual investor behavior. Individuals’ investment behavior may be affected in the long-term, if the treatments

cause an increased motivation to acquire more information on the topic of sustainable investing. While it is difficult to observe what information participants actually look at, we ask participants at the end of the survey whether they are interested in being provided with additional information about sustainable investments. Participants can submit their interest in receiving additional information on (1) attitudes of Germans towards sustainable investments (social information), (2) expected return and risk of sustainable information (return information), (3) how to structure investments in a way that causes firms to act more sustainably (impact information), or (4) none of the above.

**Table 3.3:** The efficacy of just-in-time peer information depends on investors' priors

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Allocation to the sustainable fund in EUR					
	Prior < 70			Prior >= 70		
Treatment: Impact	392.754*** (126.799)			507.633*** (182.935)		
Treatment: Social		282.679** (124.522)			259.502 (165.887)	
Treatment: Return			313.684** (125.214)			59.874 (220.010)
Preferences	Yes	Yes	Yes	Yes	Yes	Yes
Investment motives	Yes	Yes	Yes	Yes	Yes	Yes
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
$\alpha$	2,474.867*** (839.898)	2,992.256*** (803.968)	2,271.431*** (830.363)	2,004.533** (1,013.875)	2,332.009** (983.010)	2,475.878** (1,039.290)
Observations	1,255	1,303	1,352	983	995	900
R <sup>2</sup>	0.256	0.259	0.223	0.263	0.276	0.283

Notes: This table shows the outcome of six OLS regressions. We split participants in the treatment groups into sub-samples, according to their stated prior beliefs about the presented peer information. We categorize participants into those who underestimated the presented information (response < 70) and those who correctly estimated or overestimated the presented information (response >= 70). Columns 1, 2, and 3 include participants of the former category in the impact, social, and return treatments, respectively, as well as participants in the control group. Columns 4, 5, and 6 include participants of the latter category in the impact, social, and return treatments, respectively, as well as participants in the control group. The EUR amount allocated to the sustainable fund constitutes the dependent variable. Dummy variables that are equal to 1 if a participant is in the “impact”, “social”, or “return” treatment group and 0 if a participant is in the control group represent our main explanatory variables. We add control variables on preferences, investment motives and participant demographics (See Table B1 for more information on the control variables). \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust standard errors are given in parentheses.

Table 3.4 shows the outcome of three OLS regressions with a binary dependent variable that is equal to 1 if participants indicate being interested further information about sustainable investments and 0 otherwise. Participants in all three treatment groups are significantly more likely to ask for additional information, compared to the control group. We additionally consider what type of information investors are most interested in. The largest share of participants (43.9%) asks for additional information on the risk and return of sustainable investments, followed by additional information on how to have an impact with sustainable investments (20.2%) and additional information on what peers think about sustainable investments (11.2%).

#### **4.5 Peer information does not increase sustainable investments outside the decision environment**

To get a better sense of the long-term effects of the peer information treatments, we observe participants' portfolio holdings over time. Specifically, we explore, whether the proportion of sustainable funds over conventional funds in participants' portfolios changes between October 2022 (prior to the launch of the survey) and January 2023.

We apply two different definitions of sustainability in investors' fund holdings. First, we make use of the definition of the SFDR. Specifically, we define a fund as "sustainable", if it falls under article 8 or article 9 according to the SFDR and as "conventional" otherwise. Second, we use the globe rating of the platform *Morningstar*. Sustainably-minded investors have been shown to invest a larger share into those funds that have five globes (Hartzmark & Sussman, 2019). Therefore, we define a fund as "sustainable", if it has five globes according to the *Morningstar* sustainability rating and as "conventional" otherwise.

Table 3.5 shows the outcome of two sets of OLS regressions with the changes in the proportion of sustainable funds as dependent variables. All coefficients of the treatment dummies are not significantly different from 0. Therefore, while just-in-time peer information affects sustainable investment behavior, it does not affect trading behavior outside of the decision environment.

**Table 3.4:** Peer information increases investor demand for information on sustainable investments

	(1)	(2)	(3)
Dependent variable:	Information demanded		
Treatment: Impact	0.075*** (0.022)		
Treatment: Social		0.068*** (0.021)	
Treatment: Return			0.048** (0.022)
Preferences	Yes	Yes	Yes
Investment motives	Yes	Yes	Yes
Demographics	Yes	Yes	Yes
$\alpha$	0.428*** (0.151)	0.274** (0.140)	0.393** (0.153)
Observations	1,453	1,510	1,470
R <sup>2</sup>	0.113	0.125	0.119

*Notes: This table shows the outcome of three OLS regressions. The dependent variable is binary and is equal to 1 if participants indicated being interested further information about sustainable investments and 0 otherwise (See Table B1 for the exact wording of the elicitation). Dummy variables that are equal to 1 if a participant is in the “impact”, “social”, or “return” treatment group and 0 if a participant is in the control group represent our main explanatory variables. We add control variables on preferences, investment motives and participant demographics (See Table B1 for more information on the control variables). \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust standard errors are given in parentheses.*

**Table 3.5:** Peer information does not increase sustainable investments in the long-term

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Change in the sustainability of participants' portfolios					
	Article 8 & 9 funds			5 globe funds		
Treatment: Impact	-0.003 (0.003)			-0.003 (0.002)		
Treatment: Social		-0.002 (0.004)			-0.003 (0.002)	
Treatment: Return			-0.001 (0.005)			0.000 (0.003)
Preferences	Yes	Yes	Yes	Yes	Yes	Yes
Investment motives	Yes	Yes	Yes	Yes	Yes	Yes
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
$\alpha$	-0.021 (0.023)	-0.041 (0.031)	0.038 (0.032)	-0.007 (0.015)	-0.007 (0.015)	0.016 (0.022)
Observations	1,471	1,531	1,485	1,471	1,531	1,485
R <sup>2</sup>	0.015	0.017	0.018	0.010	0.009	0.009

*Notes: This table shows the outcome of six OLS regressions. We define funds in individuals' portfolios as "sustainable" or "conventional". In columns 1, 2, and 3, we define a fund as "sustainable", if it can be categorized as article 8 or article 9 fund, according to the definition of the Sustainable Finance Disclosures Regulation (SFDR) of the European Commission and as "conventional" otherwise. In columns 4, 5, and 6, we define a fund as "sustainable", if it has five globes according to the Morningstar sustainability rating and as "conventional" otherwise. The dependent variable in all columns is the change in the proportion of sustainable funds in participants' portfolios between October 2022 and January 2023. Dummy variables that are equal to 1 if a participant is in the "impact", "social", or "return" treatment group and 0 if a participant is in the control group represent our main explanatory variables. We add control variables on preferences, investment motives and participant demographics (See Table B1 for more information on the control variables). \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust standard errors are given in parentheses.*

## 5 Conclusion

In a field study, we show that when exposing retail investors to peer information that portrays sustainable investing as a social norm, these investors allocate a larger share to sustainable investment funds themselves. This is the case when providing investors with information about (a) peers' propensity to invest sustainably (social treatment), (b) peers' beliefs regarding the impact (impact treatment) and (c) peers' beliefs regarding the expected return (return treatment) of sustainable investments.

Participants in the impact treatment group invest more sustainable than participants in the control group, independent of participants' prior belief about the peer information shown. However, for respondents in the social and the return treatment groups, the information treatment is only effective when the reported share of investors with a positive attitude towards sustainable investing is higher than participants' prior expectations.

Our results create a starting point for the design of interventions intended to break down obstacles to invest in sustainable investments. Taken together, our findings suggest that retail investors in our sample are susceptible to simple peer information on sustainable investments and ready to change their behavior as a response. This indicates that the MiFID II amendment that requires financial institutions to talk to their clients about the sustainability of their investments may be an effective way to change behavior in line with the policy goal of increasing the sustainability of investments if executed correctly and with the right information. Our results show that not all investors respond equally to peer information treatments with those being affected the most, who have not previously perceived sustainable investment to be a social norm. Hence, our findings can be useful for financial advisors to help their clients overcome obstacles to invest into sustainable financial assets in a targeted and customer-specific approach.

Further, our results open interesting avenues for future research. While the interventions that we use affect investor behavior at the point of decision, they do not have a long-term impact on investor behavior. This is in line with previous research on peer information interventions, which suggests little success for the long-term (see, e.g. Bauer et al. (2022) or the discussion by Chater and Loewenstein (2023)). Future studies may



explore whether continuous repetition of the treatment may extend the duration of the treatment effect, which has proven to evoke long-term behavior change Allcott and Rogers (2014).

# B Appendix

**Table B1:** List of variables

Variable name	Description
Allocation to the sustainable fund in EUR	<p>The EUR amount invested in the ESG fund by survey participants when given the choice to allocate EUR 10,000 in (a) a sustainable fund or (b) an alternative conventional fund. Corresponding instructions and survey question (translated from German): "Please read the following information carefully. From all participants, we will choose one at random. If you are selected, your decision in the next question will be a real decision. That is, EUR 10,000 will be invested for six months according to your selection. At the end of the six months, the investment will be sold and you will receive the profit from the sale (including accrued dividends). You will not be charged any taxes or fees. An example: If you are drawn and the value of your investment increases by 5% in the six months, you will receive EUR 500 from us. If the price stays the same or falls below EUR 10,000, you receive EUR 0.</p> <p>You can divide the EUR 10,000 between two funds. We have selected the funds so that they differ only in their sustainability orientation. Both funds invest globally in equities, primarily in highly capitalized stocks that are expected to have a higher dividend yield than the market average.</p> <ul style="list-style-type: none"> <li>• Fund 1 considers all companies worldwide.</li> <li>• Fund 2 only considers sustainable companies. This means that Fund 2 excludes stocks of firms with very low ESG scores. Further, certain industries that do not meet the sustainability criteria, such as arms manufacturers or tobacco companies, are excluded.</li> </ul> <p>Please choose how you want to divide the EUR 10,000 between the two funds."</p>
Change in the sustainability of participants' portfolios: 5 globe funds	<p>The change in the proportion of sustainable funds in participants' portfolios between October 2022 and January 2023. A fund is defined as "sustainable", if it has five globes according to the <i>Morningstar</i> sustainability rating and as "conventional" otherwise.</p>
Change in the sustainability of participants' portfolios: Article 8 & 9 funds	<p>The change in the proportion of sustainable funds in participants' portfolios between October 2022 and January 2023. A fund is defined as "sustainable", if it can be categorized as article 8 or article 9 fund according to the Sustainable Finance Disclosures Regulation (SFDR) and as "conventional" otherwise.</p>
Comprehension question 1 (d)	<p>Dummy variable that equals one if a respondent answered attention question 1 correctly and 0 otherwise. Corresponding survey question (translated from German): "Who was interviewed in the survey described above? Please select only one of the following answers:</p> <p><input type="checkbox"/> Participants from Germany [correct]</p> <p><input type="checkbox"/> Participants from all over Europe</p> <p><input type="checkbox"/> Participants from all over the world"</p>
Comprehension question 2 (d)	<p>Dummy variable that equals one if a respondent answered attention question 2 correctly and 0 otherwise. Corresponding survey question (translated from German): Participants of the just mentioned survey were asked...</p> <p><input type="checkbox"/> ...how they assess the impact of sustainable investments, for example on the environment (impact treatment group), whether they want to invest in sustainable investments in the future (social treatment group), about their expectations concerning the return of sustainable investments (return treatment group). [correct]</p> <p><input type="checkbox"/> ... how they assess the impact of risky assets, for example on the environment (impact treatment group), whether they want to invest in risky assets in the future (social treatment group), about their expectations concerning the return of risky assets (return treatment group).</p> <p><input type="checkbox"/> ... how they assess the impact of short-term investments, for example on the environment (impact treatment group), whether they want to invest in short-term investments in the future (social treatment group), about their expectations concerning the return of short-term investments (return treatment group)."</p>
Demographic: Age	Participants' self-reported age.
Demographic: Children (d)	Dummy variable that equals one if children live in the participant's household, zero otherwise.
Demographic: College degree (d)	Dummy variable that equals one if the respondent has a college degree, zero otherwise.
Demographic: Household Size	Number of people living in the participant's household.
Demographic: Male (d)	Dummy variable that equals one if the respondent is male, zero otherwise.
Demographic: Married (d)	Dummy variable that equals one if the respondent is married, zero otherwise.
Demographic: Retired (d)	Dummy variable that equals one if the respondent is in retirement, zero otherwise.
Demographic: Self-employed (d)	Dummy variable that equals one if the respondent is self-employed, zero otherwise.
Demographic: Unemployed (d)	Dummy variable that equals one if the respondent is unemployed, zero otherwise.
Information demanded (d)	<p>Dummy variable that equals one if the respondent reported being interested in further information about sustainable investments. Corresponding survey question (translated from German): "We plan to create and distribute tailored information sheets on the various topics related to sustainable investing. Which of the following topics would you be interested in? Please select only one of the following answers:"</p>

Variable name	Description
	<input type="checkbox"/> How can I use my investments to influence companies to behave more sustainably? [Impact information] <input type="checkbox"/> What do Germans think about sustainable investments [Social information] <input type="checkbox"/> What is the risk / return of sustainable investments [Return information] <input type="checkbox"/> None of the three topics [No information]
Investment motive: High return	An ordinal variable that is drawn from the response to the question (translated from German): "How important are the following aspects to you when making investment decisions? – High return". The response was given on a scale from 1 (Not at all important) to 7 (Very important).
Investment motive: Diversification	An ordinal variable that is drawn from the response to the question (translated from German): "How important are the following aspects to you when making investment decisions? – Diversification". The response was given on a scale from 1 (Not at all important) to 7 (Very important).
Investment motive: Dividends	An ordinal variable that is drawn from the response to the question (translated from German): "How important are the following aspects to you when making investment decisions? – Dividends". The response was given on a scale from 1 (Not at all important) to 7 (Very important).
Investment motive: Low risk	An ordinal variable that is drawn from the response to the question (translated from German): "How important are the following aspects to you when making investment decisions? – Low risk". The response was given on a scale from 1 (Not at all important) to 7 (Very important).
Investment motive: Low fees	An ordinal variable that is drawn from the response to the question (translated from German): "How important are the following aspects to you when making investment decisions? – Low fees". The response was given on a scale from 1 (Not at all important) to 7 (Very important).
Investment motive: Sustainability	An ordinal variable that is drawn from the response to the question (translated from German): "How important are the following aspects to you when making investment decisions? – sustainability". The response was given on a scale from 0 (Not at all important) to 7 (Very important).
Preference: Investment horizon	An ordinal variable that is drawn from the response to the question (translated from German): "When you make investment decisions, for example, when investing in stocks or funds: How would you describe your investment horizon?" The response was given on a scale from 1 (Very short-term) to 7 (Very long-term).
Preference: Risk attitude	An ordinal variable that is drawn from the response to the question (translated from German): "How would you rate your willingness to take risks in financial matters" The response was given on a scale from 1 (Not at all willing to take risks) to 7 (Very willing to take risks).
Preference: Trust	An ordinal variable that is drawn from the response to the question (translated from German): "Generally speaking, would you say that most people can be trusted or that you have to be very careful in dealing with people?" The response was given on a scale from 1 (People cannot be trusted) to 7 (People can be trusted).
Preference: Patience	An ordinal variable that is drawn from the response to the question (translated from German): "Are you generally an impatient person, or someone who always shows great patience?" The response was given on a scale from 1 (Very impatient) to 7 (Very patient).
Preference: Altruism	An ordinal variable that is drawn from the response to the question (translated from German): "How willing are you to give to good causes without expecting anything in return?" The response was given on a scale from 1 (Not at all willing) to 7 (Very willing).
Preference: Self-control	An ordinal variable that is drawn from the response to the question (translated from German): "How willing are you to give up something that is beneficial for you today in order to benefit more from that in the future?" The response was given on a scale from 1 1 (Not at all willing) to 7 (Very willing).
Preference: Charity (d)	A dummy variable that is drawn from the response to the question (translated from German): "Do you donate to charity on a regular basis?" It equals one if a participant responded "yes", else zero.
Prior: Impact	The response given to the following question (translated from German): "In a large-scale study, over 1,000 people were surveyed on the subject of sustainable financial investments. The aim of the survey was to understand what Germans think about sustainable financial investments. The respondents come from all over Germany and thus reflect the views and attitudes of Germans well. Among other things, participants were asked how they assess the positive impact of sustainable investments, for example on the environment. What percentage of respondents do you think indicated that sustainable investments make an important contribution, e.g., to environmental and climate protection?" The response was given on a scale from 0 to 100 in one-unit steps.
Prior: Social	The response given to the following question (translated from German): "In a large-scale study, over 1,000 people were surveyed on the subject of sustainable financial investments. The aim of the survey was to understand what Germans think about sustainable financial investments. The respondents come from all over Germany and thus reflect the views and attitudes of Germans well. Among other things, participants were asked whether they would like to invest in sustainable investments in the future. What percentage of respondents do you think indicated that they would like to invest in sustainable investments in the future?" The response was given on a scale from 0 to 100 in one-unit steps.
Prior: Return	The response given to the following question (translated from German): "In a large-scale study, over 1,000 people were surveyed on the subject of sustainable financial investments. The aim of the survey was to understand what Germans think about sustainable financial investments. The respondents come from all over Germany and thus reflect the views and attitudes of Germans well. Among other things, participants were asked how they assess the return opportunities of sustainable investments. What percentage of respondents do you think indicated that you would get the same or higher returns with sustainable investments?" The response was given on a scale from 0 to 100 in one-unit steps.
Treatment: Impact	Dummy variable that equals one for the respondent in the "impact" treatment group. It equals zero for the respondents in the control group. Members of the "impact" treatment group are provided with the "impact" information treatment before conducting the allocation decision.
Treatment: Social	Dummy variable that equals one for the respondent in the "social" treatment group. It equals zero for the respondents in the control group. Members of the "social" treatment group are provided with the "social" information treatment before conducting the allocation decision.
Treatment: Return	Dummy variable that equals one for the respondent in the "return" treatment group. It equals zero for the respondents in the control group. Members of the "return" treatment group are provided with the "return" information treatment before conducting the allocation decision.

**Table B2:** Descriptive summary statistics on final participant sample after exclusions

Variable	mean	sd	min	p50	max	N
Age	48.76	15.62	18	49	82	3,098
Allocation to the Sustainable Fund in EUR	5,816	2,48	0	6	10	3,098
Children (d)	0.327	0.469	0	0	1	3,098
College Degree (d)	0.468	0.499	0	0	1	3,098
Household Size	2.358	1.122	1	2	5	3,098
Investment Motive: High Returns	5.356	1.396	1	5	7	3,098
Investment Motive: Diversification	4.521	1.539	1	4	7	3,098
Investment Motive: Dividend	4.682	1.507	1	5	7	3,098
Investment Motive: Low Risk	5.530	1.391	1	6	7	3,098
Investment Motive: Low Fees	5.427	1.526	1	6	7	3,098
Investment Motive: Sustainability	4.397	1.920	1	5	7	3,098
Male (d)	0.629	0.483	0	1	1	3,098
Married (d)	0.546	0.498	0	1	1	2,953
Preference: Investment Horizon	4.931	1.548	1	5	7	3,098
Preference: Risk Attitude	3.547	1.500	1	4	7	3,098
Preference: Trust	2.997	1.561	1	3	7	3,098
Preference: Patience	4.454	1.587	1	5	7	3,098
Preference: Altruism	4.792	1.407	1	5	7	3,098
Preference: Self-control	5.037	1.382	1	5	7	3,098
Preference: Charity (d)	0.501	0.500	0	1	1	3,098
Prior: Impact	55.70	19.21	8	60	100	736
Prior: Social	55.43	19.46	0	60	100	801
Prior: Return	49.32	19.62	0	50	100	756
Retired (d)	0.189	0.392	0	0	1	3,098
Self-employed (d)	0.0468	0.211	0	0	1	3,098
Unemployed (d)	0.0210	0.143	0	0	1	3,098



## Chapter 4

# Dirty Money. The impact of ESG news sentiment on dividend consumption

### Abstract

Using a large European bank dataset, we show that in response to negative ESG news exposing controversial business practices of dividend-paying firms, investors amplify their consumption from dividend income, compared to dividends from non-controversial firms. This increased consumption is immediate, occurring on the dividend payout day. We control for selection effects and rule out attention and adjustments to the dividend payout size as mechanisms. Instead, our results are consistent with laboratory evidence showing that people who earn money by violating social norms counter resulting negative emotions with mood-enhancing behavior, such as increased consumption. This aligns with the principles of emotion regulation theory. We demonstrate the applicability of emotion regulation theory outside of the laboratory in an important real-world context, financial markets.

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Adapted from: Laudi, M., Pauls, T., & Smeets, P. (2023). Dirty Money. The impact of ESG news sentiment on dividend consumption. *Working Paper*. Available at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4574351](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4574351)

# 1 Introduction

Does the current public sentiment about a company's impact on society affect how investors consume from dividend income? For instance, does a scandal revealing a car manufacturer's illegally high pollution levels, or child labor practices of a food processing conglomerate affect investors' dividend spending patterns? While investors have been shown to demand a premium for holding stocks of firms whose business practices violate social norms,<sup>1</sup> there is no evidence on how sentiment about firms' social responsibility affects consumption from stock market income.

Evidence from laboratory studies reveals that people experience negative emotions when they earn money by violating a social norm, for example by lying, influencing how they spend the proceeds (Gneezy et al., 2014; Park & Meyvis, 2019). These findings are in line with emotion regulation theory, which posits that people tend to counter negative emotions with mood-enhancing behaviors, such as increased consumption spending (Tice et al., 2001) - a practice colloquially known as *retail therapy* or *comfort buying*.

Identifying this propensity for amplified consumption as a reaction to negative emotions in a real-world context is challenging. Consequently, researchers resort to surveys and laboratory experiments. These experiments have consistently validated the notion that motives for emotion regulation affect consumption behavior (Andrade, 2005; Kemp et al., 2014; Kemp & Kopp, 2011). In a controlled experiment, for instance, participants express that a disappointingly low lottery win triggers negative emotions, driving them to spend their winnings for consumption that uplifts their mood (Levav & McGraw, 2009).

In this paper, we address the question whether consumption behavior driven by emotion regulation can be observed outside a controlled experiment in a real-world setting. We examine behavior in an important context - financial markets. Specifically, we assess whether investors increase their consumption from dividend income<sup>2</sup> when it comes from

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<sup>1</sup>For example, Hong and Kacperczyk (2009) show that norms-constrained institutional investors demand a premium for holding "sin" stocks, which are stocks of firms, whose business practices involve the production or distribution of alcohol, tobacco, or gambling

<sup>2</sup>We examine dividend payments, because empirical evidence shows that household consumption strongly responds to income from dividends (Baker et al., 2006; Bräuer et al., 2022; Graham & Kumar, 2006). Other forms of stock market income are not suitable for our purposes. Proceeds from stock sales are not suitable, because selling decisions might be driven by unobserved factors that also influence

a firm that has recently been linked to negative environmental, social, and governance (ESG) news.

There are several reasons why findings from controlled laboratory experiments may not hold in real-life situations. Lab studies may suffer from experimenter demand effects (Zizzo, 2010), where subjects unconsciously infer the “desired” behavior from the given instructions. Additionally, laboratory studies only capture responses within a short time frame, neglecting the potential for emotional cooling-off periods which might influence real-world behavior. In general, research has shown that lab-demonstrated behavior does not always replicate in real-world contexts (Falk & Heckman, 2009; Levitt & List, 2007). Consequently, it remains uncertain whether emotion regulation theory is applicable in practice.

To validate emotion regulation theory in a real-world context, we require granular data on investor consumption patterns, stock market activities, and dividend disbursements. Using a comprehensive dataset from a European universal bank, we connect investor trading records, dividend income, and individual-level consumption-saving data.

Our sample comprises 18,566 individual investors over a two-year period (July 2017 - July 2019), with comprehensive demographic information, categorized current account transactions, portfolio holdings, and trading records. We augment this data with scores from Truvalue Labs (TVL), a firm specializing in tracking ESG-related news and their significance. TVL scores have been used in recent finance studies, including Cheema-Fox et al. (2021), Chen et al. (2020), Kim and Yoon (2023), and Serafeim (2020), and Moss et al. (2023). We estimate the marginal propensity to consume (MPC) around the receipt of dividends from companies with varying TVL scores, following the methodologies of Parker (2017) and Bräuer et al. (2022).

The findings are striking - investors consume approximately twice as much from dividends associated with negative ESG news sentiment, compared to those from companies without such news. This behavior manifests in an increase of approximately EUR 12.81

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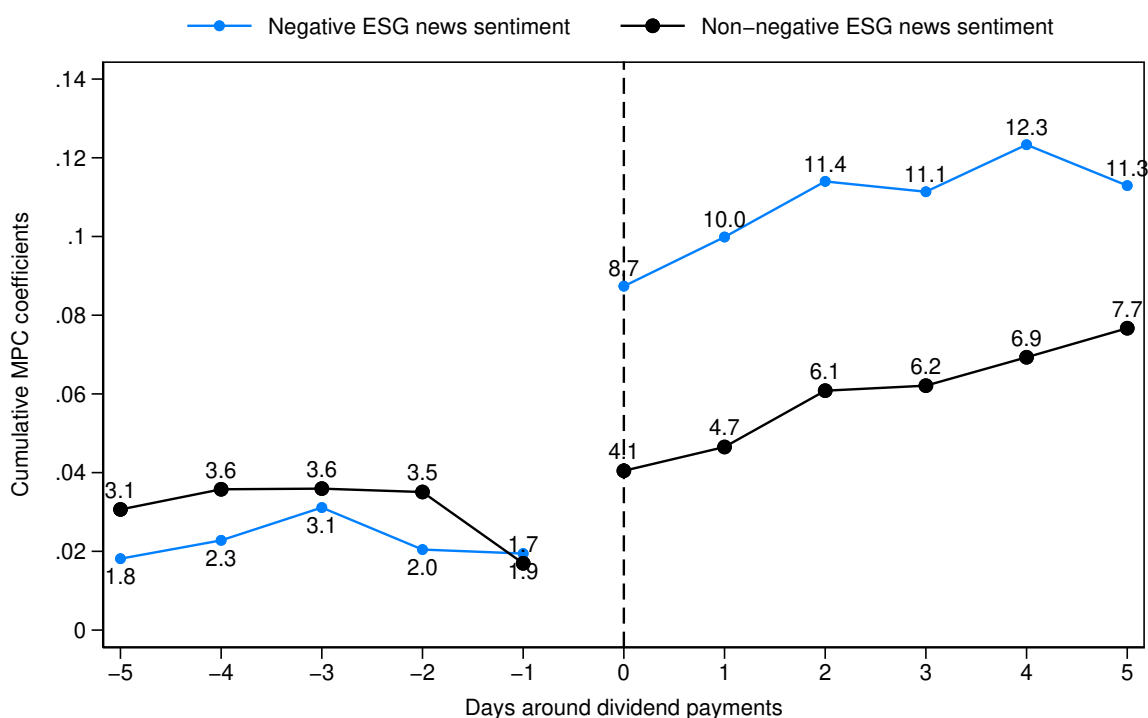
consumption-saving decision in response to the proceeds from the sale. Unrealized capital gains have also been shown to affect household consumption behavior (Andersen et al., 2021; Di Maggio et al., 2020). However, when capital gains are not realized, we cannot causally link consumption-saving decisions to price movements of specific stocks.



in spending on days when such dividends are disbursed, relative to the days when other dividends are issued. For context, the average daily consumption in our sample amounts to EUR 106.26. This heightened consumption response is immediate, occurring on the day of dividend disbursement, as depicted in Figure 4.1.

**Figure 4.1:** Cumulated consumption responses to dividends

*Notes: The figure displays the cumulated marginal propensity to consume coefficient estimates 5 days before until 5 days after a dividend pay date. The coefficients are taken from our main regression specification 4.1, which includes day-of-week fixed effects, week-of-month fixed effects, month-year fixed effects, holiday fixed effects, and individual fixed effects. The ESG news sentiment of a dividend inflow is defined as negative, if the TVL score of the issuing company was in the lowest 30<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out. TVL scores capture public sentiment towards a company's environmental, social, and governance (ESG) matters from, for example, local, national, and international news, reports from NGOs, trade blogs, or social media.*



While these results align with emotion regulation theory, we consider alternative explanations. Firstly, we rule out the possibility of an attention-driven consumption response. If investors were more attentive to stocks with negative ESG news, we would expect them to log into their investment accounts more frequently when receiving such dividends. We show that there is no difference in login behavior on days when investors

receive dividends from firms with negative or non-negative ESG news coverage. Attention effects might also have prompted increased consumption from dividends related to stocks with exceptionally positive ESG news, but we do not observe this. Taken together, our results indicate that we have not captured an attention effect.

Secondly, we show that ESG news events do not systematically impact the size of dividend payouts. It could have been the case that companies embroiled in negative ESG news might increase dividends to placate investors. However, our data disproves this conjecture.

Further, we implement several robustness checks. Firstly, we mitigate potential endogeneity issues by exploiting the panel structure of our data and running all our analyses with investor (and time) fixed effects, thereby eliminating any time-invariant differences among investors that could correlate with both responsible investment behavior and consumption. Secondly, our results are in line with those of Moss et al. (2023) in that investors in our sample do not sell stocks after ESG controversies, indicating that ESG news sentiment does not influence individual holding probability.

Thirdly, we test our primary model with varying definitions of negative ESG news sentiment. In our main regression specification, a dividend inflow is defined as being associated with negative ESG news sentiment, if the TVL score of the issuing company was in the lowest 30<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out. In additional analyses, we define a dividend to have negative sentiment if the issuing company's TVL score decreased in the top 30<sup>th</sup> percentile over the past month, 3 months, 6 months, and 1 year before the dividend was paid out. We also conduct robustness checks using alternative cutoff values including the 20<sup>th</sup> and 10<sup>th</sup> percentiles. The results are consistent across these varying specifications. Further, when running our analysis with *Google Trends* data as an alternate measure of ESG news sentiment, the results remain qualitatively unchanged and they become even stronger compared to our findings with the TVL scores.

Fourthly, our results are consistent when only considering investors who received dividends with both negative and non-negative ESG news sentiment during the sample

period. Fifthly, we confirm that our main outcome is not skewed by a few specific stocks held by many investors. The effects persist even when we exclude the most held stocks, or the stocks that are responsible for the highest dividend income among investors in our sample.

A key contribution of our paper is to understand how behavior found in the lab generalizes to real-world behavior. Prior laboratory work documents that individuals' utility from consumption varies based on their current emotional state (Goldsmith et al., 2012). In controlled experimental settings, people who experience negative emotions express an intention to increase consumption to improve their emotional state in the short-term (Andrade, 2005; Kemp et al., 2014; Kemp & Kopp, 2011; Tice et al., 2001). Building the bridge from the lab to the field is important because behavior from the lab sometimes translates into the field, e.g. (Benz & Meier, 2008; Cohn et al., 2015; Cohn & Maréchal, 2018; Dai et al., 2018; Falk & Heckman, 2009; Karlan, 2005; Riedl & Smeets, 2017). Yet, in other cases, behavior differs in the lab and in the field, e.g. (Galizzi & Navarro-Martinez, 2019; Levitt & List, 2007; List, 2006; Stoop et al., 2012). We show that people who earn proceeds of investments that violate a social norm consume more of that income, which is in line with the laboratory evidence.

Our findings also contribute to the literature on ESG investing.<sup>3</sup> Numerous studies demonstrate that a significant proportion of investors factor in their social preferences along with financial returns while making investment decisions.<sup>4</sup> Our research reveals a novel facet - ESG news do not only affect investment behavior, but also consumption behavior.

In addition, our findings contribute to the literature on the role of emotions in financial decision-making. Kuhnen and Knutson (2011) show that both positive and negative emotional states significantly affect individual financial decision making. Similarly, Breaban and Noussair (2018) show that emotions affect how individuals trade in experimental

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<sup>3</sup>See for example Baker et al. (2022), Benson and Humphrey (2008), Ceccarelli et al. (2023), Gollier and Pouget (2022), Heinkel et al. (2001), Hong and Kacperczyk (2009), and Pedersen et al. (2021).

<sup>4</sup>See Anderson and Robinson (2022), Barber et al. (2021), Bauer et al. (2021), Gibson Brandon et al. (2022), Hartzmark and Sussman (2019), Krueger et al. (2020), Laudi et al. (2022), and Riedl and Smeets (2017).

asset markets. Emotions also affect individuals' decision to invest in socially responsible assets (Heeb et al., 2023). There are even spillover effects of emotions evoked in non-financial domains, for example by the weather (Hirshleifer & Shumway, 2003) or by the outcomes of sports events (Edmans et al., 2007), on behavior in the financial domain. We add to this by showing that emotions evoked in the investment domain affect behavior in the consumption domain.

Finally, we contribute to the literature that identifies inter-linkages between behavior in the consumption domain and the investment domain. Household consumption has been shown to be sensitive to inflows from portfolio holdings. For example, Loos et al. (2020) show that after an exogenous change in the displayed purchase prices of mutual funds, investors whose funds are newly displayed as winners are more likely to sell and show a heightened MPC from these inflows. Further, Baker et al. (2006) and Graham and Kumar (2006) or Bräuer et al. (2022) assert that consumption significantly responds to dividend income. We extend this understanding by demonstrating that the strength of the consumption response to dividends is notably amplified when those dividends originate from a firm embroiled in recent negative ESG news.

This research underscores the importance of comprehensively examining the interplay between investment and consumption decisions. Future studies might venture further into exploring other facets of how financial decisions in one domain spill over into others.

## 2 Data and variable definitions

### 2.1 Sample

We cooperate with a German universal bank offering a large spectrum of financial products to retail investors with several million clients in Germany. This allows us to access a wide range of demographic characteristics of investors, where our entire sample comprises 55,173 clients. We exclude clients who have less than four consumption days per month on average and who are younger than 18 years old. We windorize clients in the top and bottom 1% consumption percentiles. Furthermore, as we investigate consumption

from dividend income, we exclude clients who do not receive any dividend in our sample period. Finally, we exclude clients who do not receive any dividend from a single stock. Our final sample includes 18,566 clients. Table C3 shows descriptive statistics for these clients. As such, the results that we report represent behavior of stock investors who receive dividends. Around 70% of investors are male and have a relationship of over 20 years with their bank. Investors on average own EUR 125,843 in total assets, hold 5.4 different stocks and receive on average EUR 68.9 of dividends per month.

## 2.2 Panel construction

For each individual, the bank provides anonymized administrative and transaction data at the account level. The clients in our sample have investment accounts and checking accounts at the collaborating bank. The data contains socio-demographic characteristics, products usage, account balances, as well as end-of-month portfolio holdings and individual trading records. Further, we draw on current account transactions data, categorized into 87 spending- and income categories. Our sample period spans 24 months, from July 2017 to July 2019.

## 2.3 Consumption variable definition

We estimate clients' daily consumption using the data provided by the bank. The dataset comprises the date, amount, and the category of each transaction, whereby inflows and outflows are categorized into 87 categories which can be summarized into 12 main categories. The categories are based on classifications by the German National Bureau of Statistics. The main categories are 'Living', 'Housing', 'Leisure and Traveling', 'Mobility', 'Health', 'Children', 'Career and education', 'Saving and Investing', 'Income', 'Insurance', 'Loans', and 'Other Outflows'. For our measure of consumption, we only consider outflows and exclude 'Income' transactions (12 categories). Further, we exclude transactions from the categories 'Saving and Investing' (6 categories), 'Insurances' (10 categories) and 'loans' (5 categories). As we aim to measure the self-initiated consumption response to

dividend payments, we exclude recurring expenses (13 categories).<sup>5</sup> Table C4 presents a comprehensive overview over the consumption categories and the construction of our consumption variable.

Transactions are categorized by the bank’s categorization tool. If a transaction cannot be categorized, it will be left ‘uncategorized’. In our sample, about 78% of the outflow transactions could be classified by the categorization tool. The categorization tool most easily identifies frequent transactions with common transaction partners such as, for example, large supermarket chains or restaurant franchises. As a result, the uncategorized transactions are likely to be infrequent transactions with unique transfer descriptions, such as peer-to-peer transactions or transactions with smaller partners such as, for example, small local or foreign shops. We exclude uncategorized outflow transactions that are multiples of EUR 100 in our analyses, since such round transactions often are peer-to-peer transfers.<sup>6</sup>

It is important to note that we observe booking dates in our data which might differ from the actual payment-date if the booking process is delayed. Based on information provided by our cooperating bank, most transactions are booked on the same day the payment was made and only few transactions are delayed. If the booking of a transaction is delayed, the booking date differs about one to two days from the payment-date. However, discussing delayed transactions in our data with the cooperating bank, we find no indication that bookings are delayed in a systematic manner and in particular, we have no reason to believe that dividends with negative ESG news sentiment might be systematically (un-)affected by delays, compared to dividends with non-negative ESG news sentiment.

## 2.4 Identification of dividend payments

To measure the timing and size of income from dividends, we download dividend payment dates from Datastream and match them with the clients’ portfolio holdings. We then

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<sup>5</sup>Note that credit card transactions are typically settled at the end of the month and as such appear as recurring expenses in our data.

<sup>6</sup>As a robustness check, we also built a second consumption measure which includes all uncategorized transactions. The untabulated results are qualitatively the same as our reported main result.

identify whether a client owns the stock of a dividend-paying company in the month the dividend is paid. In a second step, we verify whether clients receive an inflow that is labeled as “Dividends/Interest/Distributions” by the categorization tool on the dividend payment date. This cross check minimizes potential measurement error that is caused by, for example, misclassifications in the categorization tool or errors in Datastream’s dividend payment date information.

As we observe the amount of money which is actually transferred on clients’ current accounts, we do not have to rely on assumptions regarding individual tax rates, currency exchange rates or individual banking fees and commissions. Finally, as we cross verify the data provided by the bank with payment-dates from Datastream, we ensure that dividend payments match the actual days that the income is booked to a client’s account.

## 2.5 ESG news sentiment definition

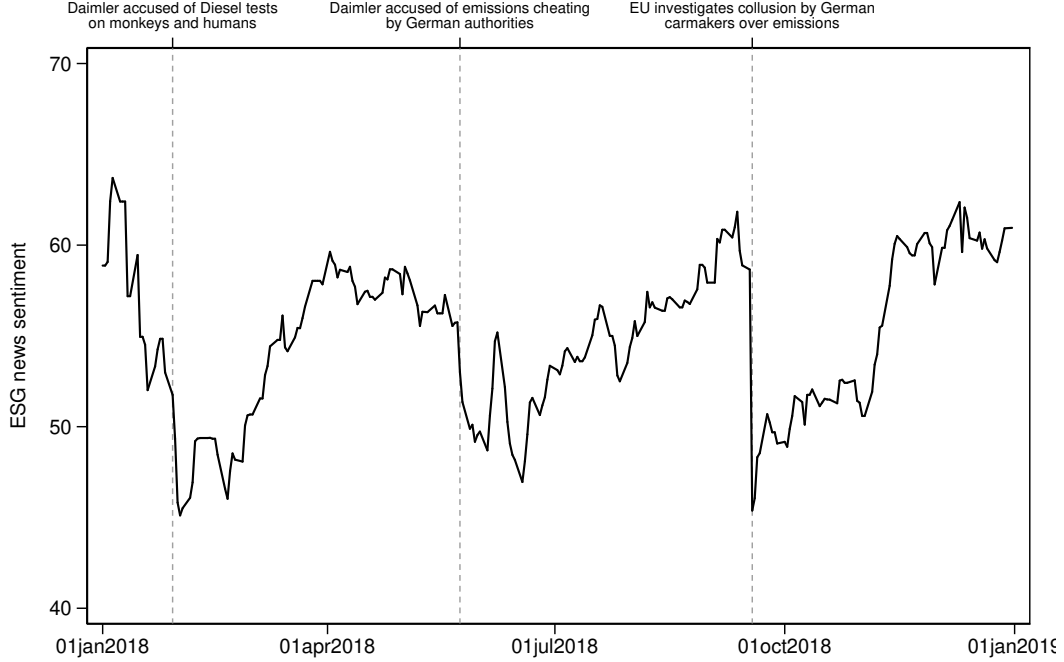
We use Factset’s Truvalue Labs (TVL) scores to measure the current ESG news sentiment of dividend-paying firms. We specifically consider a news-based ESG sentiment measure, as it offers several key advantages for our setting, compared to ESG scores that are commonly used in the literature. TVL does not rely on annual ratings and periodic corporate disclosure, but grasps the sentiment from non-firm sources such as, for example, analyst reports or (social) media articles using natural language processing and AI methodologies in eleven languages (including German, the native language of most respondents in our sample).

The AI algorithm has been trained on a dataset, where ESG experts have classified the valence of ESG news. The score is normalized to lie on a scale between 0 and 100. Importantly, the score is updated daily, which allows us to pinpoint the ESG news sentiment of a firm on the exact day a dividend is paid out. To ensure that firms have enough news coverage, we follow Chen et al. (2020) and require firms to have at least one score change per quarter, in order to make sure that firms in our sample have enough news coverage.

Figure 4.2 illustrates an example for the TVL score development for the most held

**Figure 4.2:** TVL score of Daimler AG

*Notes: This figure shows the daily Truvalue Labs (TVL) score of Daimler AG for 2018. The gray vertical dashed lines mark noteworthy negative ESG-related news events.*



single stock in our sample, Daimler AG, for 2018. Noteworthy negative ESG-related news events in that time period are marked by the grey dashed lines. The first noteworthy negative ESG-related news event occurred on September 29, when reports accused Daimler of diesel tests on monkeys and humans. The other two noteworthy negative ESG-related news events are related to the diesel emissions scandal, in which Daimler was involved. On May 24, Daimler was accused of emissions cheating by German authorities and on September 18, the EU started investigating collusion by German carmakers over emissions. As Figure 4.2 shows, all three events led to a stark decrease in Daimler's TVL score.

For our main analysis, we define the ESG news sentiment of a dividend inflow as negative, if the TVL score of the issuing company was in the lowest 30<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out. However, investors may not only respond to the current TVL score at the payout day, but also to changes of this score over time. Thus, we additionally consider ESG news sentiment changes. Specifically, in



further model specifications, we define the ESG news sentiment of a dividend inflow as negative, if the decrease of the issuing company's TVL score was in the highest 30<sup>th</sup> percentile over the time period of ii) one month before the dividend was paid out, iii) three months before the dividend was paid out, iv) half a year before the dividend was paid out, and v) one year before the dividend was paid out. In further robustness checks, we also consider alternative cutoff values, including the 20<sup>th</sup> and the 10<sup>th</sup> percentile.

### 3 Empirical strategy

#### 3.1 Regression specification

In our main analysis, we estimate individuals' MPC in a narrow window around the receipt of dividends, in line with Parker (2017) and Bräuer et al. (2022). As such, we take over the definition of MPC from Bräuer et al. (2022), which is not in line with the traditional definition as the marginal consumption from marginal disposable income, but rather the marginal consumption from dividend income.

We differentiate between dividends associated with negative ESG news sentiment and dividends associated with non-negative ESG news sentiment by estimating the following model:

$$C_{i,t} = \sum_{k=-5}^5 \beta_{\gamma,t+k}(D_{\gamma,i,t+k}) + \sum_{k=-5}^5 \beta_{\lambda,t+k}(D_{\lambda,i,t+k}) + TimeFe_t + IndFe_i + \epsilon_{i,t} \quad (4.1)$$

where  $C_{i,t}$  refers to the euro amount of spending of individual  $i$  on day  $t$ .  $D_{\gamma,i,t+k}$  describes the EUR amount of dividends associated with negative ESG news sentiment<sup>7</sup> received by individual  $i$  on day  $t+k$ .  $D_{\lambda,i,t+k}$  describes the EUR amount of dividends associated with non-negative ESG news sentiment received by individual  $i$  on day  $t+k$ . Consequently,  $\beta_{\gamma,k}$  measures the amount of consumption on  $k$  days before/after a dividend payment, relative to one EUR received in dividends associated with negative ESG news

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<sup>7</sup>according to the definition in section 2.5

sentiment.  $\beta_{\lambda,k}$  measures the amount of consumption on  $k$  days before/after a dividend payment, relative to one EUR received in dividends associated with non-negative ESG news sentiment.

We include a comprehensive set of fixed effects, including time fixed effects that control for potential cyclical consumption patterns and individual fixed effects, which absorb time-invariant heterogeneity across individuals. Specifically,  $TimeFe_t$  represents a vector containing day-of-week, week-of-month and month-of-year fixed effects.  $TimeFe_t$  further includes bank-holiday fixed effects as well as fixed effects for the day after a bank-holiday. The reason is that account transactions are not processed on bank holidays and therefore booked on the day after the bank holiday.  $IndFe_i$  represents individual fixed effects. In all our regression models, we double-cluster standard errors at the individual-date level.

### 3.2 Investors keep track of dividend payments

When interpreting the outcome of our main regression specification 4.1, we make several assumptions. Firstly, we assume that investors are aware of dividends they receive and that the consumption effect is a response to this inflow. Secondly, we assume that investors follow the news on firms that they hold. In the following, we provide evidence which supports these assumptions.

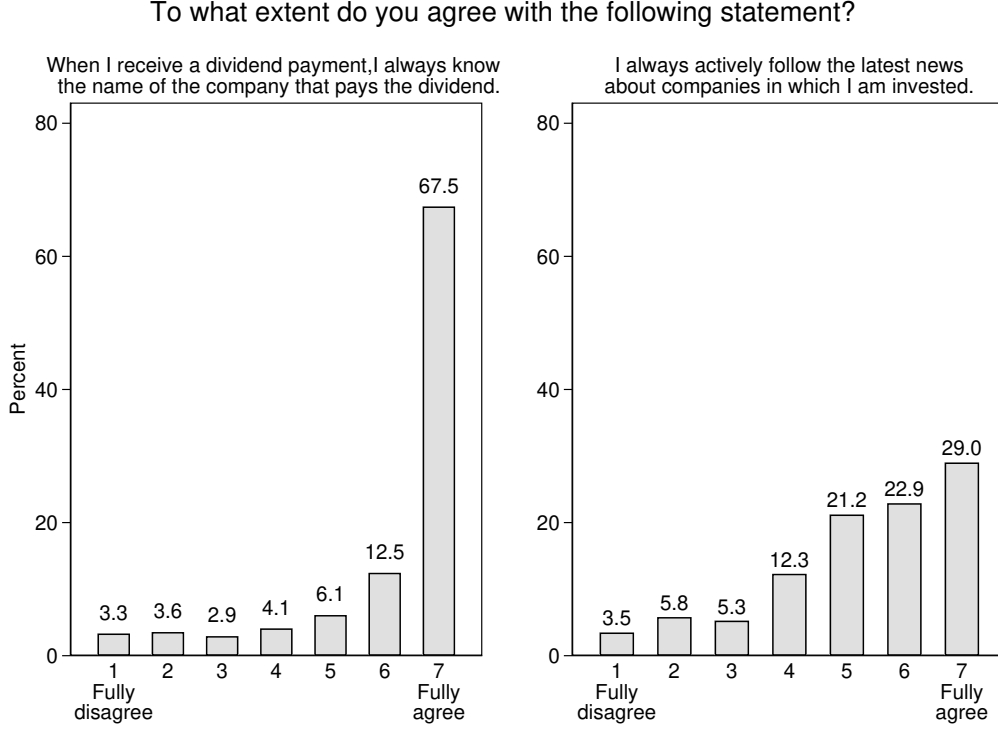
We conducted a survey with investors in our sample together with our cooperating bank. The survey took about 10 minutes and was incentivized with a EUR 5 Amazon voucher for completion. 27,382 investors in our sample were invited to our survey via email in May 2021. Of those, 1,504 followed the bank’s invitation and started the survey (response rate: 5.5%). This response rate is slightly higher than that reported in related studies with bank retail clients, such as Giglio et al. (2021). 1,408 clients fully completed the survey (attrition rate: 6.4%).

We summarize the results in Figure 4.3. Among the investors in our sample, 86.1% state that they “somewhat agree”, “agree” or “fully agree” with the statement: “When I receive a dividend payment, I always know which company it comes from” and 73.1% state that they “somewhat agree”, “agree” or “fully agree” with the statement “I always

actively follow the latest news about companies in which I am invested”.

**Figure 4.3:** Survey on investor attention

*Notes: This figure displays survey responses from  $N = 1,408$  investors in our sample who completed our survey conducted in May 2021. The responses were given on a 7-point Likert scale from 1 “Fully disagree” to 7 “Fully agree”.*



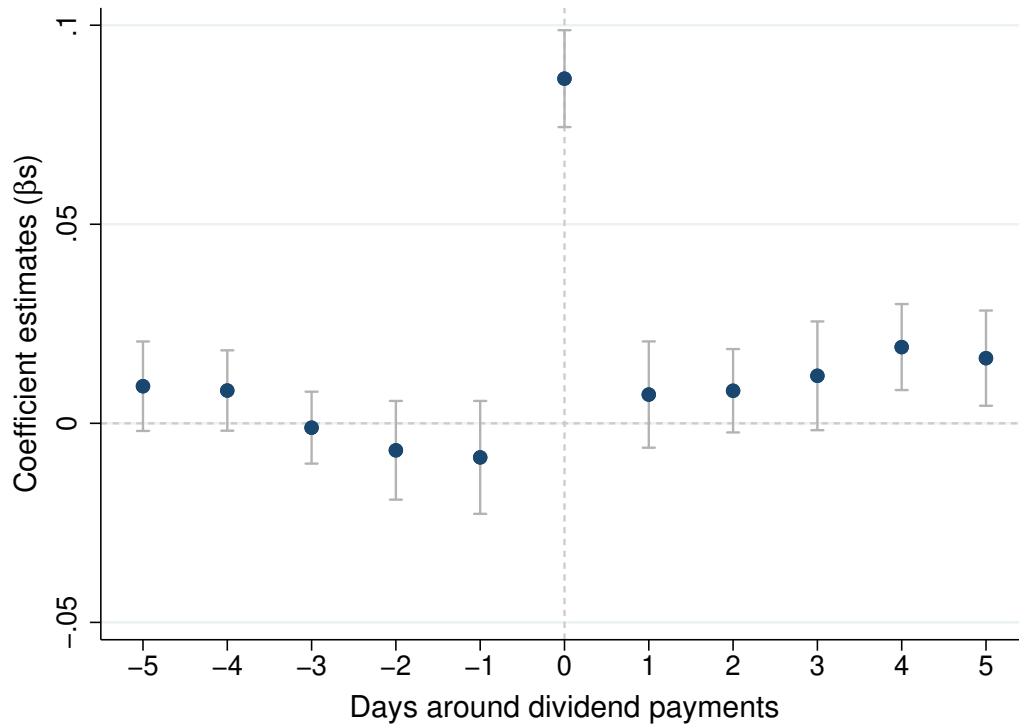
While this is an indication that our assumption holds, this is only reported and not revealed behavior. Therefore, we additionally check login behavior of investors in our sample. Specifically, we draw on login data from our users conduct a regression in the following form:

$$dLogin_{i,t} = \sum_{k=-5}^5 \beta_k(dD_{i,t+k}) + TimeFe_t + IndFe_i + \epsilon_{i,t} \quad (4.2)$$

Thereby, in comparison to equation 4.1, the left-hand variable is replaced by a dummy variable which indicates whether a user logged into his or her banking account and the right hand variable is replaced by a dummy variable that indicates whether an individual

**Figure 4.4:** Login behavior on dividend pay dates

The figure shows regression coefficients where the dependent variable is a dummy variable indicating whether a client logged into his or her bank account on day  $t$ . The regression sample comprises 18,550 investors. The regression includes day-of-week fixed effects, week-of-month fixed effects, month-year fixed effects, holiday fixed effects, individual fixed effects. Robust standard errors are individual-date double clustered. 95%-intervals are displayed around coefficient estimates.



$i$  receives a dividend on day  $t$ . The regression includes day-of-week fixed effects, week-of-month fixed effects, month-year fixed effects, holiday fixed effects, as well as individual fixed effects. Robust standard errors are individual-date double clustered. Figure 4.4 presents the regression coefficients from five days before to five days after the dividend payout date. Investors log in significantly more to their account on the dividend payout day than on other days. This provides additional evidence for our assumption that investors take note of dividend inflows.

## 4 Main result

**Main result:** *Investors show a larger marginal propensity to consume out of dividend income after negative ESG-related news.*

**Support:** We first evaluate the outcome of our main regression equation 4.1. The results are shown in Table 4.1. The coefficients represent day-zero MPCs, which refer to the individual consumption response on the day a dividend is received ( $k = 0$ ).<sup>8</sup>

The data show a general positive consumption response (MPC) on a day of dividend payout. This is in line with prior findings that investors consume from dividends (Baker et al., 2006; Bräuer et al., 2022; Graham & Kumar, 2006).

In line with emotion regulation theory, investors consume twice as much from dividend income related to a company with negative ESG news than from dividend income of a company without negative ESG news. This result is based on the TVL score on the dividend payout date (column 1).

When we consider the development of TVL scores over the previous 1, 3 and 6 months before dividend payout for our measure of ESG news sentiment (columns 2, 3, and 4), the difference of consumption responses to non-/negative dividends is economically significant in all columns and statistically significant at the 1% and 5% level, respectively in columns 3 and 4. The difference of consumption responses to non-/negative dividends is not statistically significant when defining ESG news sentiment in terms of the development of TVL scores 1 year before dividend payout (column 5). Taken together, our results show a larger consumption response to dividends when they are paid out by firms with negative ESG news sentiment. Notably, it could be the case that on some days, both "positive" and "negative" ESG news sentiment-related dividends are paid out. The resulting classification errors result in the fact that the reported coefficient differences are conservative.

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<sup>8</sup>To increase readability of the tables, we omit the MPCs on the 5 weekdays before and after the dividend payout dates and focus on MPCs on the day on which dividends are paid out ( $\beta_{\gamma,t+0}$  and  $\beta_{\lambda,t+0}$ ). All interpretations that we make here hold when considering the 5 weekdays before and after the dividend payout dates.

**Table 4.1:** Consumption responses to dividends

	(1)	(2)	(3)	(4)	(5)
ESG News Sentiment	At the Day	-1 Month	-3 Months	-6 Months	-1 Year
Negative	0.0874*** (0.0264)	0.0698*** (0.0130)	0.1002*** (0.0151)	0.0654*** (0.0107)	0.0605*** (0.0176)
Non-negative	0.0405*** (0.0078)	0.0420*** (0.0089)	0.0318*** (0.0061)	0.0404*** (0.0095)	0.0422*** (0.0088)
Negative - Non-negative	0.0469*	0.0278*	0.0684***	0.025**	0.0183
P-value	0.0899	0.0577	0.0000	0.0450	0.3395
R <sup>2</sup>	0.0709	0.0709	0.0709	0.0709	0.0709
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	9,388,265	9,388,265	9,388,265	9,388,265	9,388,265
Clients	18,566	18,566	18,566	18,566	18,566

*Notes: The table shows marginal propensity to consume coefficient estimates taken from five iterations of regression specification 4.1 (by column). The ESG news sentiment of a dividend inflow is defined as negative, if the TVL score of the issuing company was in the lowest 30<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out (column 1). In the remaining columns, the ESG news sentiment of a dividend inflow is defined as negative, if the decrease of the issuing company's TVL score was in the highest 30<sup>th</sup> percentile over the time period of one month before the dividend was paid out (column 2), three months before the dividend was paid out (column 3), half a year before the dividend was paid out (column 4), or one year before the dividend was paid out (column 5). We perform Wald tests to determine whether the Negative and Non-negative coefficients are statistically significantly different from each other, by column. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust, individual-date double clustered standard errors are given in parentheses.*

## 5 Results are not driven by attention

In this section, we test whether increased investors' attention that is caused by negative ESG news drives the higher MPC coefficients for dividends associated with negative ESG news. Attention has been identified in prior studies as an important factor influencing financial decisions (Bordalo et al., 2020; Hartzmark et al., 2021; Hartzmark & Solomon,

2022).

As a first test for attention as a driver of our main effect, we re-estimate our model from equation 4.2 but differentiate between dividends with negative and non-negative ESG news sentiment according to our measures described in section 2.5. Table 4.2 presents the regression results and shows that investors do not pay more attention to dividends with negative ESG news sentiment, compared to dividends with non-negative ESG news sentiment. This provides evidence against attention as a driver of our main result.

We further test whether investors in our sample react to positive ESG-related news events. If attention to news events drives our main result, we would also expect higher MPC coefficients after positive ESG news. Our definitions of positive dividend payouts are analogous to the definitions of negative dividend payouts. That is, in our first specification we define the ESG news sentiment of a dividend inflow as positive, if the TVL score of the issuing company was in the highest 30<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out. In our further specifications, we define the ESG news sentiment of a dividend as positive, if the decrease of the issuing company's TVL score was in the highest 30<sup>th</sup> percentile over the time period of ii) one month, iii) three months, iv) half a year, and v) one year before dividend-payout.

The results are shown in Table 4.3. The insignificant coefficient differences between positive and neutral TVL scores show that investors do not spend more out of dividend income after positive ESG news coverage of dividend-paying firms. However, consistent with previous specifications, investors spend significantly more out of dividend income after negative ESG news coverage on the social responsibility of the dividend-paying firm.

## **6 Investors do not re-balance their portfolios after negative ESG news**

In our analyses, we include individual fixed effects to rule out any between-investor differences that may affect both the individual propensity to hold controversial stocks, as well as individual MPC from dividend income. In addition, we check investors' trading behav-

**Table 4.2:** Login behavior on dividend pay dates

	(1)	(2)	(3)	(4)	(5)
ESG News Sentiment	At the Day	-1 Month	-3 Months	-6 Months	-1 Year
Negative	0.0983*** (0.0103)	0.0921*** (0.0122)	0.0794*** (0.0095)	0.0755*** (0.0087)	0.0805*** (0.0114)
Non-negative	0.0822*** (0.0066)	0.0842*** (0.0058)	0.0890*** (0.0070)	0.0900*** (0.0065)	0.0879*** (0.0068)
Negative - Non-negative	0.0162	0.0079	-0.0095	-0.0145	-0.0074
P-value	0.1441	0.4976	0.3839	0.1047	0.5641
R <sup>2</sup>	0.1789	0.1788	0.1789	0.1789	0.1788
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	3,628,964	3,628,964	3,628,964	3,628,964	3,628,964
Clients	18,550	18,550	18,550	18,550	18,550

*Notes: The table shows user login probability estimates taken from five iterations of regression specification 4.2 (by column) as described in section 5. Here, the left-hand variable is a dummy variable indicating whether a user logged into his or her online banking account on day  $t$ . The ESG news sentiment of a dividend inflow is defined as negative, if the TVL score of the issuing company was in the lowest 30<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out (column 1). In the remaining columns, the ESG news sentiment of a dividend inflow is defined as negative, if the decrease of the issuing company's TVL score was in the highest 30<sup>th</sup> percentile over the time period of one month before the dividend was paid out (column 2), three months before the dividend was paid out (column 3), half a year before the dividend was paid out (column 4), or one year before the dividend was paid out (column 5). We perform Wald tests to determine whether the Negative and Non-negative coefficients are statistically significantly different from each other, by column. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust, individual-date double clustered standard errors are given in parentheses.*

ior in response to corporate controversies. If investors do not rebalance their portfolios after a change in firms' ESG news sentiment, then we can regard the ESG news sentiment of firms in investors' portfolios as quasi-random. We conduct regression analyses in the following form:



**Table 4.3:** Consumption responses to dividends after positive ESG news

	(1)	(2)	(3)	(4)	(5)
ESG News Sentiment	At the Day	-1 Month	-3 Months	-6 Months	-1 Year
Negative	0.0884*** (0.0264)	0.0696*** (0.0128)	0.1003*** (0.0151)	0.0658*** (0.0106)	0.0606*** (0.0175)
Neutral	0.0372*** (0.0102)	0.0339** (0.0134)	0.0300*** (0.0074)	0.0407*** (0.0129)	0.0389*** (0.0114)
Positive	0.0444*** (0.0109)	0.0491*** (0.0109)	0.0368*** (0.0108)	0.0419*** (0.0117)	0.0482*** (0.0126)
Diff Negative - Neutral	0.0512*	0.0357**	0.0704***	0.0251*	0.0217
P-value	0.0714	0.0348	0.0000	0.0993	0.3118
Diff Positive - Neutral	0.0073	0.0152	0.0068	0.0012	0.0093
P-value	0.6093	0.3500	0.6034	0.9439	0.5686
R <sup>2</sup>	0.0709	0.0709	0.0709	0.0709	0.0709
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	9,388,265	9,388,265	9,388,265	9,388,265	9,388,265
Clients	18,566	18,566	18,566	18,566	18,566

*Notes: The table shows marginal propensity to consume coefficient estimates taken from five iterations of regression specification 4.1 (by column). The ESG news sentiment of a dividend inflow is defined as negative, if the TVL score of the issuing company was in the lowest 30<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out (column 1). In the remaining columns, the ESG news sentiment of a dividend inflow is defined as negative, if the decrease of the issuing company's TVL score was in the highest 30<sup>th</sup> percentile over the time period of one month before dividend was paid out (column 2), three months before dividend was paid out (column 3), half a year before dividend was paid out (column 4), or one year before dividend was paid out (column 5). The ESG news sentiment of a dividend inflow is defined as positive, if the TVL score of the issuing company was in the highest 30<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out (column 1). In the remaining columns, the ESG news sentiment of a dividend inflow is defined as positive, if the increase of the issuing company's TVL score was in the highest 30<sup>th</sup> percentile over the time period of one month before the dividend was paid out (column 2), three months before the dividend was paid out (column 3), half a year before the dividend was paid out (column 4), or one year before the dividend was paid out (column 5). The ESG news sentiment of the remaining dividends that are not classified as positive or negative are classified as neutral. We perform Wald tests to determine whether the difference between the Negative and Neutral coefficients, as well as the difference between the Positive and Neutral coefficients is statistically significant, by column. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust, individual-date double clustered standard errors are given in parentheses.*

$$Trade_{c,t} = \beta_{c,t}(TVLScore_{c,t}) + \rho_{c,t}(Price_{c,t}) + TimeFe_t + FirmFe_c + \epsilon_{c,t}, \quad (4.3)$$

where  $Trade_{c,t}$  represents a vector of three different dependent variables: The i) logged number of shares of company  $c$  bought on day  $t$ , ii) the logged number of shares of company  $c$  sold on day  $t$ , and iii) the logged number of shares of company  $c$  traded on day  $t$  by investors in our sample.  $TVLScore_{c,t}$  represents a vector of i) the TVL ESG score of company  $c$  on day  $t$ , as well as the TVL score of company  $c$  on day  $t$ , relative to the TVL score of company  $c$  ii) one day before, iii) one week before, iv) two weeks before, and v) one month before.  $Price_{c,t}$  represents a vector of i) the stock price of company  $c$  on day  $t$ , as well as the stock price of company  $c$  on day  $t$ , relative to the stock price of company  $c$  ii) one day before, iii) one week before, iv) two weeks before, and v) one month before. Further, we include day-of-week fixed effects, week-of-month fixed effects, month-year fixed effects, holiday fixed effects, as well as firm fixed effects.

Table C1 shows the respective regression results. None of the  $TVLScore_{c,t}$  coefficients are significantly different from zero, indicating that investors in our sample do not rebalance their portfolios after ESG controversies. This result is in line with the findings of Moss et al. (2023), who analyze trading behavior on the online brokerage service *Robinhood* to show that investors do not trade in response to ESG news. This reinforces our assumption that there is no different pool of investors who hold controversial companies than those who do not and that investors in our sample do not actively select into or out of controversial companies.

## 7 Negative ESG-related news do not affect dividend size

In this section, we address another potential concern that may bias our interpretation of the main result, namely that ESG-related news systematically affect the size of dividends

that are paid out. To test whether this is the case, we conduct regression analyses in the following form:

$$Dividend\ Size_{c,t} = \beta_{c,t}(TVLScore_{c,t}) + \rho_{c,t}(Price_{c,t}) + TimeFe_t + FirmFe_c + \epsilon_{c,t}, \quad (4.4)$$

where  $Dividend\ Size_{c,t}$  represents a vector of four different dependent variables: The i) dividend amount (in EUR) that is determined by company  $c$  on the day  $t$  of the company's annual general meeting (AGM), ii) a binary indicator of whether the size of the dividend has increased, compared to the last dividend that was paid out by company  $c$ , iii) a binary indicator of whether the size of the dividend has decreased, compared to the last dividend that was paid out by company  $c$ , and iv) a binary indicator of whether the size of the dividend has changed, compared to the last dividend that was paid out by company  $c$ .

$TVLScore_{c,t}$  represents a vector of i) the TVL ESG score of company  $c$  on day  $t$ , as well as the TVL score of company  $c$  on day  $t$ , relative to the TVL score of company  $c$  ii) one month before, iii) three months before, iv) six months before, and v) one month before.  $Price_{c,t}$  represents a vector of i) the stock price of company  $c$  on day  $t$ , as well as the stock price of company  $c$  on day  $t$ , relative to the stock price of company ii) one day before, iii) one week before, iv) two weeks before, and v) one year before. Further, we include day-of-week fixed effects, week-of-month fixed effects, month-year fixed effects, holiday fixed effects, as well as firm fixed effects.

Table C2 shows the respective regression results, which indicate that the ESG news events do not systematically affect dividend size. In alternative untabulated regression specifications, we separately consider dividends that are paid out quarterly and those that are paid out annually and arrive at the same results.

## 8 Additional robustness checks

### 8.1 Restricting the sample to investors who receive both negative and non-negative dividends

To provide a cleaner analysis of within-advisor differences in consumption responses to dividends from companies with non-/negative ESG news sentiment, we re-run our analysis with a subset of investors who receive both negative and non-negative dividends during our observation period. This decreases our sample size to 9,025 investors. The results are shown in Table 4.4. Again, all estimated coefficient differences are positive and most coefficient differences are statistically significant.

### 8.2 Varying the definition of negative ESG news sentiment

In our main regression, we define the ESG news sentiment of dividend-paying firms in terms of their TVL scores. We decided on a cutoff at the 30<sup>th</sup> percentile, whereby the ESG news sentiment of a dividend inflow is defined as negative, if the TVL score of the issuing company was in the lowest 30<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out. We ensure that the cutoff that we use does not drive our finding and that results do not change with different cutoff values. Therefore, in Tables 4.5 and 4.6 we alter the threshold to the 20<sup>th</sup> percentile and 10<sup>th</sup> percentile, respectively. The results show that the valence of all coefficients remains the same for both alternative cutoff values.

### 8.3 Removing top dividend stocks

Our results might be biased by investors actively investing in stocks aiming for high dividends. We grasp the stocks' dividend yield from *Factset* and exclude the 50 stocks with the highest dividend yields. Those stocks account for 7.8% of the holdings in our sample. As shown in Table 4.7, our main result is robust against removing the stocks with the highest dividend yields.

**Table 4.4:** Consumption responses to dividends among clients who receive both negative and non-negative dividends

	(1)	(2)	(3)	(4)	(5)
ESG News Sentiment	At the Day	-1 Month	-3 Months	-6 Months	-1 Year
Negative	0.0818*** (0.0252)	0.0687*** (0.0125)	0.0984*** (0.0140)	0.0653*** (0.0104)	0.0613*** (0.0177)
Non-negative	0.0430*** (0.0079)	0.0386*** (0.0068)	0.0320*** (0.0066)	0.0367*** (0.0075)	0.0431*** (0.0087)
Negative - Non-negative	0.0388	0.03**	0.0664***	0.0286**	0.0182
P-value	0.14	0.03	0.00	0.01	0.34
R <sup>2</sup>	0.0719	0.0708	0.0710	0.0715	0.0715
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	4,572,689	6,057,724	6,559,812	6,204,904	6,320,543
Clients	9,025	11,951	12,963	12,252	12,479

*Notes: The table shows marginal propensity to consume coefficient estimates taken from five iterations of regression specification 4.1 (by column). Only clients, who receive both negative and non-negative dividends, in terms of ESG news sentiment, during our observation period are included in our sample. The ESG news sentiment of a dividend inflow is defined as negative, if the TVL score of the issuing company was in the lowest 30<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out (column 1). In the remaining columns, the ESG news sentiment of a dividend inflow is defined as negative, if the decrease of the issuing company's TVL score was in the highest 30<sup>th</sup> percentile over the time period of one month before the dividend was paid out (column 2), three months before the dividend was paid out (column 3), half a year before the dividend was paid out (column 4), or one year before the dividend was paid out (column 5). We perform Wald tests to determine whether the Negative and Non-negative coefficients are statistically significantly different from each other, by column. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust, individual-date double clustered standard errors are given in parentheses.*

## 8.4 Removing mostly held stocks

To rule out the possibility that our main results are driven by only a few stocks, which would reduce the generalizability of our findings, we re-run our main regression without the top two held stocks in our sample. Together, these stocks account for around

**Table 4.5:** Consumption responses to dividends with the the lowest 20<sup>th</sup> percentile in terms of TVL score defined as negative

	(1)	(2)	(3)	(4)	(5)
ESG News Sentiment	At the Day	-1 Month	-3 Months	-6 Months	-1 Year
Negative	0.0809*** (0.0145)	0.0721*** (0.0150)	0.0999*** (0.0115)	0.0591*** (0.0119)	0.0754*** (0.0220)
Non-negative	0.0452*** (0.0083)	0.0425*** (0.0086)	0.0402*** (0.0081)	0.0456*** (0.0090)	0.0413*** (0.0082)
Negative - Non-negative	0.0357**	0.0296*	0.0596***	0.0135	0.0341
P-value	0.0200	0.0659	0.0000	0.3026	0.1430
R <sup>2</sup>	0.0709	0.0709	0.0709	0.0709	0.0709
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	9,388,265	9,388,265	9,388,265	9,388,265	9,388,265
Clients	18,566	18,566	18,566	18,566	18,566

*Notes: The table shows marginal propensity to consume coefficient estimates taken from five iterations of regression specification 4.1 (by column). The ESG news sentiment of a dividend inflow is defined as negative, if the TVL score of the issuing company was in the lowest 20<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out (column 1). In the remaining columns, the ESG news sentiment of a dividend inflow is defined as negative, if the decrease of the issuing company's TVL score was in the highest 20<sup>th</sup> percentile over the time period of one month before the dividend was paid out (column 2), three months before the dividend was paid out (column 3), half a year before the dividend was paid out (column 4), or one year before the dividend was paid out (column 5). We perform Wald tests to determine whether the Negative and Non-negative coefficients are statistically significantly different from each other, by column. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust, individual-date double clustered standard errors are given in parentheses.*

13.0% of the holdings in our sample.<sup>9</sup> Table 4.8 shows the results of our main regression specification when only considering this sub-sample. The results are consistent with our main result that investors show a larger MPC out of dividend income after negative

<sup>9</sup>We estimate the share by combining the total Euro amount held by all clients in the first and last month in our sample

**Table 4.6:** Consumption responses to dividends with the the lowest 10<sup>th</sup> percentile in terms of TVL score defined as negative

	(1)	(2)	(3)	(4)	(5)
ESG news sentiment	At the day	-1 month	-3 months	-6 months	-1 year
Negative	0.0729*** (0.0144)	0.0652*** (0.0162)	0.1028*** (0.0248)	0.0972*** (0.0189)	0.0907*** (0.0199)
Non-negative	0.0459*** (0.0083)	0.0454*** (0.0088)	0.0447*** (0.0081)	0.0455*** (0.0082)	0.0457*** (0.0085)
Negative - Non-negative	0.027*	0.0198	0.0581**	0.0516**	0.045**
P-value	0.0636	0.2483	0.0149	0.0122	0.0353
R <sup>2</sup>	0.0709	0.0709	0.0709	0.0709	0.0709
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	9,388,265	9,388,265	9,388,265	9,388,265	9,388,265
Clients	18,566	18,566	18,566	18,566	18,566

*Notes: The table shows marginal propensity to consume coefficient estimates taken from five iterations of regression specification 4.1 (by column). The ESG news sentiment of a dividend inflow is defined as negative, if the TVL score of the issuing company was in the lowest 10<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out (column 1). In the remaining columns, the ESG news sentiment of a dividend inflow is defined as negative, if the decrease of the issuing company's TVL score was in the highest 10<sup>th</sup> percentile over the time period of one month before the dividend was paid out (column 2), three months before the dividend was paid out (column 3), half a year before the dividend was paid out (column 4), or one year before the dividend was paid out (column 5). We perform Wald tests to determine whether the Negative and Non-negative coefficients are statistically significantly different from each other, by column. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust, individual-date double clustered standard errors are given in parentheses.*

ESG-related news.

**Table 4.7:** Consumption responses to dividends with the the top dividend-paying stocks removed

	(1)	(2)	(3)	(4)	(5)
ESG News Sentiment	At the Day	-1 Month	-3 Months	-6 Months	-1 Year
Negative	0.0925*** (0.0284)	0.0780*** (0.0161)	0.1014*** (0.0156)	0.0694*** (0.0119)	0.0677*** (0.0195)
Non-negative	0.0403*** (0.0076)	0.0419*** (0.0085)	0.0322*** (0.0061)	0.0405*** (0.0090)	0.0418*** (0.0084)
Negative - Non-negative	0.0522*	0.0362**	0.0692***	0.029**	0.0259
P-value	0.0746	0.0358	0.0000	0.0227	0.2134
R <sup>2</sup>	0.0709	0.0709	0.0709	0.0709	0.0709
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	9,388,265	9,388,265	9,388,265	9,388,265	9,388,265
Clients	18,566	18,566	18,566	18,566	18,566

*Notes: The table shows marginal propensity to consume coefficient estimates taken from five iterations of regression specification 4.1 (by column), whereby we exclude the Top 50 stocks with the highest dividend yields from our sample as described in section 8.2. The ESG news sentiment of a dividend inflow is defined as negative, if the TVL score of the issuing company was in the lowest 30<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out (column 1). In the remaining columns, the ESG news sentiment of a dividend inflow is defined as negative, if the decrease of the issuing company's TVL score was in the highest 30<sup>th</sup> percentile over the time period of one month before the dividend was paid out (column 2), three months before the dividend was paid out (column 3), half a year before the dividend was paid out (column 4), or one year before the dividend was paid out (column 5). We perform Wald tests to determine whether the Negative and Non-negative coefficients are statistically significantly different from each other, by column. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust, individual-date double clustered standard errors are given in parentheses.*



**Table 4.8:** Consumption responses to dividends with the most-held stocks removed.

	(1)	(2)	(3)	(4)	(5)
ESG News Sentiment	At the Day	-1 Month	-3 Months	-6 Months	-1 Year
Negative	0.0809*** (0.0235)	0.0712*** (0.0131)	0.1019*** (0.0203)	0.0580*** (0.0095)	0.0728*** (0.0200)
Non-negative	0.0405*** (0.0081)	0.0418*** (0.0089)	0.0365*** (0.0072)	0.0446*** (0.0096)	0.0406*** (0.0084)
Negative - Non-negative	0.0404	0.0294**	0.0654***	0.0135	0.0322
P-value	0.1030	0.0457	0.0019	0.2415	0.1323
R <sup>2</sup>	0.0709	0.0709	0.0709	0.0709	0.0709
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	9,388,265	9,388,265	9,388,265	9,388,265	9,388,265
Clients	18,566	18,566	18,566	18,566	18,566

*Notes: The table shows marginal propensity to consume coefficient estimates taken from five iterations of regression specification 4.1 (by column), whereby we exclude the top two held stocks as described in section 8.2. The ESG news sentiment of a dividend inflow is defined as negative, if the TVL score of the issuing company was in the lowest 30<sup>th</sup> percentile in terms of TVL score on the day the dividend was paid out (column 1). In the remaining columns, the ESG news sentiment of a dividend inflow is defined as negative, if the decrease of the issuing company's TVL score was in the highest 30<sup>th</sup> percentile over the time period of one month before the dividend was paid out (column 2), three months before the dividend was paid out (column 3), half a year before the dividend was paid out (column 4), or one year before the dividend was paid out (column 5). We perform Wald tests to determine whether the Negative and Non-negative coefficients are statistically significantly different from each other, by column. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust, individual-date double clustered standard errors are given in parentheses.*

## 8.5 Implementing an alternative measure of ESG news sentiment

To ensure that we capture ESG-related news sentiment, we re-run our main regressions with an alternative measure. Specifically, we use *Google Trends* data. *Google Trends* provides the relative search volume on *Google* scaled between 0 and 100. Thereby, indexation depends on the time period chosen, as the lowest search volume in the chosen time period equals 0 and the highest equals 100, representing the lowest and highest relative search popularity of the specified search term, respectively.

We download weekly data from *Google Trends* for the 500 most held companies<sup>10</sup> in our sample, the search term being a respective company's name and the word 'scandal'.<sup>11</sup>

We define the ESG news sentiment of a dividend inflow as negative, if a company's *Google Trends* score exceeds the level of 50 within a time period of i) 1 month, ii) 3 months, iii) 6 months, and iv) 1 year, respectively. To avoid that a company's *Google Trends* score exceeds the level of 50 due to a generally higher or lower search volume, we only consider controversies where the company's score has been below the threshold for the preceding six months.<sup>12</sup>

Table 4.9 shows the results. The *Google Trends* ESG news sentiment measure gives similar results to the analyses with TVL scores. Consistent with the TVL results, a controversy in terms of our *Google Trends* measure has a significant effect on consumption, when it was within one month ( $p < 0.01$ ), three months ( $p < 0.01$ ), or six months ( $p < 0.05$ ). If we define dividends' ESG news sentiment in terms of search volume within the past year, the coefficient differences are in the expected direction but not statistically significant. All of these results are in line with our results in Table 4.1. This gives us confidence that we have correctly identified firms' ESG news sentiment, as both measures give consistent results.

<sup>10</sup>We estimate the 500 most held companies by combining the total Euro amount held by all clients in the first and last month in our sample. Those 500 companies account for 96.4 percent of the holdings in our sample. We were able to download the respective data for 482 companies.

<sup>11</sup>We use the German term "Skandal", since our investor population is German.

<sup>12</sup>As robustness, we also consider i) all scores above 50 and ii) only controversies where the company's score has been below the threshold for the preceding 12 months. The untabulated results remain qualitatively the same.

**Table 4.9:** Consumption responses to dividends with ESG news sentiment defined in terms of *Google Trends*

	(1)	(2)	(3)	(4)
ESG News Sentiment	-1 Month	-3 Months	-6 Months	-1 Year
Negative	0.0968*** (0.0128)	0.0924*** (0.0125)	0.1081*** (0.0281)	0.0729*** (0.0219)
Non-negative	0.0448*** (0.0081)	0.0449*** (0.0081)	0.0411*** (0.0070)	0.0397*** (0.0065)
Negative - Non-negative	0.052***	0.0475***	0.067**	0.0332
P-value	0.0003	0.0008	0.0189	0.1315
R <sup>2</sup>	0.0709	0.0709	0.0709	0.0709
Individual FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	9,388,265	9,388,265	9,388,265	9,388,265
Clients	18,566	18,566	18,566	18,566

*Notes: The table shows marginal propensity to consume coefficient estimates taken from five iterations of regression specification 4.1 (by column). The ESG news sentiment of a dividend inflow is defined as negative, if the Google Trends score indicated that the issuing company faced a scandal in the month before the dividend was paid out (column 1), three months before dividend was paid out (column 2), six months before dividend was paid out (column 3), or the year before dividend was paid out (column 4) as described in section 8.5. We perform Wald tests to determine whether the Negative and Non-negative coefficients are statistically significantly different from each other, by column. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust, individual-date double clustered standard errors are given in parentheses.*

## 9 Conclusion

We demonstrate practical implications of evidence from the laboratory by showing real-world behavior driven by emotion regulation. Through analysis of investor consumption patterns, stock market activities, and dividend disbursements, we uncover a significant relation between firm-level ESG news sentiment and consumption patterns from dividend income. As such, our findings shed light on the complex interplay between emotions,

financial decisions, and consumption choices.

We build a bridge between controlled laboratory experiments and the dynamic context of financial markets, which adds to our understanding of the external validity of financial behavior in laboratory experiments. Specifically, our results have implications for the external relevance of prior laboratory work that demonstrates increased consumption as a response to experienced negative emotions, especially those that record negative emotions evoked by norm violations.

Furthermore, our research expands the discourse on ESG investing by revealing a link between ESG news sentiment and consumption behavior. While previous studies have highlighted the influence of social preferences on investment choices, we go a step further, demonstrating how these preferences resonate in the realm of consumption decisions. This underscores the interconnected nature of investment and consumption, highlighting the need for a more comprehensive consideration of financial behaviors across domains.

Our exploration of the heightened consumption response to dividends from companies embroiled in negative ESG news also challenges conventional financial economic theory. By illustrating that investors do, indeed, differentiate between income sources and that consumption patterns can be influenced by the circumstances surrounding dividend payouts, we enriched our understanding of the complexities of investor decision-making.

Our findings open interesting avenues for future research beyond the domain of financial markets. For example, individuals have been shown to have a preference to work for a company whose business practices are in line with their social preferences, for which they are willing to accept 9% lower wages (Krueger et al., 2023). It would, for example, be interesting to see whether individuals' consumption responses to wages paid by a firm with negative ESG performance differ differently than wages paid by a firm with positive ESG performance.

## C Appendix

**Table C1:** Investors do not re-balance their portfolios after negative ESG news

Dependent Variable:	(1) Long Trades (Log)	(2) Short Trades (Log)	(3) Trades (Log)
TVL at the Day	-0.001 (0.001)	-0.000 (0.000)	-0.000 (0.001)
TVL Change 1 Day	-0.002 (0.004)	-0.001 (0.004)	-0.002 (0.005)
TVL Change 1 Week	0.006 (0.005)	0.002 (0.004)	0.006 (0.006)
TVL Change 2 Weeks	0.001 (0.002)	-0.004 (0.004)	-0.004 (0.004)
TVL Change 1 Month	0.002 (0.003)	0.004 (0.004)	0.003 (0.004)
$\alpha$	-6.972*** (0.036)	-7.235*** (0.027)	-6.476*** (0.034)
R <sup>2</sup>	0.468	0.419	0.520
Stock Price Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	547,195	547,195	547,195
Companies	974	974	974

*Notes: This table gives regression coefficient estimates taken from three iterations of regression specification 4.3 (by column) as described in section 6. As right hand variables, we use the logged number of shares bought (column 1), the logged number of shares sold (column 2), and the logged number of shares traded (column 3) on day  $t$ . As right hand variables, we derive several variables from the stocks' TVL ESG score and stock price. Further, we add firm fixed effects, day-of-week fixed effects, week-of-month fixed effects, month-year fixed effects, holiday fixed effects, and individual fixed effects. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust, firm-date level double clustered standard errors are given in parentheses.*

**Table C2:** Negative ESG-related news do not affect dividend size

Dependent Variable:	(1) Amount	(2) Increase	(3) Decrease	(4) No Change
TVL at the Day	-0.002 (0.003)	0.000 (0.001)	0.000 (0.000)	0.000 (0.001)
TVL Change 1 Month	-0.033 (0.045)	0.015 (0.011)	-0.006 (0.006)	0.010 (0.010)
TVL Change 3 Months	-0.005 (0.019)	-0.002 (0.009)	0.007 (0.005)	0.004 (0.009)
TVL Change 6 Months	-0.025 (0.025)	0.008 (0.008)	-0.004 (0.003)	0.003 (0.006)
TVL Change 1 Year	0.009 (0.019)	0.003 (0.006)	-0.006* (0.003)	-0.004 (0.005)
$\alpha$	3.289*** (0.177)	0.311*** (0.036)	0.114*** (0.020)	0.391*** (0.029)
R <sup>2</sup>	0.958	0.287	0.412	0.493
Stock Price Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	6,070	6,061	6,061	6,457
Companies	858	857	857	900

*Notes: This table gives regression coefficient estimates taken from four iterations of regression specification 4.3 (by column) as described in section 7. As left hand variables, we use the dividend amount (in EUR) that is determined by company  $c$  on the day of the company's AGM  $t$  (column 1), a binary indicator of whether the size of the dividend has increased, compared to the last dividend that was paid out by company  $c$  (column 2), a binary indicator of whether the size of the dividend has decreased, compared to the last dividend that was paid out by company  $c$  (column 3), and a binary indicator of whether the size of the dividend has changed, compared to the last dividend that was paid out by company  $c$  (column 4). As right hand variables, we derive several variables from the stocks TVL ESG score and stock price. Further, we add firm fixed effects, day-of-week fixed effects, week-of-month fixed effects, month-year fixed effects, and holiday fixed effects. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. Robust, firm-date level double clustered standard errors are given in parentheses.*

**Table C3:** Sample descriptives

	Mean	SD	5th perc.	30th perc.	Median	70th perc.	95th perc.
<b>Panel A: Demographics</b>							
Male	0.697	0.459	0.000	0.000	1.000	1.000	1.000
Age	51.1	14.7	29.0	42.5	50.0	57.0	78.5
Married	0.466	0.499	0.000	0.000	0.000	1.000	1.000
Years with Bank	20.4	11.4	4.9	12.5	19.2	24.2	44.5
Employed	0.541	0.498	0.000	0.000	1.000	1.000	1.000
Civil Servant	0.020	0.142	0.000	0.000	0.000	0.000	0.000
Manager	0.029	0.169	0.000	0.000	0.000	0.000	0.000
Retired	0.082	0.274	0.000	0.000	0.000	0.000	1.000
<b>Panel B: Financial Assets and Transactions</b>							
Total Assets (EUR)	125,843	356,343	704	6,343	21,503	72,755	570,306
Stocks (EUR)	62,916	228,417	469	3,559	9,681	28,623	270,962
Funds (EUR)	47,437	160,362	0	0	482	17,929	236,792
Other Assets (EUR)	15,490	82,009	0	0	0	0	75,000
Assets (#)	8.6	14.4	1.0	2.0	4.4	8.8	31.9
Stocks (#)	5.4	11.2	1.0	1.0	2.5	5.0	19.0
Funds (#)	2.4	4.4	0.0	0.0	0.5	2.0	11.0
Monthly Trades (#)	1.3	3.8	0.0	0.1	0.4	1.0	5.2
Monthly Buy Transactions (#)	0.9	2.3	0.0	0.1	0.2	0.6	3.6
Monthly Sell Transactions (#)	0.4	1.6	0.0	0.0	0.1	0.2	1.9
<b>Panel C: Dividends and Consumption (Monthly Average)</b>							
Consumption	3,234.4	2,591.5	699.7	1,778.4	2,558.7	3,654.0	8,055.1
No of Consumption Days	9.6	4.1	3.0	7.0	9.5	12.0	16.6
Dividend Inflows	68.9	162.0	0.6	6.8	18.1	46.2	298.3
No of Dividend Days	0.3	0.3	0.1	0.1	0.2	0.3	0.8
<b>Panel D: Spending Transactions (Monthly Average)</b>							
Living	294.9	271.9	27.4	129.6	214.9	343.2	842.8
Housing	535.8	567.9	1.3	174.3	367.1	654.8	1,671.6
Leisure & Traveling	141.4	197.4	2.6	43.9	85.7	152.1	444.2
Mobility	95.2	129.8	0.0	24.3	57.8	105.3	310.6
Health	64.7	134.1	0.0	7.3	22.5	55.2	260.2
Children	54.1	212.9	0.0	0.0	0.0	1.7	337.5
Career & Education	21.6	62.6	0.0	0.0	2.5	12.8	97.5
Saving and Investing	2,727	13,441	0	59	391	1,339	12,182
Insurance	513.6	586.4	0.0	135.0	299.7	619.6	1,690.4
Loans	384.3	840.5	0.0	0.0	25.2	323.8	1,739.5
Other	48.9	121.3	0.4	8.0	16.0	32.5	206.0
Uncategorized	3,757.8	4,436.0	330.8	1,369.3	2,375.0	3,962.9	11,915.0
<b>Investors</b>	<b>18,566</b>						

*Notes: This table presents summary statistics for the investors in our sample. Panel A shows the investors' demographic information. Panel B focuses on the investors' financial assets and financial transactions. Panel C presents information on the investors' dividends and consumption. Finally, panel D provides information on the investors' outflow transactions.*

**Table C4:** Consumption variable

Category	Included in Consumption Variable?	Comment
<b>1. Living</b>		
Food and Drink	Yes	
Clothing	Yes	
Telecommunication	No	Recurring
Cosmetics	Yes	
Drugstore	Yes	
Pets	Yes	
Canteen	Yes	
Gifts	Yes	
Other	Yes	
<b>2. Housing</b>		
Rent	No	Recurring
Power and Energy	No	Recurring
Home Accessories	Yes	
Condo Fee	No	Recurring
Domestic Help	No	Recurring
Property Taxes	No	Recurring
Renovation and Maintenance	Yes	
Other	Yes	
<b>3. Leisure and traveling</b>		
Eat Out	Yes	
Events	Yes	
Sports	No	Recurring
Hobbies and Clubs	No	Recurring
Traveling	Yes	
Media (Books, Movies...)	Yes	
Electronics	Yes	
Subscriptions	No	Recurring
Other	Yes	
<b>4. Mobility</b>		
Cars	Yes	
Bicycle	Yes	
Motorcycle	Yes	
Public Transportation	Yes	
Taxi	Yes	
Refueling	Yes	
Other	Yes	



Category	Included in Consumption Variable?	Comment
<b>5. Health</b>		
Pharmacy	Yes	
Doctor	Yes	
Glasses	Yes	
Hospital	Yes	
Other	Yes	
<b>6. Children</b>		
Toys	Yes	
Children's Clothing	Yes	
Childcare	No	Recurring
School Fees	No	Recurring
Alimony Payments	No	Recurring
Other	Yes	
<b>7. Career and Education</b>		
Office Supplies	Yes	
Business Travel	Yes	
Tuition Fee	No	Recurring
Continuing Education	Yes	
Other	Yes	
<b>8. Saving and Investing</b>		
	No	Financial
<b>9. Insurance</b>		
	No	Financial
<b>10. Loans</b>		
	No	Financial
<b>11. Other Outflows</b>		
Donations	No	Recurring
Cash Withdrawals	Yes	
Internet Purchases	Yes	
Other	No	Recurring

*Notes: This table shows various transaction categories used by the bank's categorization tool and indicates whether the respective categories are included in our measure of consumption as described in section 2.3. "Uncategorized spending" refers to spending that could not be categorized by the bank's categorization tool.*

# Chapter 5

## Summary of the findings

According to a recent amendment to the EU-wide MiFID II regulation, financial institutions are required to elicit their clients' sustainability preferences. Through this regulation change, sustainability has found a natural entry point into consultations between financial advisors and clients. This dissertation explores the impact of sustainability-related financial advice on investment behavior. Comprising three distinct chapters, it delves into the dynamics of financial advisors' role in promoting sustainable investments.

In Chapter 2, I investigate implications for pricing through a study involving 415 professional advisors in the US and Europe. These advisors manage investment portfolios on behalf of clients, who submit either a conventional or a socially responsible investment mandate. The results show that financial advisors charge a premium for sustainable investment mandates, with the study design ruling out differences in effort, skill, or costs as explanations. Instead, the results are consistent with price discrimination, where advisors exploit clients' sustainable investment preferences to extract additional profits.

Furthermore, this premium is primarily imposed on sustainable investment clients with low or unknown financial literacy. Interestingly, the premium diminishes when advisors know clients' financial literacy to be high. The results further indicate that providing advice to sustainable investment clients presents an opportunity for advisors to earn higher fees, with sustainable investors being as likely as conventional clients to pay for advice, even at a premium.

In the Chapter 3, I administer a field experiment with clients of a European universal bank to examine the impact of perceived social norms on sustainable retail investments. I provide retail investors with information about peers' inclination towards sustainable investing during an investment decision. My results show that peer information raises the amount allocated to stock funds labeled as sustainable. This effect is primarily driven by participants initially underestimating peers' propensity to invest sustainably. Further, treated individuals indicate an increased interest in additional information on sustainable investments, primarily on risk and return expectations. However, by analyzing account-level portfolio holding data over time, I find that peer information does not affect the sustainability of investor portfolios over the months following the experiment.

In Chapter 4, I exploit a large dataset from a European bank to gain deeper insights into how retail investors react to negative environmental, social, and governance (ESG) news concerning companies in their portfolios. The dataset connects investor trading records, dividend income, and consumption-saving behavior at the individual level. The sample consists of 18,566 individual investors and covers a 24-month period from July 2017 to July 2019. I merge this customer data with daily firm-level ESG news sentiment scores from Truvalue Labs. I find that retail investors do not sell in response to scandals that expose socially irresponsible business practices of firms in their portfolio. However, investors do react to these news by showing an increased consumption response. Specifically, investors consume approximately twice as much out of dividends associated with negative ESG news sentiment, compared to income from companies without negative ESG news. I control for selection effects and rule out attention and adjustments to the dividend payout size as mechanisms. Instead, the results are consistent with laboratory evidence showing that people who earn money by violating social norms counter resulting negative emotions with mood-enhancing behavior, such as increased consumption. This aligns with the principles of emotion regulation theory. I demonstrate the applicability of emotion regulation theory outside of the laboratory in an important real-world context, financial markets.

Overall, this dissertation shows that financial advisors may foster sustainable investing

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by providing information to clients during the buying decision, even though this information does not affect the sustainability of portfolios in the long-term. However, selling behavior is less influenced by new information on the sustainability of firms. The findings also reveal that financial advisors charge a premium for sustainable investing mandates and clients who cannot signal high financial literacy bear the burden of higher fees.



# Chapter 6

## Zusammenfassung

Laut einer kürzlich erfolgten Anpassung der EU-weiten MiFID-II-Verordnung sind Finanzinstitute dazu verpflichtet, die Nachhaltigkeitspräferenzen ihrer Kunden zu erfragen. Durch diese Regulierung hat Nachhaltigkeit einen natürlichen Einzug in die Beratungsgespräche zwischen Finanzberatern und Kunden gefunden. Die vorliegende Dissertation untersucht die Auswirkungen von nachhaltigkeitsbezogener Finanzberatung auf das Anlageverhalten. In drei eigenständigen Kapiteln wird die Dynamik der Rolle von Finanzberatern bei der Förderung nachhaltiger Investitionen untersucht.

In Kapitel 2 untersuche ich die Auswirkungen auf die Preisgestaltung anhand einer Studie mit 415 professionellen Finanzberatern in den USA und Europa. Diese Berater verwalten Anlageportfolios im Auftrag von Kunden, die entweder einen konventionellen oder einen sozial verantwortlichen Anlageauftrag erteilen. Die Ergebnisse zeigen, dass Finanzberater einen Aufschlag für nachhaltige Anlagemandate verlangen, wobei das Studiendesign Unterschiede im Aufwand, in den erforderlichen Kompetenzen oder den Kosten als Erklärung ausschließt. Stattdessen deuten die Ergebnisse auf eine Preisdiskriminierung hin, bei der die Berater die nachhaltigen Anlagepräferenzen ihrer Kunden ausnutzen, um zusätzliche Gewinne zu erzielen.

Darüber hinaus wird diese erhöhte Gebühr in erster Linie bei Kunden mit geringen Finanzkenntnissen erhoben. Es gibt keinen Aufschlag, wenn die Berater wissen, dass die Finanzkompetenz der Kunden hoch ist. Die Ergebnisse deuten außerdem darauf hin,

dass die Beratung nachhaltiger Anlagekunden den Beratern die Möglichkeit bietet, höhere Einnahmen zu erzielen, da nachhaltige Anleger genauso häufig für die Beratung zahlen wie konventionelle Kunden, selbst wenn sie einen Aufschlag zahlen müssen.

In Kapitel 3 führe ich ein Feldexperiment mit Kunden einer europäischen Universalbank durch, um die Auswirkungen wahrgenommener sozialer Normen auf nachhaltige Investitionen zu untersuchen. Ich gebe Kleinanlegern während einer Anlageentscheidung Informationen über die Neigung von Peers zu nachhaltigen Investitionen. Meine Ergebnisse zeigen, dass diese Informationen den nachhaltig investierten Betrag erhöhen. Dieser Effekt ist in erster Linie darauf zurückzuführen, dass die Teilnehmer die Neigung der Peers, nachhaltig zu investieren, anfänglich unterschätzt haben. Darüber hinaus zeigen die Befragten ein gesteigertes Interesse an zusätzlichen Informationen zu nachhaltigen Anlagen, vor allem zu Risiko- und Renditeerwartungen. Bei der Analyse der Portfoliobestandsdaten auf Kontoebene im Zeitverlauf stelle ich jedoch fest, dass die übermittelten Informationen keinen Einfluss auf die Nachhaltigkeit der Anlegerportfolios in den Monaten nach dem Experiment haben.

In Kapitel 4 nutze ich einen großen Datensatz einer europäischen Bank, um tiefere Einblicke zu gewinnen, wie Privatanleger auf negative environmental, social, and governance (ESG) Nachrichten über Unternehmen in ihren Portfolios reagieren. Der Datensatz verbindet Handelsdaten von Anlegern, Dividendeneinkünfte und Sparverhalten auf individueller Ebene. Die Stichprobe besteht aus 18.566 Einzelanlegern und deckt einen 24-monatigen Zeitraum von Juli 2017 bis Juli 2019 ab. Ich führe diese Kundendaten mit täglichen ESG-Nachrichten-Sentiment-Scores von Truvalue Labs auf Unternehmensebene zusammen. Ich stelle fest, dass Kleinanleger ihre Aktien nach Skandalen, die sozial unverantwortliche Geschäftspraktiken von Unternehmen in ihrem Portfolio aufdecken, nicht verkaufen. Allerdings reagieren die Anleger auf diese Nachrichten mit einem erhöhten Konsumverhalten. Konkret konsumieren Anleger etwa doppelt so viel aus Dividenden, die mit negativen ESG-Nachrichten in Verbindung stehen, im Vergleich zu Erträgen von Unternehmen ohne negative ESG-Nachrichten. Ich kontrolliere für Selektionseffekte und schließe Aufmerksamkeit und Anpassungen der Dividendenausschüttungshöhe als Mech-

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anismen aus. Stattdessen stimmen die Ergebnisse mit Laborergebnissen überein, die zeigen, dass Menschen, die Geld verdienen, indem sie gegen soziale Normen verstoßen, den daraus resultierenden negativen Emotionen mit stimmungsaufhellendem Verhalten, wie beispielsweise erhöhtem Konsum, begegnen. Dies entspricht den Grundsätzen der Emotionsregulationstheorie. Ich zeige die Anwendbarkeit der Emotionsregulationstheorie außerhalb des Labors in einem wichtigen realen Kontext, den Finanzmärkten.

Insgesamt zeigt diese Dissertation, dass Finanzberater nachhaltiges Investieren fördern können, indem sie ihren Kunden während der Kaufentscheidung Informationen zur Verfügung stellen, auch wenn diese Informationen wenig Einfluss auf die Nachhaltigkeit der Portfolios auf lange Sicht haben. Das Verkaufsverhalten wird jedoch durch neue Informationen über die Nachhaltigkeit von Unternehmen weniger beeinflusst. Die Ergebnisse zeigen auch, dass Finanzberater einen Aufschlag für nachhaltige Anlagemandate verlangen und dass Kunden, die keine hohe Finanzkompetenz signalisieren können, höhere Gebühren zu tragen haben.





# Chapter 7

## Samenvatting

Volgens een recente wijziging in de EU-brede MiFID II-regelgeving zijn financiële instellingen verplicht om hun klanten te vragen naar hun duurzaamheidsvoorkeuren. Door deze regelgeving heeft duurzaamheid een natuurlijke ingang gevonden in de adviesgesprekken tussen financiële adviseurs en klanten. Dit proefschrift onderzoekt de impact van duurzaamheidsgerelateerd financieel advies op beleggingsgedrag. Drie op zichzelf staande hoofdstukken onderzoeken de dynamiek van de rol van financieel adviseurs in het bevorderen van duurzaam beleggen.

In hoofdstuk 2 onderzoek ik de implicaties voor de prijsstelling aan de hand van een studie onder 415 professionele financiële adviseurs in de VS en Europa. Deze adviseurs beheren beleggingsportefeuilles namens klanten die een conventioneel of een maatschappelijk verantwoord beleggingsmandaat opgeven. De resultaten laten zien dat financieel adviseurs een premie vragen voor duurzame beleggingsmandaten, hoewel de onderzoeksopzet verschillen in inspanning, vereiste vaardigheden of kosten uitsluit als verklaring. In plaats daarvan suggereren de resultaten prijsdiscriminatie, waarbij adviseurs de duurzame beleggingsvoorkeuren van hun klanten uitbuiten om extra winst te maken.

Bovendien wordt deze verhoogde vergoeding voornamelijk in rekening gebracht aan klanten met weinig financiële kennis. Er is geen toeslag als adviseurs weten dat de financiële kennis van klanten hoog is. De resultaten suggereren ook dat het adviseren van duurzame beleggingsklanten adviseurs de mogelijkheid biedt om hogere inkomsten

te verdienen, omdat duurzame beleggers net zo bereid zijn te betalen voor advies als conventionele klanten, zelfs als ze een toeslag moeten betalen.

In hoofdstuk 3 voer ik een veldexperiment uit met klanten van een Europese universele bank om de invloed van waargenomen sociale normen op duurzame investeringen te onderzoeken. Ik geef particuliere beleggers tijdens een beleggingsbeslissing informatie over de neiging van peers om duurzaam te beleggen. Mijn resultaten laten zien dat deze informatie het bedrag dat duurzaam wordt geïnvesteerd verhoogt. Dit effect is voornamelijk te wijten aan het feit dat deelnemers in eerste instantie de neiging van peers om duurzaam te beleggen onderschatten. Verder tonen respondenten een toegenomen interesse in aanvullende informatie over duurzame beleggingen, met name over risico- en rendementsverwachtingen. Wanneer ik echter de portefeuilleggegevens op rekeningniveau analyseer in de loop van de tijd, ontdek ik dat de verstrekte informatie geen invloed heeft op de duurzaamheid van beleggersportefeuilles in de maanden na het experiment.

In hoofdstuk 4 gebruik ik een grote dataset van een Europese bank om meer inzicht te krijgen in hoe particuliere beleggers reageren op negatief environmental, social, and governance (ESG) nieuws over bedrijven in hun portefeuille. De dataset combineert handelsgegevens van beleggers, dividendinkomsten en spaargedrag op individueel niveau. De steekproef bestaat uit 18.566 individuele beleggers en bestrijkt een periode van 24 maanden van juli 2017 tot juli 2019. Ik voeg deze klantgegevens samen met dagelijkse ESG-nieuws sentiment scores van Truvalue Labs op bedrijfsniveau. Ik vind dat particuliere beleggers niet reageren op schandalen die maatschappelijk onverantwoorde bedrijfspraktijken van bedrijven in hun portefeuille blootleggen. Beleggers reageren echter wel op dit nieuws door hun consumptiegedrag te verhogen. Specifiek consumeren beleggers ongeveer twee keer zoveel van dividenden die verband houden met negatief ESG-nieuws in vergelijking met rendementen van bedrijven zonder negatief ESG-nieuws. Ik controleer voor selectie-effecten en sluit aandacht en aanpassingen van het dividenduitkeringsniveau uit als mechanismen. In plaats daarvan komen de resultaten overeen met laboratoriumbevindingen die laten zien dat mensen die geld verdienen door sociale normen te schenden, de resulterende negatieve emoties compenseren met stemmingsverbeterend gedrag,

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zoals meer consumptie. Dit is in lijn met de principes van de emotieregulatietheorie. Ik laat de toepasbaarheid van de emotieregulatietheorie buiten het laboratorium zien in een belangrijke praktijkcontext, financiële markten.

Samenvattend laat dit proefschrift zien dat financieel adviseurs duurzaam beleggen kunnen bevorderen door hun klanten informatie te geven tijdens de aankoopbeslissing, zelfs als deze informatie weinig invloed heeft op de duurzaamheid van portefeuilles op de lange termijn. Verkoopgedrag wordt echter minder beïnvloed door nieuwe informatie over duurzaamheid van bedrijven. De resultaten laten ook zien dat financieel adviseurs een premie in rekening brengen voor duurzame beleggingsmandaten en dat klanten die niet kunnen aangeven dat ze financieel onderlegd zijn, te maken krijgen met hogere kosten.



# Chapter 8

## Impact Paragraph

The studies presented in this dissertation contribute to our understanding of how concerns for sustainability influence individual decision-making in financial markets. As such, the studies have implications for practitioners in different sectors.

First, the dissertation has implications for policy makers. It is a pressing concern for policy makers to increase the amount of funds that are invested under the consideration of ESG criteria. As part of the action plan to promote sustainable investments, the European Commission has put in place a policy amendment to the MiFID II, which requires financial advisors to elicit their clients' sustainability preferences in their investments. In Chapter 2 of this dissertation, I identify a potential unintended side consequence of this policy amendment. Specifically, financial advisors may take knowledge about their clients' sustainability preferences in order to extract additional profits from those who do communicate these preferences. When clients can signal high financial literacy, the premium is eliminated, but sustainable investment clients who cannot signal high financial literacy bear the burden of higher fees. This form of discriminatory pricing is concerning, as it could hurt consumer welfare and negatively affect the long-run attractiveness of sustainable investing.

In a separate survey with financial regulators, I show that these results are a surprise to the majority of policy makers. When confronted with the results, a significant majority (81%) also believes that attention from policy makers is necessary. Regulators suggest

policy interventions, such as transparency (30%), standardized fees (25%) and consumer education (17%).

In addition, Chapter 3 shows that if conflicts of interest that potentially lead to price discrimination can be resolved, financial advice may be a useful tool to increase households' propensity to invest sustainably. Investors in my sample report a lack of knowledge about sustainable investing and tend to view sustainable investments as a trade-off between non-pecuniary benefits, such as having an impact or feeling good, and a lower risk-adjusted return. However, investors are receptive to new information concerning sustainable investing and change their investment behavior accordingly. Specifically, I show that peer information provided at the buying decision increases the proportion of funds that flow into sustainable investments. Importantly, this information only alters behavior, when it changes investors' prior beliefs.

Chapter 4 gives an indication that the buying decision is indeed the point in time when investors are most susceptible to new information on sustainable investments. After this decision, my results show that retail investors' portfolios are relatively sticky, which leads them to do few adjustments their portfolios, even after news of ESG scandals concerning companies in their portfolios.

What is important to mention at this point is of course that policy makers should supervise that investment clients are not manipulated into sustainable investments. The financial advice should be utilized to close the knowledge gap of investors, in order to better align sustainability-minded households' investments with their preferences.

This dissertation also has implications for financial institutions catering to retail investors. Chapter 2 shows that clients with a preference for sustainability have a higher willingness to pay for advice. Since financial advice represents a credence good, where clients cannot fully assess the quality, even ex-post, this may be exploited by financial advisors. At least in the short run, this dissertation shows that it is a profitable strategy for financial advisors to use discriminatory pricing, where higher fees are charged and more expensive products are sold to sustainable investors. However, these implications should be taken with caution. Despite moral considerations related to price discrimination, my

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results cannot make any claims on the long-term profitability of such a strategy. For example, there may be potential negative shocks to profitability if this price discrimination is uncovered and made public.

Next to implications for pricing, the results presented in this dissertation may help finance professionals better understand how retail investors react to sustainability information. As shown in Chapter 3, investors are influenced by new information that change their prior beliefs related to sustainable investments at the point of purchase, however, as shown in Chapter 4 their trading behavior is less influenced by new information about the sustainability of companies that they already hold in their portfolios. This provides an insight about when sustainability information should be shown to investors, in order to help them align their portfolios with their sustainability preferences.





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