Journal of Behavioral and Experimental Finance 41 (2024) 100882

Contents lists available at ScienceDirect

Journal of Behavioral and Experimental Finance

journal homepage: www.elsevier.com/locate/jbef

Which ESG+F dimension matters most to retail investors? An experimental study on financial decisions and future generations

Matteo Benuzzi [a,*], Klaudijo Klaser [a], Karoline Bax [a,b]

[a] University of Trento, Department of Economics and Management, Trento, Italy
[b] TUM School of Management, TUM Campus Heilbronn, Technical University of Munich, Heilbronn, Germany

ARTICLE INFO

Keywords:
ESG
Sustainability
Economic experiment
Financial decisions
Investor preference

ABSTRACT

In this study, we address the ongoing debate about the relative importance of the three dimensions of the ESG framework and whether they are sufficient to capture the full scope of sustainability. We propose a new dimension, the Future Generations pillar (F-pillar), which aims to account for intergenerational equity and sustainability. Our online experiment explores how retail investors make investment decisions when presented with different combinations of financial and ESG information, including the F-pillar. Our findings suggest that retail investors try to balance their financial objectives with sustainability considerations. Moreover, the E-pillar appears to be most relevant when investors adopt a sustainability perspective, while the S-pillar is most relevant when investors consider the financial perspective. Interestingly, our results show that an explicit F-pillar is somewhat redundant, as individuals believe that the three existing ESG pillars already indirectly address the sustainability towards the future generations. This study contributes to the ongoing debate on the relevance of the ESG framework and highlights the need to further explore the interplay between financial and sustainability considerations in retail investment decision-making.

1. Introduction

According to the (Special Eurobarometer Report on Climate Change, 2021), half of the European population considers climate change to be among the four most serious problems the world is facing and that should be urgently addressed. However, while environmental sustainability is often considered the primary or sole concern, it represents just one element of the multifaceted sphere of the Sustainable Development Goals (SDGs). Indeed, the 2030 Agenda for Sustainable Development has identified 17 dimensions of sustainability divided into 169 specific targets. These macro-level sustainability objectives are intertwined with micro-level Environmental, Social, and Governance (ESG) firm goals (Minh Hieu, 2023; Wilburn and Wilburn, 2020) through the double materiality perspective (Delgado-Ceballos et al., 2023). Thus, the ESG framework comprises a set of indicators that expand corporations' focus to encompass their impact on a wider set of stakeholders and potentially surpass the profit maximization perspective (Friedman, 1970).

Nowadays, to match as many sustainability firm-level objectives as possible with the Sustainable Development Goals, the ESG+ framework is gaining momentum (Magalhães et al., 2023; O'Hearn et al., 2022; Shackelford et al., 2023; Varley and Lewis, 2021; Wilson, 2021, 2023). The "+ " symbol that flanks the canonical ESG acronym is designed to encapsulate the impact of sustainability factors beyond Environment, Society and Governance. Following this evolution of the concept of sustainability at firm level, we explore a potential fourth sustainability dimension: the "Future generations" pillar (F-pillar). We propose to explore actions that can have a direct impact on the well-being of future generations, conceptualizing them as companies' stakeholders (Abrudan et al., 2021).

Retail investors are considered increasingly important for the future of ESG investments (Tan, 2022), but little is known about their motivations and preferences. In this study, we examine their investment decisions using an experimental approach to shed light on how different sustainability factors interact with risk and return preferences. Participants face binary investment choices between a sustainable and a standard company, with real money at stake. We investigate whether

* Corresponding author.
E-mail address: matteo.benuzzi@unitn.it (M. Benuzzi).

https://doi.org/10.1016/j.jbef.2023.100882
Received 14 June 2023; Received in revised form 6 September 2023; Accepted 5 December 2023
Available online 12 December 2023

retail investors consider only risk and return, or sustainability factors are traded-off against returns.

Our results suggest that financially less attractive companies were chosen more often when they triggered a donation to an organization representing a sustainability pillar, indicating prosocial behavior. We also find that the importance of the sustainability factors varies according to the perspective adopted by the investor, with the E and S pillars being the most important within a sustainability and financial perspective, respectively. Additionally, our results suggest that the three standard ESG pillars produce positive spillover effects on future generations, obviating the need to explicitly introduce the F-pillar.

The remainder of the paper is organized as follows. In Section 2, we introduce the relevant literature on ESG scores and our contribution, in Section 3 we provide a detailed explanation of our experimental design, and in Section 4 we present and discuss our results. Finally, in Section 5, we report our conclusions.

2. Literature review and contributions

2.1. 2ESG scores

By 2020, in the five major world markets alone, over $35 trillion in assets had been invested in sustainable funds, i.e., funds whose "*approach [that] considers environmental, social and governance (ESG) factors in portfolio selection and management*" (GSIA, 2020). As a guide, different data providers (e.g., Bloomberg, MSCI, Refinitiv) provide non-financial ESG information and scores, which are designed to link a wide range of individual indicators with an overall score. The purpose of these scores may be different for different data providers.[1] Despite the growth of sustainable investing, the link between ESG scores and the financial and economic performance of the underlying companies is highly debated (Avramov et al., 2022; Schiereck et al., 2019). Indeed, research has not yet found a consensus on whether higher scores have a positive, negative, or no effect on companies' performance, also in terms of risk management (Nirino et al., 2021). Several issues, such as measurements divergence (Berg et al., 2020), post-publication changes (Berg et al., 2021), variation in weighting across providers (Dimson et al., 2020), and missingness (Sahin et al., 2022; Sahin et al., 2023) have contributed to the argument regarding the ambiguous effect of ESG on financial performance and risk. In our study we bypass this debate by providing subjects with a direct measure of sustainability, that is a real donation to an organization that represents the pillar taken into consideration (Milinski et al., 2006; Brodback et al., 2020).

2.2. ESG and the investors' perspective

Eccles et al. (2011) used the "hits" of ESG-related metrics on Bloomberg as a proxy for the interest in sustainability and found that investors were first interested in those metrics classified under transparency of ESG reporting, followed by governance. Using survey information from senior investment professionals, Amel-Zadeh and Serafeim (2018) found that 82% of respondents used ESG information as *"it is financially material to investment performance"*. Respondents argued that this non-financial information was primarily helpful in *"assessing a company's reputational, legal and regulatory risk"*. Van Duuren et al. (2016) conducted a survey study on portfolio managers and found that the governance pillar was the most relevant because *"it is informative about the quality of the management of the firm"*. Similar results are reported in Crifo et al. (2015). Hence, governance seems to be the dominant pillar for the investment professionals. However, the reason is not related to sustainability per se, but rather to a holistic view of a company, encompassing both financial and non-financial information in the valuation process. Indeed, McLean et al. (2022) found that the most common responsible investing approach is integration of ESG considerations into fundamental analysis. Interestingly, although the assets managers they surveyed ranked the E-pillar as the most important, those asset managers who were part of a climate initiative had notably high portfolio carbon intensity, suggesting once again that financial considerations dominate sustainability ones. Risi (2018) examined socially responsible investing (SRI) that incorporates environmental, social, and governance (ESG) factors into investment strategies and reveals that varying time horizons influence the adoption of both reactive and proactive SRI approaches. Moreover, Risi et al. (2021) noted that high-net-worth individuals leaning towards SRI often place financial returns above social welfare. This tendency stems from the influence of their reference groups, which encourage them to pursue economic profits, even when they already possess significant wealth.

In the current reengineering of public finance, mobilizing private capital is a critical step to tackle sustainability problems (Tan, 2022). This requires studying the incorporation of ESG considerations into retail investment decisions. In a global survey with institutional investors, Eccles et al. (2017) asked the participants which would be the most valuable actions to overcome the barriers of integrating ESG factors into investment decisions and most of the respondents cited greater customer demand, highlighting the necessity of focusing on the perspective of retail investors. Nevertheless, little is known about their motivations, and how their decisions are influenced by the single sustainability dimensions. A first difficulty concerns the level of literacy of such investors on these topics: a study on Swiss households, which are known for their high general financial literacy, showed low sustainable finance literacy (Filippini et al., 2021). Another difficulty stems from the fact that the concept of what is important is highly dependent on the way in which the question is asked. Firstly, there is the financial-sustainability trade-off: according to Cohen et al. (2011) retail investors rank economic performance first, followed by governance and finally social responsibility. Indeed, in a field experiment that involved thousands of clients of a bank, Døskeland and Pedersen (2016) found that a newsletter containing positive financial information concerning green funds was more likely to trigger both the search for additional information and the decision to invest in such funds, than information concerning their contribution to sustainability. Moreover, from the individual's point of view, the ESG dimensions can be considered under at least two perspectives: the financial perspective and the sustainability perspective. The former perspective concerns the way in which ESG information can be used to improve the valuation of a company (Edmans, 2023), while the latter concerns the overall impact on the society. Thus, stating that one dimension is more important than another without specifying the perspective tells us little about the true preferences over the three pillars. In a survey study of Australian superannuation members, De Zwaan et al. (2015) somewhat distinguished between these two perspectives. Their results suggest that most individuals agree that *"considering ESG makes sense from a financial perspective"*, especially the G-pillar. Moreover, individuals seemed to believe that concern for the E-pillar hurts financial outcomes the most. As far as the way in which funds are "considered highly" is concerned, no pillar seems to dominate the others. On the contrary, Berry and Junkus (2013) surveyed American individual investors and found that for both socially responsible and conventional investors, the E-pillar played a dominant role, whereas governance did not play a role as prominent as expected. A survey study of socially responsible investors in Australia by Pérez-Gladish et al. (2012) found that the concern for the social pillar triggers a higher allocation in socially responsible funds, while the concern for the environmental dimension does not. Finally, Filippini et al. (2021) found that retail investors find the G-pillar less

[1] For example, for Refinitiv they *"measure the company's ESG performance based on verifiable reported data in the public domain"* (Eikon, 2022), for MSCI they *"measure a company's resilience to long-term, industry material environmental, social and governance (ESG) risks"* (MSCI, 2020), and for Morningstar they *"support investors in evaluating the relative environmental, social, and governance risks within portfolios"* (Sustainalytics, 2021).

important than the other two.

A recent working paper of Giglio et al. (2023) focuses on investors' beliefs about ESG and finds that on average they expect ESG investments to underperform the market, but at the same time there is considerable heterogeneity in beliefs. Moreover, while they find that investors who invest in these funds usually expect overperformance, even investors who expect underperformance allocate some of their money on them, for instance because *"it is the right thing to do"*. This is supported by Christiansen et al. (2023) who show that SRI and conventional investors have similar returns on their conventional portfolios, suggesting non-financial motives for SRI investments.

Taken together, these studies suggest further research on the relative importance of the different dimensions of the ESG framework, with a particular focus on the perspective of retail investors.

2.3. ESG in experimental economics

In a framed field experiment with private equity investors, Crifo et al. (2015) found that ESG scores affect the valuation of a company and the decision to invest: entrepreneurs failing to perform on the ESG dimensions experienced a higher cost of capital and limited access to private equity. Moreover, investors seem to prefer to invest in sustainable (fictitious) companies if they perform well in ESG areas adjacent to the company's strategy (Cheng et al., 2015).

Khemir et al. (2019) focused on the relative importance of the three ESG pillars: providing experimental subjects with different sets of non-financial information, they tested whether there was some trade-off between financial and non-financial information (Paetzold et al., 2022; Van Duuren et al., 2016). They found that the influence of ESG information was significant, and that governance and social information had more influence than environmental information. On the contrary, through a questionnaire, Naveed et al. (2020) found that environmental and governance information was more important than the social one.

All the experimental results reported so far were choice experiments, based on hypothetical scenarios, where the choice had generally no direct impact on the decision-makers' payoff. To the best of our knowledge, only two previous experiments on the ESG factors were performed with real money at stake for the decision-maker. Martin and Moser (2016) found that fictitious managers and shareholders were willing to bear a financial cost to positively contribute to the environment. Brodback et al. (2020) studied the willingness to pay to buy dual-outcome lotteries with a potential donation resembling the three ESG dimensions. They found that, in general, subjects were willing to pay to hold sustainable assets.

Other experiments focus on the choices of investors trading-off returns with social outcomes. For instance, Bonnefon et al. (2022) found that investors bidding to buy companies with externalities in the form of donations are willing to pay 0.78 cents for each unitary donation, with this effect driven by the willingness to align their portfolios to their own values (rather than to have an impact on society). Similarly, Heeb et al. (2023) found that investors exhibit a positive willingness to pay to reduce CO_2 emissions, but this is mostly unrelated to the amount actually reduced. Humphrey et al. (2021) found that, compared with their baseline allocation, investors significantly reduce their allocation to stocks when this reduces a negative externality, but they do not significantly increase it when this increases a positive externality. Thus, they found an asymmetric effect of the externality, expressed as a donation to a charity chosen by the subject among a given pool, which covers several areas of the ESG framework.

2.4. Paper's contributions

With our paper, we contribute to the existing literature by extending the experimental practice in which a prosocial choice can affect both the subject's payoff and the real world through a donation. Unlike Martin and Moser (2016), and Heeb et al. (2023), we do not focus only on the environmental pillar, but include all the three ESG pillars; and unlike Humphrey et al. (2021) and Bonnefon et al. (2022), we do not allow subjects to choose the recipient of the donation, but we assign it as a treatment, as in Brodback et al. (2020). Our framework differs from Brodback et al. (2020), in that we do not explicitly measure the willingness to pay, since our subjects face binary decisions between lottery-companies. Furthermore, from a methodological perspective, we analyze choices both in a risk and in an uncertainty framework. Finally, our subject pool is not limited to students, so it is closer to the population of real retail investors.

We also contribute to the stream of literature on the relative importance of the three pillars: we study this from three different perspectives. First, like Khemir et al. (2019) we study the impact of ESG on investment decisions, but with the production of real monetary impacts. Second, we distinguish between the sustainability and financial perspectives of investments in two non-incentivized ranking tasks. Third, we study the relative importance from a sustainability perspective with an indirectly incentivized allocation task.

Finally, based on a recent stream of literature, which is questioning the rigor of the current ESG paradigm (Trahan and Jantz, 2023), we consider the possibility that the ESG framework might not represent a complete and inclusive set of sustainability dimensions (Purvis et al., 2019; Clément et al., 2022). Specifically, this literature seeks to remark that the current ESG framework should not be assumed as absolute and immutable. Instead, sustainability should be considered under an evolutionary perspective (Vidal Marchi, 2021), allowing organizations to commit to new and more inclusive sustainability factors over time (Bansal, 2005). An example that goes in this direction is the literature that is suggesting adding a new Health (H) pillar (Consolandi et al., 2020; Kuzmina and Lindemane, 2017; O'Hearn et al., 2022; Wilson, 2021, 2023). Another example is the inclusion of a Technological (T) pillar, which accounts for the impact of technology on everyday lives (Shackelford et al., 2023). A third example is provided by Magalhães et al. (2023), who suggest adding a People (P) pillar that accounts for the direct impact on people's welfare (e.g., personal development, sense of participation and belonging, quality of working life).

In line with this ESG+ view (Varley and Lewis, 2021), in our experiment we add and explore a fourth sustainability dimension closely related to Magalhães et al. (2023), the Future Generations pillar (F-pillar), which adds the well-being of future generations to the sustainability equation – in the sustainability identification, prioritization, and planning process of organizations (Sheehan et al., 2023). The F-pillar is equivalent to conceptualizing future generations as direct stakeholders of a company (Abrudan et al., 2021).

The rationale of the F-pillar is the following. The Brundtland Report (Our Common Future, 1987) states that *"sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs"*. According to this definition, in our study we designed the F-pillar to have an impact on education and health of children. We consider having a direct impact on the wellbeing and opportunities of the next generation as the most representative action underpinning sustainable development as generally defined. So, together with the standard ESG paradigm, we propose this new perspective to firms: to measure the impact that an organization has on the welfare of future generations to guarantee sustainable choices and actions.

Moreover, from a company or investor perspective, the F-pillar, as conceived, emphasizes the attention on the time dimension underlying the concept of sustainability and stresses the trade-offs between the current and the future stakeholders of a firm (Abrudan et al., 2021; Bansal and DesJardine, 2014). In this sense, the F-pillar is exclusively forward looking and, together with benefiting future generations, can

Table 1
Lotteries of part 1 of the experiment.

Lottery	Payoffs (in tokens), probabilities	Expected return	Variance	Notes
A	6, 20%; 10, 20%; 15, 60%	12.20	13.36	Same in all 8 rounds
B1	6, 30%; 10, 10%; 15, 60%	11.80	16.56	Is dominated by A
B2	6, 20%; 9.50, 20%; 14.50, 60%	11.80	12.16	Is dominated by A
B3	6, 20%; 10, 35%; 15, 40%; 22, 5%	11.80	17.16	Is dominated by A
B4	6, 95%; 40, 5%	7.70	54.91	Is dominated by A
B5	6, 20%; 9.99, 20%; 15, 60%	12.198	13.37	Is dominated by A
B6	4, 20%; 10, 20%; 20, 60%	14.80	44.16	Trade-off
B7	6, 20%; 12, 20%; 15, 60%	12.60	12.24	Dominates A
B8	6, 20%; 10, 20%; 15, 60%	12.20	13.36	Probabilities unknown

also benefit organizations in escaping the short-termism trap, aligning business with society (Bansal and DesJardine, 2014; Bansal et al., 2022; Kim et al., 2019). Thus, from an overarching perspective, the F-pillar can help to bridge the current risk-reward framework dominating the ESG paradigm from the supply side with the demand for sustainability from the investors side. This is because the F-pillar is not ambiguous in terms of impact: while we look at the current ESG framework through the double materiality perspective (Chiu, 2022), the F-pillar looks exclusively at the impact side.

3. Method and experimental design

3.1. Research questions and development of hypothesis

In the last decades trillions of dollars have been invested in sustainable funds. However, this does not necessarily mean that investors were willing to give up returns to be sustainable (Pedersen et al., 2021). Indeed, research has not found evidence of a systematic negative relationship between returns and sustainability (Avramov et al., 2022; Hartzmark and Sussman (2019); Hong et al., 2009; Schiereck et al., 2019). On the contrary, other reasons may account for the increase in sustainable investments, such as tax advantages (Celani et al., 2022), expectations over future regulations (Sadden, 2023), expectations over other investors' behavior (Pástor et al., 2022), beliefs over the relationship between sustainability and returns (Bauer et al., 2021; Giglio et al., 2023), intermediaries' conflicts of interest (Crawford et al., 1982), signaling (Riedl and Smeets, 2017), political or regulatory constraints (Barber et al., 2021), and so on. With our experimental setting we isolate these factors by creating a clear relationship between the sustainability and the financial dimension of an investment decision. In this way, we can test the following hypothesis.

Hypothesis 1. *The contribution to an organization impacting an ESG+F dimension does not affect the decisions on which company to choose.*

Rejection of the first hypothesis would indicate investors are not solely motivated by the financial dimension.

In the previous sections, we reported contrasting findings of surveys and experiments concerning the importance of the three ESG dimensions, and we have stressed how the perspective adopted to evaluate them is pivotal in this assessment. Within our design, we explicitly distinguish between the financial perspective (ability to produce better risk-adjusted returns, regardless of the impact on the world) and the sustainability perspective (ability to make a positive impact). Hence, we can test Hypotheses 2a and 2b (adopting a neutral standpoint), and, in case of rejection, we can further study how the four (three) dimensions rank within each perspective.

Hypothesis 2a. *: The four ESG+F pillars have the same importance from a "sustainability perspective".*

Hypothesis 2b. *: The four ESG+F pillars have the same importance from a "financial perspective".*

In the last decades, there has been a growing focus on the externalities that companies create for a wide range of stakeholders. While most of these stakeholders have the ability – at least to some extent – to voice their concerns to companies and authorities, future generations do not (Gabor, 2013). For this reason, a number of policies and long-term goals have been set at an international level to safeguard the interest of future generations. Therefore, we question (1) whether the current generation cares about the interests of the next one and whether it is willing to bear a cost to favor it, and (2), whether the ESG framework per se is sufficient to address the interests of future generations, making the new F-pillar redundant, or a new pillar is needed to ensure all the shades of sustainability. We therefore formulate our hypothesis accordingly.

Hypothesis 3. *The ESG pillars are all a proxy for the attention towards future generations.*

3.2. Experimental design

The experiment was divided into two parts, preceded by an introduction, and followed by a questionnaire.

In the first part of the experiment, subjects played eight rounds in which they chose between two lotteries, representing two companies: Company A and Company B. Each subject made a total of eight binary independent choices, with the order of the rounds randomized at the subject level. Company A was the same for all the eight rounds, while Company B varied each time, in terms of magnitude of potential outcomes, number of outcomes, and probability of each outcome (see Table 1). Company B was a sustainable company, so an investment in it entailed a donation of 5 tokens (£0.50) to an organization (on top of the financial outcome stemming from the lottery). On the contrary, Company A was a "normal" company, so investing in it did not entail any consequence other than the outcome of the lottery. There were four treatments plus the baseline: in the baseline, the choice of Company B did not entail any donation, so the choice was only between lotteries. In each of the four treatments, the receiver of the donation varied to proxy the activities of the three ESG pillars as well as the F-pillar.[2] Throughout the eight rounds of the first part, each subject engaged with only one of these sustainability dimensions (between-subjects design).

Thanks to our setup, we could overcome three general issues. First, by showing both the probability distribution of outcomes and the size of the donation, we made the relationship (trade-off) between the sustainability and the financial dimensions explicit, overcoming the role of

[2] They were *"an organization that plants trees to capture carbon emissions and foster biodiversity"* (E-pillar), *"an organization that protects workers' rights and fights discrimination in the workplace"* (S-pillar), *"an organization that fosters transparency in company reporting and management supervision"* (G-pillar) and *"an organization that provides education and healthcare to children"* (F-pillar). While the recipients of the donations may not fully cover the scope of each pillar, they are a very good proxy for some of the activities that are part of the ESG+F framework and that concern sustainability. Unlike Brodback et al. (2020), we did not provide the name of the organizations to keep a wider scope.

beliefs regarding the financial performance of ESG investments.[3] Second, we overcame the problem of measuring the impact of an ESG investment: while the outcome of such investments may be ambiguous in real life, we provided subjects with a clear and direct consequence of an investment in B, that is a donation to an organization. Finally, by making real donations, we overcome the issue of increased elicited prosocial behavior when choices are purely hypothetical (Camerer et al., 2017).

The first part of the experiment was directly incentivized: one of the eight rounds was randomly selected to be paid. One random outcome of the selected lottery was paid to the subjects with a 10 tokens-to-1 £ exchange rate. In addition to this direct payment, the donation provided an indirect incentive. The lotteries/companies are presented in Table 1.

In the second part of the experiment, subjects were asked about the relative importance of the four ESG+F pillars. First, they were asked to rank them on a 1–4 scale from a financial perspective (ability to produce better risk-adjusted returns, regardless of the impact on society), and then to perform the same ranking task but according to a sustainability perspective (ability to make a positive impact). Finally, subjects were asked to allocate an endowment of 100 tokens (£10.00) to the four pillars to undertake actions to positively impact the world. We specified that some choices would have been implemented as donations to real organizations. Furthermore, to measure the extent to which the "Future generations" pillar can be included within the standard ESG framework, we introduced a treatment in the allocation task: for half of the subjects, we restricted the choices to the three traditional ESG pillars. McLean et al. (2022) used a similar allocation task to elicit the relative importance of the three pillars in the investment process.

There were no direct incentives in part two. However, subjects were aware that their choices in the allocation task could translate into a real donation of £ 10.00, allocated to different organizations depending on their actual allocations. This provided an indirect incentive to capture the relative importance attributed to the pillars from a purely altruistic perspective.

Subjects were aware of the incentivization schemes, that is they knew which choices affected their payoff, and which choices could trigger a donation. Moreover, we paid them a flat fee consistent with the average completion time.

3.3. Data collection and description of the sample

To address our research questions, we pre-registered the experiment on Open Science Framework,[4] coded it in oTree (Chen et al., 2016) and run it on the online platform Prolific (Palan et al., 2018). We set the following restrictions to the eligible subject pool: (i) country of origin must be Germany, UK, France, Italy, or Spain, (ii) fluent in English, (iii) at least 20 years old. After the restrictions, the subjects matching our requirements were over 43.000.

We collected 410 gendered-balanced observations, 405 of which were valid. Five of them were excluded because they failed both the attention checks we included in the experiment: the two attention checks were (1) in one round Company B was better than Company A under all perspectives, so nobody should choose Company A; (2) in the final questionnaire one questions explicitly asked the subjects to mark the last alternative.

The average length of the experiment was slightly more than 7 min, and the subjects earned a fixed fee of £ 1 plus an average bonus of £ 1.2 (with s.d. of £ 0.44), for a total of £ 2.2 on average. The detailed demographics of our sample can be found in the Appendix.

[3] In one of the eight rounds, the probability distribution of outcomes was unknown (uncertainty framework), making beliefs over ESG potentially relevant.

[4] Link: https://osf.io/tj9eg?view_only=60b411615c8b46218aa49629411d2b29

4. Results

4.1. Hypothesis 1 - Contributions to ESG+F organization and investment decisions

In part 1 of the experiment subjects made eight choices between two companies: Company A (normal) and Company B (sustainable in four treatments, normal in the baseline). Fig. 1 shows the average count of "Company B choices" for each treatment and its 95% confidence interval. The payoff structure of the lotteries was the same in all the treatments, but except for the baseline, investing in Company B in the four treatments entailed – in addition to the financial payoff – a donation to an organization with some sustainable goals. Thus, for subjects purely motivated by their financial payoff, there should be no difference in the average count of Company B chosen in the treatments versus the baseline. On the contrary, prosocial individuals should choose Company B more frequently if treated.

Subjects assigned to the baseline treatment invested in Company B slightly less than three times, while those assigned to the treatments invested in Company B about six times, indicating that they were willing to give up some return or take more risk with the sole purpose of triggering the donation.

Furthermore, we compare the average and median number of "Company B choices" between treatments using parametric (t-test) and non-parametric (Wilcoxon test) tests, respectively. We conduct the tests multiple times: (i) four times comparing the baseline versus each one of the four treatments individually, (ii) once comparing the baseline versus the "E", "S" and "G" treatments merged, (iii) once comparing the baseline versus all the four treatments merged. All tests delivered a statistically significant result ($p < 0.001$), indicating that subjects were more likely to invest in Company B for all four treatments vis-à-vis the baseline treatment. Therefore, we can reject Hypothesis 1: a contribution to an organization with a sustainable objective does influence the investment choices, making it more likely to select a company that would otherwise be considered less attractive from a risk-return perspective.

We now investigate whether the treatment was effective in affecting the investment decisions for all rounds, or only when investing in a sustainable way was relatively cheap, that is when the cost of choosing B instead of A was small. For each round, the red bars in Fig. 2 represent the proportion of subjects assigned to the baseline treatment who selected Company B, while the other bars represent the four treatments. We employ a test of equal proportions to compare these proportions in the baseline versus each treatment, for each round. The comparisons between A and B7 correctly led to statistically insignificant results for all treatments because this was the only case in which Company B dominated Company A. For the other 28 comparisons (7 rounds times 4 treatments), the test was statistically significant at a 0.10% level in 16 cases, at a 1% level in 7 cases, at a 5% level in 3 cases, and not significant in only 2 cases (see the appendix for more details). This indicates that some subjects were willing to bear the cost of being pro-social for all the configurations that we employed in our experiment. These included higher variance, lower expected return, higher downside risk, stochastic dominance, and passing from a risk to an uncertainty framework.

Since only one of the eight choices would be paid, subjects implicitly built a probability distribution of their final payoff over the eight rounds. The distribution of treated subjects exhibited a lower expected return and a higher standard deviation (p-value of the Wilcoxon test is <0.001 for both tests).

4.1.1. Individual characteristics

We use Wilcoxon tests to test whether individual characteristics affected the number of "Company B choices" for the treated subjects: we excluded the subjects assigned to the baseline treatment from the dataset, and we divided the remaining pool into two subgroups according to some criterion. These criteria were based on information

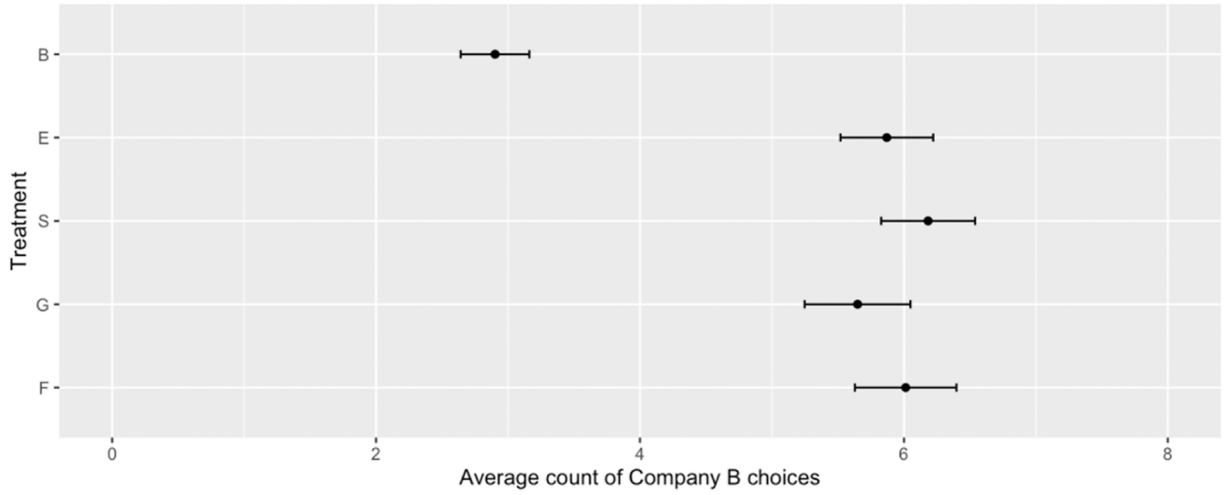

Fig. 1. Average count of "Company B" choices per treatment and 95% confidence interval. The figure shows that treated subjects ("E", "S", "G", "F") invested in Company B more often than subjects assigned to the baseline treatment "B".

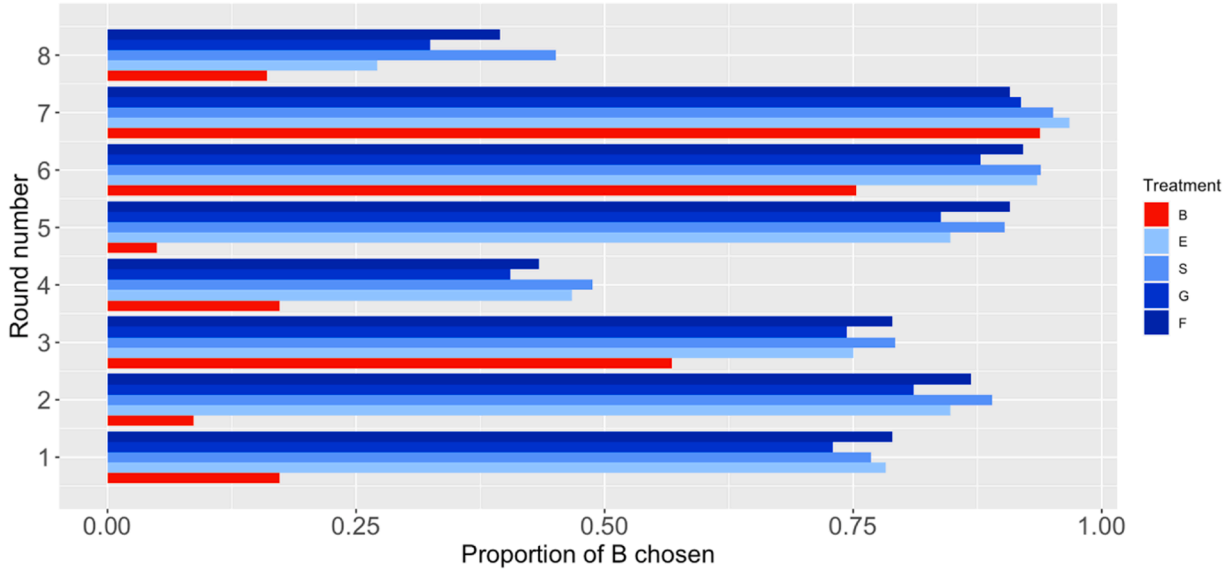

Fig. 2. Proportion of Company B choices by treatment and by round number (i.e., pairwise comparison). Except from round 7, treated subjects are more likely to invest in Company B than subjects assigned to the baseline.

collected from the final questionnaire. We found that subjects who would allocate more resources to ESG companies in a hypothetical portfolio ($p < 0.001$), those who made at least a charitable donation in the last year ($p < 0.001$), and those who believe ESG aspects should be considered more important than profits ($p < 0.03$) were more likely to invest in "Company B". Being investors ($p = 0.15$), having a prior knowledge of ESG matters ($p = 0.88$), and beliefs over ESG ($p = 0.58$) do not seem to significantly affect decisions, instead.

We further test the correlation between some socio-demographic variables we collected and the number of prosocial choices. We find that race, education level, employment type, and income play no role. On the contrary, age and gender do: individuals younger than 30 ($p < 0.05$) and men ($p < 0.01$) tend to be less prosocial.

4.1.2. *Regression analysis*

We now turn to a regression approach to summarize the results of the previous paragraphs (see Table 2). We start with a linear regression (Model 1) modelling the number of times an individual invested in "Company B" as the dependent variable (Y). The predictors are the dummy variables indicating the assigned treatment (E, S, G, F):

$$Y = \beta_0 + \beta_1 E + \beta_2 S + \beta_3 G + \beta_4 F + \varepsilon.$$

Our sample size is 405: one observation for each subject. We test whether the coefficients of each of the four treatments are statistically different from each other with a Chi-squared test, and we find we cannot reject the null hypothesis $H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4$ that all the four coefficients are equal ($p = 0.19$). Thus, we can merge the four treatments

Table 2
Linear regressions modelling the number of "Company B choices".

	(1) Count of B investments	(2) Count of B investments	(3) Count of B investments	(4) Count of B investments	(5) Count of B investments	(6) Count of B investments	(7) Count of B investments
Intercept	2.90 * **	2.90 * **	2.97 * **	3.27 * *	2.98 * **	3.02 * **	3.18 * **
	(0.18)	(0.18)	(0.50)	(0.69)	(0.51)	(0.53)	(0.63)
Donation to E	2.97 * **						
	(0.24)						
Donation to S	3.28 * **						
	(0.25)						
Donation to G	2.75 * **						
	(0.25)						
Donation to F	3.11 * **						
	(0.25)						
Treated		3.03 * **	3.01 * **	1.94 * **	2.86 * **	2.33 * **	1.52 * *
		(0.20)	(0.20)	(0.59)	(0.21)	(0.31)	(0.47)
Importance				-0.40			
				(0.52)			
Treated: Importance				1.17			
				(0.62)			
Allocation					-0.10		
					(0.52)		
Treated:Allocation					0.73		
					(0.56)		
Charity						-0.19	
						(0.36)	
Treated:Charity						1.05 * *	
						(0.40)	
Prosocial Score							-0.58
							(0.72)
Treated:Prosocial Score							2.54 * *
							(0.79)
Controls	No	No	Yes	Yes	Yes	Yes	Yes
R^2	0.38	0.37	0.41	0.42	0.43	0.44	0.46
Adjusted R^2	0.37	0.37	0.38	0.39	0.39	0.41	0.42
Num Obs	405	405	405	405	405	405	405

* **p < 0.001; * *p < 0.01;* p < 0.05

into one unique dummy variable (T) equal to 1 if the subject was assigned to one of the four treatments, and equal to 0 if she was assigned to the baseline (Model 2). We add control variables we collected through the questionnaire (C), and we find that the effect of the treatment does not change in size and remains highly significant (Model 3).

Finally, we estimate four more models adding each time a different interaction term between the treatment (T) and a prosocial measure (P). We use the measures that we found to be correlated with our dependent variable in the previous paragraph: importance of ESG versus profits (Model 4), ESG allocation in a hypothetical portfolio (Model 5), donation to charity (Model 6), and the average of the three previous measures (Model 7). The models have the form:

$$Y = \beta_0 + \beta_1 T + \beta_2 P + \beta_3 TP + \gamma C + \varepsilon$$

We find that the interaction term is highly significant ($p < 0.01$) in Model 6 and 7, it is weakly significant ($p = 0.06$) in Model 4, while it is insignificant in the Model 5. The model using the average of the three prosocial measures is the one yielding the largest adjusted R^2.

We delve into the individual choices by using generalized linear mixed-effects models (Table 3) to model the probability to invest in Company B. In this way, we analyze each individual choice made by the subjects and account for the fact that observations are not independent (our sample size is now 3.240: 8 observations for each of the 405 subjects). Our dependent variable Y_{ij} is a dummy variable equal to 1 if the individual i ($i = 1, 2, \ldots 405$) decided to invest in Company B at round j (j = 1, 2, … 8), and 0 otherwise. Random effects are at subject level, i.e., each of the 405 subjects has a different intercept ($\beta_0 + u_i$). Fixed effects include the treatment, the prosocial measure, the interaction between the two, and the type of choice the subject faced at round j. The latter is a categorical variable which can be "B Dominant", "A Dominant", "Trade-off', "B Uncertain".[5] We consider the same four prosocial measures previously indicated, and we also add controls.

$$\eta_{ij} = \beta_0 + u_i + \beta_1 T_i + \beta_2 P_i + \beta_3 T_i P_i + \beta_4 \; B\_Dominant_j + \beta_5 \; A\_Dominant_j + \beta_6 B\_Uncertain_j + \gamma C_i + \varepsilon_{ij}$$

$$u_i \sim N(0, \sigma_i^2)$$

$$Y_{ij} = 1/(1 + \exp(-\eta_{ij}))$$

The regressions confirm that: (i) the treatment was effective in providing an indirect incentive to invest in Company B, (ii) the treatment was more effective on prosocial subjects, (iii) different manifestations of the cost of being sustainable had different effects on the likelihood of investing in Company B, with individuals less likely to invest in B when this entailed moving from a risk to an uncertainty framework, and more likely to invest in B when B was not stochastically dominated. A detailed multicollinearity analysis can be found in Appendix C. The analysis does not raise relevant concerns about the correlation across variables.

***Result 1**: By choosing financially worse lotteries to trigger a donation, individuals showed prosocial behavior. This behavior was more common among individuals who had also exhibited it outside the experiment, and it was robust to different manifestations of the cost of being prosocial.*

Our results suggest that women were more prosocial than men. Adding the coefficient of gender in the regressions does not really

[5] The label indicates: B stochastically dominates A (round 7), A stochastically dominates B (rounds 1–5), no stochastic dominance (round 6), probabilities are not provided for Company B's outcomes (round 8).

Table 3
Generalized linear mixed-effect regressions modelling the probability to invest in Company B.

	(1) Probability to invest in B	(2) Probability to invest in B	(3) Probability to invest in B	(4) Probability to invest in B	(5) Probability to invest in B	(6) Probability to invest in B
Intercept	-0.61 * **	0.85 * **	1.16 *	0.93 *	0.97 *	1.07 *
	(0.11)	(0.22)	(0.59)	(0.45)	(0.47)	(0.54)
Treated	1.77 * **	2.33 * **	1.41 * *	2.17 * **	1.72 * **	0.99 * *
	(0.13)	(0.17)	(0.47)	(0.18)	(0.25)	(0.38)
B Dominant		0.80 * *	0.80 * *	0.80 * *	0.80 * *	0.79 * *
		(0.28)	(0.28)	(0.28)	(0.28)	(0.28)
A Dominant		-1.99 * **	-1.99 * **	-1.99 * **	-1.99 * **	-1.98 * **
		(0.19)	(0.19)	(0.19)	(0.19)	(0.19)
B Uncertain		-3.78 * **	-3.78 * **	-3.78 * **	-3.78 * **	-3.78 * **
		(0.23)	(0.23)	(0.23)	(0.23)	(0.23)
Importance			-0.32			
			(0.42)			
Treated:Importance			0.98			
			(0.50)			
Allocation				-0.07		
				(0.42)		
Treated:Allocation				0.70		
				(0.46)		
Charity					-0.16	
					(0.29)	
Treated:Charity					0.91 * *	
					(0.32)	
Prosocial Score						-0.47
						(0.58)
Treated:Prosocial Score						2.24 * **
						(0.64)
Controls	No	No	Yes	Yes	Yes	Yes
AIC	3763.35	3146.34	3154.17	3149.27	3138.08	3126.52
BIC	3781.60	3182.84	3330.59	3325.69	3314.50	3302.93
Log Likelihood	-1878.68	-1567.17	-1548.09	-1545.64	-1540.04	-1534.26
Num obs	3240	3240	3240	3240	3240	3240
Num participants	405	405	405	405	405	405
Var Intercept	0.43	0.96	0.80	0.79	0.73	0.69

* **$p < 0.001$;* * $p < 0.01$; *$p < 0.05$

Table 4
Comparison of the different rankings.

	p-value	Avg rank E	Avg rank S	Avg rank G	Avg rank F
ESG+F (sust ranking)	< 0.001	1.62	2.56	3.50	2.32
ESG (sust ranking adj)	< 0.001	1.37	1.95	2.69	-
ESG+F (fin ranking)	< 0.001	2.19	1.89	3.15	2.78
ESG (fin ranking adj)	< 0.001	1.86	1.61	2.53	-

represent a "gender effect" on choices since we should expect that only treated women are more likely to choose B. Moreover, since 80% of our subjects were treated the coefficient would capture mostly the effect on treated subjects, incorrectly suggesting that women in general, and not treated women, were more likely to choose B. Instead of adding another interaction term in our regressions, we replicate some of the regressions in Tables 2 and 3 and focus exclusively on treated and subjects. The regressions are shown in Appendix B in Tables 10 and 11. In line with previous evidence, the variable age (standardized) and the dummy variable "Male" are significant in all models, with positive and negative coefficients respectively.

4.2. Hypothesis 2 - Relative importance of the ESG+F pillars

In the previous section we found that, taken individually, each dimension of the ESG framework appears to be traded-off with financial returns. We continue our analysis by considering the dimensions altogether comparing their relative importance. We study this aspect both from a sustainability perspective and a financial perspective. As mentioned earlier, the former is a dimension related to individuals' social preferences and it is independent of risk and returns, while the latter is exclusively related to these measures.

We test Hypotheses 2a and 2b using the rankings elicited in the "sustainability perspective" and "financial perspective" ranking tasks, respectively: we use a Friedman test to compare (i) the rankings of the

Table 5
Relative proportion of allocated tokens (panel A) and p-values of the pairwise comparison of the allocations (panel B).

Panel A				
	Factor E	Factor S	Factor G	Factor F
ESG+F	31.26	28.62	15.61	24.44
ESG	41.17	37.51	21.31	-

Panel B			
Treatment	Vs Factor S	Vs Factor G	Vs Factor F
Factor E	0.03	< 0.001	< 0.001
	0.14	< 0.001	NA
Factor S	-	< 0.001	< 0.01
	-	< 0.001	NA
Factor G	-	-	< 0.001
	-	-	NA

Table 6
Average allocation to the three ESG pillars in the two treatments.

	Average allocation E	Average allocation S	Average allocation G
Allocations (ESG+F adj)	41.24	37.56	21.20
Allocations (ESG)	41.17	37.52	21.21
p-value Wilcoxon test	0.80	0.90	0.95

four pillars, (ii) the rankings of the three ESG pillars, excluding the F-pillar and adjusting the rankings accordingly. The results are shown in Table 4.

All four tests are statistically significant ($p < 0.001^{***}$), indicating that subjects do not assign the same importance to the pillars for either perspective. Since the Friedman tests yielded a statistically significant result, we use pairwise Nemenyi's post-hoc tests to identify which pillars rank significantly differently from the others.

Considering the sustainability perspective, for the first specification, we obtain that the E-pillar ranks first ($p < 0.001$ for all three pairwise comparisons), the G-pillar ranks last ($p < 0.001$ for all three pairwise comparisons), and the F-pillar ranks higher than the S-pillar ($p < 5\%$).[6] The second specification clearly shows that E ranks higher than S, and S ranks higher than G ($p < 0.001$ for all pairwise comparisons).

Considering the financial perspective, the tests indicate that subjects first rank the S-pillar, followed by the E-pillar, the F-pillar and lastly the G-pillar ($p < 1\%$ for all pairwise comparisons).

Rankings may be criticized because they do not consider the "distance" between alternatives. Moreover, we did not allow for ties, forcing subjects to assign all rankings 1–4. In the allocation task we overcome these issues by asking subjects to allocate an endowment of 100 tokens to organizations operating in areas compatible with the four pillars. In Panel A of Table 5 we report the average allocations of tokens to the pillars, controlling for the assigned treatment, while in Panel B we report the p-values of the paired Wilcoxon tests representing the pairwise comparison of the median allocations to the pillars. The first row shows the results for the ESG+F treatment, while the second row shows the results for the ESG treatment.

The results reported in Table 5 confirm that the G-pillar is considered the least important. Allocations to the S-pillar are significantly higher than those in the F-pillar, reversing the situation previously described. Moreover, although the E-pillar received more resources than the S-pillar in both treatments, this difference is statistically significant for only one treatment.

Result 2a*: We find that individuals adopting a sustainability perspective assign different weights to the different pillars, with the E-pillar being the most important, and the G-pillar being the least important. The S and F pillars fall in between.*

Result 2b*: We find that individuals adopting a financial perspective assign different weights to the different pillars, with the S-pillar being the most important, followed by the E-pillar and the F-pillar. The G-pillar ranks last.*

Taken together, our results indicate that under both perspectives, the relative weights of the pillars are not equal, leading to the rejection of both Hypotheses 2a and 2b. Moreover, the two perspectives lead to different rankings of the pillars. This is not entirely surprising since what is best for the shareholders from a financial perspective may not necessarily be the best for the broader set of stakeholders from a sustainability perspective. However, the ranking from a financial perspective is somewhat surprising (although somewhat in line with previous literature on retail investors, such as Filippini et al., 2021): the G-pillar being considered unimportant represents an important divergence compared to its prominent role according to financial professionals. It may be argued that our subjects are unsophisticated and inexperienced about financial matters, but we find that the individuals that we classified as investors[7] ranked the G-pillar as (un)important as the non-investors ($p = 0.48$). The results for the S-pillar are perhaps not too surprising, as it is easier to imagine how activities falling under the umbrella of the S-pillar can boost employee morale, which in turn has a positive impact on productivity and profitability. Indeed, these examples are often cited by advocates of the integration of the ESG framework into valuation models (Edmans, 2023).

Result 2c*: Retail investors attribute a different relative importance to the pillars depending on the perspective considered.*

4.3. *Hypothesis 3* - The role of the Future generations (F-pillar)

Lastly, we focus our analysis on the role of the F-pillar. In part one of the experiment, we found that a donation to an organization that benefits the next generation was as likely to trigger an investment in "Company B" as any other ESG pillar, supporting the idea that the current generation cares for the next generation. Moreover, the ranking from a sustainability perspective indicated that the F-pillar ranks second, right after the E-pillar, while the allocation task suggested a lower importance of this pillar.

We further investigate the role of the proposed F-pillar: we do this by comparing the pillars' allocations in the two treatments of the allocation task that differed by the presence or absence of the F-pillar, which we called ESG+F and ESG treatments, respectively. The latter treatment is expected to reduce the average allocation to the other three pillars, but the magnitude of the reduction may not be the same for all pillars. To investigate this, we remove the donation to the F-pillar from the ESG+F treatment and rescale the remaining allocations so that they add up to 100. Then we compare the average allocation to each pillar between the two treatments (Table 6).

The relative allocation to the ESG pillars is basically the same in the two treatments. This result is consistent with either the idea that the ESG framework already incorporates the concern for future generations (so an allocation to the F-pillar is a substitute of an allocation to the three pillars), or that the ESG framework has nothing to do with the concern for future generations (so an allocation to the F-pillar is a complement to an allocation to the three pillars). A situation in between should be ruled out because otherwise we should have found a different relative allocation to the pillars across the two treatments. We use the answers given to the question "Which of the criteria better serves the interests of future generations?" to disentangle between the two mentioned possibilities. The most frequent answer was "All of them" (38.5%), followed by "Environment" (38%), "Social" (20.50%), and "Governance" (2.5%). "None of them" received less than 0.50%. Thus, this does not corroborate the complements hypothesis, while it does – to some extent – corroborate the substitutes hypothesis. Hence, we do not reject our third hypothesis.

[6] In alternative post-hoc tests the p-value is between 5% and 10%, indicating a weaker significance of this result.

[7] A subject is classified as an investor if she made at least one investment in stocks or bonds in the last twelve months. They account for about 30% of our total sample.

Result 3: *Almost all the subjects believe that at least one of the ESG pillars produces some spillover benefits for the future generations, with almost 40% of the subjects agreeing that all the pillars proxy the Future generations pillar.*

The belief that an allocation to the standard ESG pillars induces positive spillovers on future generations may justify the partial divergence of results of the S-pillar and F-pillar between the ranking from a sustainability perspective and the implicit ranking of the allocation task. While the S-pillar ranked third in the former task, it played a more prominent role in the latter task, ranking second. The opposite was true for the F-pillar. In the ranking task subjects simply indicated their preferred order of the four pillars, whereas the allocation task involved a (potential) donation thereby inducing a real trade-off between pillars. However, because of the spillover effects, a token allocated to the ESG pillars served – to some extent – the same purpose of an allocation to the F-pillar. Subjects may then have acted accordingly, reducing the direct allocation to the F-pillar in favor of the other three pillars in the allocation task compared to the ranking task.

Hence, we can conclude that there is no need, also from a policy perspective, to introduce a specific sustainable pillar that directly accounts for the needs of future generations: the existing three pillars already contribute indirectly to the well-being of future generations. However, the current generation is genuinely concerned about future generations, and the current ESG framework is not easy to interpret in this light. Therefore, it might be desirable to introduce a future-generations-weighted ESG score, where the indicators that contribute the most to the well-being of future generations receive more weight. Rather than adding complexity to the current ESG paradigm by introducing a new pillar that partially overlaps with the existing ones, or abandoning the goal of taking future generations into direct account, this represents a middle ground. The salience of this measure may force firms to focus more on their impact on the future generations, and account for it in their decisions, overcoming the problems of the physical absence of representatives of the next generations to advocate for their own well-being and of the intrinsic short-termism that characterizes organizations. The computation of such a score is beyond the scope of this paper and is left to future research.

5. Conclusions

The Sustainable Development Goals have highlighted the multiple dimensions of the concept of sustainability. In the same vein, the ESG framework is being adopted to disclose non-financial information and policies of organizations based on three pillars: Environmental, Social and Governance. Recently, the environmental dimension (E-pillar) has received more attention than the other two. However, many scholars have questioned whether these three dimensions are equally important and whether they are the only ones that should be considered relevant. This is resulting in a new stream of literature enquiring ESG+ pillars.

Based on an online experiment, this paper examines the investment decisions of retail investors when different combinations of financial and ESG information are provided. In addition to the traditional three pillars, we introduced the Future Generations pillar (F-pillar), which is a proposed extension (ESG+F) of the existing ESG framework to consider intergenerational equity and sustainability actions that directly affect future generations.

We report three key findings. First, retail investors are balancing financial returns with sustainability goals. Second, the relative importance of the three pillars varies depending on the perspective adopted, with the E and S pillars ranking first in the sustainability and financial perspective, respectively. Finally, an explicit F-pillar is somewhat redundant, as individuals seem to believe that the three existing pillars already indirectly address the concern for future generations. From a more general perspective, this last result calls attention to the possibility that the ESG+ framework creates overlapping and redundant pillars that do not sufficiently distinguish from the current ones.

From a holistic perspective, our results also point to a role for different actors in achieving sustainability: investors can affect the cost of capital of companies through their preferences for sustainable firms, companies can improve their disclosures to ensure that investors have the ability to discriminate according to actual sustainability, and finally data providers can implement scores based on a sustainability perspective and allow investors to choose the perspective to adopt when creating their own scores.

Our findings are somewhat limited by the sample pool which is mostly white (88%), has an average age of 32, and where students account for 28% of the observations. It would be interesting to see whether these results hold for older generations, other ethnicities, and with a population more in line with the actual investor archetype.

High on the agenda for future research there are at least three possible directions that involve the study of retail investors. One direction goes beyond exploring the isolated effect of each of the ESG pillars and focuses on the interaction effects (interconnections) of the sustainability dimensions in a within-subject frame (Galbreath, 2013). Another possible direction is to quantify the trade-offs between the various ESG pillars. Lastly, more research is needed to understand how the various "+" could harmoniously and structurally fit within the current ESG framework.

Funding

This research did not receive any specific external funding.

Declaration of Competing Interest

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

Appendix A. Experimental design and details

Instructions

In the following rounds you will be asked to make financial decisions. In each round, you will have to invest in one of the two companies displayed: company A or company B.
The possible outcomes of the two investment and their probabilities will be provided in a table. Moreover, some of your choices throughout the experiment may have a positive impact on society in the form of a donation to an organization pursuing some social objective. Finally, it is possible that you will see only the potential outcomes from the investment, but not their probabilities. **The same rules apply for all eight rounds. You can read them only in the first round.**

After you have played the eight rounds, you will be asked some questions related to the environment, society, governance and future generations.

The outcome of an investment is presented in tokens, which will be converted into £ with a 10:1 exchage rate. One of the eight rounds will be randomly selected and the tokens you earned in that round will be your variable payment for the experiment.

Example of a round

	Company A	*Company B*
Your financial outcomes	Outcome / Probability 6 / 20% 10 / 20% 15 / 60%	Outcome / Probability 6 / 20% 9.5 / 20% 14.5 / 60%
Social outcomes	0 tokens for workers' rights No donation	5 tokens for workers' rights Donation to an organization protecting the rights of workers
Choice	Company A	Company B

Power analysis

We determined the sample size based on the power analysis on the set of tests (Welch two samples t-test) we planned to use for our main analysis (Part 1). The following assumptions were used as inputs to compute the sample size in G*Power: "t test" (for Test family), "Means: Difference between two independent means (two groups)" (for Statistical test), two tails, $\alpha = 5\%$, $\beta = 5\%$ and allocation ratio $= 1$. Conservatively assuming that subjects in the baseline would choose Company B twice on average (with a SD of 1) and subjects in the treatments would choose Company B three times (with a SD of 2), would yield an effect size of 0.63. An effect size of 0.60 would require 74 subjects per group, i.e., 370 subjects. The use of a non-parametric test (Wilcoxon test) would only require 15 more subjects. Thus, our sample size of about 400 subjects seems justified.

Demographic information of the sample

Table 7
Summary statistics of the subjects in our sample.

Variable	Categories	Proportion
Gender	Male	48.80%
	Female	48.60%
	Others	2.60%
Race	White	88.10%
	Asian	4.70%
	Black/brown	2.70%
	Latino	1.20%
	Others	3.30%
Occupation	Full-time worker	40.20%
	Part-time worker	12.60%
	Unemployed	11.90%
	Student	28.40%
	Other	6.90%
Education	High school	34.60%
	Bachelor	37.00%
	Master	18.30%
	MBA	1.20%
	PhD	3.20%
	Other	5.70%
Income	No income	13.30%
	$<$ 10.000	28.10%
	10.000–20.000	19.50%
	20.000–30.000	19.30%
	$>$ 30.000	19.80%
Age	Q1	24
	Mean	32.8
	Median	29
	Q3	40
	Standard deviation	11.40
Nationality	British	39.75%
	Italian	35.06%
	Spanish	17.04%
	French	5.68%
	German	2.47%

Donations

The amounts donated to specific organizations given the choices of the subject pool:

- The E organization received a total of £ 53.50 (£ 33.00 for part 1, and £ 20.50 for part 2).
- The S organization received a total of £ 47.50 (£ 29.00 for part 1, and £ 18.50 for part 2).
- The G organization received a total of £ 31.00 (£ 22.50 for part 1, and £ 8.50 for part 2).
- The F organization received a total of £ 32.00 (£ 29.50 for part 1, and £ 2.50 for part 2).

Questionnaire

Please answer the following questions.

Have you made any investment in stocks or bonds in the last 12 month?

- ○ Yes
- ○ No

Before starting this experiment, did you know what the sustainability ESG criteria were?

- ○ I had never heard about ESG and I still do not understand what it is
- ○ I did not know about ESG, but I partially understood it thanks to this experiment
- ○ I heard about ESG, but I did not know it very well
- ○ I knew what ESG was
- ○ I knew what ESG was and made investment decisions considering this dimension

Which of the criteria do you think better serves the interests of future generations?

- ○ Attention to the environment
- ○ Attention to workers/social aspects
- ○ Attention to governance aspects
- ○ All are equally important
- ○ None of them is important

How do you think attention to ESG criteria impacts on company performance?

- ○ It mostly improves financial/economic performance
- ○ It mostly worsens financial/economic performance
- ○ It has little or no impact on financial/economic performance

Please choose the last option for this question.

- ○ Protecting the environment should be a priority
- ○ Protecting workers should be a priority
- ○ Profits should be a priority
- ○ Control should be a priority

Do you think a company should pay attention to the ESG criteria even if these actions reduce profits?

- ○ Yes, ESG is more important than profits
- ○ Yes, but only if the company's profit remains positive
- ○ No, unless ESG performance are very poor
- ○ No, ESG actions should be undertaken only if they increase the profits

Imagine you had some savings, how would you invest them with respect to the ESG criteria?

- ○ I would not consider ESG criteria
- ○ I would allocate up to 10% of my portfolio to ESG investments
- ○ I would allocate up to 20% of my portfolio to ESG investments
- ○ I would allocate up to 50% of my portfolio to ESG investments
- ○ I would allocate all my portfolio in ESG investments

Did you make a donation to a charity in the last 12 months?

- ○ Yes, more than one
- ○ Yes, just one
- ○ No

Appendix B. Detailed results

We now report some details about the statistical tests mentioned in the paper. In Fig. 3 we show the distribution of the count of Company B choices across the five treatments. In Table 8 we report the p-values of the tests comparing the mean (t-test) and the median (Wilcoxon test) of the count of Company B choices in the baseline versus the four treatments of part 1 of the experiment. In Table 9 we report the p-values of the equal proportion test comparing for every round the proportion of subjects investing in Company B in the baseline versus each of the four treatments.

In Table 10 and Table 11 we report the OLS and GLMM regressions similar to those in Tables 2 and 3, but focusing exclusively on treated subjects.

In Table 12 and Table 13 we report the p-values of the pairwise post-hoc tests conducted on the rankings from a sustainability and financial perspective respectively (part 2 of the experiment).

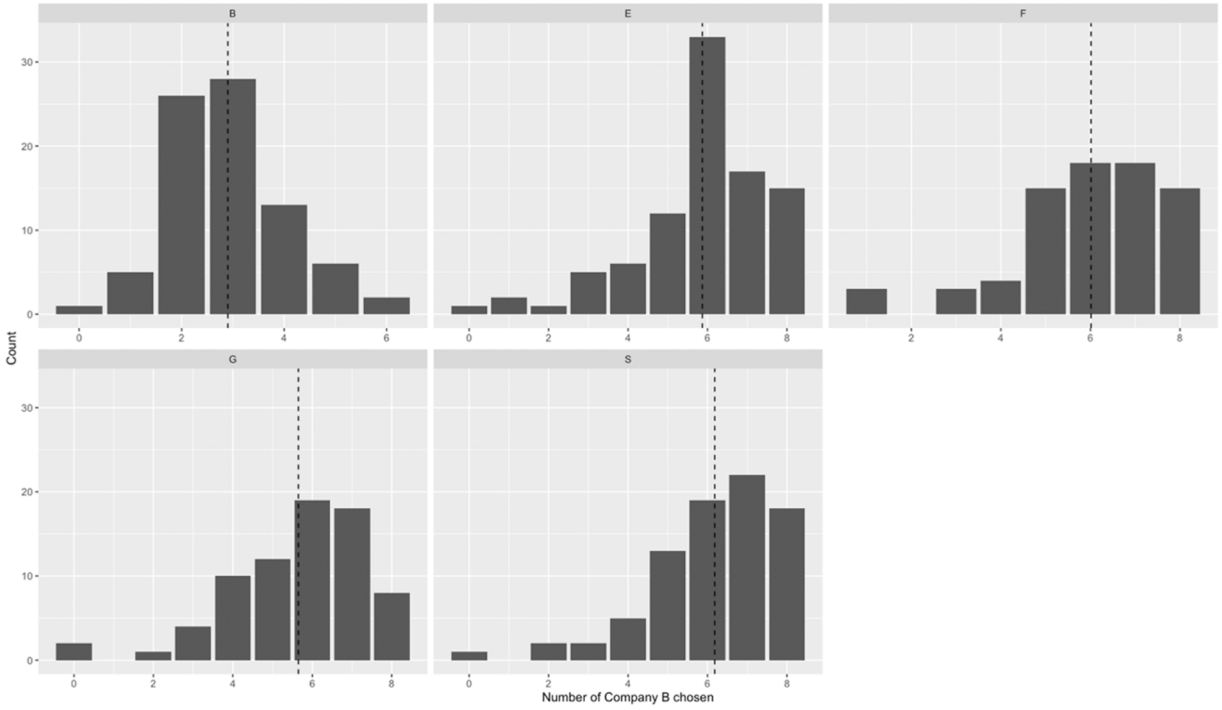

Fig. 3. Distribution of Company B choices across the different treatments. The top left graph shows the distribution of the Baseline treatment, which has an average significantly lower than the other four distributions (see the location of the vertical dashed line).

Table 8
Average count of Company B choices across treatments and statistical tests comparing the baseline versus the four treatments (and some combined treatments).

Treatment	Average # of Company B	p-value t-test	p-value Wilcoxon test
Baseline	2.90	-	-
Treatment E	5.87	< 0.001	< 0.001
Treatment S	6.18	< 0.001	< 0.001
Treatment G	5.65	< 0.001	< 0.001
Treatment F	6.01	< 0.001	< 0.001
ESG Treatments	5.91	< 0.001	< 0.001
ESG+F Treatments	5.93	< 0.001	< 0.001

Table 9
p-values of equal proportion tests comparing for each round if subjects assigned to the baseline chose company B with the same frequency of subjects assigned to the treatments.

	Baseline vs E	Baseline vs S	Baseline vs G	Baseline vs F	Baseline vs ESG+F
A vs B1	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
A vs B2	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
A vs B3	< 0.02	< 0.01	< 0.04	< 0.01	< 0.001
A vs B4	< 0.001	< 0.001	< 0.01	< 0.001	< 0.001
A vs B5	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
A vs B6	< 0.01	< 0.01	0.073	< 0.01	< 0.001
A vs B7	0.58	0.98	0.88	0.68	1
A vs B8	0.11	< 0.001	< 0.03	< 0.01	< 0.01

Table 10
Linear regressions modelling the number of "Company B choices" focusing on treated subjects. The regressions show all the coefficients of the control variables.

	(1) Count of B investments	(2) Count of B investments	(3) Count of B investments	(4) Count of B investments	(5) Count of B investments
Intercept	5.64 * **	5.01 * **	5.54 * **	5.18 * **	4.67 * **
	(0.38)	(0.50)	(0.38)	(0.39)	(0.43)
Importance		0.70			
		(0.36)			
Allocation			0.55 *		
			(0.23)		
Charity				0.80 * **	
				(0.21)	
Prosocial Score					1.78 * **
					(0.39)
Male	-0.62 * *	-0.58 * *	-0.62 * *	-0.43 *	-0.44 *
	(0.19)	(0.19)	(0.19)	(0.19)	(0.19)
Other gender	0.12	0.11	0.16	0.37	0.34
	(0.65)	(0.65)	(0.65)	(0.64)	(0.63)
Undisclosed gender	-0.58	-0.67	-0.45	-0.89	-0.74
	(1.23)	(1.22)	(1.22)	(1.20)	(1.19)
Age (standardized)	0.38 * *	0.39 * *	0.34 * *	0.34 * *	0.30 *
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Asian	-0.04	-0.05	-0.09	-0.03	-0.10
	(0.45)	(0.45)	(0.45)	(0.44)	(0.44)
Black/Brown	-1.15 *	-1.11 *	-1.00	-1.28 *	-1.06
	(0.56)	(0.56)	(0.56)	(0.55)	(0.55)
Latino	0.94	0.85	0.83	0.98	0.78
	(0.98)	(0.98)	(0.98)	(0.96)	(0.95)
Other race	0.08	0.06	0.06	-0.11	-0.11
	(0.57)	(0.57)	(0.57)	(0.56)	(0.55)
Income 0–10 K	0.25	0.19	0.20	0.25	0.15
	(0.32)	(0.32)	(0.32)	(0.31)	(0.31)
Income 10–20 K	0.26	0.23	0.25	0.12	0.12
	(0.38)	(0.38)	(0.38)	(0.37)	(0.37)
Income 20–30 K	-0.02	-0.05	-0.11	-0.09	-0.19
	(0.42)	(0.42)	(0.42)	(0.41)	(0.41)
Income 30 K+	0.29	0.29	0.19	0.15	0.06
	(0.43)	(0.43)	(0.43)	(0.42)	(0.42)
Bachelor	0.09	0.09	0.10	0.03	0.06
	(0.23)	(0.23)	(0.22)	(0.22)	(0.22)
Master	0.27	0.31	0.20	0.34	0.28
	(0.28)	(0.28)	(0.28)	(0.28)	(0.27)
MBA	0.85	0.80	0.92	0.74	0.80
	(0.85)	(0.85)	(0.85)	(0.83)	(0.82)
PhD	-0.09	0.03	-0.11	0.13	0.15
	(0.59)	(0.59)	(0.59)	(0.58)	(0.57)
Other education	0.12	0.16	0.17	0.23	0.28
	(0.42)	(0.42)	(0.42)	(0.41)	(0.41)
Full-time	0.25	0.21	0.31	0.16	0.21
	(0.38)	(0.38)	(0.38)	(0.37)	(0.37)
Part-time	-0.06	-0.07	0.05	-0.19	-0.05
	(0.39)	(0.39)	(0.39)	(0.38)	(0.38)
Other form of work	0.09	0.01	0.16	-0.05	0.00
	(0.49)	(0.49)	(0.49)	(0.48)	(0.47)
Student	0.89 * *	0.88 * *	0.85 * *	0.82 *	0.80 *
	(0.33)	(0.33)	(0.33)	(0.32)	(0.32)
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.11	0.12	0.12	0.15	0.17
Adjusted R^2	0.05	0.05	0.06	0.09	0.10
Num Obs	324	324	324	324	324

* **$p < 0.001$; * *$p < 0.01$; *$p < 0.05$

Table 11
Generalized linear mixed-effect regressions modelling the probability to invest in Company B focusing on treated subjects. The regressions show all the coefficients of the control variables.

	(1) Probability to invest in B	(2) Probability to invest in B	(3) Probability to invest in B	(4) Probability to invest in B	(5) Probability to invest in B
Intercept	2.95 * **	2.14 * **	2.58 * **	2.28 * **	1.78 * **
	(0.24)	(0.48)	(0.39)	(0.40)	(0.42)
Importance		0.61 *			
		(0.31)			
Allocation			0.58 * *		
			(0.21)		

(*continued on next page*)

Table 11 (*continued*)

	(1) Probability to invest in B	(2) Probability to invest in B	(3) Probability to invest in B	(4) Probability to invest in B	(5) Probability to invest in B
Charity				0.70 * **	
				(0.18)	
Prosocial Score					1.65 * **
					(0.34)
B Dominant	0.32	0.32	0.31	0.32	0.31
	(0.33)	(0.33)	(0.33)	(0.33)	(0.33)
A Dominant	-1.62 * **	-1.62 * **	-1.62 * **	-1.62 * **	-1.62 * **
	(0.23)	(0.23)	(0.23)	(0.23)	(0.23)
B Uncertain	-3.70 * **	-3.71 * **	-3.71 * **	-3.70 * **	-3.70 * **
	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)
Male		-0.54 * *	-0.57 * **	-0.41 *	-0.41 *
		(0.17)	(0.17)	(0.17)	(0.16)
Other gender		0.02	0.07	0.26	0.25
		(0.57)	(0.57)	(0.56)	(0.56)
Undisclosed gender		-0.53	-0.28	-0.72	-0.59
		(1.04)	(1.04)	(1.02)	(1.01)
Age (standardized)		0.40 * **	0.35 * *	0.36 * *	0.33 * *
		(0.11)	(0.11)	(0.11)	(0.11)
Asian		-0.04	-0.09	-0.01	-0.09
		(0.39)	(0.39)	(0.38)	(0.38)
Black/Brown		-0.89	-0.77	-1.03 *	-0.84
		(0.47)	(0.47)	(0.46)	(0.46)
Latino		0.95	1.01	1.08	0.95
		(0.93)	(0.94)	(0.91)	(0.91)
Other race		0.11	0.12	-0.03	-0.03
		(0.49)	(0.49)	(0.49)	(0.48)
Income 0–10 K		0.17	0.18	0.23	0.12
		(0.28)	(0.28)	(0.27)	(0.27)
Income 10–20 K		0.22	0.23	0.12	0.11
		(0.33)	(0.33)	(0.32)	(0.32)
Income 20–30 K		-0.10	-0.18	-0.14	-0.24
		(0.37)	(0.37)	(0.36)	(0.36)
Income 30 K+		0.19	0.06	0.06	-0.03
		(0.37)	(0.38)	(0.37)	(0.37)
Bachelor		0.10	0.11	0.05	0.06
		(0.20)	(0.20)	(0.19)	(0.19)
Master		0.35	0.25	0.38	0.34
		(0.25)	(0.25)	(0.24)	(0.24)
MBA		0.84	0.95	0.80	0.84
		(0.77)	(0.76)	(0.75)	(0.74)
PhD		-0.08	-0.20	0.02	0.06
		(0.51)	(0.50)	(0.49)	(0.49)
Other Education		0.27	0.27	0.33	0.37
		(0.37)	(0.37)	(0.36)	(0.36)
Full-time		0.20	0.31	0.15	0.19
		(0.33)	(0.33)	(0.33)	(0.32)
Part-time		-0.09	0.02	-0.20	-0.09
		(0.34)	(0.34)	(0.33)	(0.33)
Other form of work		0.00	0.14	-0.06	-0.04
		(0.43)	(0.43)	(0.42)	(0.42)
Student		0.83 * *	0.80 * *	0.78 * *	0.76 * *
		(0.29)	(0.29)	(0.28)	(0.28)
Controls	No	Yes	Yes	Yes	Yes
AIC	2467.55	2467.80	2463.90	2456.20	2448.08
BIC	2496.85	2626.02	2622.12	2614.43	2606.30
Log Likelihood	-1228.78	-1206.90	-1204.95	-1201.10	-1197.04
Num obs	2592	2592	2592	2592	2592
Num participants	324	324	324	324	324
Var Intercept	1.30	1.04	1.02	0.96	0.92

* **$p < 0.001$; * *$p < 0.01$;* $p < 0.05$

In line with previous evidence (see Individual Characteristics in Section 4.1), the variable age (standardized) and the dummy variable "Male" are significant in all models, with positive and negative coefficients respectively. Moreover, the dummy variable indicating that the subject is a student appears with a positive and significant coefficient, whereas the dummies associated with the other types of employment are always insignificant. There is also some weak evidence of a negative coefficient for the Black/Brown dummy variable. Income and education are insignificant in all models.

The variables "Allocation", "Charity" and "Prosocial score" appear with positive and significant coefficients, whereas the coefficient of "ESG importance" is positive but significant only in the GLMM model.

Table 12
p-values of pairwise Nemenyi's post-hoc tests of the rankings from a sustainability perspective. The first line of each cell reports the rankings considering all four pillars, while the second line only considers the E, S and G pillars.

Treatment	Vs Factor S	Vs Factor G	Vs Factor F
Factor E	< 0.001	< 0.001	< 0.001
	< 0.001	< 0.001	NA
Factor S	-	< 0.001	< 0.05
	-	< 0.001	NA
Factor G	-	-	< 0.001
	-	-	NA

Table 13
p-values of pairwise Nemenyi's post-hoc tests of the rankings from a financial perspective. The first line of each cell reports the rankings considering all four pillars, while the second line only considers the E, S and G pillars.

Treatment	Vs Factor S	Vs Factor G	Vs Factor F
Factor E	< 0.01	< 0.001	< 0.001
	< 0.001	< 0.001	NA
Factor S	-	< 0.001	< 0.001
	-	< 0.001	NA
Factor G	-	-	< 0.001
	-	-	NA

Appendix C. Multicollinearity analysis

We first test that the assignment of the treatment is uncorrelated with the socio-demographic variables we collected (gender, age, income, race, education, type of employment). None of the tests (Kruskal-Wallis tests) is statistically significant. We also test whether assignment to the treatment is correlated with answers given to the questions in the sustainability questionnaire. For 7 out of 8 questions we do not find a statistically significant result, while for one question we reject the null hypothesis: individuals who believe that ESG actions should be undertaken only if they increase profits were less likely to receive the treatment. However, since only 2% of our entire sample expressed this belief, we do not consider this affecting the results.

We further test whether some of the independent variables we used in the regressions ("Portfolio allocation", "ESG importance", "Charity", and "Prosocial Score") are correlated with the socio-demographic variables used as controls. The tests suggest the existence of some correlation, especially with age and gender. Therefore, we proceed with a Variance Inflation Factor (VIF) analysis and regress each of the four variables individually on the set of socio-demographic variables (and with the dummy indicating if the subject was treated). None of the four regressions yielded an (unadjusted) R^2 larger than 20%, resulting in VIFs ranging between 1.06 and 1.23.

Finally, we apply the vif function of the R package car (Fox, 2023) to the estimated models 3–7 (OLS) reported in Table 2 and to the estimated models 3–6 (GLMM) reported in Table 3. Since the OLS models 4–7 include an interaction, we set type = "predictor" to account for the interactions. We report the GVIF adjusted for the degrees of freedom (i.e., GVIF^(1/(2Df))) in Table 14 and Table 15.

The evidence from the VIF analysis does not suggest multicollinearity to be an issue.

Table 14
Coefficients for GVIF adjusted OLS models.

Variable	Model 3 GVIF adj	Model 4 GVIF adj	Model 5 GVIF adj	Model 6 GVIF adj	Model 7 GVIF adj
Treatment	1.01	1.02	1.03	1.04	1.04
Importance	-	1.02	-	-	-
Allocation	-	-	1.03	-	-
Charity	-	-	-	1.04	-
Prosocial score	-	-	-	-	1.04
Gender	1.04	1.04	1.04	1.05	1.05
Race	1.03	1.03	1.03	1.03	1.03
Age	1.37	1.37	1.39	1.38	1.39
Income	1.15	1.15	1.15	1.16	1.15
Education	1.04	1.04	1.05	1.05	1.05
Employment type	1.19	1.20	1.20	1.20	1.20

Table 15
Coefficients for GVIF adjusted GLMM models.

Variable	Model 3 GVIF adj	Model 4 GVIF adj	Model 5 GVIF adj	Model 6 GVIF adj
Treatment	2.94	1.12	1.61	2.47
Importance	1.84	-	-	-
Treat:Import	3.41	-	-	-
Allocation	-	2.53	-	-
Treat:Alloc	-	2.58	-	-
Charity	-	-	2.22	-
Treat:Char	-	-	2.51	-
Prosocial score	-	-	-	2.25
Treat:Pros	-	-	-	3.25
Comparison	1.01	1.01	1.02	1.02
Gender	1.04	1.05	1.05	1.05
Race	1.03	1.03	1.03	1.03
Age	1.37	1.38	1.37	1.38
Income	1.15	1.16	1.16	1.16
Education	1.04	1.05	1.05	1.05
Employment type	1.20	1.20	1.20	1.20

References

Abrudan, L.C., Matei, M.C., Abrudan, M.M., 2021. Towards sustainable finance: conceptualizing future generations as stakeholders. Sustainability 13 (24), 13717.

Amel-Zadeh, A., Serafeim, G., 2018. Why and how investors use ESG information: evidence from a global survey. Financ. Anal. J. 74 (3), 87–103.

Avramov, D., Cheng, S., Lioui, A., Tarelli, A., 2022. Sustainable investing with ESG rating uncertainty. J. Financ. Econ. 145 (2), 642–664.

Bansal, P., 2005. Evolving sustainably: a longitudinal study of corporate sustainable development. Strateg. Manag. J. 26 (3), 197–218.

Bansal, P., DesJardine, M.R., 2014. Business sustainability: it is about time. Strateg. Organ. 12 (1), 70–78.

Bansal, P., Reinecke, J., Suddaby, R., Langley, A., 2022. Temporal work: the strategic organization of time. Strateg. Organ. 20 (1), 6–19.

Barber, Brad M., Morse, Adair, Yasuda, Ayako, 2021. Impact investing. J. Financ. Econ. 139 (1), 162–185.

Bauer, Rob, Ruof, Tobias, Smeets, Paul, 2021. Get real! Individuals prefer more sustainable investments. Rev. Financ. Stud. 34 (8), 3976–4043.

Berg, F., Fabisik, K., & Sautner, Z. (2021). Is History Repeating Itself? The (Un) Predictable Past of ESG Ratings. Available at SSRN 3722087, doi:110.2139/ssrn.3722087.

Berg, F., Kölbel, J.F., & Rigobon, R. (2020). Aggregate Confusion: The Divergence of ESG Ratings. Available at SSRN 3438533, doi:10.2139/ssrn.3438533.

Berry, Thomas C., Junkus, Joan C., 2013. Socially responsible investing: an investor perspective. J. Bus. Ethics 112 (4), 707–720.

Bonnefon, J.F., Landier, A., Sastry, P.R., & Thesmar, D. (2022). The moral preferences of investors: Experimental evidence (No. w29647). National Bureau of Economic Research.

Brodback, D., N. Günster, and S. Pouget. 2020. The valuation of corporate social responsibility: A willingnessto-pay experiment. Working Paper, University of Muenster.

Camerer, Colin, Mobbs, Dean, 2017. Differences in behavior and brain activity during hypothetical and real choices. Trends Cogn. Sci. 21 (1), 46–56.

Celani, Alessandra, Luisa Dressler, and Martin Wermelinger. "Building an Investment Tax Incentives database: Methodology and initial findings for 36 developing countries." (2022).

Chen, D.L., Schonger, M., Wickens, C., 2016. oTree—an open-source platform for laboratory, online, and field experiments. J. Behav. Exp. Financ. 9, 88–97.

Cheng, M.M., Green, W.J., Ko, J.C.W., 2015. The impact of strategic relevance and assurance of sustainability indicators on investors' decisions. Audit.: A J. Pract. Theory 34 (1), 131–162.

Chiu, I.H., 2022. The EU sustainable finance agenda: developing governance for double materiality in sustainability metrics. Eur. Bus. Organ. Law Rev. 23 (1), 87–123.

Christiansen, C., Jansson, T., Kallestrup-Lamb, M., Noren, V., 2023. Households' investments in socially responsible mutual funds. Q. Rev. Econ. Financ. 87, 46–67.

Clément, A., Robinot, É., Trespeuch, L., 2022. Improving ESG scores with sustainability concepts. Sustainability 14 (20), 13154.

Cohen, J., Holder-Webb, L., Nath, L., Wood, D., 2011. Retail investors' perceptions of the decision-usefulness of economic performance, governance, and corporate social responsibility disclosures. Behav. Res. Account. 23 (1), 109–129.

Consolandi, C., Phadke, H., Hawley, J., & Eccles, R.G. (2020). Material ESG outcomes and SDG externalities: Evaluating the health care sector's contribution to the SDGs. Organization & Environment, 33(4), 511–533.

Crawford, Vincent P., Sobel, Joel, 1982. Strategic information transmission. Économ.: J. Econom. Soc. 1431–1451.

Crifo, P., Forget, V.D., Teyssier, S., 2015. The price of environmental, social and governance practice disclosure: an experiment with professional private equity investors. J. Corp. Financ. 30, 168–194.

De Zwaan, L., Brimble, M., & Stewart, J. (2015). Member perceptions of ESG investing through superannuation. Sustainability Accounting, Management and Policy Journal.

Delgado-Ceballos, J., Ortiz-De-Mandojana, N., Antolín-López, R., Montiel, I., 2023. Connecting the sustainable development goals to firm-level sustainability and ESG factors: the need for double materiality. BRQ Bus. Res. Q. 26 (1), 2–10.

Dimson, E., Marsh, P., Staunton, M., 2020. Divergent ESG ratings. J. Portf. Manag. 47 (1), 75–87.

Døskeland, Trond, Pedersen, Lars Jacob Tynes, 2016. Investing with brain or heart? A field experiment on responsible investment. Manag. Sci. 62 (6), 1632–1644.

Eccles, R.G., Kastrapeli, M.D., Potter, S.J., 2017. How to integrate ESG into investment decision-making: results of a global survey of institutional investors. J. Appl. Corp. Financ. 29 (4), 125–133.

Eccles, Robert G., Serafeim, George, Krzus, Michael P., 2011. Market interest in nonfinancial information. J. Appl. Corp. Financ. 23 (4), 113–127.

Edmans, Alex, 2023. The end of ESG. Financ. Manag. 52 (1), 3–17.

Eikon, Refinitiv. "Environmental, social and governance scores from Refinitiv." (2022).

Filippini, M., Leippold, M., Wekhof, T., 2021. Sustainable finance literacy and the determinants of sustainable investing. Swiss Financ. Inst. Res. Pap. 22-02.

Fox, J. (2023). Companion to applied regression. Retrieved from ⟨https://cran.r-project.org/web/packages/car/car.pdf⟩.

Friedman, Milton, Friedman, A., 1970. Doctrine: the social responsibility of business is to increase its profits. N. Y. Mag. 32–33.

Gabor, A., 2013. The savings principle and inter-generational justice. Eur. J. Sci. Theol. 9 (2), 299–308.

Galbreath, J., 2013. ESG in focus: the Australian evidence. J. Bus. Ethics 118 (3), 529–541.

Giglio, Stefano, et al. Four Facts About ESG Beliefs and Investor Portfolios. No. w31114. National Bureau of Economic Research, 2023.

GSIA (2020). Global Sustainable Investment Review 2020. URL: ⟨http://www.gsi-alliance.org/wp-content/uploads/2021/08/GSIR⟩⟨-⟩ 20201.pdf. Visited: 25.07.2022.

Hartzmark, Samuel M., Sussman, Abigail B., 2019. Do investors value sustainability? A natural experiment examining ranking and fund flows. J. Financ. 74 (6), 2789–2837.

Heeb, Florian, et al., 2023. Do investors care about impact? Rev. Financ. Stud. 36 (5), 1737–1787.

Hong, Harrison, Kacperczyk, Marcin, 2009. The price of Sin: The effects of social norms on markets. J. Financ. Econ. 93 (1), 15–36.

Humphrey, Jacquelyn, et al., 2021. The asymmetry in responsible investing preferences. National Bureau of Economic Research.

Khemir, S., Baccouche, C., & Ayadi, S.D. (2019). The influence of ESG information on investment allocation decisions: An experimental study in an emerging country. Journal of Applied Accounting Research.

Kim, A., Bansal, P., Haugh, H., 2019. No time like the Present: How a present time perspective can foster sustainable development. Acad. Manag. J. 62 (2), 607–634.

Kuzmina, J., Lindemane, M., 2017. ESG Investing: new challenges and new opportunities. J. Bus. Manag. 14, 85–98.

Magalhães, M.F., Parreiras, M., Ouriques, L., Mangeli, E., Silva, F., Valle, E., & Xexéo, G. (2023, March). An Educational Game about Sustainability Based on ESG+ P concepts. In Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL conference, 50, 44–52.

Martin, Patrick R., Moser, Donald V., 2016. Managers' green investment disclosures and investors' reaction. J. Account. Econ. 61 (1), 239–254.

McLean, L., Diaz-Rainey, I., Gehricke, S., Zhang, R., 2022. In holdings we trust: uncovering the ESG fund lemons (Available at). SSRN 4050964.

Milinski, M., Semmann, D., Krambeck, H.J., Marotzke, J., 2006. Stabilizing the Earth's climate is not a losing game: supporting evidence from public goods experiments. Proc. Natl. Acad. Sci. 103 (11), 3994–3998.

Minh Hieu, V. (2023). The moderating role of innovative organizational climate on the relationship between environmental monitoring social monitoring, governance monitoring and sustainable development goals (case of Vietnam). Economic research-Ekonomska istraživanja, 36(2).
MSCI. "MSCI ESG Ratings". (2020).
Naveed, M., Sohail, M.K., Abdin, S.Z., Awais, M., Batool, N., 2020. Role of ESG disclosure in determining asset allocation decision: an individual investor perspective. Paradigms 14 (1), 157–166.
Nirino, N., Santoro, G., Miglietta, N., Quaglia, R., 2021. Corporate controversies and company's financial performance: exploring the moderating role of ESG practices. Technol. Forecast. Soc. Change 162, 120341.
O'Hearn, M., Gerber, S., Cruz, S.M., Mozaffarian, D., 2022. The time is ripe for ESG+ Nutrition: evidence-based nutrition metrics for Environmental, Social, and Governance (ESG) investing. Eur. J. Clin. Nutr. 76 (8), 1047–1052.
Our Common Future (1987), Report published by the United Nations World Commission on Environment and Development (WCED).
Paetzold, F., Busch, T., Utz, S., Kellers, A., 2022. Between impact and returns: private investors and the sustainable development goals. Bus. Strategy Environ. 1–16.
Palan, S., Schitter, C., 2018. Prolific. ac—a subject pool for online experiments. J. Behav. Exp. Financ. 17, 22–27.
Pástor, Ľuboš., Stambaugh, Robert F., Taylor, Lucian A., 2022. Dissecting green returns. J. Financ. Econ. 146 (2), 403–424.
Pedersen, Lasse Heje, Fitzgibbons, Shaun, Pomorski, Lukasz, 2021. Responsible investing: the ESG-efficient frontier. J. Financ. Econ. 142 (2), 572–597.
Pérez-Gladish, Blanca, Benson, Karen, Faff, Robert, 2012. Profiling socially responsible investors: Australian evidence. Aust. J. Manag. 37 (2), 189–209.
Purvis, B., Mao, Y., Robinson, D., 2019. Three pillars of sustainability: in search of conceptual origins. Sustain. Sci. 14, 681–695.
Riedl, Arno, Smeets, Paul, 2017. Why do investors hold socially responsible mutual funds? J. Financ. 72 (6), 2505–2550.
Risi, D., 2018. Time and business sustainability: socially responsible investing in Swiss banks and insurance companies. Bus. Soc. 59 (7), 1410–1440.
Risi, D., Paetzold, F., Kellers, A., 2021. Wealthy private investors and socially responsible investing: the influence of reference groups. Sustainability 13 (22), 12931.
Sadden, E. (2023). EU approves law banning sales of new petrol, diesel cars from 2035. S&P Global Commodity insight.
Sahin, Ö., Bax, K., Czado, C., Paterlini, S., 2022. Environmental, Social, Governance scores and the Missing pillar—why does missing information matter? Corp. Soc. Responsib. Environ. Manag. 29 (5), 1782–1798. https://doi.org/10.1002/csr.2326.
Sahin, Ö., Bax, K., Czado, C., Paterlini, S., 2023. The pitfalls of (non-definitive) environmental, Social, and Governance scoring methodology. Glob. Fiananc. J. 56, 100780.
Schiereck, D., Friede, G., & Bassen, A. (2019). Financial performances of green securities. In Migliorelli, M., & Dessertine, P., (Eds.), The rise of green finance in Europe, 95–117. Palgrave Macmillan, Cham.
Shackelford, S.J., Raymond, A., McCrory, M.A., & Bonime-Blanc, A. (2023). Cyber Silent Spring: Leveraging ESG+ T Frameworks and Trustmarks to Better Inform Investors and Consumers About the Sustainability, Cybersecurity, and Privacy of Internet-Connected Devices. University of Pennsylvania Journal of Business Law, 25(2), 505–557.
Sheehan, N.T., Vaidyanathan, G., Fox, K.A., Klassen, M., 2023. Making the invisible, visible: overcoming barriers to ESG performance with an ESG mindset. Bus. Horiz. 66 (2), 265–276.
Special Eurobarometer 513 (2021). Full report. ⟨https://climate.ec.europa.eu/system/files/2021–07/report_2021_en.pdf⟩.
Sustainalytics, Morningstar. "Morningstar Sustainability Ratings Methodology". (2021).
Tan, C., 2022. Private investments, public goods: regulating markets for sustainable development. Eur. Bus. Organ. Law Rev. 23 (1), 241–271.
Trahan, R.T., Jantz, B., 2023. What is ESG? Rethinking the "E" pillar. Bus. Strategy Environ. 1–10.
Van Duuren, E., Plantinga, A., Scholtens, B., 2016. ESG integration and the investment management process: fundamental investing reinvented. J. Bus. Ethics 138 (3), 525–533.
Varley, S., & Lewis, S. (2021). How to realize the full potential of ESG+. Ernest & Young, accessed at: ⟨https://www.ey.com/en_gl/sustainability/realize-potential-esg-plus⟩.
Vidal Marchi, R. (2021). Materiality as a Dynamic Concept in ESG Reporting: An Intersection of Compliance and the Evolutionary Nature of Sustainability. Ateliers Doctoraux of the Centre of Excellence of the European School of Law-Capitole, forthcoming, Cahiers Jean Monnet, 1–15. Available at SSRN: ⟨https://ssrn.com/abstract=3829596⟩.
Wilburn, K., Wilburn, R., 2020. ESG reporting using UN sustainable development goals. J. Strateg. Innov. Sustain. 15 (2), 109–128.
Wilson, N. (2021). It's time for ESG to incorporate health. Fortune Magazine. ⟨https://fortune.com/2021/08/25/esg-companies-health-reporting-legal-general/⟩.
Wilson, N. (2023). ESG + Public Health = ESHG. Stanford social innovation review. ⟨https://ssir.org/articles/entry/esg_public_health_eshg#⟩.