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Nudging households' sustainable investments: results from a pilot lab-in-the-field experiment in two Italian cities☆

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ABSTRACT

This paper investigates households' willingness to pay for sustainable investments using evidence from a pilot lab-in-the-field experiment run in different branches of a large Italian bank. The analysis reveals three main results. First, the willingness to pay is lower for graduated individuals, higher for those with a medium investment horizon, for those engaged in volunteering and for those concerned about climate change. Second, the exposure to a negative (vs. positive) visual treatment, causes an average increase in the willingness to pay for Environmental, Social, and Governance assets, albeit this effect vanishes once controls are added. Third, when dissecting results by the factor of interest, the negative visual treatment significantly increases the willingness to pay among the investors interested in the Environmental dimension only. This suggests that, with suitable leverage, the demand and willingness to pay for all sustainability dimensions can be nudged, with important industry and policy implications.

1. Introduction

Since the 2015 Paris Agreement and the UN 2030 Agenda, responsible and sustainable investments, along with the integration of Environmental, Social, and Governance (ESG) dimensions into investment decisions, have been gaining increasing attention, especially in combination with the Principles for Responsible Investment [1] by the United Nations [2].

In order to finance the transition towards sustainability, markets have developed new financial products. Debt products now range from Green Bonds and Social Bonds to Sustainable bonds and second-generation sustainability linked bonds, whose return is linked to a combination of ESG sustainable objectives. Similarly, capital products now include Net zero funds, besides stocks or equity funds with E(SG) ratings. Against this background, a substantial strand of the academic literature has investigated the pricing of sustainable assets compared to their conventional counterparts, focusing on the existence of the so-called "premium", i.e., the return differential between sustainable and conventional assets with mixed empirical evidence (for instance, see Ref. [3,4] for green bonds; [5] for social bonds; [6] for stocks).

As for the role of investors, most of the attention has been devoted to institutional ones and their importance in the transition to a less carbon intensive economy (see, e.g., Ref. [7,8]), also fostered by an increasing regulation in that direction in the banking, insurance, pension fund, and asset managers industries.[1] On the other hand, the role of retail investors, and specifically households, is crucial as well. Recent market

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[1] For example, the Markets in Financial Instruments Directive, known as MiFID II, was amended through two delegated regulations (2021/1253 and 2021/1269) as part of a broad Sustainable Finance Action Plan (SFAP) developed by the European Commission (EC). Specifically, since August 2022 advisors are required to ask their clients their sustainability preferences as part of the MiFID II suitability assessment.

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overviews (e.g., Ref. [9,10]) show that retail investors are increasingly willing to invest sustainably and are interested in understanding the actual impact of their investments. As claimed in D'Ecclesia et al. [11], "*investor preferences are changing: millennials – as well as women – are […] increasingly committed to sustainability and making more environmentally conscious choices compared to previous generations*". Moreover, European regulation (cf. MiFID II) is moving toward enabling retail investors to make informed decisions and invest according to their sustainability preferences, though further progress is still needed [12].

Emphasizing the retail category is scientifically relevant, as proved by the existing literature on household sustainable finance, which highlights that differences in household characteristics and motivations can strongly influence participation in sustainable finance and the allocation of capital to Socially Responsible (SR) investments (e.g. Ref. [13–15]). However, a related but so far scarcely investigated issue is the "Willingness To Pay" (WTP) for sustainable assets, i.e., how much they are willing to pay in terms of reduced returns to foster sustainability via their financial investments, and whether it can be nudged.

Against this background, the present paper addresses two main research questions: Do private investors think they have to sacrifice return to invest in ESG assets, and, if so, what is their WTP to contribute to sustainability via their financial investments? Can households be stimulated in their financial decisions to support financial sustainability by using visual nudges and, if so, what kind of visual nudge is more effective?

To this end, we conducted a pilot lab-in-the-field experiment and administered a survey to customers of a big commercial bank in Italy, with the twofold aim to evaluate investors' WTP and the effectiveness of two different visual treatments in stimulating sustainable investment choices.[2]

To the best of our knowledge, this study is the first to examine the WTP for sustainable assets in a lab-in-the-field experiment using visual nudges.

Our main results can be summarized as follows. First, the WTP is higher for investors with a medium time horizon (i.e., between 1 and 5 years), pro-social preferences (i.e., being engaged in volunteering activities), and for those more concerned about climate change issues. Second, the WTP for ESG assets can be stimulated by a negative (vs. positive) visual nudge suggestive of the negative consequences of a natural disaster, albeit this effect vanishes once controls are added. Last, when dissecting results by the factor of interest, the negative visual treatment significantly increases the WTP among the investors interested in the Environmental dimension only.

The remainder of this paper is organized as follows. Section 2 provides an overview of the relevant literature. Section 3 describes the experiment design. Section 4 provides descriptive statistics of the data collected, while Section 5 presents the results of the econometric analysis. Section 6 discusses the main findings and provides concluding remarks.

2. Literature review

Since the 2000s, the academic literature on households' sustainable investments has been developing quickly, mainly resting on theoretical models that incorporate the non-monetary dimensions in investment decisions.[3] Empirical studies mostly rely on market or survey data, while experimental approaches are less common but emerging, confirming the scientific relevance of households in shaping sustainable investment dynamics.[4]

Within this literature, a first strand looks at the motivations for sustainable investments resting on a theoretical framework where the individual's utility function depends on both wealth and non-wealth returns, the latter capturing the socially responsible dimensions of the decision [16,17]. Results point to investors getting direct utility from the socially responsible attributes of the funds, the so-called intrinsic motivation [18]. In the same spirit, Døskeland and Pedersen [19], based on the theoretical model by Levitt and List [20], use a natural field experiment to show that wealth framing is more effective than moral framing in inducing investors to engage in SR investments. Other studies based on experiments about investors' sustainability decisions are represented by Glac [21], Pasewark and Riley [22], Gutsche et al. [23] and Seifert et al. [24].

A second strand of the literature focuses on the historical performance of sustainable funds compared to conventional ones, and hence on the potential existence of an "ethical penalty" for sustainable investments. Although some policymakers and academics argue that there is no trade-off between doing well and doing good, existing studies report mixed evidence on the impact of social responsibility on expected returns (e.g., Ref. [25–28]). These heterogeneous results may depend on the geographical areas (e.g., Europe vs. US), strategies (e.g., negative vs. positive screening) and asset type (e.g., bonds vs. stocks) as shown by Revelli and Viviani [29].

A third strand of the literature investigates investors' WTP for sustainable products and, in parallel, seeks to profile socially responsible investors. Renneboog et al. [26] emphasize that existing studies hint at but do not univocally prove the willingness of agents to accept a lower return in exchange for social or ethical goals. Benson and Humphrey [30] find that SR fund flows are less sensitive to returns than conventional funds, while Riedl and Smeets [13] highlight social preferences as the main driver of SR investing. Gutsche and Ziegler [31] find that WTP for certified sustainable products is higher than WTP for uncertified ones, and that WTP is greater among investors with strong environmental attitudes, left-leaning political views, and a higher warm-glow effect. Other evidence for investors' profiling is given by Bauer and Smeets [15], Junkus and Berry [32], and Hood et al. [33]. Further, Rossi et al. [14] find that Dutch households are willing to pay a price to be socially responsible rather than needing a little nudge, such as a gift. However, self-assessed financially literate individuals are less interested in SR investments and the stated demand for SR funds is sensitive to the return penalty.[5]

Finally, this paper contributes also to the literature investigating how visual cues can be used to stimulate different types of pro-environmental behaviors. Visual cues and prompts capture individuals' attention and work by unlocking people's subconscious and consequently affecting subconscious actions [34,35]. Visual cues have been proven useful to encourage different types of environmental consumers' behaviours [36–39]. To the best of our knowledge, Gajewski et al. [40] is the only contribution that explores the effect of different nudges, including visual ones, on investment choices. Specifically, the authors evaluate the impact of nudges on US retail investors who are asked to choose the allocation percentage to four funds (including a SR fund) with specific risk-return features. They find that a nudge making SR funds the default investment option is the most efficient in increasing SR investing. However, their experiments are conducted online and do not allow for a

[2] The survey conducted during the lab-in-the-field experiment investigated other related issues (e.g. knowledge, interest, preference for direct vs. indirect selection of ESG investments): results over these issues are summarized in Bertelli et al. [51].

[3] Among the topics not covered in this review, the optimal portfolio composition accounting for sustainability features (e.g., Ref. [3,52]), as it is not investigated in our experiment.

[4] A recent special issue edited by Kirchler and Weitzel [53] overviews contributions in experimental finance, a field that has been gaining popularity in recent years. The contributions closer to our work are those in the field of individual decision making, although none of the reviewed papers focuses on household choices of sustainable assets.

[5] Brunetti et al. [54] have recently extended and resubmitted questions in 2024 so as to elicit changes compared to 2016.

conclusion about investors' WTP since the SR fund has the same risk and return profile as the index fund, and comparison with the other fund options is not possible in terms of risk-return characteristics.

To sum up, the existing literature is not conclusive on the WTP for sustainable products, and it provides limited evidence on the use of nudges as tools to overcome behavioural barriers to SR investing (see Ref. [41,42]).

Against this backdrop, this study implements a pilot lab-in-the-field experiment that contributes to overcoming these limitations. Specifically, by exposing participants to realistic investment trade-offs and varying return profiles, our design allows us to assess participants' WTP, while benefiting from both the experimental control of lab settings and the behavioural authenticity of field environments.

3. The experiment design

We conducted two rounds of an incentivized lab-in-the-field experiment in three different branches of a well-known large commercial bank that operates extensively across all regions of Italy. One branch is located in Modena (in Northern Italy) and the other two are located in Rome (in Central Italy). Both the cities and the branches, that are all general (i.e., branches not dedicated to specific activities and/or clients), were selected by the managers of the bank to maximize the potential number of visitors during the experimental period. Specifically, the branch in Modena, the smallest of the two cities, is the only one in the city and, being located close to one of the most popular fresh food markets, ensures a high number of daily accesses. The two branches in Rome are located in different areas: one is highly central, while the other is more peripheral and located close to a popular market, like the one in Modena. As the number of customers entered in the first branch in Rome during the allowed period was pretty low, a second branch has been indicated, allowing the collection of additional observations, thus matching the number of observations collected in Modena.

The experiment was run during the opening hours between 21 and 25 October in the Modena branch, between 25 and 29 November in the first Rome branch, and between 2 and December 6, 2024 in the second Rome branch.

The customers entering the bank were asked to participate in an incentivized survey lasting about 5 min.[6] The survey was incentivized because, after agreeing to participate, the recruited subjects were informed that, at the end of the interview, they would receive a gift whose value depended on the answers given to the questions of a specific section of the survey and a random selection mechanism.

The recruited subjects were thus assigned, through a randomized assignment mechanism, to one of three groups, i.e., two treatment and one control group. The first group of customers (*"Negative visual nudge"*) received a card suggestive of the negative consequences of a natural disaster. We opted for a picture of a landscape after a flood, generated with AI and reported in the top panel of Fig. 1. The choice was made based on two considerations. First, floods are among the natural disasters that are most easily attributed to climate change (as opposed to, e.g., wildfires or landslides). Second, extreme rainfalls and floods are likely to be quite resonant to the populations living in areas where the experiment took place, as opposed to, e.g., glaciers melting, hurricanes, or sea level rise. The second group (*"Positive visual nudge"*) received a card displaying a picture of a nice green countryside (see bottom panel of Fig. 1).[7]

Fig. 1. Visual treatments.
Notes: For both treatments, we report the English translation – original in Italian.

In both cases, the card was handed to the participants at the moment of the presentation of the research project. The customers were invited to look at the names of the Universities involved and the title of the project, reported on the card, without explicitly mentioning the picture. This had a twofold aim. On the one hand, this reassured that the initiative did not have commercial purposes and that answers would have been maintained completely anonymous and used only for scientific purposes. On the other hand, this ensured they took a good look at the picture, drawing their attention to the visual cue we adopted to nudge people towards sustainable investments. The card was delivered directly into the hands of the participants, who were also informed that they could take it home. Finally, the third group of customers received no cards and acted as a control.

The experimental protocol was the same for all participants. Irrespective of the group they were assigned to, participants completed a short questionnaire on their investment choices. Answers were provided to the researchers, who registered them on a tablet computer. The

[6] Throughout the paper we will use the word customer and not client to mean that the person entering the bank was not necessarily linked to the bank by a formal relationship as normally the term client implies. In fact, we did not know the reason – and we did not mean to ask – why the person was there.

[7] The choice of the two nudges was made in line with a non-financial literature evaluating the effectiveness of positive/negative messages or loss/gain frames in the context of pro-environmental behaviours, with ambiguous results depending on the specific behaviour. For instance, positive images and gain-framed prompts have been found effective, for instance, in the context of the recycling of mobile phones [55] or to improve waste sorting [56]. In some cases, showing pleasant or funny visual prompts may be effective as they create a positive emotional state [57]. In other cases, negative visual cues or messages can be impactful, leveraging individual feelings of guilt and shame, or stimulating reciprocity and individual responsibility, as in the case of the WTP an environmental tax to reduce bottled water usage [58].

researchers conducted interviews separately for each participant and in different places of the banks to reduce the risk of spillover effects across participants and treatment groups. Before starting the questionnaire, interviewers provided participants with a plain definition of ESG investments. Then the questionnaire was administered (the complete questionnaire, translated from Italian, is reported in Appendix A, available in the Supplementary data, along with the indication of which questions had answers provided in randomized order).

The first two questions of the survey (Q1 and Q2) are related to the participant's knowledge and interest in ESG assets. Specifically, the second question asks whether the customer would be interested in financial products focusing on the Environmental (or, alternatively, Social or Governance) issues only or in financial products that combine all these aspects. The respondent could also declare not to be interested in investing in ESG financial products whatsoever. Then, conditional on declaring an interest in ESG products, the following two questions (Q3 and Q4) aim to elicit the respondent's preferences for their ideal share of ESG assets in their financial portfolio and for the preference to delegate the choice of the mix between risk, return, and sustainability aspects to specialized operators.

This first set of questions aims to help customers familiarize themselves with ESG products, a category of financial products still scarcely known (see results in the next Section). We cannot exclude that these initial questions may have drawn participants' attention to ESG products, potentially affecting their choices in the subsequent "investment task" (i.e., inducing a sort of experimenter demand effect). However, we needed to balance the risk of creating expectations about the experimental objectives, which may affect the subjects' choices, with the risk of having subjects not able to make an informed decision, being unaware of the characteristics of the proposed asset. Further, even though the potentially induced effect goes in the direction of encouraging the choice of ESG products, this effect would be common to all experimental groups, including the control. Accordingly, it should have no impact on the differential effect of the two visual cues, or if any, it should reduce the magnitude of the impact of the cues with respect to the control group.

The fifth question (Q5) represents the core of our research as it aims at eliciting customers' willingness to give up the return of an asset for its sustainable characteristics, i.e., the WTP for a sustainable asset. In this question, we presented participants with a small incentivized "multiple price list" (MPL) investment task, where subjects are typically asked to express their relative preference for an option A over another option B, whose monetary value is varied systematically. After the subject has chosen the preferred option on each row of the MPL, one row is randomly selected and implemented to determine their reward.[8]

In our setting, we asked participants to indicate their preference between two assets with the same financial characteristics, i.e., type of asset and risk profile, but different return and sustainability profiles: one with ESG certification (asset A) and one without (asset B), under four different annual return scenarios. For asset B, without ESG certification, the annual return ranges from 2 % to 4 %.[9] The annual return of security A, with ESG certification, is held fixed at 2 % in the first three scenarios and then increased to 3 % in the last scenario, compared to 2 % of return for security B. In other words, in the first scenario, the two securities are presented with the same return, with the aim of eliciting the respondent's preference for ESG products, other conditions (risk and return) being equal. In the next two scenarios, instead, the returns for non-ESG investments are progressively increased, while maintaining at 2 % the return of the ESG security. Specifically, the proposed return differential ranges from 0 % (Scenario 1) to 2 % (Scenario 3). The aim of these scenarios is to elicit how much return participants would be willing to give up, i.e., their WTP, to invest in a security with sustainable characteristics. In the last scenario, the annual return is reversed, and security B, without ESG certification, is presented with a lower return (2 %) compared to security A, with ESG certification, offering 3 %. The rationale in this case is to assess whether the respondent exhibits a strong aversion to ESG products, despite their higher profitability. Overall, the four scenarios allow us to detect the respondents' attitude towards (or against) ESG products and suggest their potential WTP, i.e., willingness to sacrifice the investment return.[10] The complete task is shown in Table 1.

Table 1
Investment choice task.

Scenario	Asset A (ESG)	Asset B (non-ESG)
1	2 % annual return	2 % annual return
2	2 % annual return	3 % annual return
3	2 % annual return	4 % annual return
4	3 % annual return	2 % annual return

Notes: Sequence of MPL investment choices.

As commonly done in economic experiments, to elicit respondents' preferences, we incentivized the answers given to the investment task. Since we were not allowed to provide the bank customers with monetary incentives, we opted for gifts of different values. Specifically, the monetary value of the gift received by each participant at the end of the survey was linked to one of the answers provided in the investment task. One of the four scenarios was randomly selected; then the assigned gift was the one associated with the financial return chosen by the respondent in that scenario. More precisely, investment choices of financial returns equal to 2 % were rewarded with a pencil (market value of 1.5€), choices of 3 % financial return with a bag (market value of 7€), while the choices of 4 % financial returns with a thermal water bottle (market value of 15€). The association between financial returns and the value of each gift, together with gift pictures, is displayed in Table 2.

At the end of the survey, participants were asked to provide some information about their demographic and pro-social characteristics. Demographic questions asked about gender, education, birth cohort, region of birth, and region of residence. Information about pro-social attitudes was elicited by asking about the degree of concern for climate change and pollution problems (both with a 4-level Likert scale:

[8] We have chosen to adopt an MPL design, which is one of the most commonly employed techniques for this purpose, as it is incentive-compatible and easy to explain and understand, while inducing truthful revelation by participants [59,60]. MPLs have been widely used in several different domains (e.g., Ref. [61–65]), and even in demanding settings, like in-store experiments [66,67].

[9] The values chosen for the financial returns, 2 %, 3 %, and 4 %, were at the same time sufficiently easy to understand and in line with the financial market performances reported in late 2024 (the press release of the OEE, dated 19 September 2024, reported an annualized return for the CAC 40 French stock market index equal to 3.71 %, and an annual average nominal performance of fixed income products of 1.5 %. see https://www.oee.fr).

[10] Typically, studies employing MPL use an extensive list of binary choice alternatives for a diverse set of goods, services, or lotteries, depending on the specific aims of the research. In our survey, we adopted a simplified version of the MPL, encompassing only four alternatives, in compliance with the bank's request to keep the administration of the questionnaire within a few minutes and to avoid distracting clients from their banking operations. The choice of considering only four binary alternatives reduces the risk of having multiple switching behaviors, which is one of the main issues with MPL [68]. Indeed, the multiple switchers in our experiment are only 7 (i.e., less than 2 %, compared to the average 17 % reported in the previous literature). Moreover, in our study, participants did not complete the investment task on their own. Rather, researchers orally presented the binary choices, one at a time, carefully explaining their content and providing the opportunity to revise decisions. In this way, potential sources of error were minimized, including those stemming from cognitive biases (such as framing, inattention, and incomprehension) or from inconsistencies [68,69].

"Not at all", "A little", "Quite a lot", "A lot") and individual engagement in volunteering. The overall interview lasted about 5 min, a time compatible with the average waiting time of customers entering a bank for their own work or personal tasks.

4. The data

The final dataset counts 397 observations, almost equally split between the two cities (204 in Modena and 193 in Rome, 67 of which are in the first and 126 in the second branch).[11] To gain insight into the resulting sample, the descriptive statistics over the entire sample are reported in Table 3. All variables are defined in Appendix B, available in the Supplementary data.

The knowledge of ESG assets is quite scarce, as the vast majority of the participants, 56.2 %, were not aware of the existence of sustainable or ESG investment products before the interview (this percentage is a bit higher in Roma than in Modena and is slightly higher for women than men). However, there is a huge potential demand, as only 15.6 % of the respondents would not be interested in sustainable or ESG investment products.

Among those interested, the vast majority (53.9 %) are interested in assets targeting all the three dimensions of sustainability, had they a sum of money to invest. Among those interested in one dimension only, most would target the environmental one (E Factor chosen by 15.9 % of the respondents), while the Social and the Government ones are confirmed to be still less of interest (11.8 % for the Social one and only 2.8 % for the Governance one). Dissecting the results by city and gender we also identify potentially relevant interactions. For instance, we observe that in Rome there is less interest in the mix of ESG dimensions, and more interest in the E and S factors, compared to Modena, and that females have a higher propensity to invest in ESG assets, and are more sensitive to E and S factors than males.

Most of the respondents interested in ESG investments declare that in their ideal portfolio allocation ESG assets would represent a relevant portion, ranging from less than a quarter (34.8 %) to up to a half (37.5 %). Remarkably, 8.1 % and 3.5 % would invest most of their financial assets in ESG products (with respondents in Modena and women slightly more likely to invest higher shares in ESG products).

In doing so, more than a half of the sample (54.4 %) would prefer an indirect investment, via e.g., funds, in which the selection is made by specialized operators on the topic, delegating the optimal mix of all the involved dimensions (risk, return, and sustainability), while only 29.5 % would personally make their selection.

Finally, most of the respondents are willing to forgo part of the financial return to hold sustainable assets: specifically, the WTP equals 1 % in 27.1 % of the cases and reaches 2 % in 40.5 % of the cases.

In terms of demographics, the sample is almost evenly split between "*Female*" and "*Male*," with a slight majority for males, confirming the well-known result that males are more typically in charge of the financial decisions of the households (see e.g., Ref. [43] for the case of Italy). Despite all birth cohorts are represented, almost two thirds of respondents were born in the 1950s (18.4 %), 1960s (29.7 %) and 1970s (19.2 %), with some differences by gender (more females among those born in the 1970s) and by city (younger in Modena than in Rome), as displayed in Fig. 2.

Most of the respondents hold either a high school diploma or a university degree, representing 42.1 % and 43.9 % of the total sample, respectively. Postgraduate qualifications, slightly more common in Rome compared to Modena, represent a small portion of the sample. The education level is almost evenly split between genders, even if women have a slightly higher educational level compared to men. The sample shows a good heterogeneity also in terms of birth area, with most of the respondents being born in the North and Center of Italy (where the interviews took place), but with sufficient portions of people born also in the South of Italy (12.7 %) and abroad (10.1 %). Most of the respondents, 62.3 %, have a medium investment horizon (between 1 and 5 years), while the rest is almost evenly split between a shorter (less than one year, 21.3 %) and longer (more than 5 years, 16.4 %) horizon. The distribution is almost the same across the two gender categories, with males (respondents in Rome) having a slightly more (less) marked preference for longer horizons. Climate and pollution concerns are widespread in both cities, as 85.4 % of the respondents declared to be either "A lot" or "Quite a lot" concerned about the climate crisis, with women slightly more concerned than men. The concerns about pollution are even more marked, with 94.1 % of respondents declaring some degree of concern, again with women being more sensitive than men. Remarkably, respondents express greater concern about pollution than about the climate crisis, with more than half of the sample (55.3 %) reporting strong concern about pollution, compared to 41.3 % expressing similar concern about the climate crisis. Finally, 28.2 % of the respondents engage in volunteering activity, with a distribution that is overall similar across the two cities and genders.

Last, the perfectly uniform distribution of the treatments confirms the correct execution of the experiment.

We then define two additional variables, helpful for the definition of the estimation sample. The first one is "*Incoherent*", which isolates some inconsistencies in the answers given by the respondents. Specifically, seven respondents (6 in Modena, 1 in Rome) reported being willing to forego a 2 % financial return in Scenario 3 but were not willing to forego a 1 % financial return in Scenario 2. Similarly, five respondents (2 in Modena, 3 in Rome) reported a positive WTP in Scenarios 2 and 3, but then chose the non-ESG asset, despite its lower return, in Scenario 4. Finally, six respondents (2 in Modena, 4 in Rome) declared a preference for the ESG asset in Scenario 1, i.e., when it has the same return as the non-ESG asset, but not in Scenario 4, when it has an even higher return. The variable "*Incoherent*" thus takes the value 1 in these 12 cases (some of these respondents made more than one inconsistent choice) and 0 otherwise. The second variable is "*ESG Adverse*". This variable takes the value 1 for the 11 respondents (3 in Modena, 8 in Rome) who never selected ESG assets, even when it comes with a higher return compared to the non-ESG asset (Scenarios 1 and 4, respectively). It thus indicates that the respondent is absolutely averse to this type of asset (some of them explicitly reported their scepticism by citing the *greenwashing* phenomenon). All the econometric analyses are run on a sample excluding 23 individuals who gave inconsistent answers or were clearly ESG averse.

5. Econometric analyses

In order to assess if and how the treatment *causally* affects the WTP for ESG products, we estimate the following linear regression model:

$$WTP_i = \beta_0 + \beta_1 T_i^+ + \beta_2 T_i^- + \boldsymbol{X\beta} + \varepsilon_i \quad (1)$$

where:

- WTP_i is the Willingness To Pay of the respondent *i;*
- T_i^+: is an indicator for respondent i receiving the positive visual treatment
- T_i^-: is an indicator for respondent i receiving the negative visual treatment
- $\boldsymbol{X}$: is a vector of controls, including various combinations of the following set of variables:
- Demographic: gender (dummy for being a male), birth cohort (dummy for being relatively young, i.e., born after 1980), birth area

[11] We are aware that the number of observations and the geographical coverage limit the generalizability of our results. However, we believe that our study, which is not intended to be nationally representative, still provides useful evidence on investors' WTP for sustainable assets and the potential impact of visual nudges.

Table 2
Incentivized choices and gifts value.

Financial return	2%	3%	4%
Monetary value	1.5€	7€	15€
Associated gadget		 	 

Notes: See https://shop.gibischool.it/shop/b0qn9qfyib892k6653x4ctes0re7fdc4 and https://store.uniroma2.it.

(dummies for being born in the Centre, South and islands, and abroad, with North as reference category), and level of education (dummy for being at least graduated).
- Survey city: dummy for being interviewed in Rome.
- Financial horizon: set of dummies for the preferred investment horizon, chosen between medium (between 1 and 5 years), long (longer than 5 years), and short (below 1 year) as the reference category.
- Social preferences: which are controlled with a dummy for being engaged in volunteer activity, together with either a dummy for being concerned ("Quite a lot" or "A lot") for climate change, or similarly so for pollution.
- Finally, ε_i is the error term.

Estimates for coefficients in model (1) are obtained by OLS and requesting bootstrap standard errors (150 replications, with seed 1979).[12]

The results obtained are reported in Table 4. Column (1) reports the estimates with the visual treatments only: the positive one is not significant, while the negative one has a 10 % statistical significance. In other words, compared to receiving no treatment, a positive visual treatment does not cause any significant change in WTP, while the exposure to a negative one causes an average increase in the WTP for the ESG asset by 18.69 %.

However, as shown in columns (2) and (3) of Table 4, neither treatment is significant once the model is augmented with an additional set of controls. As for the latter, we observe that the WTP is not associated with the gender, or with the cohort or area of birth, and does not vary between the two cities considered for the experiment. The results on gender depart from some literature, reporting that women are more likely to invest in SR assets even if the return is lower (e.g., Refs. [14,15,32,33]). We do find a negative association between the WTP and the level of education. Specifically, graduated individuals have a WTP that is somewhat between 19 % and 21 % lower compared to non-graduated ones. Results in the literature where the data at hand provide information about both education and income and wealth, typically report that preferences for sustainable assets are positively associated with the level of education and negatively with the level of income and wealth (see, e.g., Refs. [15,44], or [14]). However, we were not allowed to collect any information on respondents' wealth or income when administering our survey, so our model specification only features the level of education. Considering that the level of education typically positively correlates with both income and wealth, and that we have no reason to believe this does not hold in our sample, it is plausible that education in our model acts as a proxy for income and wealth. Consequently, the negative effect we report for education may actually capture the negative association between wealth/income and the WTP as typically reported in the same literature (see, e.g., [32] and [33]). The investment horizon also plays a role, as the WTP is significantly higher for those with an investment horizon between 1 and 5 years, as opposed to those with shorter horizons. This result is consistent with sustainability not being a short-term concept, rather requiring time and persistence to generate measurable impacts [71], and with previous findings that investors who have a higher average holding period are more likely to invest in SR funds [13]. A medium-term horizon may therefore allow households to reconcile financial returns with social and environmental objectives. Finally, and quite interestingly, social preferences and climate concern play a key role as the WTP is significantly higher among those engaged in volunteering activities and those concerned about climate change. This finding is in line with Riedl and Smeets [13], who show that Dutch investors with stronger social preferences are more likely to choose SR investments. As for environmental issues, the motivational role of climate awareness in shaping sustainable investment behaviour has been highlighted by Filippini et al. [45] and Strauβ et al. [46] for Swiss investors and by Jia et al. [47] for Japanese investors. In contrast, Anderson and Robinson [48] find that environmentally oriented Swedish households do not always translate their attitudes into pro-environment portfolios. This mismatch is explained by informational barriers, which hinder the transformation of pro-environment preferences into concrete investment choices. It is worth noting that WTP has a statistically significant association with climate concerns and a non-significant one with pollution concerns. Both variables pertain to environmental issues and are highly correlated (51.28 %) but they may reflect slightly different attitudes: while individuals who are less worried about climate change may still be concerned about pollution, as its adverse health effects are more tangible (especially in highly polluted urban areas), climate physical risks are often perceived as more distant and less directly linked to human action.

We then dissect the results by which factor of interest, if any, was declared with reference to ESG assets (see Table 5). Several

[12] Mooney and Duval [70] suggest a total of 50–200 replications to get adequate for estimates of standard error and normal-approximation confidence intervals.

Table 3
Descriptive statistics.

Variable	Obs.	Mean	Std. dev.
City			
Modena	397	0.514	0.500
Rome	397	0.486	0.500
Knowledge			
No	397	0.562	0.497
Yes	397	0.438	0.497
Factor of Interest			
E Factor	397	0.159	0.366
S Factor	397	0.118	0.323
G Factor	397	0.028	0.164
ESG Mix	397	0.539	0.499
Not interested	397	0.156	0.363
Ideal allocation			
Less than 25 %	397	0.348	0.473
Between 25 % and 50 %	397	0.375	0.485
Between 50 % and 75 %	397	0.081	0.273
More than 75 %	397	0.035	0.185
Not interested	397	0.161	0.368
Selection			
Personally	397	0.295	0.456
Indirect via funds	397	0.544	0.499
Not interested	397	0.161	0.368
WTP			
0 %	395	0.324	0.469
1 %	395	0.271	0.445
2 %	395	0.405	0.492
Gender			
Female	396	0.475	0.500
Male	396	0.525	0.500
Birth cohort			
≤1940	391	0.136	0.343
1950	391	0.184	0.388
1960	391	0.297	0.457
1970	391	0.192	0.394
≥1980	391	0.192	0.394
Birth Area			
North	395	0.433	0.496
Centre	395	0.339	0.474
South and Islands	395	0.127	0.333
Abroad	395	0.101	0.302
Education			
Primary School	392	0.005	0.071
Middle School	392	0.077	0.266
High School	392	0.421	0.494
Graduate	392	0.439	0.497
Post-graduate	392	0.059	0.235
Investment horizon			
Short	385	0.213	0.410
Medium	385	0.623	0.485
Long	385	0.164	0.370
Worried for climate crisis			
Not at all/Little	392	0.145	0.353
Quite a lot/A lot	392	0.854	0.353
Worried for pollution			
Not at all/Little	394	0.058	0.235
Quite a lot/A lot	394	0.941	0.235
Volunteering			
Yes	393	0.282	0.451
No	393	0.718	0.451
Treatment			
Positive Visual	397	0.348	0.477
Negative Visual	397	0.317	0.466
Control	397	0.335	0.473
Incoherent			
No	397	0.970	0.171
Yes	397	0.030	0.171
ESG Averse			
Yes	395	0.028	0.165
No	395	0.972	0.165

Notes: All variables are coded as dummies; detailed definitions are provided in Appendix B. Numbers of observations lower than 397 reflect item non-response or cases in which respondents selected the "prefer not to answer" option.

considerations are in order. First, once again, the positive visual treatment is never statistically significant. Second, the negative visual treatment significantly boosts the WTP, but only for the individuals who reported an interest in the environmental dimension only. This result, which is remarkably robust to different ways of controlling for environmental and social preferences, is fascinating in several respects. First, it seems to confirm that the awareness that sustainability cannot be reached without a multidimensional approach is still far from being reached among the public opinion. Against this somewhat deceiving evidence, the remarkably significant – and large in magnitude – effect of the treatment proposed is encouraging considering that the treatment we have used leveraged on the environmental dimension only. This seems to suggest that, with the correct leverage, the demand and a potentially positive WTP for ESG assets can be stimulated. This interpretation finds support in Gajewski et al. [40], who also employ a visual nudge (priming) in the form of shocking images. Although they do not study the WTP but the choice only, they find that the visual nudge alone never has a significant effect on sustainable investment choices, yet it becomes effective only when combined with additional nudging mechanisms such as default options or textual messages. The non-significant effect on the visual nudge alone may derive from the fact that the image they use primarily evokes social issues, whereas socially responsible funds often pursue broader objectives that also encompass environmental concerns.

6. Discussion and conclusions

Against the changes in the sustainable asset universe and in households' attitudes towards investing in sustainability, we ran a pilot lab-in-the-field experiment with the final aim to evaluate investors' WTP and the effectiveness of a visual nudge in stimulating investment choices. As far as we know, this is the second study after Gajewski et al. [40] to use visual nudges in connection with sustainable investment choices and the first to do so using a lab-in-the-field approach specifically targeting retail investors' WTP. While our findings offer valuable insights, some caution is recommended due to the exploratory nature of the study and potential limitations in terms of generalizability. Nevertheless, with a sample of almost 400 participants, although not representative of the Italian population, our experiment may still provide suggestive evidence.

In particular, we find three main results. First, the WTP for ESG products is significantly associated with education, investment horizon and pro-social attitudes. Specifically, we observed that graduated individuals have a WTP that is between 19 % and 21 % lower compared to those who are not graduated. Results in the literature typically report that preferences for sustainable assets are positively associated with the level of education (see, e.g., Refs. [15,44], or [14]), but considering that we do not have any information about wealth or income, education is likely to capture the negative association typically reported in the same literature between wealth and income and the WTP. As for the investment horizon, we report a significantly higher WTP for those with an investment horizon between 1 and 5 years, hinting at investors correctly interpreting sustainability as a long-term concept. Last, the WTP is significantly higher among those engaged in volunteering activities and with climate change concerns.

Second, we find that the exposure to a negative visual treatment causes an average increase by about 19 % in the WTP for ESG assets, while receiving a positive visual treatment does not cause any significant effect. Once the model is augmented with a set of control variables, though, neither treatment shows any significant effect.

Third, when we dissect the results by factor of interest, the positive visual treatment is still never statistically significant, while the negative visual one significantly increases the WTP of the individuals with interest in the environmental dimension only. This result, which is robust to the inclusion of control variables and to different ways of controlling for environmental and social preferences, points to a relevant

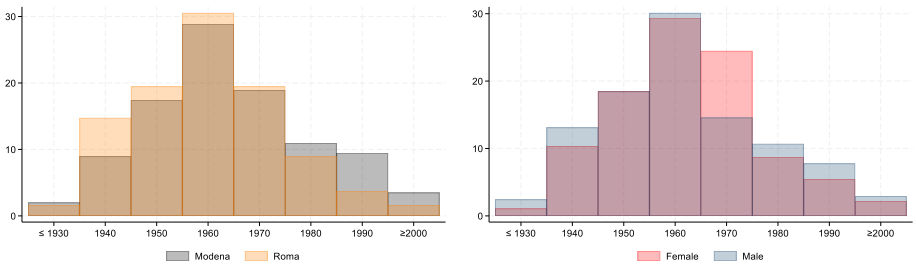

Fig. 2. Distribution of birth cohort by city and gender.

Table 4
WTP for ESG assets: average treatment effects and other covariates coefficients.

VARIABLES	(1)	(2)	(3)
T_i^+	0.0298	0.0396	0.0228
	(0.113)	(0.108)	(0.101)
T_i^-	0.1869*	0.1542	0.1325
	(0.110)	(0.104)	(0.122)
Male		−0.1264	−0.1283
		(0.092)	(0.083)
Young		−0.0927	−0.0970
		(0.117)	(0.120)
Birth = Centre		−0.0546	−0.0687
		(0.182)	(0.170)
Birth = South and islands		−0.0070	0.0175
		(0.158)	(0.177)
Birth = Abroad		0.0019	−0.0077
		(0.198)	(0.203)
Graduate		−0.1917**	−0.2134**
		(0.091)	(0.093)
City = Rome		−0.0274	0.0133
		(0.155)	(0.143)
Investment horizon = Medium		0.2340**	0.2362**
		(0.112)	(0.118)
Investment horizon = Long		0.0922	0.1011
		(0.153)	(0.150)
Volunteer		0.2295**	0.2181**
		(0.096)	(0.099)
Climate		0.3250**	
		(0.135)	
Pollution			0.3794
			(0.235)
Constant	1.0236***	0.7323***	0.6664***
	(0.073)	(0.180)	(0.253)
Observations	372	353	354
R-squared	0.0091	0.0812	0.0700

Notes: the table reports the estimates of the linear regression model (1) having the WTP as dependent variable. Bootstrapped standard errors (150 replications, with seed 1979) are reported in parentheses. ***, ** and * represent significance at 1, 5, 10 % levels, respectively.

Table 5
WTP for ESG assets: average treatment effects and other covariates coefficients, by declare factor of interest.

VARIABLES	E Factor	S Factor	ESG Factor	Interested	Not interested
T_i^+	0.1905	0.2905	0.044	0.1006	−0.0659
	(0.278)	(0.341)	(0.120)	(0.107)	(0.290)
T_i^-	0.5909**	0.1833	0.0751	0.2037*	0.0238
	(0.247)	(0.322)	(0.147)	(0.107)	(0.335)
Demographic	NO	NO	NO	NO	NO
Investment horizon	NO	NO	NO	NO	NO
Volunteer	NO	NO	NO	NO	NO
Climate	NO	NO	NO	NO	NO
Pollution	NO	NO	NO	NO	NO
Observations	62	45	204	320	52
R-squared	0.0938	0.0176	0.0015	0.0104	0.0023
T_i^+	0.0525	0.2514	0.0154	0.0659	−0.0406
	(0.308)	(0.468)	(0.133)	(0.120)	(0.398)
T_i^-	0.6634**	0.2591	0.0331	0.1687	0.0816
	(0.292)	(0.426)	(0.133)	(0.118)	(0.502)
Demographic	YES	YES	YES	YES	YES
Investment horizon	YES	YES	YES	YES	YES
Volunteer	YES	YES	YES	YES	YES
Climate	YES	YES	YES	YES	YES
Pollution	NO	NO	NO	NO	NO
Observations	60	41	198	308	45
R-squared	0.3087	0.4849	0.0935	0.0805	0.1319
T_i^+	−0.0012	0.2217	0.0056	0.0548	−0.0298
	(0.301)	(0.455)	(0.129)	(0.108)	(0.376)
T_i^-	0.6210**	0.1826	−0.0007	0.1446	0.0861
	(0.296)	(0.432)	(0.143)	(0.125)	(0.506)
Demographic	YES	YES	YES	YES	YES
Investment horizon	YES	YES	YES	YES	YES
Volunteer	YES	YES	YES	YES	YES
Climate	NO	NO	NO	NO	NO
Pollution	YES	YES	YES	YES	YES
Observations	60	40	200	309	45
R-squared	0.2900	0.4434	0.0902	0.0685	0.1310

Notes: the table reports the estimates of the linear regression model (1) having the WTP as dependent variable, by subsamples of observations based on the declared factor of interest, if any. Results for the Governance (G) factor are not displayed, as only a very limited number of respondents selected it. Bootstrapped standard errors (150 replications, with seed 1979) are reported in parentheses. ***, ** and * represent significance at 1, 5, 10 % levels, respectively.

connection between the sustainability dimension that the treatment leverages on and the main factor of interest (E, S, G) for the investing household. Indeed, the treatment used in our experiment, which leverages on the environmental issue only, boosts the WTP for sustainable assets only for the households declaring an interest in the environmental dimension.

Although this result hints at households not considering sustainability as a multidimensional concept, the remarkably significant – and large in magnitude – effect found for the treatment proposed is encouraging and provides a suggestion to be tested in future research work. With the correct leverage and visual nudge also on the social and governance dimensions, the demand and a potentially positive WTP for ESG assets can be stimulated.

Overall, our findings have both financial and social implications. From a financial perspective, our results show household heterogeneity in WTP for sustainable assets which may translate into differentiated demand patterns, affecting both the design of financial products and the strategy to set up sustainable portfolios (e.g., Ref. [49,50]). These insights are particularly relevant in the context of the MiFID II regulatory framework, which requires financial advisors to incorporate clients' sustainability preferences during the adequacy assessment. Thus, understanding whether households are willing to sacrifice return to invest sustainably and how participation in sustainable finance can be stimulated by the appropriate nudges is crucial for asset managers and policymakers seeking to channel resources effectively toward sustainable investments. From a social perspective, the significant association between higher WTP and non-financial attitudes (such as being engaged in volunteering activities and concerned about climate change) provides

further evidence that sustainable investments are not only financial choices but also reflect pro-social behaviors and values. Further, the result that negative environmental treatments can stimulate a higher WTP for investors interested in the environmental dimension of ESG may suggest that information design and framing may serve as effective tools to foster pro-sustainability behavior. Hence, the adoption of effective nudges appears crucial alongside the development of financial education programs, including also information on ESG factors and the social and environmental benefits of sustainable investments.

CRediT authorship contribution statement

Beatrice Bertelli: Writing – original draft, Validation, Investigation, Data curation. **Marianna Brunetti:** Writing – original draft, Methodology, Funding acquisition, Data curation, Conceptualization. **Costanza Torricelli:** Writing – original draft, Validation, Supervision, Investigation, Funding acquisition, Conceptualization. **Mariangela Zoli:** Writing – original draft, Validation, Methodology, Conceptualization.

Appendix A and Appendix B. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.seps.2025.102405.

Data availability

The authors do not have permission to share data.

References

[1] Principles for Responsible Investment (PRI). The SDG investment case. https://www.unpri.org/sustainable-development-goals/the-sdg-investment-case/303; 2017. article.
[2] Widyawati L. A systematic literature review of socially responsible investment and environmental social governance metrics. Bus Strat Environ 2020;29(2):619–37.
[3] Bertelli B, Boero G, Torricelli C. The market price of greenness: a factor pricing approach for Green and Conventional Bonds. Ann Finance 2025;21:317–50.
[4] Zerbib OD. The effect of pro-environmental preferences on bond prices: evidence from green bonds. J Bank Finance 2019;98:39–60.
[5] Torricelli C, Pellati E. Social bonds and the "social premium". J Econ Finance 2023;47(3):600–19.
[6] Alessi L, Ossola E, Panzica R. What greenium matters in the stock market? The role of greenhouse gas emissions and environmental disclosures. J Financ Stabil 2021;54:100869.
[7] De Angelis T, Tankov P, Zerbib OD. Climate impact investing. Manag Sci 2023;69(12):7669–92.
[8] Landi GC, Turriziani L, Muto V, Ricciardi I. Exploring the nexus between ESG risk variations and investment preferences: insights from sustainable ETFs during the COVID-19 era. Soc Econ Plann Sci 2024;95:102039. https://doi.org/10.1016/j.seps.2024.102039.
[9] GSIA. Global Sustainable Investment Review 2022. https://www.gsi-alliance.org/members-resources/gsir2022/; 2023.
[10] Dupre S, Bayer C, Santacruz T. A Large Majority of Retail Clients Want to Invest Sustainably Survey of French and German retail investors' sustainability objectives. 2°Investing Initiative; 2020.
[11] D'Ecclesia RL, Levantesi S, Stefanelli K. Measuring business impacts on the sustainability of European-listed firms. Soc Econ Plann Sci 2024;96:102078.
[12] Horn M. The European green deal, retail investors and sustainable investments: a perspective article covering economic, behavioral, and regulatory insights. Current Research in Environmental Sustainability 2024;7:100241.
[13] Riedl A, Smeets P. Why do investors hold socially responsible mutual funds? J Finance 2017;72(6):2505–50.
[14] Rossi M, Sansone D, Van Soest A, Torricelli C. Household preferences for socially responsible investments. J Bank Finance 2019;105:107–20.
[15] Bauer R, Smeets P. Social identification and investment decisions. J Econ Behav Organ 2015;117:121–34.
[16] Bollen NP. Mutual fund attributes and investor behavior. J Financ Quant Anal 2007;42(3):683–708.
[17] Beal D, Goyen M, Phillips PJ. Why do we invest ethically? J Invest 2005;14(3):66–77.
[18] Ariely D, Bracha A, Meier S. Doing good or doing well? Image motivation and monetary incentives in behaving prosocially. Am Econ Rev 2009;99(1):544–55.
[19] Døskeland T, Pedersen LJT. Investing with brain or heart? A field experiment on responsible investment. Manag Sci 2016;62(6):1632–44.
[20] Levitt SD, List JA. What do laboratory experiments measuring social preferences reveal about the real world? J Econ Perspect 2007;21(2):153–74.
[21] Glac K. Understanding socially responsible investing: the effect of decision frames and trade-off options. J Bus Ethics 2009;87:41–55.
[22] Pasewark WR, Riley ME. It's a matter of principle: the role of personal values in investment decisions. J Bus Ethics 2010;93(2):237–53.
[23] Gutsche G, Wetzel H, Ziegler A. Determinants of individual sustainable investment behavior-A framed field experiment. J Econ Behav Organ 2023;209:491–508.
[24] Seifert M, Spitzer F, Haeckl S, Gaudeul A, Kirchler E, Palan S, Gangl K. Can information provision and preference elicitation promote ESG investments? Evidence from a large, incentivized online experiment. J Bank Finance 2024;161:107114.
[25] Hong H, Kacperczyk M. The price of sin: the effects of social norms on markets. J Financ Econ 2009;93(1):15–36.
[26] Renneboog L, Ter Horst J, Zhang C. Socially responsible investments: institutional aspects, performance, and investor behavior. J Bank Finance 2008;32(9):1723–42.
[27] Bauer R, Koedijk K, Otten R. International evidence on ethical mutual fund performance and investment style. J Bank Finance 2005;29(7):1751–67.
[28] Gil-Bazo J, Ruiz-Verdú P, Santos AA. The performance of socially responsible mutual funds: the role of fees and management companies. J Bus Ethics 2010;94:243–63.
[29] Revelli C, Viviani JL. Financial performance of socially responsible investing (SRI): what have we learned? A meta-analysis. Bus Ethics Eur Rev 2015;24(2):158–85.
[30] Benson KL, Humphrey JE. Socially responsible investment funds: investor reaction to current and past returns. J Bank Finance 2008;32(9):1850–9.
[31] Gutsche G, Ziegler A. Which private investors are willing to pay for sustainable investments? Empirical evidence from stated choice experiments. J Bank Finance 2019;102:193–214.
[32] Junkus JC, Berry TC. The demographic profile of socially responsible investors. Manag Finance 2010;36(6):474–81.
[33] Hood M, Nofsinger JR, Varma A. Conservation, discrimination, and salvation: investors' social concerns in the stock market. J Financ Serv Res 2014;45:5–37.
[34] Bordalo P, Gennaioli N, Shleifer A. Salience. Annual Review of Economics 2022;14(1):521–44.
[35] Wee SC, Choong WW, Low ST. Can "nudging" play a role to promote pro-environmental behaviour? Environ Chall 2021;5:100364.
[36] Essl A, Steffen A, Staehle M. Choose to reuse! the effect of action-close reminders on pro-environmental behavior. J Environ Econ Manag 2021;110:102539.
[37] Coucke N, Vermeir I, Slabbinck H, Van Kerckhove A. Show me more! the influence of visibility on sustainable food choices. Foods 2019;8(6):186.
[38] Zhang Z, Wang X. Nudging to promote household waste source separation: mechanisms and spillover effects. Resour Conserv Recycl 2020;162:105054.
[39] Lotti L, Barile L, Manfredi G. Improving recycling sorting behaviour with human eye nudges. Sci Rep 2023;13(1):10127.
[40] Gajewski JF, Heimann M, Meunier L. Nudges in SRI: the power of the default option. J Bus Ethics 2022:1–20.
[41] Pilaj H. The choice architecture of sustainable and responsible investment: nudging investors toward ethical decision-making. J Bus Ethics 2017;140:743–53.
[42] Thaler RH, Sunstein CR. Nudge. Improving decisions about health, wealth, and happiness. New Haven CT: Yale University Press; 2008.
[43] Bertocchi G, Brunetti M, Torricelli C. Who holds the purse strings within the household? The determinants of intra-family decision making. J Econ Behav Organ 2014;101:65–86.
[44] Nilsson J. Investment with a conscience: examining the impact of pro-social attitudes and perceived financial performance on socially responsible investment behavior. J Bus Ethics 2008;83(2):307–25.
[45] Filippini M, Leippold M, Wekhof T. Sustainable finance literacy and the determinants of sustainable investing. J Bank Finance 2024;163:107167.
[46] Strauß N, Krakow J, Chesney M. It's the news, stupid! the relationship between news attention, literacy, trust, greenwashing perceptions, and sustainable finance investment in Switzerland. Journal of Sustainable Finance & Investment 2023;13(4):1480–505.
[47] Jia X, Yamamoto Y, Matsumoto KI. From shock to strategy: adversity experiences and Environmental, Social, and Governance investment. J Environ Manag 2025;391:126323.
[48] Anderson A, Robinson DT. Financial literacy in the age of green investment. Rev Finance 2022;26(6):1551–84.
[49] Bertelli B, Torricelli C. The trade-off between ESG screening and portfolio diversification in the short and in the long run. J Econ Finance 2024;48(2):298–322.
[50] Bertelli B, Torricelli C. Sustainable optimal stock portfolios: what relationship between sustainability and performance? Eur J Oper Res 2025;323(1):323–40.
[51] Bertelli B, Brunetti M, Torricelli C, Zoli M. From knowledge to allocation of sustainable assets: results from an in-field survey in Italy. CEIS; 2025. https://www.ssrn.com/index.cfm/en/ceis/.
[52] Varmaz A, Fieberg C, Poddig T. Portfolio optimization for sustainable investments. Ann Oper Res 2024;341(2):1151–76.
[53] Kirchler M, Weitzel U, editors. Experiments in finance, vol. 154. Journal of Banking and Finance; 2023, 106975.
[54] Brunetti M, van Soest A, Torricelli C. The role of households in financing the move towards a sustainable economy: results from a survey in the Netherlands. Patent; 2025. CeFin Working Paper 99, available here, https://iris.unimore.it/handle/11380/1377888.
[55] Baxter J, Gram-Hanssen I. Environmental message framing: enhancing consumer recycling of mobile phones. Resour Conserv Recycl 2016;109:96–101.
[56] Lin ZY, Wang X, Li CJ, Gordon MP, Harder MK. Visual prompts or volunteer models: an experiment in recycling. Sustainability 2016;8(5):458.

[57] Bennett R. Customer recall of promotional displays at supermarket checkouts: arousal, memory and waiting in queues. Int Rev Retail Distrib Consum Res 1998;8(4):383–98.
[58] Chatterjee D, Barbhuiya MR. Bottled water usage and willingness to pay among Indian tourists: visual nudges and the theory of planned behaviour. Scand J Hospit Tourism 2021;21(5):531–49.
[59] Andersen S, Harrison GW, Lau MI, Rutström EE. Elicitation using multiple price list formats. Exp Econ 2006;9:383–405.
[60] Anderson S, Harrison GW, Lau MI, Elisabet RE. Valuation using multiple price list formats. Appl Econ 2007;39(6):675–82.
[61] Bursztyn L, Ferman B, Fiorin S, Kanz M, Rao G. Status goods: experimental evidence from platinum credit cards. Q J Econ 2018;133(3):1561–95.
[62] Meissner T, Gassmann X, Faure C, Schleich J. Individual characteristics associated with risk and time preferences: a multi country representative survey. J Risk Uncertain 2023;66(1):77–107.
[63] Brañas-Garza P, Jorrat D, Espín AM, Sánchez A. Paid and hypothetical time preferences are the same: lab, field and online evidence. Exp Econ 2023;26(2):412–34.
[64] Oprea R. Decisions under risk are decisions under complexity. Am Econ Rev 2024;114(12):3789–811.
[65] Hosni H, Segovia M, Zhao S, Palma MA, Skevas T. Improving consumer understanding of pesticide toxicity labels: experimental evidence. Sci Rep 2024;14(1):17291.
[66] Allcott H, Kessler JB. The welfare effects of nudges: a case study of energy use social comparisons. Am Econ J Appl Econ 2019;11(1):236–76.
[67] D'Amato A, Goeschl T, Lorè L, Zoli M. True to type? EU-style date marking and the valuation of perishable food. Food Policy 2023;114:102381.
[68] Jack BK, McDermott K, Sautmann A. Multiple price lists for willingness to pay elicitation. J Dev Econ 2022;159:102977.
[69] Yu CW, Zhang YJ, Zuo SX. Multiple switching and data quality in the multiple price list. Rev Econ Stat 2021;103(1):136–50.
[70] Mooney CZ, Duval RD. Bootstrapping: a nonparametric approach to statistical inference. Newbury Park, CA: Sage; 1993.
[71] Klauer B, Manstetten R, Petersen T, Schiller J. Sustainability and the art of long term thinking. Routledge; 2017.

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