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Nudging households' sustainable investments: results from a pilot lab-in-the-field experiment in Italy¹

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Abstract

This paper addresses two main research questions in sustainable finance: what is the household willingness to pay for sustainable investments? Can households be stimulated in this connection by means of visual nudges? To this end we ran a pilot lab-in-the-field experiment in October-November 2024 in different branches of a large Italian bank. Three are the main results. First, the willingness to pay is lower for graduated individuals, but higher for those with an investment horizon between 1 and 5 years, and among those engaged in volunteering and concerned about climate change. Second, the exposure to a negative visual treatment, by contrast to a positive one, causes an average increase in the willingness to pay for Environmental, Social, and Governance assets, albeit this effect vanishes once the model is augmented with control variables. 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 a suitable leverage, the demand and willingness to pay for all sustainability dimensions can be nudged, with important industry and policy implications.

Keywords: Sustainable finance; household financial choices; willingness to pay; visual nudges; lab-in-the field experiment

JEL: D14; G11; M30

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1. Introduction

The awareness about sustainability of governments, institutions, firms, and markets, has been growing since the 2015, when the Paris Agreement turned on the spotlight on climate change and environmental issues, and the United Nations included the 17 Sustainable Development Goals in the 2030 Agenda (UN, 2015), establishing the three dimensions of sustainability – economic growth, social inclusion and environmental protection – and clarifying that sustainability cannot be achieved by considering the environmental dimension exclusively. Responsible and sustainable investments, along with the integration of Environmental, Social, and Governance (ESG) dimensions into investment decisions, have been gaining increasing attention since then and even more in combination of the Principles for Responsible Investment (PRI, 2017) by the United Nations (Widyawati, 2020).¹

The need for financing the transition towards sustainability has pushed the markets to offer new financial products. Debt products now range from Green Bonds, considering the Environmental issue only, and Social Bonds, whose proceeds are allocated to social initiatives and whose issuance has increased with the Covid-19 pandemic, 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.

A relevant issue in this context is the pricing of sustainable assets compared to their conventional counterparts, which has led to a substantial strand of literature investigating the existence of the so-called “premium”, i.e. the return differential between sustainable and conventional assets. The evidence is disparate depending on the specific feature of the sustainable assets (bonds vs. equity, green vs. social), the geographical area and the period considered (for instance, see Zerbib, 2019 for green bonds; Torricelli and Pellati, 2023 for social bonds; Alessi et al., 2021 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., De Angelis et al., 2023), also fostered by an increasing regulation in that

¹ <https://www.unpri.org/about-us/what-are-the-principles-for-responsible-investment>

direction in the banking, insurance, pension fund, and asset managers industries.² On the other hand, the role of retail investors, and specifically households, has been less investigated, but the existing literature underscores the importance of socio-demographic and economic characteristics, as well as individual motivations and preferences, in shaping sustainable investment behaviour. For example, in terms of households' profiling, the literature (e.g., Rossi et al., 2019; Hood et al., 2014) proves that age, education and gender, but also religion and political orientations, are strongly associated with actual ownership of socially responsible and sustainable investments.

A related but so far scarcely investigated issue is the households' "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. Exemptions include Rossi et al (2019), who find that social investors are willing to pay a price to be socially responsible rather than needing a little nudge, such as a gift (a book or a voucher). Another relevant contribution, based on an online experiment, is Gajewski et al. (2022), who study the effect of different nudges (including visual ones) on the selection of, and not on the WTP for, sustainable funds.

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 address these questions, we conduct 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 visual nudges in stimulating sustainable investment choices.³ In particular, we test the effectiveness

² 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.

³ 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 a report available upon request.

of two different visual treatments: one suggestive of the negative consequences of a natural disaster and one displaying a nice green countryside.

To the best of our knowledge, this contribution is the first to investigate the WTP for sustainable assets in a lab-in-the-field experiment that uses visual nudges.

Our main results can be summarized as follows. First, the WTP is higher for investors with a time horizon, 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 visual cues, but only when the cue is negative. This effect however is not robust to the inclusion of all the control variables we considered. Last, we find huge heterogeneity in the effect of the visual cues by the factor of interest of the investor, whereby the negative visual treatment we propose, which leverages on Environmental issues, significantly increases the willingness to pay only among the investors interested in the Environmental dimension.

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 concludes. Appendix A reports the survey questions and Appendix B reports the definition of the variables used in the analyses.

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 of investment into household decision-making.⁴ Empirically, two main approaches have been employed. The first, more developed so far, provides econometric analyses based on either market or survey data; the second, yet less developed in this specific financial field, rests on experiments (either lab/online or lab-in-the-field) that are set up to address specific research questions.⁵

⁴ Among the topics we do not cover in this review, the optimal portfolio composition accounting also for sustainability features (e.g. Bertelli and Torricelli, 2025; Varmaz et al., 2024), since it is not investigated in our experiment.

⁵ A recent special issue edited by Kirchler and Weitzel (Eds., 2023) overviews contributions in experimental finance, a field that has been gaining popularity in recent years. The contributions closer to our work are

Within this literature, a first strand of studies look 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. For example, Bollen (2007) tests differences in behavior between investors in Socially Responsible (SR) mutual funds and investors in conventional funds: results point to investors getting direct utility from the socially responsible attributes of the funds, the so-called intrinsic motivation (Ariely et al., 2009). Similarly, Beal et al. (2005) provide three non-exhaustive and non-exclusive motivations for ethical investments: superior financial returns (consistently with traditional finance theory), non-wealth returns and social change. In the same spirit, Døskeland and Pedersen (2016), based on the theoretical model of utility of wealth and morality by Levitt and List (2007), use a natural field experiment to show that wealth framing is more effective than moral framing in inducing investors to engage in SR investments. Glac (2009) uses lab experiments to underscore that the decision frame influences the likelihood of engagement in SR investments. Pasewark and Riley (2010) apply an experimental approach to determine the effects of values on an investment decision: they ask individuals to choose between bonds issued either by a tobacco company or by a firm outside the tobacco industry and conclude that investor's personal values affect investment decisions. Gutsche et al. (2023) examine data from an incentivized framed field experiment that was part of an online survey among a broad sample of financial decision makers in Germany and find strong preferences for sustainable funds, which are driven by both pecuniary and non-pecuniary motives. Seifert et al. (2024) conduct an incentivized online experiment on two samples in Austria to investigate how information about financial return and ESG affects investors' decisions and their satisfaction, finding that combining both types of information has no additional effect.

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, some studies attest that social responsibility does have implications for

those in the field of individual decision making, although none of the reviewed papers focuses on household choices of sustainable assets.

the expected returns (e.g. Hong and Kacperczyk, 2009). For example, Renneboog et al. (2008) find that SR funds in European, North-American and Asia-Pacific countries underperform compared to conventional ones and conclude from this that the SR investors pay a price for their socially responsible choice. In contrast, Bauer et al. (2005), using a database of German, UK and US ethical mutual funds, do not find significant differences in risk-adjusted returns between ethical and conventional funds. Gil-Bazo et al. (2010) even find that US SR funds outperformed conventional ones in the period 1997-2005. These different results may be interpreted also in light of the evidence by Revelli and Viviani (2015), who, by means of a meta-analysis of 85 studies and 190 experiments, show that heterogeneous results about SR investments financial performance 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).

A third strand of the literature, this paper contributes to, investigates investors' willingness to pay for sustainable products and, in parallel, seeks to profile socially responsible investors. Renneboog et al. (2008) review the literature on SR investments and 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 (2008) analyze the investors' behavior and find that SR fund flows are less sensitive to returns than conventional funds, and more persistent, thus pointing out the difficulty faced by SR investors in finding alternative investments that meet their non-financial goals. Riedl and Smeets (2017) highlight social preferences as the main driver of SR investing, despite expecting a lower return, suggesting that there is a long run effect on asset prices. Gutsche and Ziegler (2019) use survey data from a representative sample of German retail investors to estimate preferences for sustainable investments through a mixed logit model. They 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 pronounced warm-glow effect. Another evidence for investors' profiling is given by Bauer and Smeets (2015), who use survey data from retail customers of the only two banks in the Netherlands that exclusively offer SR investments and find high levels of social identification among young, highly-educated and low-wealth investors, thus supporting the investor profile outlined by Junkus and Berry (2010). The roles of gender and education are also highlighted in

Nilsson (2008), who further shows that SR investors are not only driven by altruistic motives, but also by the idea that ethical mutual funds have an average or better than average performance. Hood et al. (2014) have looked at heterogeneities among socially conscious investors in terms of gender, age, religion and political affiliation. Rossi et al. (2019) analyze revealed and stated household preferences for SR investments. Using a questionnaire specifically designed for this purpose and administered to a Dutch representative household panel in 2016, they show that SR investors are willing to pay a price to be socially responsible rather than needing a little nudge, such as a gift (a book or a voucher). Highly educated individuals have a substantial latent demand that is currently unexploited. Keeping education constant, individuals who consider themselves financially literate are less interested in SR investments than others. Particularly at the intensive margin, the stated demand for SR funds is sensitive to the return penalty.⁶

Finally, running a lab-in-the-field experiment using visual nudges, 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 work by unlocking people's subconscious and consequently affecting subconscious actions (Wee et al., 2021). Typically, individuals direct their attention to a limited subset of the elements characterizing their decisional context: making certain elements more prominent or "salient" through visual cues captures individuals' attention and can affect subsequent decisions (Bordalo et al., 2022). Visual cues have been proven useful to encourage different types of environmental consumers' behaviors (Essl et al. (2021), Coucke et al., 2019). Examples of visual nudges can also be found in the literature to stimulate waste recycling (e.g. Zhang and Wang (2020), Lotti et al., 2023). To the best of our knowledge, Gajewski et al. (2022) 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 (equity fund, bond fund, index fund and socially responsible 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, because about 50% of investors do not opt out of the default allocation. However, their experiments are

⁶ Brunetti et al. (2025) have extended and resubmitted questions in 2024 so as to elicit changes compared to 2016.

conducted online and do not allow for a conclusion about investors' WTP since the socially responsible 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 potential tools to overcome behavioural barriers to SR investing (see Pilaj, 2017; Thaler and Sunstein, 2008).

Against this backdrop, this study implements a pilot lab-in-the-field experiment that overcomes these limitations. Specifically, by exposing participants to realistic investment trade-offs and varying return profiles, our design allows us to assess households' WTP, while benefiting from both the experimental control of lab settings and the behavioral 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. The branches are located in two distinct regions, in the North and the Center of Italy. The choice has been motivated to account for potential geographical heterogeneity, which is to be expected in a country such as Italy, where the financial-economic situation is quite segmented in the different geographical macro-regions. Specifically, one branch is in Modena and is located close to one of the most popular fresh food markets in the city, with mixed customers (retail, professionals, corporate). The other two branches are located in Rome: one is highly central, and with a clientele primarily consisting of corporate customers, largely relying on online banking services, while the other branch is more peripheral, located, as the one in Modena, close to a popular market, whereby customers are mainly retail. The branches were selected by the managers of the bank to achieve the highest heterogeneity possible across the clientele as well as the widest numerosity of visitors during the experimental period.

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 6 December 2024 in the second Rome branch.

The customers entering the bank were asked to participate in an incentivized survey lasting about 5 minutes.⁷ 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 Figure 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 instead a picture of a nice green countryside (see bottom panel of Figure 1).⁸ 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 anonymously 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

⁷ Throughout the paper we will use the word customer and not client to mean that the person entering the bank were 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.

⁸ 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 (Baxter & Gram-Hanssen, 2016) or to improve waste sorting (Lin et al., 2016). In some cases, showing pleasant or funny visual prompts may be effective as they create a positive emotional state (Bennett, 1998). 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 willingness to pay an environmental tax to reduce bottled water usage (Chatterjee and Barbhuiya, 2021).

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.

Figure 1: Visual treatments



Notes: for both treatments we report the English translation – original in Italian.

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 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, 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.

In the fifth question (Q5), we presented participants with a small "multiple price list" (MPL) investment task with the aim to elicit customers' willingness to give up the return of an asset for its sustainable characteristics, i.e. the so-called Willingness to pay (WTP). It thus represents the core question for our research. We have chosen this elicitation method as the MPL experiments have the merit of being easy to explain and to implement while inducing truthful revelation by participants (Andersen et al., 2006, 2007). Accordingly, they are widely used even in demanding settings, like in-store experiments, with consumers as participants (see, for instance, D'Amato et al.,

2023). Typically, to elicit the willingness to pay for some commodities, the MPL confronts subjects with a sequence of “yes” or “no” questions for a set of ordered prices, presented one per row. Then, one question is randomly selected and the subject’s choice corresponding to that row is implemented. Accordingly, this elicitation method stimulates participants to reveal their preferences truthfully.

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, conditions for ESG products are progressively worsened, by increasing the return of the non-ESG security and maintaining at 2% the return of the ESG security. 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 is presented with a lower return (2%) compared to security A (ESG), offering 3%. The rationale in this case is to check whether the respondent is against ESG products, despite their higher profitability. The complete task is shown in Table 1.

Overall, the four scenarios allow us to detect the potential preference of the respondents for ESG products and their WTP (i.e. willingness to sacrifice the investment return) or, on the contrary, a strong attitude against ESG features.

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>).

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

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. Specifically, 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: Not at all, a little, quite a lot, a lot) and individual engagement in volunteering. The overall interview lasted about 5 minutes, a time compatible with the average waiting time of customers entering a bank for their own work or personal task.

Table 2: Incentivized choices and gifts value

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

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

4. The data

The final dataset counts 397 observations, almost equally split between the two cities (204 in Modena and 195 in Rome). 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.

Table 3: Descriptive Statistics

Variable	Obs.	Mean	Std. dev.	Min	Max
City					
Modena	397	0.514	0.500	0	1
Rome	397	0.486	0.500	0	1
Knowledge					
No	397	0.562	0.497	0	1
Yes	397	0.438	0.497	0	1
Factor of Interest					
E Factor	397	0.159	0.366	0	1
S Factor	397	0.118	0.323	0	1
G Factor	397	0.028	0.164	0	1
ESG Mix	397	0.539	0.499	0	1
Not interested	397	0.156	0.363	0	1
Ideal allocation					

Less than 25%	397	0.348	0.473	0	1
Between 25% and 50%	397	0.375	0.485	0	1
Between 50% and 75%	397	0.081	0.273	0	1
More than 75%	397	0.035	0.185	0	1
Not interested	397	0.161	0.368	0	1
Selection					
Personally	397	0.295	0.456	0	1
Indirect via funds	397	0.544	0.499	0	1
Not interested	397	0.161	0.368	0	1
WTP					
0%	395	0.324	0.469	0	1
1%	395	0.271	0.445	0	1
2%	395	0.405	0.492	0	1
Gender					
Female	396	0.475	0.500	0	1
Male	396	0.525	0.500	0	1
Birth cohort					
≤ 1940	391	0.136	0.343	0	1
1950	391	0.184	0.388	0	1
1960	391	0.297	0.457	0	1
1970	391	0.192	0.394	0	1
≥ 1980	391	0.192	0.394	0	1
Birth Area					
North	395	0.433	0.496	0	1
Centre	395	0.339	0.474	0	1
South and Islands	395	0.127	0.333	0	1
Abroad	395	0.101	0.302	0	1
Education					
Primary School	392	0.005	0.071	0	1
Middle School	392	0.077	0.266	0	1
High School	392	0.421	0.494	0	1
Graduate	392	0.439	0.497	0	1
Post-graduate	392	0.059	0.235	0	1
Investment horizon					
Short	385	0.213	0.410	0	1
Medium	385	0.623	0.485	0	1
Long	385	0.164	0.370	0	1
Worried for climate crisis					
Not at all/Little	392	0.145	0.353	0	1
Quite a lot	392	0.441	0.497	0	1
A lot	392	0.413	0.493	0	1
Worried for pollution					
Not at all/Little	394	0.058	0.235	0	1
Quite a lot	394	0.388	0.488	0	1
A lot	394	0.553	0.498	0	1
Volunteering					
Yes	393	0.282	0.451	0	1

No	393	0.718	0.451	0	1
Treatment					
Positive Visual	397	0.348	0.477	0	1
Negative Visual	397	0.317	0.466	0	1
Control	397	0.335	0.473	0	1
Incoherent					
No	397	0.970	0.171	0	1
Yes	397	0.030	0.171	0	1
ESG Averse					
Yes	395	0.028	0.165	0	1
No	395	0.972	0.165	0	1

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).

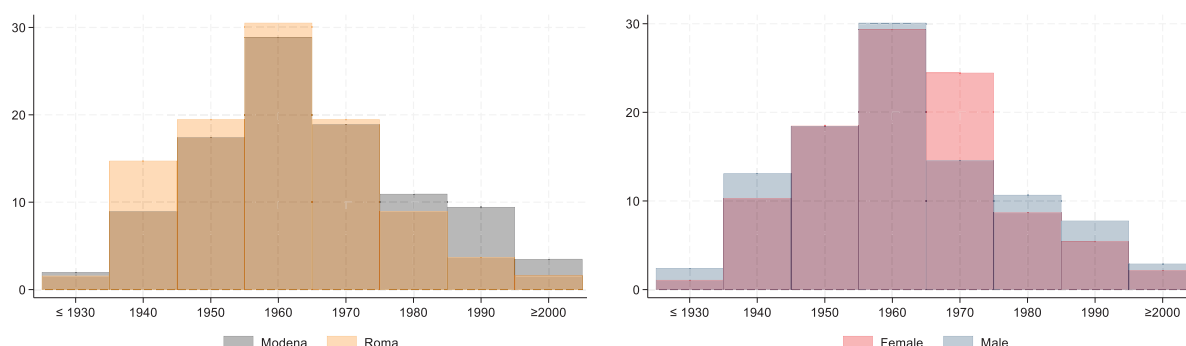
In doing so, more than a half of the sample (54.4%) would prefer an indirect investment, via e.g. funds, in which the selection is made by specialized operators on

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., Bertocchi et al., 2014 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 Figure 2.

Figure 2: Distribution of birth cohort by city and gender.



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, with 85.4% of respondents either a lot (41.3%) or quite a lot (44.1%) concerned about the climate crisis, and 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, we located seven respondents (6 in Modena, 1 in Rome) who declared to be willing to forego a 2% financial return in Scenario 3 but were not willing to forego a 1% financial return in Scenario 2. Similarly, we spotted five respondents (2 in Modena, 3 in Rome) declaring a positive WTP in Scenarios 2 and 3, but who eventually selected the non-ESG asset, despite its lower return, in Scenario 4. Finally, we reported six respondents (2 in Modena, 4 in Rome) who 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 value 1 in these 12 cases (some of these respondents made more than one inconsistent choice) and 0 otherwise. The second variable is "*ESG Averse*". This variable takes 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 assets (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 willingness to pay for ESG products, we estimate the following linear regression model:

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

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
- $\mathbf{X}$: 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 (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 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.
- 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)¹⁰.

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,

¹⁰ Mooney and Duval (1993) suggest a total of 50 – 200 replications to get adequate for estimates of standard error and normal-approximation confidence intervals.

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, both treatments are not 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. However, we do find a negative association between the WTP and the level of education. Specifically, we find that graduated individuals have WTP that is somewhat between 19% and 21% lower compared to those non-graduated. Results in the literature typically report that the preferences for sustainable assets are positively associated with the level of education (see, e.g., Nilsson, 2008, Bauer and Smeets, 2015, or Rossi et al., 2019). However, recalling that we were not able to collect any information about wealth or income, the level of education might somewhat act as a proxy for them and thus actually capture the negative association again typically reported in the same literature between wealth and income and the WTP. The investment horizon also plays a role, as the WTP is significantly higher for those with an investment horizon comprised between 1 and 5 years, as opposed to those with shorter horizons, typical of elderly people. 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 concerned about climate change.

Table 4: Treatment effect estimates

VARIABLES	(1)	(2)	(3)
T_i^+	0.0298 (0.113)	0.0396 (0.108)	0.0228 (0.101)
T_i^-	0.1869* (0.110)	0.1542 (0.104)	0.1325 (0.122)
Male		-0.1264 (0.092)	-0.1283 (0.083)
Young		-0.0927 (0.117)	-0.0970 (0.120)
Birth = Centre		-0.0546 (0.182)	-0.0687 (0.170)
Birth = South and islands		-0.0070 (0.158)	0.0175 (0.177)
Birth = Abroad		0.0019 (0.198)	-0.0077 (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: bootstrap standard errors (150 replications, with seed 1979) are reported in parentheses. ***, ** and * represent significance at 1, 5, 10% levels, respectively.

We then dissect the results by which factor of interest, if any, was declared with reference to ESG assets (see Table 5). Several considerations are in order. First, once again, the positive visual treatment is never statistically significant. Second, the negative visual treatment has significantly boosted the WTP of the individuals who reported an interest only in the environmental dimension. 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. (2022), 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.

Table 5: Treatment effect estimates, by 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	-0.12	-0.107	-0.29
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: bootstrap standard errors (150 replications, with seed 1979) are reported in parentheses.

***, ** and * represent significance at 1, 5, 10% levels, respectively. Results for the Governance (G) factor are not displayed, as only a very limited number of respondents selected it.

6. 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. (2022) 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 results.

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., Nilsson, 2008, Bauer and Smeets, 2015, or Rossi et al., 2019), 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 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.

Our results have thus relevant industry and policy implications. Specifically, for the financial industry, also in regulatory terms (e.g., MiFID II), and for asset managers, both in terms of assets and portfolios offered to customers (e.g., Bertelli and Torricelli, 2024 and 2025) and of the selection of the appropriate nudges to increase participation in sustainable finance.

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Appendix A - Questionnaire (Translated form Italian).

The University of Modena and Reggio Emilia and the University of Rome Tor Vergata are conducting a research project on financial investment choices in Italy in connection to sustainability.

To this end, we would like to ask you a few questions. The questionnaire is completely anonymous, does not require sensitive data, and lasts about 5 minutes.

To thank you for your time, we will give you a gift. The monetary value of the gift is tied to the financial choices you will indicate during the questionnaire in a scenario drawn randomly from the 4 that will be presented to you.

ESG financial products (such as stocks, bonds, or funds), also known as Sustainable or (Socially) Responsible investments, are those linked to companies committed to protecting the environment (e.g., reducing greenhouse gas emissions), promoting social initiatives (for the society in general or their employees, e.g., corporate kindergarten), and improving corporate governance (e.g., anti-corruption rules, ethical business practices).

Q1: Have you already heard about sustainable or ESG investment products?

Answer:

- Yes
- No

Q2: Suppose you receive a sum of cash to invest. Would you be interested in investing it in ESG products and, if so, in which of the following directions?

Answer (randomized order):

- Exclusively for environmental purposes (E Factor), e.g., reduction of greenhouse gas emissions in their production activity
- Exclusively for social purposes (S Factor), e.g., promoting safety in the workplace
- Exclusively for purposes related to corporate governance (G Factor), e.g., promoting ethical business practices
- For a mix of initiatives with purposes in all three directions (environmental, social, and governance - ESG Factors)
- I would not be interested in investing this amount of money in ESG financial products

Q3 (if Q2 ≠ from not interested): What percentage of your portfolio would you like to be invested in ESG products?

Answer:

- Not at all (0%)
- A little (less than 25%)
- Quite (between 25% and 50%)
- A lot (between 50% and 75%)
- All or almost all (more than 75%)

Q4 (if Q2 ≠ from not interested): Assuming you want to invest in stocks with sustainability characteristics, would you prefer to choose between (randomized order):

Answer:

- stocks personally selected in order to identify the optimal mix for her between risk, return, and sustainability
- equity funds, in which the selection is made by operators specialized in the topic, delegating the optimal mix of all dimensions involved (risk, return, and sustainability)

Q5: In the following questions, we will ask you to choose between two securities that have the same risk profile but differ in return and sustainability profile.

You will be asked to tell us which security you would prefer between security A, which has ESG certification, and security B, which does not have such a certification, under four different annual return scenarios.

Scenario	Security A (ESG)	Security 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

In conclusion, we would like to ask you some questions necessary to process the results of our study. This information request has been structured in such a way that the respondent cannot be identified in any way.

- Gender
 - Male
 - Female
 - Other
 - Prefer not to answer
- Birth cohort
 - 1930 or earlier
 - 1940
 - 1950
 - 1960
 - 1970
 - 1980
 - 1990
 - 2000 or later
 - Prefer not to answer
- Education
 - Elementary School

- Middle School
 - High School
 - Graduate
 - Post-graduate
 - Prefer not to answer
- Birth region
 - List of all Italian regions and “abroad”
 - Prefer not to answer
 - Residence region
 - List of all Italian regions and “abroad”
 - Prefer not to answer
 - Investment horizon
 - Short (Less than 1 year)
 - Medium (between 1 and 5 years)
 - Long (over 5 years)
 - Prefer not to answer
 - Are engaged in any volunteering?
 - Yes
 - No
 - Prefer not to answer
 - How concerned are you about the climate crisis?
 - Not at all
 - Little
 - Quite a lot
 - A lot
 - Prefer not to answer
 - How concerned are you about pollution?
 - Not at all
 - Little
 - Quite a lot
 - A lot
 - Prefer not to answer

Appendix B – Description of variables

Variable	Description
Rome	Binary variable taking value 1 if the respondent is interviewed in Rome, 0 otherwise
Knowledge	Binary variable assuming value 1 if answer to Q1 is "Yes", 0 if answer to Q1 is "No"
Factor of Interest	Categorical variable indicating which direction, if any, would the investor care the most in ESG products (based on answers to Q2), i.e.: 1 = for Factor E; 2 = for Factor S; 3 = for Factor G; 4 = for the mix of the three above, i.e., ESG Factors; 5 = not interested in ESG financial products
Ideal allocation	Ordinal variable indicating the ideal amount of ESG in financial portfolio, and taking the following values (based on answers to Q3): 1 = 0% 2 = less than 25% 3 = between 25% and 50% 4 = between 50% and 75% 5 = more than 75%
Selection	Categorical variable indicating the preferred type of ESG investment, and assuming the following values (based on answers to Q4): 1= direct investments (assets personally selected by the investor) 2 = indirect investments (assets selected by a fund)
WTP	Variable representing the respondent's willingness to pay i.e., the highest return he/she is willing to sacrifice for sustainability. Specifically, $WTP = \max(w_s)$ where $w_s = \max(\text{return of non-ESG asset} - \text{return of ESG asset}; 0)$, where $s = 1, 2, 3, 4$ are the four scenarios in Q5. WTP thus takes values 0%, 1% or 2%.
Male	Binary variable taking value 1 if the respondent is Male, 0 otherwise
Birth cohort	Ordinal variable indicating the birth cohort, and taking the following values: 1 = birth year up to 1949; 2 = birth year between 1950 and 1959; 3 = birth year between 1960 and 1969; 4 = birth year between 1970 and 1979; 5 = birth year equal or after 1980
Birth Area	Categorical variable taking the following values: 1 = North 2 = Centre 3 = South and Islands 4 = Abroad

	"North", "Centre", "South and Islands" correspond to the regional divisions defined by the Italian National Institute of Statistics (ISTAT)
Education	Ordinal variable representing the respondent's highest education level achieved, and taking the following values: 1 = Primary school; 2 = Middle school; 3 = High school; 4 = Graduate; 5 = Post-graduate
Investment horizon	Ordinal variable representing the respondent's preferred investment horizon, and taking values: 1 = less than 1 year 2 = between 1 and 5 years 3 = 5 years or longer
Climate	Binary variable taking value 1 if the respondent declared to be "Quite a lot" or "A lot" concerned about the climate crisis, and 0 otherwise
Pollution	Binary variable taking value 1 if the respondent declared to be "Quite a lot" or "A lot" concerned about pollution, and 0 otherwise
Volunteering	Binary variable assuming value 1 if the respondent is engaged in volunteering and 0 otherwise
Treatment	Categorical variable representing the customer assignment group upon survey participation acceptance, and taking values: 1 = "Positive Visual" 2 = "Negative Visual" 3 = "Control"
Incoherent	Binary variable assuming value 1 if the respondent makes incoherent choices in Q5, 0 otherwise. We consider as incoherent the following choices: - Respondent declares a 2% WTP in Scenario 3, but does not accept a 1% WTP in Scenario 2 - respondent has a non-zero WTP in Scenarios 2 and 3, but eventually selects the non-ESG asset despite its lower return in Scenario 4 - respondent selects 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 a higher return
ESG Averse	Binary variable assuming value 1 if in Q5 the respondent selects the non-ESG asset both when it has the same return and when it has a lower return than the ESG asset (Scenarios 1 and 4, respectively), 0 otherwise

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