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# Why Do Retail Investors Pick Green Investments? A Lab-in-the-Field Experiment with Crowdfunders<sup>☆☆☆</sup>

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## ABSTRACT

Do investors invest in green projects because they expect higher returns, to help the environment, or to help other people? To separate these motivations, we run a decision experiment in which crowdfunders choose between a higher return or a positive environmental impact, and between a higher return or a positive social impact. A majority of investors choose environmental and social impact over higher returns, conditional on large enough impact. Combining the experimental data with historical investments, we find that investors allocate a larger share of funds to green projects if they value environmental impact more and if they expect a higher return, but not if they value social impact more, all else equal. These findings suggest that investors have a preference for positive environmental impact, and satisfy it by investing in green projects. Finally, we introduce new survey measures of impact for future use, which are experimentally validated and predict field behavior.

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## 1. Introduction

Addressing climate change and reducing greenhouse gas emissions will require substantial changes in the global economy, especially in the energy and transportation sectors (e.g., [Unger et al., 2010](#)). These changes will require considerable investments in R&D for new technologies, such as renewable energy or low-emission transportation, and in infrastructure

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to replace or phase out existing high-emission technologies. The capital market plays a central role in the financing of these new technologies, products, and services. If the financing is inefficient, or financing constraints prevent better technologies from being developed and socially desirable projects from being implemented, then the goal of reducing greenhouse gas emissions and limiting climate change might not be attainable. Indeed, the conditions in capital markets directly determine how costly addressing climate change will be. For individual firms and industries, these challenges determine future capital costs.

For these reasons, it is important to understand how investors evaluate investments in “green” projects that have a positive environmental impact, compared to conventional projects with worse environmental impact. On the one hand, investments in new green technologies may be more risky or less profitable, as many new technologies and products fail. Risk-averse investors might thus be hesitant to invest in such projects. On the other hand, investors might have a preference for doing something positive for the environment, effectively increasing their utility from investing in a green project, while also expecting a return on investment. Such preferences might make green projects more attractive than conventional projects, all other factors (e.g., expected returns, risk, and liquidity) being equal.

In this paper, we study German-speaking investors from a group of crowdfunding platforms offering both green investment projects and conventional investment projects. This allows us to investigate why investors choose green projects over conventional projects. The main question is whether investors invest because they believe green projects are more profitable in expectation, whether they invest because they have a preference to achieve a positive environmental impact, whether they have a preference to achieve a positive social impact, or a combination of these.

Testing the hypothesis that investors value environmental impact is difficult, because measuring the true preferences for impact is not straightforward. One approach is to ask investors directly whether it is important to them to achieve a positive environmental impact. However, given that questions of environmental policies and climate change have been met with increasing polarization in recent years (e.g., Farrell, 2016; Chinn et al., 2020), there is a concern that answers to such survey questions would be biased. In particular, social desirability bias might favor answers that let the investor appear as caring about the environment and wanting to achieve positive environmental impact, even if they do not have such preferences.

We address this potential problem with self-reporting by conducting an online lab-in-the-field decision experiment. This experiment allows us to use an incentivized preference elicitation method from the lab, but with investors from the field, to find out how much they truly value environmental and social impact when making investment decisions. Our method—a menu-based Becker-DeGroot-Marschak (BDM) mechanism (Becker et al., 1964)—achieves this by introducing an explicit trade-off. In the decision experiment, investors can either receive a higher expected investment return by choosing a voucher to be used for *non-green* investment projects, or else they can give this money to an environmental or social cause, thus achieving environmental or social impact, but getting no higher investment return. Consequently, investors cannot merely claim to care about environmental and social impact without consequence; they must give up a higher investment return to do so, adding credibility to our lab measures of the importance of environmental and social impact. The voucher can later be used by the investors on a real estate project of their choice, but not on green projects, which ensures a clean trade-off between higher investment return and environmental impact.

We asked all investors to indicate their willingness to donate to each of two organizations to capture environmental impact, and a third organization to capture social impact. The first is a carbon offsetting firm that uses donations to reduce greenhouse gas emissions, for example by substituting fossil fuel energy sources with renewable energy sources. Second is Greenpeace, the best known and most-donated-to environmental organization in the country of study. A donation to either of these two organizations implies environmental impact. By using donations to both organizations, our measure of environmental impact is broader than mere carbon offsetting, which some environmental activists reject (e.g., Greenpeace, 2020; Guardian, 2021), and so classifications based on carbon offsetting alone might be misleading. Third is the Red Cross, a donation to which implies social but not environmental impact, through providing care to the elderly and sheltering the homeless, among many other initiatives.

Our BDM procedure allows us to determine—for each investor and each organization—the donation amount for which the investor prefers the donation to the specific organization over an investment voucher for themselves.<sup>1</sup> Hence, the BDM procedure produces a fine measure of the importance of environmental impact and social impact. Investors who choose the voucher for themselves, no matter how large the donation amount to the green organizations, reveal themselves as not attaching much importance to environmental impact. Investors who forgo the investment voucher for a smaller donation amount to a green organization, on the other hand, attach a larger importance to environmental impact. Similarly, the importance of social impact is measured with the willingness to give up the voucher for donations to the social organization.

About 21% of investors chose the voucher independent of the donation amount to the environmental organizations, and hence reveal they do not value environmental impact. At the other extreme, about 14% of investors are willing to give up the voucher for any donation amount, and hence reveal a very strong preference for environmental impact. The remaining 65% are willing to give up the voucher only for a sufficiently large donation, with a large variation in the indifference point. These numbers suggest that a large portion of investors might be willing to accept slightly lower investment returns from green projects if the environmental impact is sufficiently large. Moreover, investors on average value environmental

<sup>1</sup> The experiment can therefore be viewed as having a within-subjects design, where each of the three organizations is a treatment.

impact slightly more than social impact, demonstrating greater willingness to give up the voucher for a donation with environmental impact than for social impact.

We next investigate to what degree green investments in the field are driven by a preference for environmental or social impact. A field observation of an investment in a green project is not enough to conclude that its environmental impact is a motivating factor, or that investors have preferences for such impact. For example, the investor might not value the environmental impact of a green project, but believe the project is more profitable than the alternative non-green projects. Such a field observation also does not help us distinguish the environmental versus social motives of investors, whereas our experimental data does. Distinguishing environmental and social motives tells us whether investors choose green projects because they value helping the environment *per se*, or rather because they value helping the environment since it ultimately helps other people. Hence, we distinguish whether green investments are due to some form of social preferences, where the investor gains utility if the investment benefits others, or whether there is also a separate environmental preference that can explain green investments.

In order to distinguish all of these motives, we combine our incentivized measures of the importance of environmental and social impact with beliefs about the profitability of green projects and with the investment history of the investor. Ours is the first study to combine individual return expectations, social motives and environmental motives to jointly explain field investment behavior.

Our main finding is that investors invest more in green projects if they believe green projects to be more profitable and if they attach more importance to environmental impact, but not if they attach more importance to social impact, holding all else constant. Consequently, investors who are more willing to give up higher investment returns via the voucher for environmental impact are also those who invest more in green projects. These findings are consistent with investors having a preference for environmental impact, which is satisfied by investing in green projects, and not only with investing because they expect better returns from green projects.

The statistical insignificance of the importance of social impact implies that investors behave as if green projects do not have a positive social impact beyond their positive environmental impact. In other words, our investors value social impact, but this is not the major driver of investments in green projects. And because the importance of environmental and social impact are positively correlated, one might erroneously find the social motive to be a significant predictor when not controlling for the environmental motive due to omitted variable bias. It is therefore important to elicit both of these motives if researchers want to understand investor motives, since the high correlation makes it easy to confuse one with the other.

Additional survey evidence confirms the findings from the experimental and field data. Out of 11 options, investors view a high interest rate and environmental impact as the two most important characteristics of a potential investment project when they decide whether to invest or not. Social impact ranks lower. An interesting new finding from the survey is that investors use crowdfunding, rather than stocks, bonds, funds, or other investment alternatives, because it allows them to pick the specific project that will receive the money, which is not possible with mutual funds or even stocks of large firms. Hence, these investors appear to value the control they have over what their money is actually used for.

On a methodological level, our incentive-compatible lab measures of the importance of environmental and social impact prove to be useful for explaining field behavior, and can therefore be used in the future to categorize investors. The present study also introduces two new non-incentivized survey questions on the importance of environmental impact, and one on the importance of social impact. We show that these new survey measures are experimentally valid, i.e., significantly correlated with our incentivized lab measures, which justifies future use. In fact, one of our two survey measures of the importance of environmental impact is a stronger predictor of field behavior—the share of funds invested in green projects—than the incentivized lab measure. The strong correlation between field behavior and survey measures can be taken as evidence that social desirability bias—for the survey questions we used—is not a major problem when measuring the importance of environmental impact.<sup>2</sup>

The platforms we study are part of the Austrian ROCKETS Group, which consists of multiple crowdfunding platforms with various specializations. The platform GREEN ROCKET has exclusively green investment projects, with an environmental or sustainability focus, such as renewable energy projects or funding of electric bikes. HOME ROCKET has exclusively real estate projects, and LION ROCKET funds small firms. The investors are mostly from Austria, Germany, and Switzerland. Crowdfunding has been growing rapidly over the last few years (55% annually in Germany from 2010 to 2020 (Dorfleitner and Hornuf, 2023), 40% annually in the UK from 2014 to 2017 (Zhang et al., 2018)), so this is a study of a dynamic and relatively new form of investment. Moreover, sustainable and green investing is a large growth area as well (e.g., Global Sustainable Investment Alliance (2021)).

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<sup>2</sup> A fair question is why we need the incentivized experiment if the survey questions are equally valid. In general, incentivization is seen as the main way in experimental economics to reduce the effects of small biases (such as the social desirability bias one might expect in the environmental context) and low effort. Hence incentivized choice data tends to be of higher quality than unincentivized survey data (e.g., Camerer and Hogarth (1999)). Thus, without the incentivized experiment, we would not be able to know that the survey responses are valid; the incentivized responses serve as a necessary benchmark. Indeed, one contribution of this paper is to experimentally validate the survey questions, and this requires both the experiment and the survey questions. Second, one could argue that social desirability bias is not an issue in the context of an online survey, compared to an in-person survey. While this position sounds plausible, our design allows us to empirically test this by comparing the incentivized and survey responses. Hence, our design allows us to let the data speak for itself.

Projects that seek funding on the platforms typically offer a debt contract to investors (Hornuf et al., 2022), which specifies the duration and interest rate of the project loan. On rare occasions, an additional profit-sharing component is included in the contract, so that more money is paid out if the firm/project exceeds a certain threshold by a predefined date. If investors collectively invest enough and reach the project funding goal by the end of the funding period, the funds are transferred to the project, so the crowd of investors effectively extends a loan with the crowdfunding platform as intermediary. If not enough money is invested by the end of the campaign, then the funds are returned to the investors. The typical duration of the crowdfunded loan is between 2 and 6 years. The project team provides details about the project on the platform website, including the project description, previous funding experience, business plan, and sometimes the possibility to directly contact the project initiator.

Our work is related to the literature on green investing and non-standard preferences. Theoretical studies have derived the equilibrium effects of non-standard preferences for green or ESG investments (Luo and Balvers, 2017; Zerbib, 2020; Pedersen et al., 2021), which has consequences for individual portfolios and might translate into lower funding costs for green firms. The results of empirical research that analyzes whether ESG portfolios underperform or outperform the market are mixed (Gompers et al., 2003; Renneboog et al., 2008; Hong and Kacperczyk, 2009; Edmans, 2011; Friede et al., 2015; Bolton and Kacperczyk, 2021). Our work also relates to the crowdfunding literature. Since the first publications on investment motives in crowdfunding appeared, scholars studying equity crowdfunding (e.g., Ahlers et al. (2015); Vismara (2016); Cumming et al. (2017); Vismara (2018)) and crowdlending (e.g., Lin et al. (2013); Dorfleitner et al. (2016); Lin and Viswanathan (2016); Mohammadi and Shafi (2017)) have mainly engaged in correlational research. Notable exceptions are the field experiments by Bapna and Ganco (2021) and Penz et al. (2022).

We take an experimental approach that allows us to control for individual characteristics of investors and elicit additional data on these investors that is not available when using only market-level data such as prices and yields. For example, Barber et al. (2021) find that investors in impact funds accept about 3 percentage points lower rates of return than investors in traditional venture capital funds. While this finding is similar to ours, they have to estimate return expectations, whereas our experimental approach allows us to elicit individual return expectations directly from the investor. This can be important if, for example, investors have overly optimistic return expectations for green investments and hence deviate from the econometric model for the expectations at the time.

We provide three main contributions. First, we distinguish the “E” and “S” motive in ESG for individual investment decisions in green projects. Previous studies elicit social preferences in decision experiments to predict investment behavior (Riedl and Smeets, 2017; Bauer et al., 2021).<sup>3</sup> Since social and environmental preferences have a positive correlation, using only one of these in regressions might lead to erroneous conclusions, as one might absorb the effect of the other. Importantly, we distinguish the investor valuation for carbon offsetting from broader environmental benefits. Some of the staunchest environmentalists reject carbon offsetting (e.g., Greenpeace, 2020; Guardian, 2021), but our environmental measure goes beyond carbon offsetting.

Our study design differs markedly from earlier studies. While we explain field investments in real projects where investors use their own money, which is arguably the most natural setting, other studies use more stylized lab investments or a vote on investment strategy with a small chance to change the outcome. Our setting thus reduces concerns of house-money effects or low stakes, providing strong external validity. Moreover, the timing in our study serves to minimize experimenter demand effects, as field investments have been made before investors are aware of and participate in the experiment.

A donation literature pioneered by Andreoni (1989, 1990) investigates why people give to charities. On the one hand, they might be altruistic and give because it helps others, or they might give because it makes them feel good—they get a “warm glow.” The empirical literature finds evidence for both types of motivations. Crumpler and Grossman (2008) find a slight majority of donors have warm glow preferences, whereas Karlan and Wood (2017) classify large donors as altruistic and small donors as having warm glow preferences. Metzger and Günther (2019) find that donors give more if it leads to more impact, all else equal, which is inconsistent with pure warm glow preferences. This donation literature looks at people who are donors and asks why they donate, whereas we want to understand how much investors care about social and environmental causes. Hence, the important outcome for this study is whether and to what degree investors are willing to donate to each of the causes, but like Brodback et al. (2021), we do not further distinguish the motivation to donate to a given cause.

Second, we introduce new experimental and survey measures of the importance of positive environmental and social impact, and elicit them from the same investors. Consequently, we can validate the survey measures based on the incentivized experimental measures. Because our survey measures are experimentally valid and good predictors of field behavior, they will be of great use for future investigations of investor motives, which are cheaper, easier, and faster to elicit than the incentivized experimental measures. We thus contribute to a related literature on how to elicit specific preferences via survey measures. Prior research has focused on risk and time preferences (Dohmen et al., 2011; Falk et al., 2016), various social preferences (Falk et al., 2018), and preferences for competition (Buser et al., 2021), whereas we add social and environmental motives particularly suited for an investment context.

<sup>3</sup> In a framing rather than decision experiment, Døskeland and Pedersen (2015) find that a wealth framing is more important than a moral framing for investment decisions.

Third, we contribute to the recent crowdfunding literature (Bapna and Ganco, 2021; Cumming and Hornuf, 2022; Cumming and Reardon, 2022; Hornuf and Siemroth, 2022; Penz et al., 2022) by providing a new solution to the puzzle of why retail investors use crowdfunding in the first place: It allows them to pick the specific project that will be realized, which is not possible with funds or stocks of large companies where such micromanagement is delegated. Crowdfunding is a relatively new financial innovation, yet conventional investment classes arguably provide better returns (stocks), lower risk (government bonds) and higher liquidity (bank deposits). Our study shows that the investor desire to select specific projects is not satisfied by any of those and hence might explain part of the growth rates in crowdfunding. This preference for project picking is a novel result and a novel explanation why crowdfunding is popular. The closest related research we are aware of is by Cumming et al. (2021), who study the choice by management teams between financing via crowdfunding or through traditional IPOs. They also study which aspects of a crowdfunding project attract more investors, and find that investors prefer younger top management teams, teams with ethnic-minority members, and projects originating in non-metropolitan areas.

The paper is structured as follows. Section 2 explains the experimental design and the elicited responses. Section 3 describes the data and section 4 presents the results. Finally, section A in the appendix gives a formal example of preferences for impact and how our experimental measures capture them. The appendix lists the experimental instructions.

## 2. Experimental design

### 2.1. Experimental task

The main objective of the experiment was to obtain robust and incentivized measures of how important social and environmental impacts are to the investor. While such information might be easier to obtain via survey questions, the potential presence of social desirability bias or other biases makes actual choices with material consequences, rather than stated preferences, more credible.<sup>4</sup>

In this experiment, we use a customized version of the BDM mechanism to elicit the importance of social and environmental impact to investors. The BDM mechanism is customized to present the method to investors in a menu-based format, that is, as a series of binary decisions (e.g., Holt and Smith, 2016; Healy, 2018), making it easier to understand than the classical BDM. In particular, it minimizes the risk of some subjects misunderstanding BDM as a first- rather than second-price auction (e.g., Bull et al., 2019). BDM is incentive-compatible, independent of the degree of risk aversion of the investor, which makes it one of the most robust elicitation techniques. It has also been shown to be the best in horse races against other techniques (e.g., Holt and Smith, 2016).

The experimental task works as follows. Investors choose between a 25 Euro voucher, which they can use to invest in a non-green real estate project, and a donation. Choosing the 25 Euro voucher effectively increases the expected investment return for the investor, but rules out that there is an environmental impact from the voucher.<sup>5</sup> If investors choose the donation, we (the researchers) promised to donate an amount  $x$  to one of three organizations to create either a social or an environmental impact.<sup>6</sup> In essence, investors can choose between a higher investment return or social/environmental impact via the donation. The choice, therefore, reveals how important social/environmental impact is to the investor. This choice is not just a stated preference: Choosing an environmental impact donation means forgoing a higher return by using the voucher.<sup>7</sup>

The BDM procedure requires the investor to choose the willingness to accept (WTA) the donation in Euros at and above which they would prefer the donation to the 25 Euro voucher. To make this choice incentive-compatible, the computer draws a random number  $x \in [1, 50]$  after the choice by the investor, and the donation in the amount of  $x$  is made if and only if  $x \geq \text{WTA}$ , i.e., if and only if the randomly chosen donation amount weakly exceeds the indifference threshold WTA by the investor.<sup>8</sup>

<sup>4</sup> That is, it is desirable to be seen as caring about the environment, even if one does not. Hence, surveys might introduce biases towards answering that the environment is important or that the respondent is environmentally responsible.

<sup>5</sup> If we had allowed the voucher to be used for green projects, then the choice of either a voucher or donation would not unambiguously have more environmental impact than the other. After all, investment in a green project can potentially yield environmental impact, whereas investment in a non-green project cannot. Hence, it was crucial not to give out cash as payment, but rather a voucher that allowed us to control what the money could be invested in or spent on.

<sup>6</sup> It was important for us rather than the investors to make the donation, so that we could be sure that the money was in fact donated and not used for a different purpose. This has the side benefit of reducing hassle for investors.

<sup>7</sup> One might argue that an investor could choose the voucher, invest the money, and then donate the returns, thus achieving environmental or social impact. However, this is implausible for three reasons. First, investment returns in crowdfunding are around 7–8%, whereas the experiment allowed the donation to be up to 200% of the voucher value. Second, investments take 1 to 3 years to be fully repaid, whereas the donations were made within weeks. Third, the investment can default.

<sup>8</sup> To see why this procedure is incentive-compatible, suppose you prefer a donation of at least 40 Euros to the 25 Euro voucher, hence  $\text{WTA} = 40$ . By choosing 40 in the experiment, you will always get the voucher if the randomly chosen donation amount is below 40—just like you prefer—and always get the donation if it is at least 40—also just like you prefer. You cannot do better by choosing a lower amount in the experiment: Suppose you choose 35 and the computer randomly draws  $x = 37$ . This results in a donation of 37 Euros, even though you preferred the voucher over a 37 Euro donation. You also cannot do better by choosing a higher amount, say 45. If the computer draws  $x = 44$ , then you get the voucher even though you would have preferred the donation of 44 Euros to go to the organization.



All integers in the interval  $x \in [1, 50]$  are chosen with a positive and equal probability by the computer. If an investor never wants to donate and always wants the voucher, they only have to choose  $WTA > 50$ . If they always want the donation, they only have to choose  $WTA = 1$ . The BDM procedure was explained in detail to the investors in the experiment. If chosen, the voucher code was given to investors immediately after finishing the experiment, and also sent to them later via email. Alternatively, we made the donations on behalf of the investors to the three organizations, and sent proof of the donations a week after closing the experiment, as explained in the experimental instructions.

Since the vast majority of investors are from Austria, we used Austrian statistics on charitable giving to select the following three organizations, which are well known and best represent environmental or social causes. First, we wanted a carbon offset organization that would use the donation to replace coal energy or plant trees in order to reduce greenhouse gas emissions. We selected [carbonfootprint.com](https://www.carbonfootprint.com), which is one of the most efficient carbon offset organizations, according to [Guardian \(2019\)](#). Second, because not everybody agrees that carbon offset is the best way to help the environment, we chose Greenpeace as a well-known environmental organization whose activities go beyond reducing greenhouse gas emissions. Greenpeace is the organization with the 7th most donations in Austria, and the environmental organization with the most donations ([Public Opinion, 2019](#)). These two organizations capture “environmental impact”: A donation to them either reduces greenhouse gas emissions or promotes environmental activism. For the third organization we chose the Austrian chapter of the Red Cross, which represents social impact. The Red Cross is active in areas such as care for the elderly and the homeless, as well as other social causes. It is the organization with the most donations in Austria ([Public Opinion, 2019](#)). In short, there are no other organizations in the country that are similarly well-known and accepted and have similar environmental or social impact.

In the experiment, we asked investors to state a WTA for each of the three organizations. The computer then randomly chose one of the three organizations  $o \in \{\text{CarbonOffset, Greenpeace, RedCross}\}$ , then randomly drew the donation amount  $x \in [0, 50]$  and then selected the donation to organization  $o$  if  $WTA(o) \geq x$ , and otherwise the investor would receive the voucher after the experiment. Thus, we received an incentive-compatible WTA for each of the three organizations, but at most made a donation to the one that was selected by the computer. WTA is censored above at 51 Euros, so we do not distinguish very large WTAs.<sup>9</sup> A lower WTA indicates a higher importance of environmental or social impact, because the investor is willing to make the donation and forgo the voucher for themselves for a lower donation.<sup>10</sup> See section A in the appendix for a formal example illustrating this and how preferences for impact are reflected in the WTA we elicit.

Further survey questions asked about the investor’s situation such as income and their attitudes towards crowdfunding (see [section 3](#) for the respective variables). The order of the experimental block and the survey block was randomized to account for order effects. Overall, the survey and experiment together took investors about 15 minutes to complete, which makes the payment per hour—in case the voucher was chosen—relatively high compared to standard lab experiments.

## 2.2. Implementation

Both the survey and experimental part were implemented in the online survey software Qualtrics. The crowdfunding platform sent email invitations for our Qualtrics experiment in two waves to a total of 4,771 investors, on April 26 and April 29, 2021. The platform had conducted online surveys of their own before, so our study was not unusual for these investors.

We selected only registered investors that had invested before to receive the invitation, because responses from registered but inactive investors are not as insightful. Moreover, inactive investors have no investment history, which we need for the analysis. Both investors that first registered on the green platform (which only features green investment projects) and those who first registered on the real estate platform (which only features investments in real estate) were invited to take part in the experiment, so that we would obtain a mix of investors. We pre-registered the design and the statistical analysis before starting data collection in order to commit ourselves to the analyses to be run and to rule out data mining.<sup>11</sup>

Of the 399 participants, 258 (65%) made choices so that they received the voucher, for the remaining investors we donated on behalf of them to each of the three organizations.<sup>12</sup>

## 3. Data

In the experimental sample we investigate, 399 users finished both the survey and the experimental part, which is close to the 400 users we planned to get according to our pre-registration. Hence, the targeted response rate of 8.4% was reached.<sup>13</sup>

<sup>9</sup> Making larger values of WTA incentive-compatible would have required us to donate more than 50 Euros per investor with positive probability, but these larger amounts would have been problematic in light of the university’s regulations on subject payments.

<sup>10</sup> Note that a lower WTA *does not* imply a lower donation. Instead, it means a donation is made more often; i.e., for smaller random draws  $x$ , but does not actually change the donation amount, which is determined by the computer.

<sup>11</sup> The pre-registration can be found at <https://www.socialscisearch.org/trials/7597>.

<sup>12</sup> In all, we donated 1,515 Euros for carbon offsetting, 1,136 Euros to Greenpeace, and 1,574 Euros to the Red Cross. The proof of donation was sent to all participants within two weeks of finishing the experiment by email, as promised in the experiment.

<sup>13</sup> We closed the experiment at 399 responses, because that is the number we committed to in the pre-registration. We could have gathered more responses by leaving the experiment open for longer, but that would have defeated the purpose of the pre-registration. Hence, the response rate is not low, but precisely what we aimed for.

We are able to test for non-response bias based on all three variables we received for the entire sample of invitees from the platform: age, gender, and whether the investor first signed up on the GREEN ROCKET platform. A two-sample t-test between participants and non-participants shows no significant difference in the mean age of respondents ( $t = 1.3594$ ,  $df = 4764$ ,  $p = 0.1741$ ).<sup>14</sup> Moreover, a t-test shows no significant difference in gender representation ( $t = -1.6339$ ,  $df = 4769$ ,  $p = 0.1023$ ), nor in green vs. real estate investors ( $t = -0.5052$ ,  $df = 4769$ ,  $p = 0.6134$ ). A Wilcoxon rank sum test yields the same conclusions. Based on these observables, we have no evidence of non-response bias.

As committed to in our pre-registration, we drop all observations where the respondent answered that they did not understand the experimental BDM procedure well, which we defined as the lowest response on a four-point Likert scale. This is the case for 47 respondents. The subsequent analysis is carried out on the remaining 352 investors.

Table 1 displays the summary statistics. InvestShareGreen is the share of money invested in green projects, relative to all money invested on any of the platforms. The average share in our sample is 44%, but there is a large group of green investors who almost exclusively invest in green projects (slightly above 25%). There is also a large group that never invests in green projects (also slightly above 25%). In this sense, we have a balanced sample of exclusively green and non-green investors.

WTA-CarbonOffset, WTA-Greenpeace and WTA-RedCross are the willingness to accept the donation to the respective organization and forgo the investment voucher from our experiment. The response  $WTA > 50$  is coded as 51. If the computer randomly draws a donation amount above WTA, the investor forgoes the 25 Euro voucher and chooses the donation instead. As our main incentivized measure of how important environmental impact is to the investor, we use

$$WTA-Green = \min \{WTA-CarbonOffset, WTA-Greenpeace\}.$$

Because some investors might be skeptical about the effectiveness of carbon offsetting, or may view Greenpeace as too radical, this combined measure is broader and more meaningful than the individual WTAs. A lower WTA indicates a greater importance of impact because the investor is willing to give up a higher investment return via the voucher for a smaller donation. WTA-RedCross is the willingness to accept a donation to the Red Cross, our main incentivized measure for the importance investors attach to social impact.

ImportanceGreen and ImportanceSocial are the survey responses to how important environmental or social impact is to the investor, on three levels (not important, fairly important, very important), coded as  $\{-1, 0, 1\}$ .<sup>15</sup> IndiffInterestGreen is the survey answer to how many percentage points of additional interest the investor would need to receive in order to invest in a company without positive social or environmental impact, compared to a company that has such impact. A larger number indicates a higher importance of environmental impact.

PreferenceRiskSeeking and PreferenceTimePatient are two survey measures eliciting risk and time preferences. Both measures are experimentally validated, correlating strongly with incentivized experimental outcomes (such as lottery choices). The risk measure is from Dohmen et al. (2011), and the time measure is from Falk et al. (2016).<sup>16</sup>

GreenProfitability is a survey response to the question of whether investors believe that projects on the green platform are less profitable, similarly profitable, or more profitable than projects on other platforms, coded as  $\{-1, 0, 1\}$ . In the instructions (see appendix, page 7), we explicitly point out that respondents should not only take the promised interest rate of the debt contracts into account, but also possible defaults (i.e., non-repayments). Hence, the GreenProfitability variable asks investors to compare the expected return of the green investment projects, taking into account possible defaults, with the expected return of conventional projects. These are subjective expectations, because while the promised interest rates are public and salient information, defaults are not. Moreover, investors likely use different samples of past investment projects to form these expectations, hence their responses differ. These subjective expectations are what we need for our purposes, because these are the ones that are used by the investors to make investments, rather than objective expectations, which would be based on data the investors do not have access to. A negative mean in Table 1 indicates that, if anything, a slight majority of investors believes green projects to be less profitable. BeliefFixClimateChange is a survey response to the question of whether climate change is a serious problem that needs to be solved, with values ranging from 0 (disagree) to 6 (agree).

The remaining variables are dummies. DMale, DFemale represent self-identified gender. DAgeUpToX indicates the age group, with the age between the previous group's upper bound and X. DIncomeUpToX indicates the income group, with an annual income (excluding capital income) between the previous group's upper bound and X. DJobX indicates whether the investor has employment status X. DInvestX indicates whether the investor is invested in alternative investment class X. Multiple answers were possible except for gender and income, where the option "no answer" was available (not displayed in the table), so the dummies need not sum to one on every question. Section B in the appendix discusses which of these demographics explain the importance that an investor attached to environmental impact.

<sup>14</sup> We dropped five observations because the respective age was almost certainly incorrect, i.e., ages considerably below 18 or above 100.

<sup>15</sup> The exact question was: "Which of the following characteristics of a project/firm are important to you when investing via crowdfunding? That is, which characteristics make a project more attractive?" Then several characteristics are listed. For ImportanceGreen: "Positive ecological or environmental impact (e.g., firm improves recycling, product reduces greenhouse gas emissions)." For ImportanceSocial: "Positive social impact (e.g., firm develops affordable prosthetics, product helps students find a flat)." See the online appendix for the entire survey/experiment wording.

<sup>16</sup> The exact questions were: "How do you personally assess yourself: Are you generally a risk-taker or do you try to avoid risk?" and "How do you personally assess yourself: Are you someone who is generally willing to give up something today in order to benefit from it in the future, or are you unwilling to do so?" Both use an 11-point Likert scale.

**Table 1**  
Summary statistics.

	Mean	SD	1st Quartile	3rd Quartile	N
InvestShareGreen (0 to 1)	0.44	0.40	0.00	1.00	352
<b>Experimental outcomes:</b>					
WTA-CarbonOffset (0 to 51)	32.25	18.29	20.00	50.00	352
WTA-Greenpeace (0 to 51)	34.53	18.38	25.00	51.00	352
WTA-RedCross (0 to 51)	32.99	18.36	25.00	51.00	352
WTA-Green (0 to 51)	31.25	18.43	20.00	50.00	352
<b>Survey answers on preferences and beliefs:</b>					
ImportanceGreen (-1 to 1)	0.45	0.66	0.00	1.00	352
ImportanceSocial (-1 to 1)	0.22	0.70	0.00	1.00	352
IndiffInterestGreen (ℝ)	2.67	3.13	1.00	3.00	352
PreferenceRiskSeeking (0 to 10)	6.15	1.83	5.00	7.00	352
PreferenceTimePatient (0 to 10)	7.05	2.03	6.00	8.00	352
GreenProfitability (-1 to 1)	-0.29	0.57	-1.00	0.00	352
BeliefFixClimateChange (0 to 6)	5.46	1.15	5.00	6.00	352
<b>Bins for current age:</b>					
DAgeUpTo25	0.06	0.23	0.00	0.00	352
DAgeUpTo35	0.24	0.43	0.00	0.00	352
DAgeUpTo45	0.23	0.42	0.00	0.00	352
DAgeUpTo55	0.22	0.41	0.00	0.00	352
DAgeUpTo65	0.17	0.38	0.00	0.00	352
DAgeAbove65	0.08	0.27	0.00	0.00	352
<b>Gender:</b>					
DMale	0.76	0.43	1.00	1.00	352
DFemale	0.21	0.41	0.00	0.00	352
<b>Household income before taxes last year (excluding capital):</b>					
DIncomeNoAnswer	0.14	0.35	0.00	0.00	352
DIncomeUpTo10k	0.03	0.18	0.00	0.00	352
DIncomeUpTo20k	0.06	0.24	0.00	0.00	352
DIncomeUpTo30k	0.08	0.28	0.00	0.00	352
DIncomeUpTo40k	0.11	0.31	0.00	0.00	352
DIncomeUpTo50k	0.11	0.31	0.00	0.00	352
DIncomeUpTo60k	0.11	0.31	0.00	0.00	352
DIncomeUpTo80k	0.15	0.36	0.00	0.00	352
DIncomeUpTo100k	0.09	0.28	0.00	0.00	352
DIncomeAbove100k	0.13	0.34	0.00	0.00	352
<b>Current job:</b>					
DJobStudent	0.06	0.23	0.00	0.00	352
DJobPublicSector	0.20	0.40	0.00	0.00	352
DJobPrivateSector	0.48	0.50	0.00	1.00	352
DJobSelfEmployed	0.18	0.39	0.00	0.00	352
DNoJob	0.01	0.08	0.00	0.00	352
DJobRetired	0.10	0.30	0.00	0.00	352
DJobNoAnswer	0.03	0.17	0.00	0.00	352
DJobHousewife	0.01	0.08	0.00	0.00	352
<b>Investments held during past year:</b>					
DInvestBonds	0.27	0.44	0.00	1.00	352
DInvestStocks	0.77	0.42	1.00	1.00	352
DInvestDeposit	0.47	0.50	0.00	1.00	352
DInvestActiveFund	0.51	0.50	0.00	1.00	352
DInvestPassiveFund	0.54	0.50	0.00	1.00	352
DInvestCrypto	0.23	0.42	0.00	0.00	352
DInvestCommodities	0.31	0.46	0.00	1.00	352
DInvestRealEstate	0.38	0.48	0.00	1.00	352
DInvestDerivatives	0.11	0.31	0.00	0.00	352
DInvestNothing	0.05	0.21	0.00	0.00	352

Overall, our investors tend to be young to middle-aged (25–55), male (76%), with a relatively even income distribution, and mostly employed in the private sector (48%). Most investors hold stocks (77%) besides crowd investments, and about half hold active or passive funds. Relatively new investment classes such as cryptocurrencies are surprisingly common with 23%.<sup>17</sup> Moreover, since these investors self-selected onto a group of platforms that offers green projects, they might be more environmentally friendly than the average citizen. Consequently, investors in our sample appear to be more progressive retail investors.

<sup>17</sup> For comparison, among customers of a retail bank in a neighboring country, Lammer et al. (2019) found only 1% to trade with cryptocurrencies. However, this number is two years older than ours, and might have changed since.



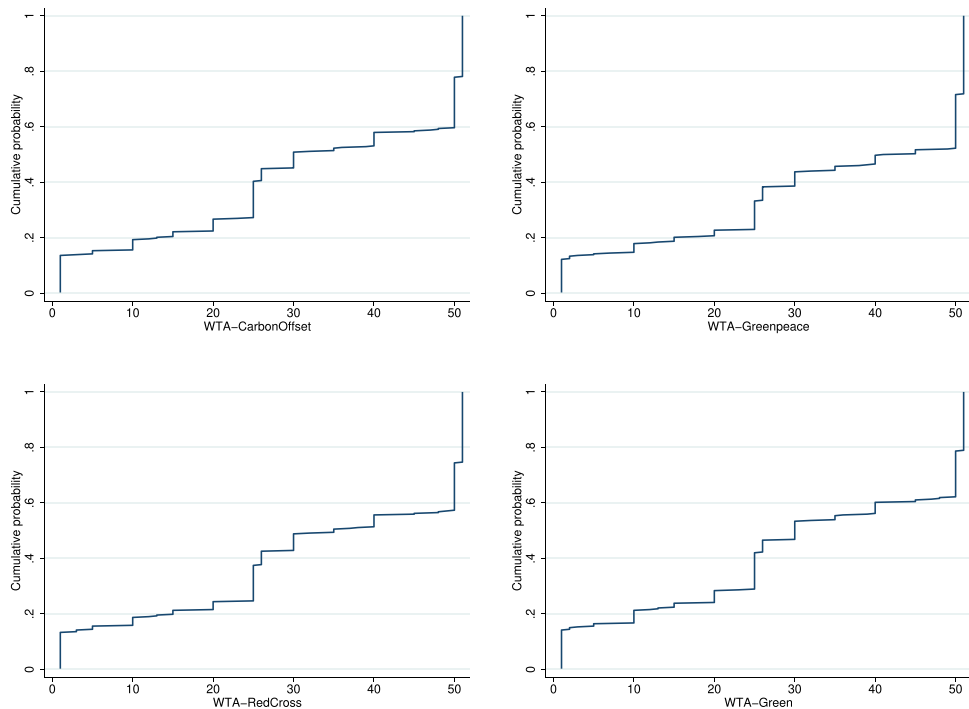


Fig. 1. Cumulative distribution functions of WTAs

## 4. Results

### 4.1. Are investors willing to give up money for positive impact?

In the field, one might be tempted to infer from an investment in a green project that the investor has a preference for achieving environmental impact. Yet this inference is not completely compelling, since there are alternative explanations. For example, even investors who have no preference for environmental impact whatsoever might still invest in a green project due to a belief that the investment is more profitable, less risky, or more liquid than other non-green projects.

Our experiment avoids these issues by giving investors a simple choice: Take a voucher that effectively increases the investment return, or instead donate the money to an environmental or social cause that does not increase the investment return. A lower WTA, which indicates that an investor is willing to give up the voucher for a lower donation, is evidence that the investor values impact more (see section 2).

The distributions of all WTAs are plotted in Figure 1. A significant share of investors (between 21% and 29%) choose the voucher, and not to donate, independent of the donation amount or independent of impact, which is achieved by setting  $WTA = 51$ . This share does not differ much by environmental vs. social impact. These investors do not value impact, or at least value it so little that it is not measured in our experiment. Their choices suggest that these investors are unlikely to invest in green projects, unless they are superior on other dimensions such as return or risk.

At the other extreme, a share of 12% to 14% of investors forgo the voucher for any donation amount by setting  $WTA = 1$ . The revealed preference of these investors shows they value impact very much, because they are willing to give up a voucher for even very small donation amounts. Their choices suggest these investors might be willing to invest in green projects even if these are viewed as less profitable or more risky, as long as there is a positive environmental impact.

The remaining group of about 60% of investors are willing to give up the higher investment return only for a sufficiently large donation amount or impact, i.e.,  $1 < WTA < 51$ . Interestingly, Figure 1 shows there is a bunching of WTAs around 25 Euros, the amount of the voucher. These investors have a 1:1 exchange rate between money for their own investment and money for the good cause.

Among the three organizations to donate to, Greenpeace is the least favorite, with the largest average WTA. A paired t-test between WTA-CarbonOffset and WTA-Greenpeace shows carbon offsetting is valued significantly more by investors ( $t = -4.1761$ ,  $df = 351$ ,  $p < 0.0001$ ). Comparing WTA-Green and WTA-RedCross as the two measures of environmental and social impact, environmental impact is valued significantly more ( $t = -2.7251$ ,  $df = 351$ ,  $p = 0.0068$ ).

**Result 1.** About 25% of investors never give up higher returns for impact, 13% give up a higher return for any kind of impact, and 60% of investors give up a higher return for a sufficiently large impact. On average, investors value environmental impact more than social impact.

**Table 2**  
Impact vs return expectations in green projects.

Dependent variable	(1) OLS InvestShareGreen	(2) OLS <sup>†</sup> InvestShareGreen	(3) OLS InvestShareGreen	(4) OLS InvestShareGreen	(5) OLS <sup>†</sup> InvestShareGreen
WTA-Green	-0.008*** (0.001)	-0.002** (0.001)	-0.008*** (0.001)		-0.008*** (0.002)
GreenProfitability	0.206*** (0.031)	0.066** (0.033)	0.208*** (0.034)	0.207*** (0.031)	0.205*** (0.031)
$\mathbf{1}\{WTA-Green \leq 50\} \times WTA-Green$				-0.007*** (0.001)	
$\mathbf{1}\{WTA-Green > 50\}$				-0.435*** (0.052)	
WTA-RedCross					-0.000 (0.002)
BeliefFixClimateChange			0.038** (0.017)		
Constant	0.741*** (0.037)	0.217*** (0.047)	0.487* (0.256)	0.726*** (0.039)	0.745*** (0.039)
Crowdfunder Controls	No	No	Yes	No	No
Only Non-Green Investors	No	Yes	No	No	No
R <sup>2</sup>	0.25	0.08	0.36	0.26	0.25
Observations	352	157	352	352	352

Note: InvestShareGreen is the share of investments on the subplatform with green projects relative to all investments. WTA-Green is the incentivized measure of how important environmental impact is to the crowdfunder, with smaller values indicating more importance. GreenProfitability $\in \{-1, 0, 1\}$  is the belief that green projects have historically been less, similarly, or more profitable than other projects. Standard errors are shown in brackets below the point estimates, and are heteroskedasticity robust. <sup>†</sup> indicates that this regression was not pre-registered in our pre-analysis plan (absence indicates that it was). \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

Hence, we have strong evidence to suggest that a significant portion of retail investors would be willing to accept a lower return as long as there is a sufficiently large environmental impact, and to a lesser degree, a positive social impact.

We can further classify investors according to whether they are willing to give up the higher investment return for some donation amount or not, for both the green and the social cause, leading to four possible types. The “Green and Social” type is willing to donate to either cause for a sufficiently large donation, and accounts for 68% in our sample. The “Neither Green Nor Social” type does not donate for any amount, and accounts for 22% of investors. Finally, 6% belong to the “Not Green But Social” type, and 3% belong to the “Green But Not Social” type. Thus, the share of investors that deem one cause but not the other important is very small, whereas the shares that either deem both important or both unimportant are very large.

#### 4.2. Why do investors invest in green projects?

In the survey, we asked investors whether, in their view, projects on the green crowdfunding platform had been more profitable, similarly profitable, or less profitable than projects on other platforms (variable GreenProfitability). We combine these return expectations with our incentivized measure of the importance of green impact, WTA-Green, where a lower value indicates a larger importance of green impact. We now investigate whether one, both, or none of these motivations explain the historical investments of investors in green projects, relative to all other investments in non-green projects. All regressions were pre-registered in our pre-analysis plan, unless indicated by <sup>†</sup> in the table.

Table 2 reports the OLS regression estimates explaining the motivations of investors to invest in green projects. The main result is that both the importance of environmental impact (WTA-Green) and the belief about the relative profitability of green projects (GreenProfitability) are strong explanatory variables for the investment share in green projects.

In all regressions, the coefficients for both variables are significantly different from zero at conventional confidence levels, and the point estimates go in the expected direction: A higher importance of green impact (lower WTA-Green) and a belief that green projects are more profitable are associated with a higher share of investments in green projects. The point estimates are remarkably stable in the full sample, and barely change when including additional investor controls (Column 3) or controlling for the importance of social impact (Column 5). On average, if an investor is willing to give up the investment voucher for a 1-Euro-smaller donation to Greenpeace or the carbon offset company, then the share of green projects in the portfolio increases by almost one percentage point. Moreover, an investor who believes that green projects are more profitable than other projects, compared to one who believes there is no difference, has a 20-percentage-point larger share in green projects.

Column 2 is the same regression as in Column 1, except that we restrict the sample to investors whose first registration was not on GREEN ROCKET, i.e., not on the platform with green projects.<sup>18</sup> Even among these more conventional investors, who did not first join for green projects, both the importance of environmental impact and beliefs about the profitability

<sup>18</sup> They may have signed up later on this platform as well, but their initial interest was conventional investments.

are significant predictors of how often such investors invest in green projects. The robustness of this result affirms that our findings are not only driven by “green investors.”

**Result 2.** Investors with a belief that green projects are more profitable, and those attaching a larger importance to positive environmental impact, make a significantly larger share of their investments in green projects.

To assess the relative importance of both variables, we can compare the  $R^2$  of two regressions similar to that in Column 1, but where either WTA-Green or GreenProfitability is excluded (not reported in Table 2). The regression with WTA-Green explains 16.5% of variation in InvestShareGreen, whereas the regression with GreenProfitability explains 12% of the variation. Hence, the variable WTA-Green is the more important predictor in this case.<sup>19</sup> This highlights further that the degree to which investors value environmental impact is important in explaining green investments.

Column 4 of Table 2 is a robustness specification in which WTA-Green is split in the part which is uncensored by the BDM procedure (for WTA-Green no more than 50 Euros) and bundling all investors whose WTA is censored (WTA above 50 Euros). The significantly negative point estimates imply that the above result applies to both the censored and uncensored range and our results are not driven by only one of these cases. Investors who chose not to donate money to a green cause under any circumstance—those with WTA-Green above 50—have on average a 43-percentage-point lower share invested in green projects, compared to those who always donated (WTA-Green equal to 1).

Column 5 adds the importance of social impact as an explanatory variable.<sup>20</sup> Consequently, we can separate whether investors put money into green projects for the environment *per se* (WTA-Green), or to achieve a positive social impact by helping the environment (WTA-RedCross). Specifically, the theoretical model in appendix A.2 shows explicitly that if green projects produce a positive social impact, then those who value social impact more (small WTA-RedCross) should invest more often in green projects than those who value social impact less (large WTA-RedCross), all else equal. This is because, due to the larger utility for low WTA-RedCross types from green projects, these investor types prefer green projects over conventional projects more often than high WTA-RedCross investors if and only if green projects have social impact. Otherwise, if green projects have no social impact, the model predicts the coefficient on WTA-RedCross to be zero.

Interestingly, in Column 5 the coefficient of the importance of social impact (WTA-RedCross) is not significantly different from zero, while the returns and environmental motives retain their significance.<sup>21</sup> We conclude from this that investors invest in green projects for the environmental impact, but not for the social impact. In other words, investors behave as if green projects have an environmental impact similar to the activities of carbon offset companies or Greenpeace, but do not have social impact in the same way the Red Cross achieves. This is because investors who value the activities of the Red Cross do not invest more in green projects than those who do not value those activities, holding importance of environmental impact and returns expectations constant.<sup>22</sup> This is an important result, because the social and environmental motives are highly correlated in our sample, so omitting the environmental motive would make the social motive incorrectly look like a significant predictor. Finally, while a simple regression with WTA-Green explains 16.5% of the variation in green investment shares (see above), the same regression with WTA-RedCross instead only explains 12.5% of the variation, also highlighting that the importance of environmental impact is a stronger predictor of field behavior.

**Result 3.** Investors who attach a larger importance to social impact, holding the importance of environmental impact and return expectations constant, do not invest a larger share of money in green projects. That is, investors behave as if green projects have a positive environmental impact, but do not have a positive social impact.

Among the investor controls in Column 3—see Table 1 for a list, not included here because of their large number—there are no significant differences among most of them to explain investments into green projects. Hence, demographics such as age, income group, job type (e.g., student, self-employed) and gender do not significantly change the investment share in green projects. Neither do risk and time preferences, so more patient or risk-averse investors do not lean significantly one way or the other. A notable exception is BeliefFixClimateChange—the degree to which one believes climate change should be addressed—which has a significant positive effect. Consequently, those who believe something should be done regarding climate change are channeling more of their funds into green projects. There are also a few significant differences for alternative investments, but no obvious and clear patterns arise.<sup>23</sup>

<sup>19</sup> However, WTA-Green can take 51 different values while GreenProfitability takes only 3 different values. So it does not follow that the importance an investor attaches to green impact is in general more important in explaining investment choices than beliefs about returns and profitability. Instead, this is a statement about the two variables we have.

<sup>20</sup> The correlation between WTA-Green and WTA-RedCross is 0.79. To dispel concerns over multicollinearity, we computed variance inflation factors (VIFs) of 2.64 and 2.69 for these variables, respectively. GreenProfitability has a VIF of 1.04. Depending on the source, a rule of thumb is that VIFs above 5 or above 10 indicate serious collinearity issues, which our variables are well below.

<sup>21</sup> The estimates are virtually unchanged when using WTA-Greenpeace or WTA-CarbonOffset instead of WTA-Green.

<sup>22</sup> Note that this finding does not imply that the importance of social impact plays no role on its own. Rather, it shows that the importance of social impact cannot explain the investment choices any better once we already explain them with the importance of environmental impact and return expectations. This result is thus in no way inconsistent with the high rank of social impact in the survey answers below.

<sup>23</sup> For example, investors who also have stocks invest a significantly smaller share in green projects on the crowdfunding platform, compared to investors who have derivatives or fixed term deposits.

**Table 3**  
Validation and predictive power of survey measures.

Dependent variable	(1) Tobit WTA-Green	(2) Tobit WTA-Green	(3) Tobit WTA-RedCross	(4) OLS <sup>†</sup> InvestShareGreen	(5) OLS <sup>†</sup> InvestShareGreen	(6) OLS <sup>†</sup> InvestShareGreen	(7) OLS <sup>†</sup> InvestShareGreen
ImportanceGreen	-12.048*** (1.776)			0.320*** (0.023)			0.236*** (0.025)
IndiffInterestGreen		-2.120*** (0.301)			0.051*** (0.005)		0.027*** (0.005)
ImportanceSocial			-9.871*** (1.767)			0.271*** (0.026)	
WTA-Green							-0.005*** (0.001)
Constant	39.212*** (1.779)	39.651*** (1.822)	38.615*** (1.650)	0.290*** (0.017)	0.299*** (0.025)	0.377*** (0.019)	0.403*** (0.043)
Control Order Effects	Yes	Yes	Yes	No	No	No	No
R <sup>2</sup>				0.28	0.16	0.23	0.38
Pseudo-R <sup>2</sup>	0.02	0.01	0.01				
Observations	352	352	352	352	352	352	352

Note: InvestShareGreen is the share of investments on the subplatform with green projects relative to all investments. WTA-Green is the incentivized measure of how important environmental impact is to the crowdfunder, with smaller values indicating more importance. WTA-RedCross is the minimum donation amount in the experiment where crowdfunders were willing to forgo the 25 Euro voucher for themselves in favor of a donation to the Red Cross. A lower amount indicates a higher importance of social impact to the crowdfunder. Standard errors are shown in brackets below the point estimates, and are heteroskedasticity robust. <sup>†</sup> indicates that this regression was not pre-registered in our pre-analysis plan (absence indicates that it was). \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

Overall, we find robust evidence that both the return expectation and the importance of environmental impact matter for investors, and both variables are strong predictors of investment decisions or capital allocations. Social impact, on the other hand, does not appear to be a central motivation for investors when deciding whether to invest in green projects.

#### 4.3. Are survey measures valid proxies for the importance of environmental and social impact?

Because environmental impact matters for capital allocation and investment decisions, it is important to ask whether self-reported survey measures are as useful as our incentivized or choice-based measure. Clearly, survey measures are easier and cheaper to obtain; however, because an answer to a survey question does not have any material consequences, economists tend to view surveys with caution and prefer actual choices with material consequences. This is particularly true if social desirability bias plays a role, as may be the case with questions about the environment. We can test whether and to what degree the incentivized measure can be captured by the two survey measures.

When validating survey measures, we can test whether the survey measures are significant predictors of the experimental measure. We can also test whether the survey measures are significant predictors of field behavior, which in this case is the share of investments in green projects. Or we can test whether the survey measure adds something on top of the experimental measure in predicting field behavior. The regressions in Table 3 do all three of these.

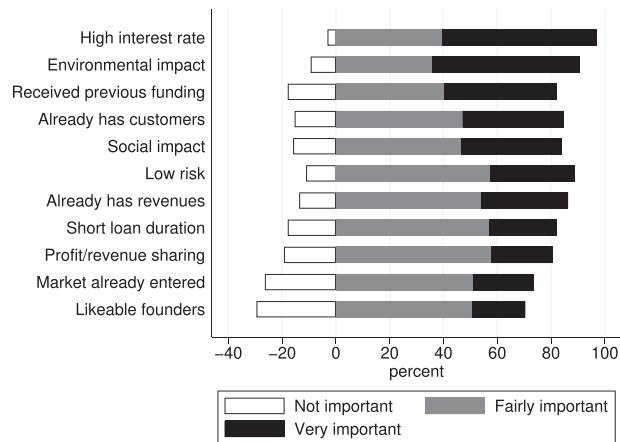
Because the measure WTA-Green is censored at 51, we use a Tobit rather than an OLS regression to estimate the effect of the regressors on the importance of environmental impact. The Tobit regression takes the censoring at 51 into account and estimates the effect of the regressors on the latent variable, the uncensored WTA, which we are interested in.<sup>24</sup>

The regressions in Columns 1 and 2 predict the incentivized experimental measure with the two survey measures of environmental importance. ImportanceGreen, measured using a three-point Likert scale, is significantly related to WTA-Green and in the direction that is expected. An investor who answers that environmental impact is “very important” is also willing to forgo the investment voucher and donate to Greenpeace/Carbon-Offsetting for a 12-Euro-lower donation, compared to an investor who answers that environmental impact is “somewhat important.”

IndiffInterestGreen is the additional return as measured by the percentage points in interest that a firm without positive social or environmental impact has to pay to investors to be as attractive as an identical firm with positive social or environmental impact. This measure is significantly related to WTA-Green as well, and the relationship has the expected direction. Consequently, both survey measures of environmental impact are experimentally valid. Our measures thus contribute to an important literature that experimentally validates survey measures for future use (e.g., Dohmen et al., 2011).

Columns 4 and 5 use these survey measures to predict the share of funds invested in green projects. Like the experimental measure WTA-Green, both survey measures of the importance of environmental impact are highly significant predictors of field behavior in the expected direction. Hence, these survey measures are not only experimentally valid, but also have external validity.

<sup>24</sup> In terms of sign and significance levels, OLS regressions have identical results to the reported Tobit regressions, though point estimates can differ. Moreover, we ran censored least absolute deviations (CLAD) regressions (Powell, 1984), which are more robust to functional form misspecification than Tobit regressions (e.g., Chay and Powell, 2001). CLAD gives identical results to the Tobit regressions in terms of sign and significance level, with very similar point estimates. Thus, our findings are very robust to the choice of the estimator.



**Fig. 2.** Responses to: Which of the following characteristics of a project are important to you when making investment decisions? Ranked by mean response.

To compare the relative predictive power of the experimental measure and the two survey measures of the importance of environmental impact, we use the  $R^2$  of simple OLS regressions with one measure at a time. WTA-Green has an  $R^2$  of 16.5% (not in the table) in predicting the share of funds invested in green projects alone. ImportanceGreen explains 28.5% of the variation in InvestShareGreen (Column 4), and IndiffInterestGreen explains 16% (Column 5). Consequently, WTA-Green and IndiffInterestGreen have a similar predictive power in explaining investments in green projects, whereas the survey measure ImportanceGreen has almost twice the predictive power. This is remarkable, because not only is this survey measure not incentivized, but having only three levels, it is also the coarsest scale by far. Thus, less is more in this case, and ImportanceGreen is actually superior to a rigorous lab measure in predicting field behavior.

Finally, Column 7 of Table 3 asks whether the two survey measures improve the prediction of the share of investments in green projects, compared to using a predictive model only with the experimental measure WTA-Green. Clearly, both survey measures are significant predictors in the expected direction, holding WTA-Green constant. Thus, the survey measures do improve the prediction and hence contain information that the experimental measure does not contain.

**Result 4.** Both survey measures ImportanceGreen and IndiffInterestGreen are experimentally valid and are highly significant predictors of field behavior. Moreover, both survey measures contain information that the experimental measure WTA-Green does not contain. ImportanceGreen has the most predictive power among the three measures in explaining the investment share in green projects.

Column 3 of Table 3 validates the survey measure of the importance of social impact to the investor. Like ImportanceGreen, ImportanceSocial is measured on a three-point Likert scale, and is a significant predictor of the experimental measure of the importance of social impact (WTA-RedCross), in the expected direction. Moreover, Column 6 shows that ImportanceSocial is a significant predictor of field behavior as well.<sup>25</sup> Therefore, future research can use our simple survey questions as measures of the value placed on social or environmental impact, which are all experimentally valid, can predict field behavior, and are potentially even more predictive of field behavior than the incentivized lab measures.

#### 4.4. Additional survey evidence on returns versus impact

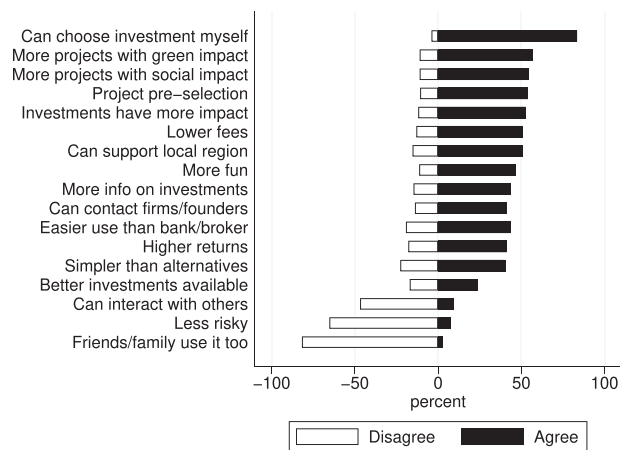
In this section, we present survey answers as complementary evidence, in addition to the above results from field and experimental data. These responses give a more comprehensive picture of why retail investors invest in certain projects, whereas the experiment tested for three specific explanations: environmental impact, social impact, and return expectations.

First, we asked what aspects of a project are important to investors. We gave a list of 11 options, and for each one asked whether it is “not important,” “fairly important,” or “very important.” The variables ImportanceGreen and ImportanceSocial derive from this question, and we see how these two aspects rank relative to other aspects. Figure 2 plots the answers, with the options ordered by the mean response of the three-level scale.

Recall that the projects on the crowdfunding platform are debt instruments. Unsurprisingly, the most important aspect of a project is the promised interest rate as a main determinant of the expected return. Perhaps surprisingly, rank 2 is claimed by whether a project has a positive environmental impact, such as reducing emissions or improving recycling. The share of investors who consider this aspect at least moderately important is only about 5 percentage points below the interest rate.

<sup>25</sup> Compare this to Column 5 in Table 2, where the experimental measure of the importance of social impact was not a significant predictor. This is because that model also controlled for return expectations and the importance of environmental impact, whereas this one in Table 3 does not.





**Fig. 3.** Responses to: Which of the following options do you see as an advantage of crowdfunding, compared to alternatives such as stocks, funds, or bonds? Neutral answer not plotted. Ranked by mean response.

Social impact ranks 5 on the importance scale. The top two responses therefore confirm the earlier results that expected returns and environmental impact are important factors in investment decisions, and in fact the most important among these 11 options.

Third, fourth and seventh most important are signals of success or profitability, namely whether the firm/project has received funding elsewhere before, whether it already has customers, and whether it is already receiving revenues. Low risk is ranked sixth, and a short maturity, which is typically associated with lower risk, is ranked eighth; thus, the investors are not overly concerned with risk.

The bottom of the importance ranking is an additional “revenue kicker” (additional payments if goals on revenue are reached), whether the firm has already entered the market, and finally whether the founders are likeable. Self-selection likely plays a role here, because investors who value more equity like investments could go to equity crowdfunding or to the equity market, instead of a debt crowdfunding platform.

Second, we asked more directly what advantages investors see in crowdfunding, compared to alternative investment classes such as stocks, bonds or funds. We offered a list of 17 potential factors. Possible responses are “do not agree,” “neutral,” or “agree.” We asked investors to disagree both if the option is factually incorrect in their view (e.g., “No, crowdfunding does not provide a higher return”), or if the statement is correct but they do not see it as an advantage (“Yes, crowdfunding does allow me to contact the founders, but I do not see this as an advantage”). Figure 3 plots the responses but omits the neutral category. Responses are again ordered by the mean response.

The top rank provides an interesting insight into why crowdfunding might be attractive: Investors can determine for themselves where their money goes, unlike, for example, with funds. And, unlike stocks or bonds of large firms, crowdfunding platforms allow the channeling of funds to very specific projects, which investors regard as important.

Ranks 2, 3, 5 and 7 again reflect that investors value environmental and social impact, which alternative investments apparently cannot provide in a similar fashion: At least 50% of investors agree that impact is an advantage. A special case of impact is that the investments benefit the region (rank 7).

Aspects of usability, such as whether the crowdfunding platform is easier to use than the stock broker or bank website (rank 11), whether the financial instruments themselves are simpler (rank 14), or whether crowdfunding is more fun (rank 8), place only in the middle. This might not be surprising, given that fintechs have now simplified conventional banking services and stock brokering, so the relative advantage appears not to be large.

The investors overwhelmingly disagree that crowdfunding is less risky.<sup>26</sup> Moreover, social interaction—such as investing with friends and family or being able to interact with other crowdfunders—are not viewed as advantages.

**Result 5.** Survey answers confirm that returns and environmental impact are the two most important project characteristics when choosing investments. Crowdfunding is attractive to investors because it allows investors to determine for themselves how the investment is used.

<sup>26</sup> While we do not have default rates for the platforms we study, historical default rates in debt crowdfunding vary substantially by platform. For example, Kirby and Worner (2014) document a range between 0.2% and 7% defaults by platform, with a median of 1.5%–2%. This exceeds the default rates of high-grade bonds, and our investor responses are consistent with this.

## 5. Discussion: Warm glow versus altruistic motives

At least since [Andreoni \(1989\)](#), the donation literature has investigated the motivations behind donations to charities. [Andreoni \(1989, 1990\)](#) distinguishes between egoistic warm glow motives and altruistic motives. The former give utility to donors based on their own donation amount, because donating makes them feel good about themselves, not because their donations improve the situation of others. The latter give utility to donors because others benefit from the donation. Both motivations can be present simultaneously, in which case the individual is impurely altruistic.

An empirically testable prediction of pure warm glow motives is that donors should not be willing to give more or less depending on how much impact the donation achieves. This prediction has been tested empirically, with mixed results. For example, in an experiment [Metzger and Günther \(2019\)](#) find that subjects lower their donations in response to information that the donation achieves low impact, and increase donations in response to information of a high impact. Moreover, a string of studies demonstrate that donors react negatively to higher administrative costs and overheads, which lower the impact that a given donation achieves ([Gregory and Howard, 2009](#); [Meer, 2017](#); [Caviola et al., 2014](#)). These studies therefore reject pure warm glow motivations and are consistent at least with impure altruism. [Karlan and Wood \(2017\)](#), interestingly, identify two different donor groups in a field experiment: Large donors respond positively to information that donations achieve impact, which is consistent with altruism, whereas small donors do not react, which is consistent with warm glow motives. [Crumpler and Grossman \(2008\)](#) estimate that 57% of subjects have warm glow motives.

Although our experiment was not designed to investigate the motivations for charitable giving, which would require varying the impact of a donation to the same organization, we can use the behavior across organizations to learn something about participants' motives. A pure warm glow investor cares only about the donation amount and not the impact it achieves. Hence, assuming the same warm glow independent of organization, such an investor is predicted to switch from the voucher to a donation of the same amount in our BDM procedure, independent of the organization donated to. As long as investors believe these organizations achieve different degrees of impact, altruists in contrast are predicted to be more willing to give to organizations they think have more impact.

A complication is that small differences in switching amounts cannot be detected by the BDM procedure in the experiment; hence, an impure altruist who cares relatively little about impact behaves the same as a pure warm glow investor in our experiment.<sup>27</sup> Consequently, under our assumptions, the share of investors who have the same switching amounts for all organizations in the BDM procedure is an upper bound for the share of pure warm glow investors. In our experiment, 58% of investors reveal the same donation WTA for all three organizations. This number is surprisingly close to those from [Crumpler and Grossman \(2008\)](#), keeping in mind that ours is an upper bound for warm glow investors.

## 6. Conclusion

The present study investigates why retail investors on a crowdfunding platform choose green investment projects. To counter the concern of social desirability bias, we conducted a lab-in-the-field experiment to answer the question. The experiment allowed us to use incentivized preference elicitation methods to see if and to what degree investors are willing to give up a higher return for impact.

We find that the majority of investors are willing to give up a higher return as long as the environmental or social impact is large enough. However, there is large variation among investors in just how much positive impact is needed to give up the higher return. Still, this is convincing evidence that investors have a preference for environmental impact and for social impact.

We further find that those with a stronger preference for environmental impact also invest a larger share of their funds in green projects; hence the experimental measure explains field behavior. This suggests that investors view green projects as one way to satisfy their preference for environmental impact. In addition to environmental impact, return expectations for green projects also play a significant role in explaining green investments. Perhaps surprisingly, even though many investors also value social impact, those who do did not invest more in green projects, all else equal, which suggests that it is environmental and not social impact that drives green investments. Overall, these findings can be taken as good news for environmental projects and technologies, as these investor preferences tend to increase demand for such investments. Whether this ultimately results in lower funding costs for green projects in large capital markets will depend on the actions of all investors, including institutional investors.

There is already some evidence that green assets can achieve lower funding costs in large markets. For example, green government bonds can have lower yields (higher prices) than conventional bonds from the same issuer. The first sale of green UK government bonds—whose proceeds are used only for environmental spending—had a lower yield of about 0.025 percentage points, with lower yields in other European countries as well ([Financial Times, 2021](#); [The Economist, 2021](#)). Since there is very little risk difference between bonds of the same issuer and since return uncertainty in fixed-income

<sup>27</sup> That is, if organization A delivers more impact than organization B, but an investor cares little about impact, then this investor will prefer the donation over the voucher for roughly the same donation amount for both organizations.

government bonds is extremely small—so risk aversion and return expectations cannot play a major role—this suggests a preference among investors to support green projects.<sup>28</sup>

Finally, our comparison of survey and experimental measures of the importance of environmental impact shows that typical concerns about social desirability bias and other self-reporting biases do not appear to be a major problem in this context. Consequently, future research is justified in using the simpler survey measures of how important environmental or social impact is to an investor. Indeed, these measures are not only experimentally valid, they are also strong predictors of field behavior. Our experimental method could still be valuable in future research on even more controversial topics, such as investments in weapons or tobacco firms, or where social desirability biases play a bigger role, for example if a survey cannot guarantee anonymity. Moreover, our paper has some limitations. The results we obtain are for the crowdfunding context, but investors in our sample are demographically diverse and have a very broad investment focus (see Table 1). Future research could study non-standard preferences for green investments in different samples of retail investors and in different asset classes and regions using our survey measures.

## Data availability

Data will be made available on request.

## Supplementary material

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.jebo.2023.02.023](https://doi.org/10.1016/j.jebo.2023.02.023)

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<sup>28</sup> Of course, among large institutional investors, the green preference may come from a desire to enhance ESG criteria and from public pressure rather than a genuine interest in green impact as with our investors.

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