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Investor Responses to Information Updates on Peer Behavior and Public Investment Policy: The Case of Green Investments

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Investor responses to information updates on peer behavior and public investment policy: The case of green investments

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Abstract

Green startups are a major driver of eco-innovation and as such a major contributor to climate change mitigation and green growth. However, they often lack sufficient funding from investors. Our study focuses on the factors that determine venture capital investors to invest in green startups. In particular, we analyze how information about i) the investments into green startups of other investors and ii) investment provision by public institutions affect the willingness of investors to act accordingly. We combine data from an online survey with angel investors comprising a discrete choice experiment and data from the Mannheim Enterprise Panel. Our findings show that the expectation of future demand for green products and the environmental attitudes of investors can explain whether investors engage in the energy industry. Regarding the effect of information provision, we find that investors strongly respond to information on both investments in green startups by other investors and public investment in green startups. However, in both cases, investors reduce their investments in green startups after receiving the information. We show that this is due to investors largely overestimating the share of investments in green startups by others and due to a crowding out of private investment by investments of public institutions.

JEL classification: G11; Q56; M14; G02; A13; C25

Keywords: Sustainable investments; Venture capital; Belief updating; Discrete choice experiment; Panel data

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1 Introduction

Investors shape the dynamics of financial and venture capital markets, following their beliefs about the profitability and risk of investments. Thus, understanding how the beliefs of investors are formed and influenced is paramount to predict the investors' behaviour and, eventually, the flows of capital within markets (Malmendier et al. 2020; Giglio et al. 2021; Zheng et al. 2016). The role of investors is of particular importance within the emerging green economy, i.e., in the context of migrating to a low-carbon economy (Durán-Romero and Urraca-Ruiz 2015; Bendig et al. 2022). Their investments enable startups to develop eco-innovation and contribute to green growth (Zhilkina et al. 2020). However, despite of the existing funding activities of investors, the lack of sufficient capital for green startups to realize green tech innovation has been a widely discussed issue (Demirel and Parris 2015; Bergset and Fichter 2015). The stated reasons include the need for significant funding, long development cycles, lack of initial competitiveness, and difficulties in attracting corporate buyers (Zhilkina et al. 2020; Bergset 2017). These factors are likely to make investors less prone to invest in green startups. Given these restraints, it is paramount to understand which factors contribute positively to investors' willingness to invest sustainably.

We focus on two potential drivers of investments in green startups: information on peer behavior and public investment policy. Peer behavior has proven to be of relevance in many aspects of environmental decision-making like energy conservation (e.g., Allcott and Rogers 2014), sustainable consumption (e.g., Demarque et al. 2015), or clean technology adoption (e.g., Bollinger and Gillingham 2012). Yet, in the context of venture investments, the existing evidence has been scarce (Bursztyn et al. 2014). We argue that in venture financing, social influence manifests itself both through peer pressure and herding behavior. Thus, receiving information about other investors' behavior should induce investors to adapt their own investment strategy accordingly. For public investment policy, the direction of the effect is less clear. While various studies find a positive relationship between public support programs and access to venture financing (Berger and Hottenrott 2021), the exact channels through which public investment policy affects investors' decisions remain ill-understood. Notably, it remains unclear how venture investors value government action and whether information updates about government commitments induce private investors to act accordingly. Several authors posit that government funding to specific technologies or sectors acts as a commitment device signaling their future profitability to private investors (Lerner 2002). To date, there is little empirical evidence on the relevance of this channel in the context of venture investments. Knowledge about the influence of other investors' choices or public investments on investment decisions into green startups is of high relevance for policymakers and practitioners to identify leveraging effects but also possible pitfalls of government

intervention.

In this paper, we use an experimental design to investigate how the investors' decisions are affected by other investors' investments in green startups and public investments. Our experiment consists of two parts: first, we expose investors to information updates about peer behavior or public investment policy using randomly assigned between-subject treatment manipulation. We then investigate the influence of these information updates using a discrete choice experiment. We ask investors to state their preferences regarding three different investment offers into startups in nine consecutive choice sets, which varied in 6 different attributes. Our focus lies on the startups' environmental contribution attribute for which we calculate investors' individual willingness to pay. We then assess if and by how much random information updates on peer behavior and public investment policy affect investors' willingness to pay for green startups.

To collect data for our experiment we approached 3,000 German startup investors to take part in an online survey comprising the discrete choice experiment and a questionnaire. The questionnaire consisted of various questions on the individual characteristics, preferences, beliefs, and investment behavior of the investors. We focus on angel investors - high-net-worth individuals investing part of their wealth in start-up companies. These investors serve as an interesting case to examine for at least three reasons. First, angel investors invest at a critical stage of company development, when other financiers such as venture capital funds or banks are not yet willing to provide funding. Second, the the market for angel investments is often argued to be much larger in scale than the institutionalized venture capital market (Wetzel Jr 1987). Third, angel investors often make their investments with other investors in informal groups or organized clubs (Lerner et al. 2018), which makes them particularly prone to peer behavior. In recent years, these investors have attracted increased attention from policymakers (OECD 2011), and various countries have given them generous tax credits and other subsidies to encourage them to commit more of their capital to venture investments (Denes et al. 2020; Ali et al. 2017).

We augment the data collected in the experiment with the Mannheim Enterprise Panel - a large-scale panel database covering the universe of German companies (Bersch et al. 2014). The Mannheim Enterprise Panel provides access to investors' portfolios comprising all companies in which they hold equity. Based on this data, we analyze how the share of green startups in the investors' portfolios is determined by their characteristics, preferences, beliefs, and investment behavior to assess the static determinants of investment decisions. Besides, we use the data to validate the investors' choices made in the discrete choice experiment.

Our findings show that individual characteristics, preferences, and beliefs are only weak predictors of the share of green startups in investors' portfolios. In addition, we also analyze the determinants of investments in the energy industry in general, where the vast majority of green startups are listed. We find the expectation of an increase in future demand for green products

as well as the environmental attitudes of the investors to correlate with their self-selection into this industry. Regarding the effect of the information provision on investors' choices, we show that updating investors on their beliefs about the share of green startups in the portfolio of other German startup investors reduces their willingness to invest in green startups. We provide evidence that this effect is largely driven by investors overstating the true value of the respective investment share. The belief update on the provision of public funds to primarily green startups leads to a similar reduction in the willingness to pay for green startups. We provide evidence that this can be explained by a crowding out of private investments by public funding.

Our study contributes to the literature in various ways. First, we contribute to the literature on peer effects in environmental decision-making (Abrahamse and Steg 2013). We also add insights to the literature on sustainable finance, in particular, to impact investing from private sources of capital (Barber et al. 2021). Besides, we contribute to the literature on public policies to foster green innovation (Mazzucato 2022, Kemp and Never 2017).

To our knowledge, we are first to analyze the responses of professional investors to updates in their beliefs on the investment behavior of third parties, i.e., other investors and public institutions, in an experimental setting. Building upon the existing evidence, we provide insights on the responsiveness of sustainable investment behavior with respect to information on institutional and peer behavior in a dynamic setting using micro-level data. Moreover, while many experimental approaches to the behavior of investors suffer from limited proof of external validity, we observe the actual portfolios of the investors taking part in our study, which had been obtained from external sources. This enables the assessment of the external validity of the stated responses taken by investors in our experiment.

2 Literature

The literature provides various examples of studies that assess the determinants of investment decisions, mostly by non-professional investors (e.g., Gutsche et al. 2021; Marshall et al. 2021; Hegeman and Sørheim 2021). The vast majority focuses on the characteristics of the investors themselves. For example, Masini and Menichetti (2012) analyze a sample of European investors finding that investors' prior beliefs, their preferences on policies, and their risk attitudes mediate the choice of investing in renewable energy projects. With a focus on retail investors, Gutsche and Ziegler (2019) use an incentivized stated choice experiment, showing that the feeling of warm glow, an affinity to left-wing parties, and environmental attitudes matter in the decision to invest in sustainable funds.

So far, peer effects have obtained less attention as determinants of sustainable investment deci-

sions. However, in other areas of environmental behavior, peer effects have been assessed vastly and shown to be effective in enhancing the individual engagement in environmental well-being and climate mitigation (Ferraro and Price 2013; Torres and Carlsson 2018; Wolske et al. 2020). For instance, in the local diffusion of photovoltaic panels, peer effects have been proven to accelerate the deployments of these technologies in neighborhoods (Bollinger and Gillingham 2012; Balta-Ozkan et al. 2021). Other evidence is provided by studies showing the effectiveness of peer effects to induce resource conservation, energy conservation in particular. Existing meta-studies estimate an average effect size of social comparisons as peer effect interventions in a range of 0.12 to 0.35 (Karlin et al. 2015; Abrahamse and Steg 2013). With direct relevance to financial decision-making, Gutsche et al. (2019) focus on the contextual factors of sustainable investment decisions, containing social influence among others. They find that sustainable investments are to a large degree determined by the social environment like family, friends, and colleagues. As our direct predecessors, Bursztyn et al. (2014) investigate peer effects among investors distinguishing between social learning and social utility as possible drivers. They show that revealing the decisions of a peer investor raises the utility of purchasing the investment though both an information signal value and a joint consumption value. Our approach adds to this since the green investment decision of angel investors has stronger normative implications and thereby, creates a context in which social utility becomes highly relevant.

Whether information on public investment policy, i.e., announcements on public capital commitments, stimulate or inhibit private capital investments has been analyzed primarily through stock investment data. The respective studies report mixed results, finding either a crowding in (Pereira 2001; Dreger and Reimers 2016; Bonga and Nyoni 2017) or out (Atukeren 2005; Coutinho and Gallo 1991) of private investments in response to public investments. Evidence from China shows that public investment in public goods crowd in private capital, whereas the opposite is the case for public investments in private, industry, and commerce goods (Xu and Yan 2014). This hints towards a possible complementarity between public and private investment related to investments to foster sustainability or other public goods. In line with this, Deleidi et al. (2020) find that public investments in renewable electricity projects can stimulate corresponding private investments. However, there are no prior studies looking specifically at the case of investments in green ventures.

3 Hypotheses

Peer influence becomes effective through two different channels. First, through social pressure to comply with a given social norm (Bicchieri and Dimant 2022). Angel investors often operate

in a densely connected community with shared values and concepts (Bygrave 1988, Sorenson and Stuart 2001). They are often organized in clubs or other types of formal and informal networks where they exchange experiences and information with their peers (Wood et al. 2020). Given these peers express their concerns about the environment and act accordingly by investing in green startups, it might increase the social pressure on other investors to act similarly and comply with the norm, i.e., it affects the social utility of the investment (Bursztyn et al. 2014). Second, the actions of other startup investors could be perceived as signal of profitability (BenSaïda et al. 2015; Georg 2014). Given information asymmetries in venture capital markets, certain market signals like prices and returns, but also actions of others may serve as cues to resolve uncertainty. The information about investment levels in green startups is likely to constitute such a signal of profitability to investors, which induces social learning among investors (Bursztyn et al. 2014). Both resulting influences through social utility and social learning point in the same direction. As a consequence of receiving the information, investors respond by adapting their own investment strategy to more closely match the behavior of other investors. This leads to our first hypothesis.

Hypothesis 1a: *If the beliefs of investors on the share of green startups in the other investors' portfolios are updated upwards, they will increase their WTP for green startups and vice versa.*

Our research design requires us to elicit information about investors' beliefs about the share of green startups in the portfolios of other startup investors. Although the belief elicitation draws the attention of investors to the actions of other investors and thereby acts as a framing, we assume that this effect is not strong enough to influence the investors' willingness to pay for green startups of investors in the experiment. We hypothesize that:

Hypothesis 1b: *Investors do not change their WTP for green startups due to the elicitation of their beliefs on the share of green startups in the portfolios of German startup investors.*

The direction of the effect of public investments on investors' decisions is a priori less clear compared to investments made by a peer group of other investors. On the one hand,the information of high levels of public funding into green startups could adversely affect investors' decision to act similarly, as it may signal the requirement of support and lower profitability of this market segment. Public investments are motivated through a political process that adheres to an agenda which not necessarily follow the objective of profitability. Conversely, public sector investments in green startups may be perceived as positive information about future funding prospects and

the development of a larger market for green investments. For example, higher levels of public investment express the government's intentions to foster these startups, making further support more likely, e.g., through regulation and legislation (Toole and Turvey 2009). Public investments might also serve as a cue for which technology pathways will be adopted in the future (Lerner 2011).
Adhering to the latter arguments and building upon the assumption that startups are more likely to succeed the more access they have to venture capital, we hypothesize that the provision of additional public investments into green startups will be interpreted as an accelerator of success for those startups by private investors. This implies that an upward correction of investors' beliefs about the public capital commitments will increase their own investments in green startups and vice versa. This leads to our fourth hypothesis:

Hypothesis 2a: *If the beliefs of investors about the yearly amount invested in primarily green startups by the public sector are updated upwards, they will increase their WTP for green startups and vice versa.*

Again, we elicit information about the beliefs of investors about government action. We establish a similar conjecture as with the *Peer* treatment. Thus, although the belief elicitation draws the attention of investors towards public investments, in the absence of an updating of the beliefs, we conjecture this to not affect the choices of investors within the discrete choice experiment. This results in our third hypothesis:

Hypothesis 2b: *Investors do not change their WTP for green startups due to the elicitation of their beliefs on the yearly amount invested into primarily green startups by the public sector.*

In the following section, we explain how we test these hypotheses by means of an experimental design, we introduce our elicitation strategy of the parameters regarding the WTP for green startups through the discrete choice experiment, and briefly present the data resulting from the DCE. Thereafter, we present the sample characteristics.

4 Experiment and Data

4.1 Design

The purpose of the study is to determine the malleability of investors' behavior to invest in green startups. We focus on how the decision of angel investors to invest in green startups is influenced by i) social information about other investors' behavior, and ii) information about public invest-

ments. In addition, we investigate how investor characteristics relate to green investments. To answer our research questions, we rely on two data sources: an online survey, containing a discrete choice experiment and a questionnaire, and the Mannheim Enterprise Panel.

In the discrete choice experiment (DCE) we ask participants to make nine consecutive choices on investments in startups. We provid three startups for each decision which differed in six attributes. Based on the attribute *environmental contribution*, we calculate the investors' individual willingness to pay for a green contribution of a startup, which serves as our first main outcome variable. DCEs are an established instrument to elicit determinants of investment behavior of different agents in the financial market (e.g., Webley et al. 2001, Pasewark and Riley 2010; Barreda-Tarrazona et al. 2011;Berry and Yeung 2013; Gutsche and Ziegler 2019) including venture capital investors (De Rassenfosse and Fischer 2016; Franke et al. 2006; Hoenig and Henkel 2015). They have proven to reliably capture the variation in investment decisions between investors. Although the nature of the stated choice lacks consequentiality and might lead to a hypothetical bias in the effect size (Hensher et al. 2005), there are ways to counteract this hypothetical bias (e.g., Loomis 2014; Alemu and Olsen 2018). As the second part of our online survey, the questionnaire follows the DCE and covers a range of 20 questions on the individual characteristics, preferences, and investment behavior of investors.

The Mannheim Enterprise Panel (MUP), maintained and administered by the Leibniz Centre for European Economic Research (ZEW), allows us to identify the actual investment portfolios of the investors participating in our study and the share of green startups in these portfolios, i.e., our second main outcome variable. The MUP is the most comprehensive micro database of companies in Germany and builds upon data from Creditreform e.V., the largest credit rating agency in Germany.[1]

To answer how the decisions of business angel investors to invest in green startups are driven by individual factors, we assess the correlation of the share of green startups in the investment portfolios with the items inquired in the questionnaire of our survey experiment. These items cover the personal characteristics, the preferences, and the investment behavior of investors. In the following, we refer to these variables as the *static determinants* of investment behavior.

To investigate the influence of information on peer and institutional behavior, we use exogenous

[1] Since 2000, Creditreform's entire database is transferred to ZEW twice a year. Before that, from 1991 to 1999, Creditreform provided micro data on newly founded firms (including startup companies) on a yearly basis. Among other variables, the MUP contains information about the shareholders of each company. Creditreform data, and hence the MUP, contain the following information on companies headquartered in Germany including already closed companies: The complete address and telephone number, number of employed persons, amount of sales, legal form, five-digit industry sector code (NACE rev. 2), date of foundation, date of closure, shareholder structure and personal details about the involved persons (year of birth, gender, private address, profession, formal qualification, marital status, number of children) and Creditreform's credit rating score, and for a subset of medium-sized corporations and company groups, balance sheet figures.

treatment manipulation which takes place prior to investors' investment decisions in our DCE. By assessing the treatment-induced variation in the investors' individual willingness to pay for an environmental contribution of a startup, we analyze investors' short-term response to the belief updating on i) the share of green startups in the portfolios of other German startup investors and ii) the yearly amount invested by the European Commission into primarily green startups. In the following, we refer to the respective responses as the *dynamic determinants* of investment behavior.

We applied four treatment manipulations and a *Baseline* treatment which took place directly before the start of the DC experiment. Table 1 provides an overview of the treatments, which had been implemented in the online survey.

Table 1: Treatments implemented in the online survey

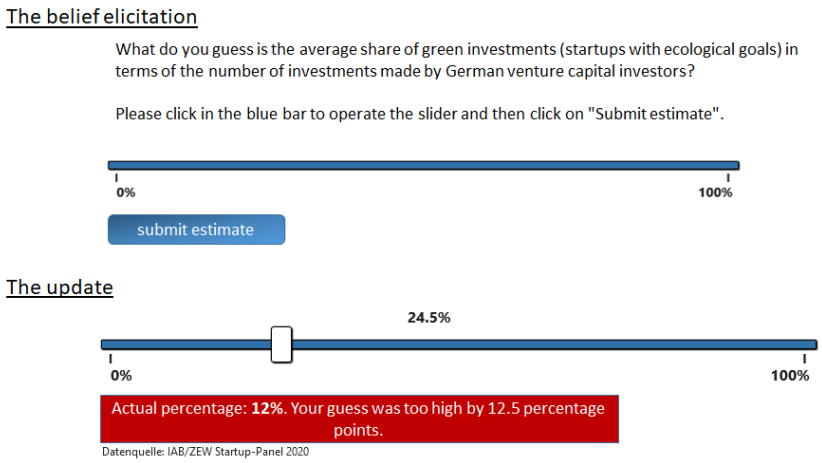
Treatment	**Description**
Baseline	No manipulation
Peer	Guess of share of green startups in German startup investors‘ portfolios
Public	Guess of volume of additional investment in venture capital provided by the European Commission with focus on green startups
Peer + update	Guess of share of green startups in German startup investors‘ portfolios + Belief update on actual value
Public + update	Guess of volume of additional investment in venture capital provided by the European Commission with focus on green startups + Belief update on actual value

Figure 1 illustrates the treatment manipulations. Figure (a) shows the treatment manipulation of the treatments *Peer* and *Peer update*. In the treatment *Peer*, the manipulation consisted of a guessing task, in which we inquired the investors' prior beliefs about the share of green startups in the portfolios of German startup investors. Investors were asked to make a guess by clicking in the slider bar and adjusting the value according to their believed value in a range from zero percent to 100 percent. In the treatment, *Peer update*, we not only elicited the investors' prior beliefs about the investments in green startups of German investors, but we also updated the beliefs of investors by showing them the actual values once they had expressed their prior beliefs. The update was provided in the red field which can be observed in Subfigure (a). The feedback consisted of the actual share as well as the difference of the actual share to the share investors had guessed. In case investors guessed correctly, the updating field was displayed in green background color, stating "Actual share: 12%: Your estimate was correct".[2]

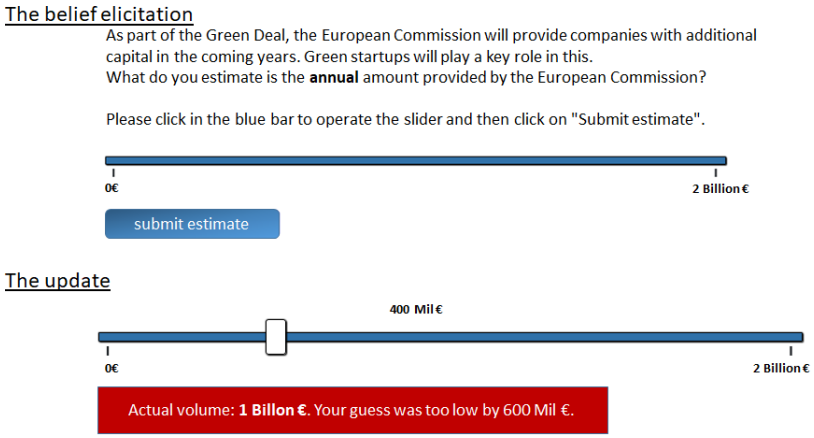
[2]The actual share of green startups in German investors' portfolios was determined by means of the Mannheim Startup Panel and the Mannheim Enterprise Panel.

Figure 1: Exemplified sketch of treatment manipulations

(a) Treatment: *Peer*, *Peer update*



(b) Treatment: *Public*, *Public update*



Note: The figure shows screenshots of the treatment manipulation interventions in the treatments *Peer*, *Peer update*, *Public*, and *Public update*. Panel (a) shows the belief elicitation question that was shown to participants in the *Peer* and the *Peer update* treatment. The lower part of Panel (a), i.e., the feedback, was only visible to participants in the *Peer update* treatment. Panel (b) shows the belief elicitation in the *Public* and *Public update* treatment, which was shown to participants in the *Public* and *Public update* treatment. The lower part shows the feedback, which was only shown to participants in the *Public update* treatment.

Subfigure 1 (b) illustrates the treatment manipulation in the treatments *Public* and *Public update*. In these treatments, we provided investors with information about the capital investment strategy of the European Commission to foster European startups with a particular focus on

green startups, mentioning that the initiative is part of the European Green Deal. Based on this, we asked investors to state their prior beliefs on the yearly amount invested in startups of the European Commission within this initiative, in the treatment *Public*. Similar to the *Peer* treatment, investors provided their answers through a slider bar ranging from zero EUR to 2 Billion EUR. In the treatment *Public update*, we also updated investors' prior beliefs on the actual yearly amount provided by the European Commission for primarily green startups through feedback. The feedback also contained information on the difference between their guess and the actual amount. Directly after this task, the DC experiment started.

4.2 Method

We obtained data from a computer-based survey that was conducted during February and March 2022. The participants in the survey are German startup investors. We sent out invitation letters to a total of 3000 startup investors in Germany, whose contact details had been provided by the German Ministry of Economic Affairs. 371 investors completed the online survey, resulting in a response rate of 12.37 percent.

The discrete choice experiment as part of the survey contained nine consecutive choices. For each choice, we asked the investors to rank three different startups by their preference in terms of making a certain investment. Although the decisions of investors in the DCE are hypothetical and had no material consequences for them, we applied sophisticated measures to assess the external validity of the choices (see subsection 2.1.3). The startups presented to investors differed in six attributes, which comprise environmental contribution, volume invested, time to market, expected returns, investment subsidy, and exit subsidy.

Table 2 summarizes the attributes and their corresponding levels of the DC experiment. As a first attribute, we included the environmental contribution of the startup, which varied between *no contribution*, *environmental contribution (without measurable evidence*), and *environmental contribution (with measurable evidence)*. We distinguished whether the environmental evidence is measurable to be able to control for greenwashing, i.e., whether it is sufficient for investors if the startup signals its green contribution, or whether the startup must provide evidence of the contribution. The second attribute gives the funding volume the startups seek from the investor. We individualized this attribute to a certain degree by inquiring the typical volume that the investor invests in startups prior to the DC experiment. Given this value, the attribute varies by 25, 75, 125, or 175 percent of the typical amount invested. The third attribute is given by the time to market and indicates by which time the startup plans to become profitable. The startups vary between *1 and 3 years* with respect to this attribute. The expected return of the startups represents the price attribute of our DC experiment. The return is either *15, 25, 35, or 45 percent*. Lastly, we added two attributes to assess the responsiveness of investors to government subsidies. These

comprise an investment subsidy which varied between *zero, 20, and 40 percent* of the initial investment and an exit subsidy, which was *either provided or not*. These subsidies were included since their investigation was commissioned by the authority which issued the project and will not be discussed in detail within this paper.[3]

Table 2: Attributes and attribute levels within DC experiment

Attributes	**Attribute levels**
Environmental contribution	No contribution Environmental contribution (without measurable evidence) Environmental contribution (with measurable evidence)
Volume invested	0.25*usual volume invested 0.75*usual volume invested 1.25*usual volume invested 1.75*usual volume invested
Time to market	1 year 3 years
Expected return	15% 25% 35% 45%
Investment subsidy	0% 20% 40%
Exit subsidy	Yes No

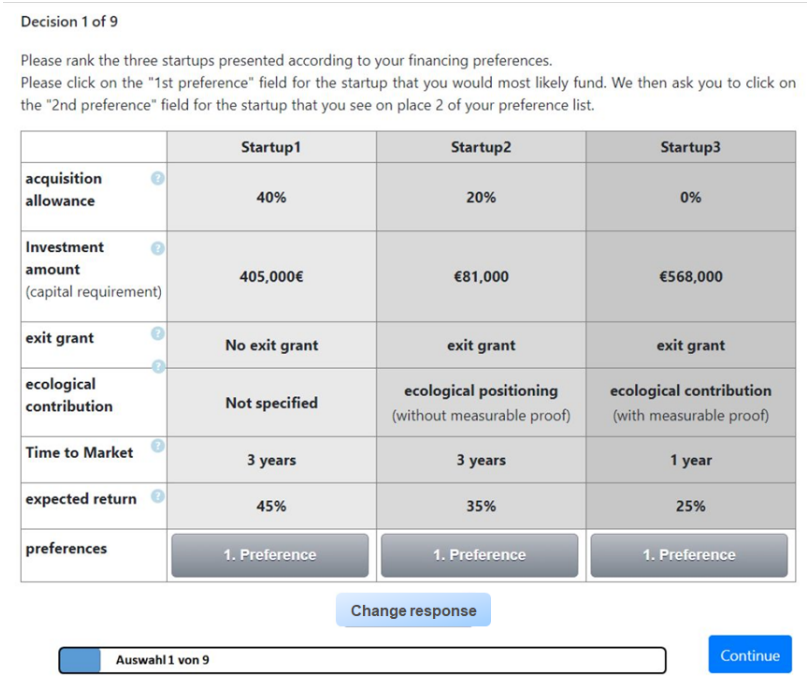
Note: The usual volume invested was inquired prior to the DCE to vary the attribute "volume invested" across a realistic range, being adapted for each investor individually.

We explained these attributes in detail to the investors prior to the DC experiment and emphasized that across all other attributes like the team, development stage, market, or degree of innovation, the presented startups do not differ (see Supplemental Material, Section 1.1). All attributes and attribute levels had been comprehensively evaluated and discussed with practitioners and experts in the field, assuring that they comply in terms of practical relevance. This is particularly the case for the environmental contribution attribute as well as the expected return attribute, i.e., our price attribute. Figure 2 shows an exemplary choice startup investors faced within the DC experiment. The order of attributes and the three startups within a choice are randomized across participating investors to avoid default effects. While taking a decision on the startups, investors had the chance to receive information about each attribute by clicking the blue circle with the question-mark next to the attribute's name. To generate the choice sets, we used the software Stata and followed the approach of Hole (2016), and a block design was used to assure variability within sets. The experiment was programmed by using the programming

[3]The subsidy attributes do not correlate with the environmental contribution attribute and are therefore not confounding our findings.

software 'otree' (Chen et al. 2016). In total, three blocks of 27 choices choice sets were generated, resulting in a total of 81 possible choices being assigned to respondents.
Apart from the DC experiment, the online survey contained a questionnaire at the end of the study. The purpose of the questionnaire was to inquire information about the investors' investment behavior, e.g., their experience in investing in startups, their valuation of patents, the industry they are usually investing in, or whether they invest alone or in a group of investors. In addition, we asked them to provide information about their personal characteristics, like their age and gender, their beliefs about profitability and demand for sustainable products, and their standard economic preferences, e.g., patience, trust, environmental attitudes, or altruism. [4]

Figure 2: Screen shot of an examplary choice presented to investors in the DC experiment



4.3 The discrete choice data

For the econometric analysis of the DC experiment, we used a mixed logit model. Mixed logit models are widely used for the analysis of DC experiments because they are highly flexible and not plagued by the IIA property (McFadden and Train, 2000). The random utility model underlying our analysis is given by the relation

[4] An overview of the variables inquired in the questionnaire is provided in the Supplementary Material, Section 1.4.

$$U_{ijm} = \beta_i' x_{ijm} + \varepsilon_{ijm}. \quad (1)$$

The left-hand side term U_{ijm} describes respondent i's utility from choosing one alternative j out of three $J = 3$ in choice situation m. U is not directly observable, but imposing that respondents will choose the alternative which gives them the highest utility (utility maximization) allows us to learn how the observable attributes in the vector x_{ijm} contribute to an individuals preferences, where x consists of the $K = 6$ different attributes, which are presented in Table 2. While these attributes are observed, learning about their contribution to individuals' utility requires us to estimate the individual specific utility parameter β_i. The term ε_{ijm} is an unobservable random utility component, which is commonly assumed to be i.i.d. with an extreme value type I distribution. In combination with the assumption that respondents maximize utility, this provides a closed-form solution for the choice probabilities which can be conveniently estimated via simulated maximum likelihood (Revelt and Train, 1998).

The discrete choice experiment allows us to observe the choices of startup investors in a controlled environment. This enables us to assess how information provision is capable to influence the investment decisions of startup investors. However, to reach external validity, it is paramount that the choices in our experiment resemble the investment choices in the real world. Therefore, we first introduce the results of the discrete choice experiments and therafter, provide evidence of their external validity.

Table 3 shows the parameter estimates of the mixed logit models for the choice among the three startups respectively. In columns 1 and 2, we present the parameters' mean and standard deviation estimates of the sample that includes all treatments, while columns 3 and 4 report the mean and standard deviation given only observations in the *Baseline* are taken into account.[5] The parameters' mean values in column 1 are all highly significant and point toward the expected directions.[6] The likelihood of investing in a startup increases with the expected return, the ecological contribution, a larger investment subsidy, and the existence of an exit subsidy. Instead, it decreases with the volume required for the investment, and the time until the first profits are generated. The third and fourth columns present the results for the *Baseline* treatment only. When comparing the parameter values, with those of column 1, we observe similar values and significance levels. The only exception is given by the attribute level "environmental contri-

[5] In the treatment *Baseline*, no treatment manipulation has taken place prior to the DCE.

[6] Note that the current model does not estimate the attribute level "Envrionmental contribution without measurable evidence". Based on the evidence from the conditional logit model (see Supplementary Material, Section 2, Table 1), showing that there is a close to zero valuation of this attribute level, we pool this attribute level with the level of a startup having no environmental contribution. We show that there is a minor effect on the estimation of the environmental contribution attribute levels.

bution", which slightly increases when only analyzing the *Baseline* treatment. However, due to the lower sample size, the volume invested as well as the ecological labeling parameters are not significant anymore.

Table 3: DCE estimation results in mixed logit models for the choice among three different startups to invest in

	all treatments		*Baseline*	
	(Mean of parameter)	(Std.Var. of parameter)	(Mean of parameter)	(Std.Var. of parameter)
Volume invested	-0.002***		-0.002**	
	(0.001)		(0.001)	
Expected return	0.074***	0.059***	0.070***	0.052***
	(0.005)	(0.005)	(0.007)	(0.008)
No Contribution/Evidence	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Environmental contribution	1.071***	1.362***	1.220***	1.541***
	(0.096)	(0.099)	(0.177)	(0.177)
1 year	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
3 years	-0.772***	1.087***	-0.789***	1.198***
	(0.083)	(0.093)	(0.151)	(0.158)
0%	-1.017***	0.846***	-0.898***	1.104***
	(0.093)	(0.117)	(0.174)	(0.197)
20%	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
40%	0.520***	0.684***	0.662***	0.799***
	(0.070)	(0.093)	(0.125)	(0.159)
No exit subsidy	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Exit subsidy	0.832***	0.432***	0.834***	0.060
	(0.078)	(0.156)	(0.128)	(0.323)
Observations	10017	10017	3564	3564
	Mean WTP estimate (based on the expected return)			
Volume invested	0.02580		0.0318	
No environmental contribution	-		-	
Environmental contribution	-14.41		-17.42	
Time to market: 1 years	-		-	
Time to market: 3 years	10.39		11.27	
No investment subsidy	13.69		12.83	
Investment subsidy of 20%	-		-	
Investment subsidy of 40%	-7.005		-9.46	
No exit subsidy	-		-	
Exit subsidy	-11.20		-11.92	

Note: We use data across 9 choice sets as a basis for the estimation of the mixed logit model. The left part of the table presents the estimation results for the entire sample. The right part of the table presents the estimation results for the *Baseline* treatment only. The parameter estimates of the explanatory variables are displayed in the upper part of the table. We report mean values and standard deviation for the random parameters and mean values only for the fixed parameters. Standard errors are reported in parentheses with significant levels reported as follows: * $p < 0.05$, ** $p < 0.01$, ***. The lower part of the table presents the mean willingness to pay (WTP) based on our price variable ("expected return"). We calculated the WTP by dividing the negative mean of the respective parameter by the mean of the "expected return" variable.

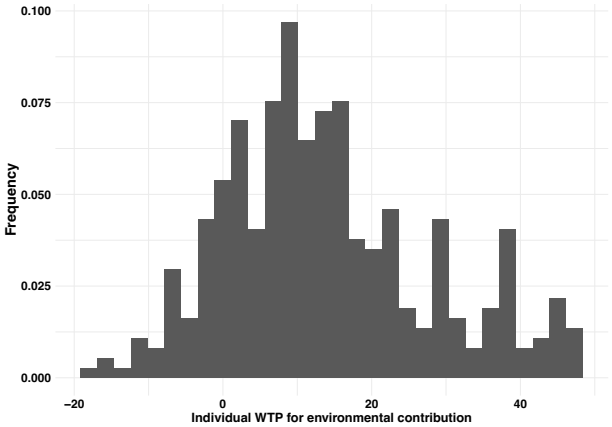
To provide further economic meaning to our variables, we also estimated the WTP for each parameter in the bottom of Table 3. From this, we can observe that our results are strongly confirmed by the willingness to pay estimates. We find the strongest willingness to pay for the environmental contribution attribute. According to our results, investors are willing to sacrifice between 14 to 17 percent of expected return in order to support a startup that makes a beneficial contribution to the environment. The size of this willingness to pay is high considering that the expected returns varied from 15 to 45 percent and that we expected a lack of funding for green startups. Besides, we observe a large willingness to pay for investing in a startup that generates first profits rather early. Investors are willing to sacrifice about 13 percent of expected returns to obtain first profits after the first year already instead of waiting two additional years. Regarding the subsidies for investments, we observe that the willingness to pay for these policies is relatively lower than their effect of returns. For a 20 percent investment subsidy, investors are only willing to give up 13 percent of expected returns. Also, for being exempted the captial tax of 25 percent through the exit subsidy, investors are only willing to sacrifice 12 percent of expected returns. These results are in line with other results in the literature showing subsidies to be an insufficient replacement of actual gains (e.g., Marino et al. 2016; Michalek et al. 2016; Serrano-Velarde 2008).

Our main estimation result of interest is given by the ecological contribution attribute. With respect to this attribute, we observe that a simple label without factual evidence of the contribution is not highly valued by investors as it increases the WTP for this attribute only slightly in column 1 and becomes even negative in column 2. Instead, an evidential environmental contribution of startups leads to substantial increases in the WTP. This hints towards a strong focus of investors on impact investments when deciding to invest in a green startup. Labeling a startup as sustainable without being able to provide sufficient evidence for this, is, however, not likely to increase the probability of funding for startups.

Apart from the valuation for environmental contributions of startups being averaged across investors, we use the DCE data to determine the respective individual willingness to pay (WTP) for an environmental contribution of startups. To estimate this, we use the individual specific utility contributions β_i, obtained by the stata command written by Hole (2013). For each investor, this gives us their valuation of the environmental attribute based on the $M = 9$ consecutive choices made. Since we are only interested in investors' preferences on startups with a measurable environmental contribution, we calculate the respective individual parameter based on a model, in which the environmental attribute is a dummy with a zero in case of no contribution or a non-measurable contribution, and one in case of a measurable environmental contribution. We divided the environmental betas by the mixed logit's coefficient for the return rate to obtain the WTP, i.e., the willingness of investors to give up return to invest in a green startup (in percentage

points of return). The distribution of the WTP is reported in Figure 3. The distribution's median is at 12 percent with a range from -17 to 48 percent in return.

Figure 3: Distribution of the individual WTP for the environmental contribution of startups



Note: The data is based on individual parameter estimates of the attribute "environmental contribution (with measurable evidence)". We used the variation of choices across the 9 choice sets to calculate the parameter for each investor. We divided the parameter by the expected return parameter to obtain the individual WTP. Thus, the horizontal axis denotes the willingness of investors to give up return to invest in a green startup (in percentage points of return).

4.4 Data on investors' green portfolio shares

To determine investors' *Green portfolio share*, we rely on data from the Mannheim Enterprise Panel.

For each investor in our DC experiment, we obtained the MUP's unique identifier code and identified the companies, the investors had invested in. Given this data, we calculated the share of green startups in the investment portfolios of our investors, *Green portfolio share*.[7] The data on the actual portfolios of the investors finds application in three parts of our analysis. First, in comparing the share of green startups in their portfolios with the individual willingness to pay for green startups in the discrete choice experiment to assess the external validity of the decisions in the DCE. Second, in regressing the share of green startups in investors' portfolios on their individual characteristics and preferences and the investment behavior indicated in the questionnaire of our survey. Third, we observe the change in the share of green startups in the

[7]We used a two-step procedure to identify green startups. First, we used a comprehensive list of words related to environmental topics (see Supplementary Material, Section 4) to assess possible matches with the description of the companies in our data. Second, three different researchers individually assessed whether the companies qualified as green startups based on the categorization used in Gubanova et al. (2015). The list-method correctly predicted green startups in 61% of cases and correctly predicted conventional startups in 78% of cases. The distribution of the *Green portfolio share* variable is presented in the Supplementary Material, Section 3.

investment portfolios of the investors after having taken part in our study to assess the long-term effect of our treatment manipulations.

To be able to assess the response of startup investors to our information treatments, it is paramount to assure external validity of the choices made in the DC experiment. We investigate this by analyzing to which degree the investors' choices in the DC experiment resemble their actual investments into green startups, i.e., the share of green startups in their portfolio.

Table 4: Correlation between green startups in investors' portfolios and environmental choices in DCE

	Dependent variable:							
	Portfolio share: green invest.							
	all treatments		all treatments		*Baseline*		*Baseline*	
	coef.	AME	coef.	AME	coef.	AME	coef.	AME
Individual env. wtp	0.027*	0.0020*	0.038*	0.0025*	0.053**	0.0037*	0.077**	0.0042***
	(0.010)	(0.001)	(0.016)	(0.001)	(0.020)	(0.002)	(0.028)	(0.001)
Constant	−0.558***		−0.512		−0.612**		−0.068	
	(0.108)		(0.639)		(0.196)		(1.063)	
Control Variables			X				X	
Observations	306		255		115		95	
Log Likelihood	−168.787		−115.694		−59.623		−32.917	

Note: The dependent variable is given by the share of green startups in the portfolios of investors according to the data in the MUP. The main explanatory variable is given by the individual parameter estimates of WTP for the environmental contribution attribute in the DCE. We use a Fractional Response Model, since the data is censored ([0,1]), to estimate the respective dependence. Column 1 and 2 presents the estimation results for the regression using the entire sample of participants. Column 3 and 4 additionally control for the influence of a wide range of other co-variates. Column 5 and 6 uses participants from the *Baseline* treatment only and column 7 and 8 repeat that estimation including also control variables. AME indicates the values for the average marginal effects. The full regression table can be retrieved from Table 2 in the Supplementary Material, Section 2. Standard errors are robust and statistical significance is reported as follows: * $p < 0.05$, ** $p < 0.01$, ***.

Table 4 reports the correlation coefficient of the investors' preferences for green startups in the DC experiment, i.e., the correlation between the individual environmental WTP and the share of green startups in their investment portfolios. The regression estimates show that an increase in the willingness to give up one percentage point of return correlates with a 0.002 higher share of green startups in the investors' portfolio on average (p=0.0331). In columns 2, 3, and 4 this value increases up to 0.0042 proving the result to be robust to the inclusion of a large range of control variables (p=0.0335) and the restriction of the sample to the observations in *Baseline* only (p=0.0077; p=0.0060). These results confirm that the choices of startups made by investors are capable of resembling their actual real-world investment choices.

4.5 Sample characteristics

In total, we have 371 investors in our sample. Of those, 132 are in the *Baseline* treatment, 94 in the *Peer* treatment, 84 in the *Peer update* treatment, 22 in the *Public* treatment, and 39 in the *Public update* treatment.[8]

We report the sample characteristics in Table 5. We observe the average investor in our sample to be male (91%) and about 55 years old. This reflects the typical profile of angel investors of being middle aged men (Morrissette 2007). The share of green startups in the investors' portfolios is on average 8 percent. On a scale from zero, not environmentally concerned, to five, highly environmentally concerned, the investors in our sample score an average of 3.65 indicating that the majority is rather environmentally concerned. The average amount invested into green startup ranges at 186,163 EUR with a mediann value of 50,000 EUR. Our the investors are relatively experienced having been active as investors for eight years on average. Not surprisingly, the investors are rather risk-seeking. On a scale from zero, not risk seeking at all, to ten, very risk-seeking, the average investor reaches a seven. In addition, investors are rather patient by tending to answer set 26 in the patience elicitation task of Falk et al. (2018), in which zero means to be not patient at all and 32 means to be very patient. The analyzed sample characteristics do not significantly vary across treatments (see Supplementary Material, Section 4, Table 8).[9]

Table 5: Sample characteristics

	Mean	**Median**	**Std. Dev.**	**Min**	**Max**
Age	54.91	55	10.08	28	87
Male	0.91	1	0.28	0	1
Portfolio share green	0.08	0	0.2	0	1
Env. Attitudes	3.65	3.67	0.48	2.33	4.67
Average amount inv.	186,163	50,000	1,095,895	1,000	15,000,000
Experience	8.01	6	6.95	1	43
Risk	7.33	8	1.82	1	11
Patience	25.89	29	7	1	32

Note: The table reports the mean, median, standard deviation, minimum, and maximum values of the parameters age, male, portfolio share green, environmental attitudes (Likert scale from 0, low env. attitudes, to 5, high env. attitudes), average amount invested (in EUR), experience (in years), risk (Likert scale from 0, fully risk avers, to 10, fully risk seeking), and patience (Scale from 0, fully impatient, to 32, fully patient) pooled across treatments.

[8] Since the focus of the study is on the influence of investors by other investors' decisions, the *Public* treatments take the purpose of a comparison treatment to assess the responsiveness to other kinds of information. Therefore, the sample size in the *Public* treatments is substantially lower

[9] As an exception, in the treatment *Peer update*, investors are slightly more patient than in the other treatments. We account for this by controlling for co-variates in the regression analysis.

5 Results

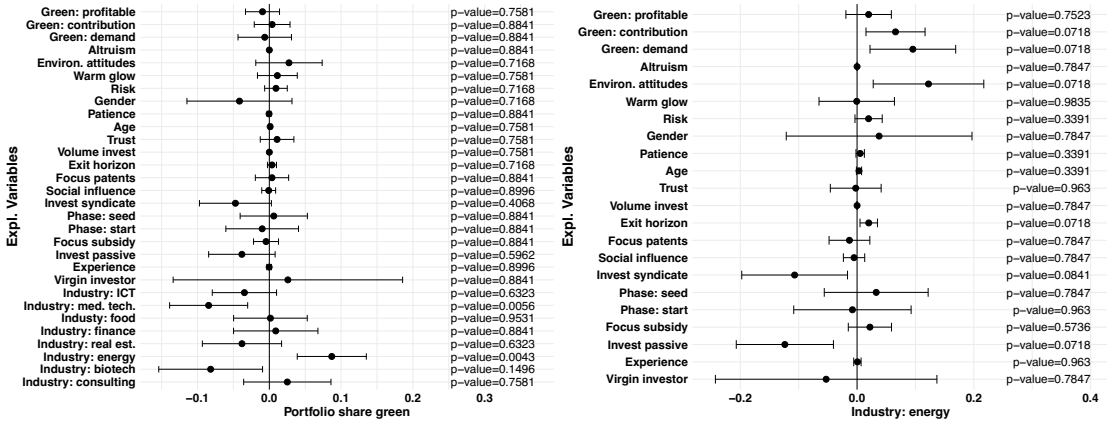
5.1 Static determinants of investments in green startups

To investigate how investors make investment decisions in startups, we assess the static relationship in a first step. We analyze how individual characteristics, preferences, beliefs, and investment behavior determine the share of green startups in the investors' portfolios.
Figure 4 shows the coefficients from a regression of a variety of characteristics on the shares of green startups in the portfolio of investors in Figure (a) and on whether the startup investors are mainly investing in the energy industry or not in Figure (b).

Figure 4: Determinants of the share of green startups in the investors' portfolios

(a) Determinants of the share of green startups in the portfolios

(b) Determinants of investing in the energy industry



Note: The estimates can be retrieved from Table A1 and A2 in the appendix. Panel (a) uses the variable *green portfolio share* as a dependent variable, which is regressed on each explanatory variable in individual Fractional Response Model-regressions using robust standard errors. Panel (b) uses the variable *Industry: energy* as a dependent variable, which is regressed on each explanatory variable in an individual Probit-regression with robust standard errors (average marginal effects displayed). The explanatory variables are retrieved from the post-questionnaire part of our survey experiment (see Supplementary Material, Section 1.4). All estimates have been adjusted for multiple hypothesis testing using the Benjamini-Hochberg procedure.

Figure (a) shows little variation with respect to the explanatory variables. The first three variables assess the influence of the investors' beliefs on the profitability, the social contribution, and the development of the demand for green startups. The following eight variables show the impact of individual characteristics and preferences like environmental preferences or gender. The

figure reveals that none of these variables reach statistical significance at conventional levels. Besides, we investigate the influence of the investment behavior on the share of green startups in the investors' portfolios, including, for instance, the volume invested, their exit horizon, or whether they invest passively or in lead function. With the exception of volume invested, these variables are not capable of determining the investment behavior in green startups. Lastly, we analyze whether the industry, in which investors usually invest, correlates with the share of green startups in the portfolios. Within this group of variables, we observe a large variation. Investing in the medicine industry reduces the share of green startups in the portfolio (p=0.0056), whereas being active in the energy industry increases the share respectively (p=0.0043).
Since the energy industry appears to have a strong predictability concerning the investments in green startups, we analyze the determinants of whether investors make investments mostly in the energy industry in Figure (b). We observe that having higher environmental attitudes (p=0.0718), believing that startups provide a substantial contribution to the sustainable development (p=0.0718), and believing that the demand for environmental products will increase throughout the next years (p=0.0718) increase the likelihood of investing in the energy industry. This evidence shows two main drivers of engaging in sustainable energy startups. First, investors have higher expectations about the future development of green startups compared to conventional ones, i.e., they are driven by strategic considerations. Second, they are more concerned about the environment, i.e., they are driven by intrinsic motivation to improve the state of the environment.

5.2 Dynamic determinants of investments in green startups

5.2.1 Investment response to information on peer and institutional behavior

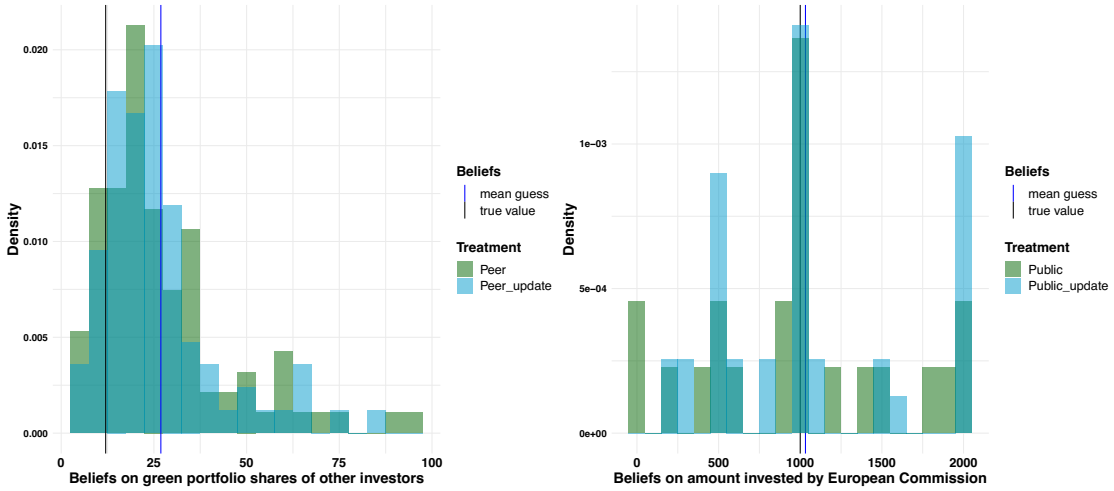
After having provided evidence that the environmental contributions of startups matter in the investment choice of investors in case startups operate in the energy industry and that the choices in our DC experiment have a sufficient degree of external validity, we next conduct an analysis of how information provision affects investment choices.
In a first step, we investigate the prior beliefs of investors on the share of green startups within other investors' portfolios and the yearly amount of provided funds for startups by the European Commission and how they align with the actual values. Figure 5 shows the respective distributions of the beliefs of investors, the mean of the belief (blue), and the true value (black). The two distributions in Figure (a) represent the beliefs in the treatments *Peer* and *Peer update*. On average, investors overestimate the share of green startups in German investors' portfolios by about 15 percentage points with a mean of 27 percentage points and a median of 23 percentage

points.[10] Thus, the belief update in the treatment *Peer update* corrects the investors' beliefs downwards in the majority of cases.

Figure (b) shows the distribution of prior beliefs on the yearly amount provided by the European Commission for primarily green startups in treatments *Public* and *Public update*. The distributions are rather similar and peak at 500 mil EUR, 1000 mil EUR, and 2000 mil EUR. On average, participants have correct beliefs about the true amount provided by the European Commission.[11] However, since the beliefs are widely dispersed, there is substantial room for belief updating on an individual level in the treatment *Public update*.

Figure 5: Distribution of prior beliefs

(a) Treatment *Peer* and *Peer update* **(b)** Treatment *Public* and *Public update*



Note: The figure shows the distribution of prior beliefs across treatments. Panel (a) shows the distribution of prior belief in the treatments *Peer* (green) and *Peer update* (blue). The vertical blue line shows the mean beliefs of investors across both treatments. Panel (b) shows the distribution of prior belief in the treatments *Public* (green) and *Public update* (blue). The vertical blue line shows the mean beliefs of investors across both treatments. In both panels, the vertical black line shows the actual value. Prior beliefs in *Peer* and *Peer update* do not significantly differ from each other (MW-U test, p=0.9895). The same is the case for prior beliefs in the *Public* and the *Public update* treatments (MW-U test, p=0.6862) (see Table A3).

To analyze how the belief question and the respective updates affected the decisions of in-

[10]The blue line represents the average beliefs in both treatments, *Peer* and *Peer update*. The averages differ only marginally between the two treatments (Wilcox-Ranksum-Test, p=0.9895, see Table A3 in the Appendix)

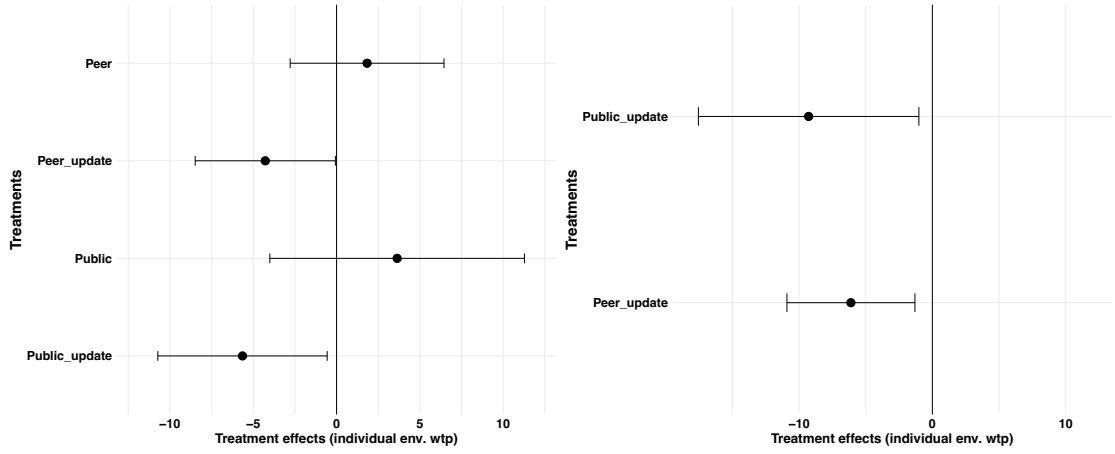
[11]The averages differ only marginally between the two treatments (Wilcox-Ranksum-Test, p=0.6862, see Table A3 in the Appendix)

vestors in startups in the DC experiment, we investigate the variation between treatments with a focus on the WTP for green startups. Figure 6 shows the size and confidence intervals of the treatment indicators of the regression analyzing the treatment variation in the individual environmental WTP variable. The depicted coefficients are based on regressions that include a comprehensive set of control variables, in particular, the *green portfolio share* variable along with their interaction terms for each treatment (see Tables A4, A5, A6 in the Appendix). Figure (a) uses the individual environmental betas in the respective treatments in comparison to the *Baseline* condition. From the coefficients of the variables *Peer* and *Public*, we observe that providing the request to guess the share of green startups in other investors' portfolios or the yearly investments of the European Commission into startups slightly raises the WTP for the *environmental contribution* attribute, although not to significant degrees (*Peer*: p=0.3755, *Public*: p=0.3272). Thus, we cannot reject hypotheses 1a and 2a. The coefficients *Peer update* and *Public update* indicate the variation in the valuation of the environmental contribution of startups after having updated the investors' beliefs on the respective topics.

Figure 6: WTP for the environmental contribution attribute by treatments

(a) Comparison with *Baseline* treatment

(b) Comparison with the respective information treatment (without updating)



Note: The treatment effects are retrieved from regression estimates presented in Tables A4, A5, and A6 in the Appendix. The dependent variable is given by the individual valuation parameter of the environmental contribution attribute in the DCE. The main explanatory variables are given by the respective treatment indicators. Each estimate uses robust standard errors. The error-bars show the 95%-confidence intervals.

We observe that the updating of the investors' beliefs reduced the willingness to let return forgo in order to finance green startups by 4.28 percentage points in the *Peer update* treatment

(p=0.0124) and 5.64 percentage points in the *Public update* treatment (p=0.0267). Based on these results, we cannot reject hypothesis 1b, but reject hypothesis 2b, since we observe the opposite effect as conjectured in the hypothesis.

In the *Peer update* treatment, the vast majority of investors overestimated the share of green startups in the German investors' portfolios. This created substantial room for the downward updating of the investors' prior beliefs. In Table 6, we assess if the degree of downward updating of the beliefs influenced the extent to which investors reduced their valuation of the environmental contribution attribute level. In columns 1 and 2, the individual environmental WTP are regressed on the beliefs on the shares in the *Peer update* treatment. We observe a significant and negative effect for the prior belief variable both in the simple regression and when controlling for a range of additional covariates (Prior belief: column 1, p=0.0208; column 2, p<0.0001).[12] This implies that investors whose prior beliefs on the share of green startups in German investors' portfolios are largely upward biased and therefore experience a stronger belief update, also reduce their valuation to a larger extent than investors with beliefs closer to the true value. This supports our hypothesis that the belief updating on the behavior of other German investors led to the change in decision-making of the participating investors in the DC experiment, i.e., the overestimation of the sustainable behavior of other investors led to a reduction of investments in green startups on average. This can be caused by two distinct mechanisms. Either the investors are influenced by social utility, i.e., to comply with social norms (Bicchieri and Dimant 2022; Bursztyn et al. 2014) or social learning takes place as they perceive the information as a signal of profitability and adjust investment decisions accordingly (BenSaïda et al. 2015; Georg 2014; Bursztyn et al. 2014). To provide evidence, we analyze to which degree investors put emphasis on other investors' decisions when making an investment. We repeat the regression in column 1 of Table 6 using subsamples based on a median-split of the influentiability variable. Interestingly, we observe that also those investors who state to act rather independently of other investors' choices strongly respond to the belief updating (p=0.0494, Table 6 in the Appendix). This result provides support for the social learning hypothesis. For the social utility conjecture to be affirmed, it should have been the investors who make investments decisions based on the behavior of their peers to respond the strongest to the belief updating interventions.

In the *Public update* treatment, the reduction in the valuation of the environmental contribution attribute level is less intuitive. From the analysis of the prior beliefs on the European Commissions' sustainable investment strategy, we obtained that investors' beliefs are on average in line with the true value. However, since the guesses are widely dispersed, there is room for belief updating on the individual level. Columns 3 and 4 of Table 6 show that, in the treatment *Public*

[12]Note that this effect is not driven by the prior beliefs of the investors or by the process of the belief elicitation itself, since Table 7 in the Supplementary Material, Section 2, reports non-significant effects for the prior belief variables.

update, an increase of the prior belief about the investments provided by the European Commission by one million EUR increases the willingness to let 0.004 to 0.006 percentage points of return forgo on average. This effect is only significant when additionally controlling for Green portfolio shares (Prior belief: column 3, p=0.0519; column 4, p=0.1613).[13] To shed further light on this result, we assess how the valuation of investments changes given the beliefs are either upward or downward updated in the *Public update* treatment. An upward update of prior belief by one million EUR of public investments tends to not significantly reduce the willingness to give up return by 0.017 percentage points (p=0.4258, Table A8 in the Appendix), while a downward adjustments in prior beliefs increase this willingness by 0.011 percentage points on average (p=0.0384, Table A8 in the Appendix). Although the results should be interpreted carefully due to the low sample size, the findings point towards a crowding out of investors' venture capital in green startups by public investments.

Table 6: Influence of belief updating on the valuation of the individual environmental WTP

	Dependent variable:			
	Individual env. wtp			
	(*Peer update*)	(*Peer update*)	(*Public update*)	(*Public update*)
Prior belief	-0.209^{*}	-0.518^{***}	0.006^{*}	0.004
	(0.088)	(0.061)	(0.003)	(0.003)
Green portfolio share	2.446	10.129^{*}	22.232^{***}	18.812^{**}
	(7.561)	(5.075)	(4.254)	(6.466)
Constant	14.810^{***}	-7.039	3.707	-11.785
	(2.567)	(19.632)	(3.149)	(21.353)
Control Variables		X		X
Observations	60	54	28	24
R^2	0.095	0.806	0.347	0.444
Adjusted R^2	0.063	0.509	0.294	0.147

Note: Full regression estimate results provided in Table 6 in the Supplementary Material, Section 2. The table presents the OLS-regression result, regressing the individual valuation parameter of the environmental contribution attribute in the DCE on the prior beliefs of investors' in the treatments Peer update (in percentage points in columns 1 and 2) and the Public update treatment (in million EUR in column 3 and 4). In columns 2 and 4, we additionally control for the influence of a range of different other co-variates. Robust standard errors in parentheses. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

5.3 Long-term effects

To measure the long-term effects of our treatment manipulation on the investment behavior of the investors, we analyzed the investments taken by the investors in the eight month after the

[13] Note that this effect is not driven by the prior beliefs of the investors or by the process of the belief elicitation itself, since Table 7 in the Supplementary Material, Section 2, reports effects pointing to the other direction for prior beliefs in the *Public* treatment.

experiment through the data provided in the MUP.
Table 7 presents this data, showing the decisions of the investors who have taken investments during this period. Due to the short time period, the number of observations is comparably low, since the number of investors who have been active during this period is only 14. These investors took an average of 2.57 investment decisions and the average share of green startups of these investments is only two percent. The latter value is substantially lower than the average of eight percent in the portfolios of the investors prior to the experiment. Only in the *Peer* treatment, investors invested in green startups. However, the evidence remains suggestive, since we cannot draw statistically sound conclusions regarding the long-term effects of our treatment manipulations.

Table 7: Investments taken by investors after the experiment (April to December 2022)

Treatment	N Investors	N Investments	Green portfolio share
Baseline	5	14	0
Peer	5	10	0.07
Peer update	4	12	0
Public	0	0	0
Public update	0	0	0
Total	14	36	0.02

Note: The table provides descriptive results regarding the investments taken by investors after the experiment, i.e., in the period from April to December 2022. The table contains the treatment the investor was assigned to (Treatment), the number of investments taken within the period (# Investments), and the share of green startups among these investments (Green portfolio share).

6 Conclusion

We investigate the malleability of the investors' behavior in terms of investing in green startups. We assess how the decisions of business angel investors of whether to invest in green startups are influenced by i) individual factors, ii) social information about other investors' investments, and iii) institutional information about public investments.
Our results show that the large majority of investors have a substantial positive willingness to pay for green startups. Their individual characteristics, preferences, and beliefs have only a small influence on investments in green startups. However, the selection into investment activities in the energy industry, where most green startups are active, are among others determined by the beliefs in the future profitability of the respective products as well as the environmental concerns of investors. On the dynamic determinants of investment decisions in green startups, we find belief updating of investors about the share of green startups in other German startup investors' portfolios to significantly reduce investors' WTP for green startups. Also, updating investors' beliefs about the provision of investments in green startups by public institutions leads to a crowding out effect of investors' venture capital engagement in green startups.

The analysis is based on a rich set of data, using an online survey with 374 German startup investors taking part in a discrete choice experiment and a questionnaire inquiring their characteristics, preferences, beliefs, and investment behavior of the investors. We combine this data with information from the Mannheim Enterprise Panel provided us with the actual investment portfolios of the investors taking part in our online survey. This enables an analysis of the determinants and influences of investments in green startups while assuring external validity of the results. To investigate how investors respond to an update of their beliefs on the behavior of other German startup investors or regarding funding provision by public institutions, we introduced treatment manipulations prior to the discrete choice experiment. Regarding the treatment manipulations on the peer effects, we elicited their beliefs on the share of green startups in German startup investors' portfolios and also updated them on the true value depending on treatment assignment. With respect to the treatment manipulation of information about the provision of public funding, we elicited the investors' beliefs about the amount yearly provided by the European Commission for primarily green startups and updated them on the true value if having been assigned to the respective treatment.

Our results have implications for policymakers and practitioners in the field of sustainable venture capital. Our static analysis of determinants of sustainable investment decisions has shown that engaging in the energy industry, where many green startups are active, is partly driven by the investors' own values regarding the environment, but also by their expectations about the future demand for sustainable products. This implies that policymakers must support and strengthen these beliefs by issuing legislation that facilitates and fosters the success of sustainable products. Moreover, we observed that the decisions of other investors regarding the investment in green startups matter with respect to making an equivalent investment. Based on the evidence of our sample, startup investors tend to overestimate the actual share of investments in green startups. This might have different reasons: green startups gain large attention currently due to their role in mitigating CO2-emissions and climate change impacts. Also, investors who have green startups in their portfolios might be more likely to talk about them in order to gain public recognition or due to enhanced public interest. This strong attention on green startups might have biased investors' beliefs about the true extent of investments in green startups. Our results have shown that for policymakers implementing a policy fostering the transparency of the existing venture into green startups is likely to backfire. Instead, most likely through the current biased attention on green startups, the investors have inflated their beliefs about the venture capital being invested sustainably, which appears to be beneficial for the environmental cause. Our results also call for caution regarding the announcement of public provision of funds to foster green startups. Although public funding leads to enhanced provision for those startups, they tend to be a substitute for private venture capital. Therefore, policymakers face a trade-off between using

public money to increase venture capital and evoking a drawback from private investors into green startups. Thus, it might be a better strategy to foster green startups by other means than public money, e.g., by reducing the bureaucratic burden or providing better channels to match startups with private investors.

Our study has limitations as there is only a limited amount of German startup investors, who take the role of business angel investors. Venture capital investors are, however, not included in the study. Although the response rate in our online survey was comparably high (e.e., Sakshaug et al. 2019), we face low sample sizes in our study which prevents us from identifying sub-sample effects with strong statistical power. This is aggravated by non-responses to certain questions in the questionnaire since we could not force investors to provide answers to our questions. Therefore, we encourage replications of our results on larger sample sizes of startup investors to gain certainty on the robustness of our findings.

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Appendix

Table A1: Determinants of sustainable start up shares within investors' portfolios

Varname	Coefficients	AME	logLik
Green: profitable	-0.124	-0.0095	-3528.4982
	(0.1563)		
Green: contribution	0.0508	0.0039	-3519.9302
	(0.1656)		
Green: demand	-0.0835	-0.0064	-3522.5253
	(0.2474)		
Altruism	0.0001	0	-3552.0981
	(0.0001)		
Environ. attitudes	0.3602	0.0274	-3549.9637
	(0.306)		
Warm glow	0.1446	0.0112	-3513.1677
	(0.183)		
Risk	0.1192^{+}	0.0092	-3520.0816
	(0.1046)		
Gender	-0.5383	-0.0416	-3525.2239
	(0.4808)		
Patience	-0.0049	-4.00E-04	-3518.684
	(0.0182)		
Age	0.0145	0.0011	-3522.836
	(0.0147)		
Trust	0.139	0.0108	-3515.9263
	(0.1524)		
Volume invest	0.00004	0	-3584.2517
	(0.00003)		
Exit horizon	0.0484	0.0037	-3537.6445
	(0.0428)		
Focus patents	0.0485	0.0037	-3534.7867
	(0.1551)		
Social influence	-0.0115	-9.00E-04	-3515.7542
	(0.0638)		
Invest syndicate	-0.624	-0.0472	-3556.9704
	(0.3242)		
Phase: seed	0.0821	0.0062	-3550.7256
	(0.3169)		
Phase: start	-0.1324	-0.01	-3549.5251
	(0.344)		
Focus subsidy	-0.0603	-0.0046	-3532.9553
	(0.115)		
Invest passive	-0.5025	-0.0382	-3548.7241
	(0.3049)		
Experience	-0.0035	-3.00E-04	-3543.038
	(0.0214)		
Virgin investor	0.3412	0.0258	-3544.6784
	(1.0719)		
Industry: ICT	-0.4625*	-0.0347	-3569.114

	(0.3058)		
Industry: med. tech.	-1.1403***	-0.0845	-3705.3132
	(0.3205)		
Industy: food	0.0204	0.0015	-3547.4091
	(0.3479)		
Industry: finance	0.1184	0.0089	-3548.9278
	(0.3983)		
Industry: real est.	-0.5068	-0.0381	-3557.6389
	(0.3499)		
Industry: energy	1.1875***	0.087	-3683.6797
	(0.3125)		
Industry: biotech	-1.091*	-0.0817	-3613.5477
	(0.4483)		
Industry: consulting	0.3329	0.025	-3553.3582
	(0.4131)		

Note: The estimates use the variable *green portfolio share* as a dependent variable, which is regressed on each explanatory variable in individual Fractional Response-Model regression using robust standard errors. The explanatory variables are retrieved from the post-questionnaire part of our survey experiment (see Supplementary Material, Section 1.4). Robust standard errors in parentheses. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

Table A2: Determinants of investing in energy industry

Varname	Coefficients	Average Marginal Effects	LogLikelihood
Green: profitable	0.0656	0.01978	-192.8
	(0.0742)		
Green: contribution	0.2212 *	0.06584	-189.45
	(0.0884)		
Green: demand	0.3215*	0.09553	-190.27
	(0.1338)		
Altruism	0.00005	4.56E-06	-192.77
	(0.00003)		
Environ. attitudes	0.4158	0.1223	-172.21
	(0.1675)		
Warm glow	-0.002	-0.0006058	-188.92
	(0.0973)		
Risk	0.066	0.01973	-187.7
	(0.0423)		
Gender	0.1254	0.03775	-188.81
	(0.2698)		
Patience	0.0179	0.005301	-184.43
	(0.0117)		
Age	0.011	0.003302	-187.28
	(0.0074)		
Trust	-0.0076	-0.002294	-191.68
	(0.0753)		
Volume invest	-3.76E-08	-1.13E-08	-198.33
	(-3.78E-08)		
Exit horizon	0.0674*	0.01997	-190.2
	(0.0265)		
Focus patents	-0.0433	-0.01304	-195.45
	(0.0627)		
Social influence	-0.0171	-0.005186	-192.23
	(0.0306)		
Invest syndicate	-0.3593 *	-0.1069	-193.12
	(0.158)		
Phase: seed	0.109	0.03276	-198.19
	(0.1512)		
Phase: start	-0.0264	-0.007954	-198.44
	(0.1704)		
Focus subsidy	0.0731	0.02199	-195.06
	(0.065)		
Invest passive	-0.4182*∗	-0.1237	-191.38
	(0.1474)		
Experience	0.002	0.0005929	-195.15
	(0.0104)		
Virgin investor	-0.1751	-0.05295	-195.01
	(0.3203)		

Note: The estimates use the variable *industry: energy* as a dependent variable, which is regressed on each explanatory variable in individual Probit-regressions using robust standard errors. The explanatory variables are retrieved from the post-questionnaire part of our survey experiment (see Supplementary Material, Section 1.4). Robust standard errors in parentheses. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

Table A3: Mean, Median, and Standard Deviation of prior beliefs across treatments

	Peer + Peer update	**Peer**	***Peer update***	**Public + *Public update***	**Public**	***Public update***
mean	26.88	26.26	27.43	1031.99	1053.85	993.25
median	22.75	25	21.25	1000	1000	1000
Std.Dev.	17.05	15.73	18.22	587.47	588.86	596.76

Note: In the Peer and Peer update treatments, we inquired prior beliefs on the average share of green startups in the portfolio of other German startup investors. The possible answers ranged from 0-100 percent. In the Public and Public update treatments, we inquired prior beliefs about the capital provided yearly by the European Commission as part of the European Green deal to fund primarily green startups. The possible range of entries varies from 0 EUR to 2 billion EUR.

Table A4: Treatment effects in comparison to *Baseline*

	Dependent variable:	
	Individual env. wtp	
	(1)	(2)
Peer	2.443	1.832
	(2.195)	(2.342)
Public	2.620	3.635
	(3.359)	(3.876)
Peer update	-3.906^{*}	-4.278^{*}
	(1.984)	(2.134)
Public update	-3.874^{+}	-5.644^{*}
	(2.232)	(2.578)
Peer x Green portf. share	23.451^{***}	23.315^{***}
	(6.310)	(5.182)
Public x Green portf. share		-0.205
		(1.056)
Peer update x Green portf. share		0.654
		(0.867)
Public update x Green portf. share		3.158^{+}
		(1.775)
Constant	13.304^{***}	-30.699^{**}
	(1.398)	(11.317)
Control Variables		X
Observations	306	255
R^2	0.083	0.287
Adjusted R^2	0.055	0.158

Note: Estimates based on an OLS-Model. The dependent variable is given by the individual valuation parameter of the environmental contribution attribute in the DCE. The main explanatory variables are given by the respective treatment indicators. Full estimation results can be retrieved from Table 3 in the Supplementary Material, Section 2. Robust standard errors in parentheses. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

Table A5: Treatment effects in comparison to *Peer*

	Dependent variable:	
	Individual env. wtp	
	(1)	(2)
Baseline	−2.443	−1.832
	(2.195)	(2.342)
Public	0.177	1.804
	(3.492)	(4.017)
Peer update	−6.349**	−6.109*
	(2.202)	(2.435)
Public update	−6.317**	−7.476**
	(2.427)	(2.748)
Baseline x Green portf. share	2.799	−3.694
	(8.333)	(16.304)
Public x Green portf. share		−0.205
		(1.056)
Peer update x Green portf. share		0.654
		(0.867)
Public update x Green portf. share		3.158+
		(1.775)
Constant	15.747***	−28.867**
	(1.693)	(10.590)
Control Variables		X
Observations	306	255
R^2	0.083	0.287
Adjusted R^2	0.055	0.158

Note: Estimates based on an OLS-Model. The dependent variable is given by the individual valuation parameter of the environmental contribution attribute in the DCE. The main explanatory variables are given by the respective treatment indicators. Full estimation results can be retrieved from Table 4 in the Supplementary Material, Section 2. Robust standard errors in parentheses. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

Table A6: Treatment effects in comparison to Public

	Dependent variable:	
	Individual env. wtp	
	(1)	(2)
Baseline	−0.177	−1.804
	(3.492)	(4.017)
Peer	−2.620	−3.635
	(3.359)	(3.876)
Peer update	−6.526^{+}	−7.913*
	(3.363)	(3.864)
Public update	−6.494^{+}	−9.280*
	(3.515)	(4.195)
Baseline x Green portf. share	−10.527	−8.183
	(8.671)	(11.341)
Peer x Green portf. share		−0.205
		(1.056)
Peer update x Green portf. share		0.654
		(0.867)
Public update x Green portf. share		3.158^{+}
		(1.775)
Constant	15.924***	−27.064*
	(3.054)	(11.423)
Control Variables		X
Observations	306	255
R^2	0.083	0.287
Adjusted R^2	0.055	0.158

Note: Estimates based on an OLS-Model. The dependent variable is given by the individual valuation parameter of the environmental contribution attribute in the DCE. The main explanatory variables are given by the respective treatment indicators. Full estimation results can be retrieved from Table 5 in the Supplementary Material, Section 2. Robust standard errors in parentheses. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

Table A7: Influence of belief updating on the valuation of the individual environmental betas in treatment *Peer update* by degree of influentiability

	Dependent variable:	
	Individual env. wtp	
	(1)	(2)
Prior belief	-0.188^{*}	-0.260
	(0.092)	(0.244)
Green portfolio share	-3.123	29.787
	(7.011)	(18.814)
Constant	14.012^{***}	15.946^{**}
	(2.838)	(6.014)
Subsample	influentiability<=median	influentiability>median
Observations	39	20
R^2	0.121	0.198
Adjusted R^2	0.073	0.104

Note: The table presents an OLS-regression result, regressing the individual valuation parameter of the environmental contribution attribute in the DCE on the prior beliefs of investors' in the treatment *Peer update*. Column 1 presents the estimation results for the subsample of participants who reported an influentiability being below or equal to the median. Column 2 reports the estimation results for the subsample of participants who reported an influentiability being above the median. Robust standard errors in parentheses. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

Table A8: Influence of belief updating on the valuation of the individual environmental betas in treatment *Public update* by whether investors under- or overestimated actual public provision of capital

	Dependent variable:	
	Individual env. wtp	
	(1)	(2)
Prior belief	−0.017	0.011*
	(0.020)	(0.005)
Green portfolio share	18.055	17.258***
	(12.904)	(4.992)
Constant	15.440	−4.167
	(10.616)	(7.198)
Subsample	Prior< true value	Prior>= true value
Observations	11	17
R^2	0.239	0.478
Adjusted R^2	0.048	0.404

Note: The table presents an OLS-regression result, regressing the individual valuation parameter of the environmental contribution attribute in the DCE on the prior beliefs of investors' in the treatment *Public update*. Column 1 presents the estimation results for the subsample of participants whose prior beliefs ranged below the actual value. Column 2 reports the estimation results for the subsample of participants whose prior belief ranged above or equal to the actual value. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

Supplementary Material

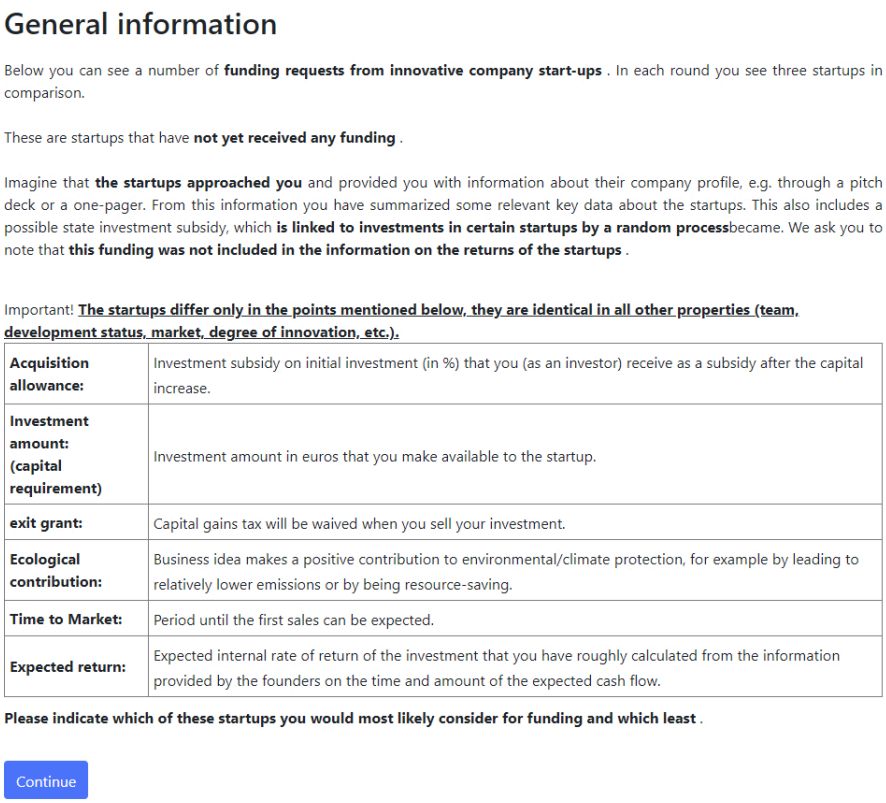
Investor responses to information updates on peer behavior and public policy: The case of green investments

This version: May, 2023

1 Screenshots of the experiment

1.1 Introduction

Figure 1



General information

Below you can see a number of **funding requests from innovative company start-ups** . In each round you see three startups in comparison.

These are startups that have **not yet received any funding** .

Imagine that **the startups approached you** and provided you with information about their company profile, e.g. through a pitch deck or a one-pager. From this information you have summarized some relevant key data about the startups. This also includes a possible state investment subsidy, which **is linked to investments in certain startups by a random process**became. We ask you to note that **this funding was not included in the information on the returns of the startups** .

Important! **The startups differ only in the points mentioned below, they are identical in all other properties (team, development status, market, degree of innovation, etc.).**

Acquisition allowance:	Investment subsidy on initial investment (in %) that you (as an investor) receive as a subsidy after the capital increase.
Investment amount: (capital requirement)	Investment amount in euros that you make available to the startup.
exit grant:	Capital gains tax will be waived when you sell your investment.
Ecological contribution:	Business idea makes a positive contribution to environmental/climate protection, for example by leading to relatively lower emissions or by being resource-saving.
Time to Market:	Period until the first sales can be expected.
Expected return:	Expected internal rate of return of the investment that you have roughly calculated from the information provided by the founders on the time and amount of the expected cash flow.

Please indicate which of these startups you would most likely consider for funding and which least .

Continue

1.2 Treatment variation

Figure 2

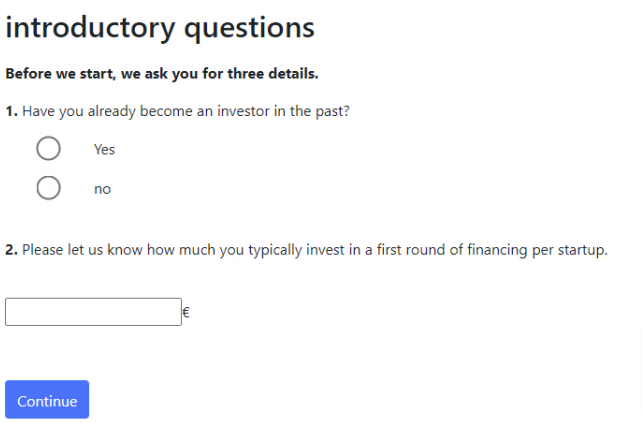


Figure 3

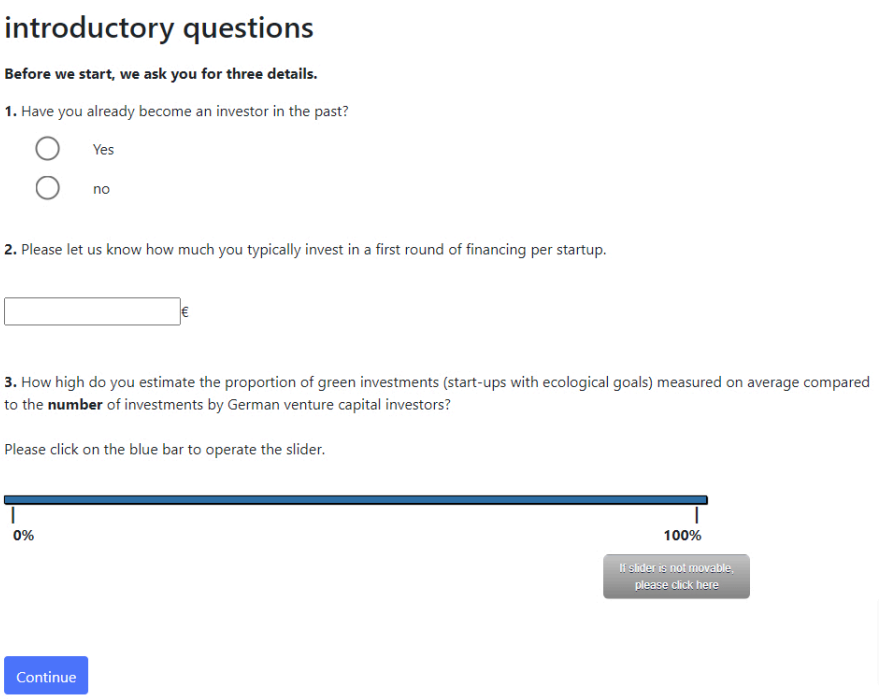


Figure 4

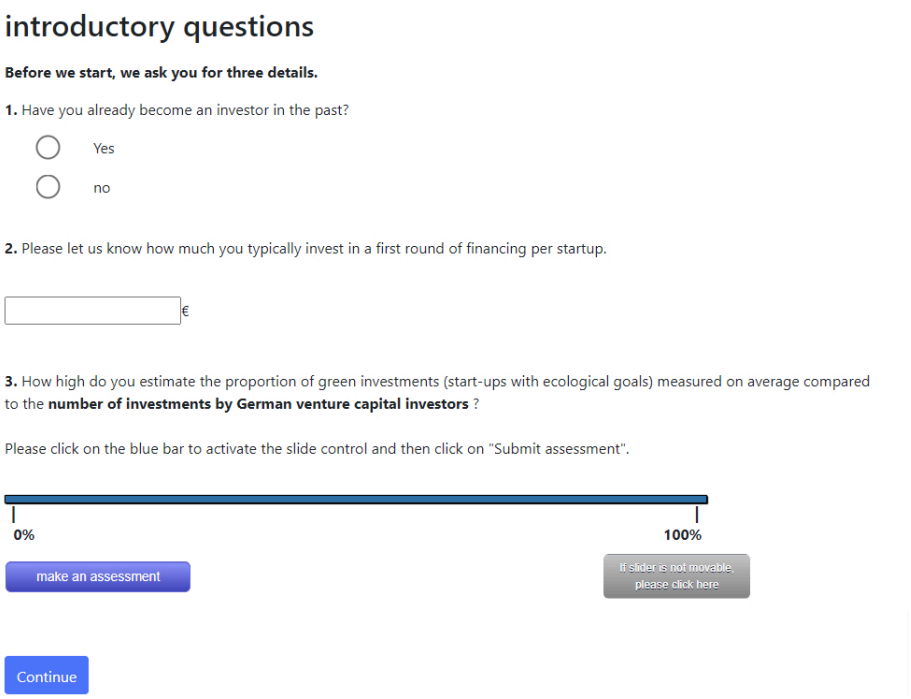

introductory questions
Before we start, we ask you for three details.
1. Have you already become an investor in the past?
Yes
no
2. Please let us know how much you typically invest in a first round of financing per startup.
€
3. How high do you estimate the proportion of green investments (start-ups with ecological goals) measured on average compared to the number of investments by German venture capital investors ?
Please click on the blue bar to activate the slide control and then click on "Submit assessment".
0%
100%
make an assessment
If slider is not movable, please click here
Continue

Figure 5

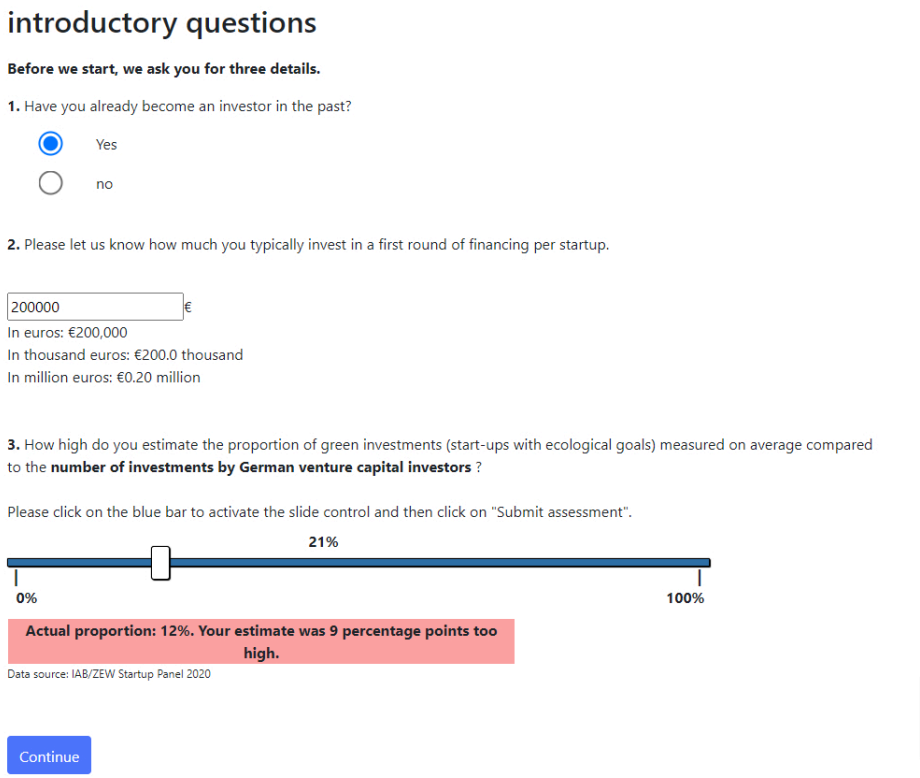

introductory questions
Before we start, we ask you for three details.
1. Have you already become an investor in the past?
Yes
no
2. Please let us know how much you typically invest in a first round of financing per startup.
200000
€
In euros: €200,000
In thousand euros: €200.0 thousand
In million euros: €0.20 million
3. How high do you estimate the proportion of green investments (start-ups with ecological goals) measured on average compared to the number of investments by German venture capital investors ?
Please click on the blue bar to activate the slide control and then click on "Submit assessment".
21%
0%
100%
Actual proportion: 12%. Your estimate was 9 percentage points too high.
Data source: IAB/ZEW Startup Panel 2020
Continue

Figure 6

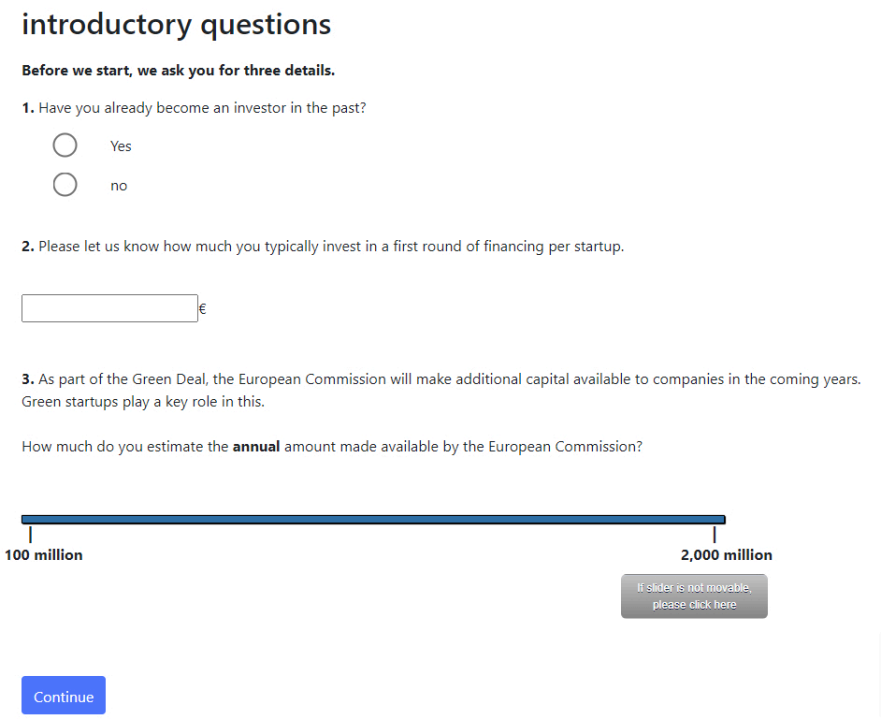

introductory questions
Before we start, we ask you for three details.
1. Have you already become an investor in the past?
Yes
no
2. Please let us know how much you typically invest in a first round of financing per startup.
€
3. As part of the Green Deal, the European Commission will make additional capital available to companies in the coming years. Green startups play a key role in this.
How much do you estimate the annual amount made available by the European Commission?
100 million
2,000 million
If slider is not movable, please click here
Continue

Figure 7

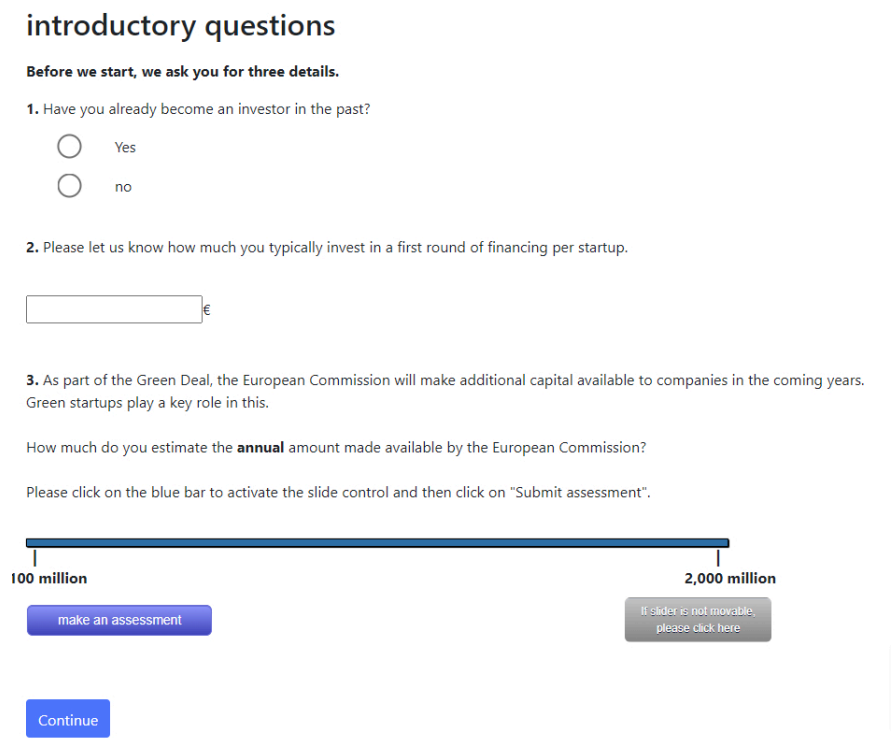
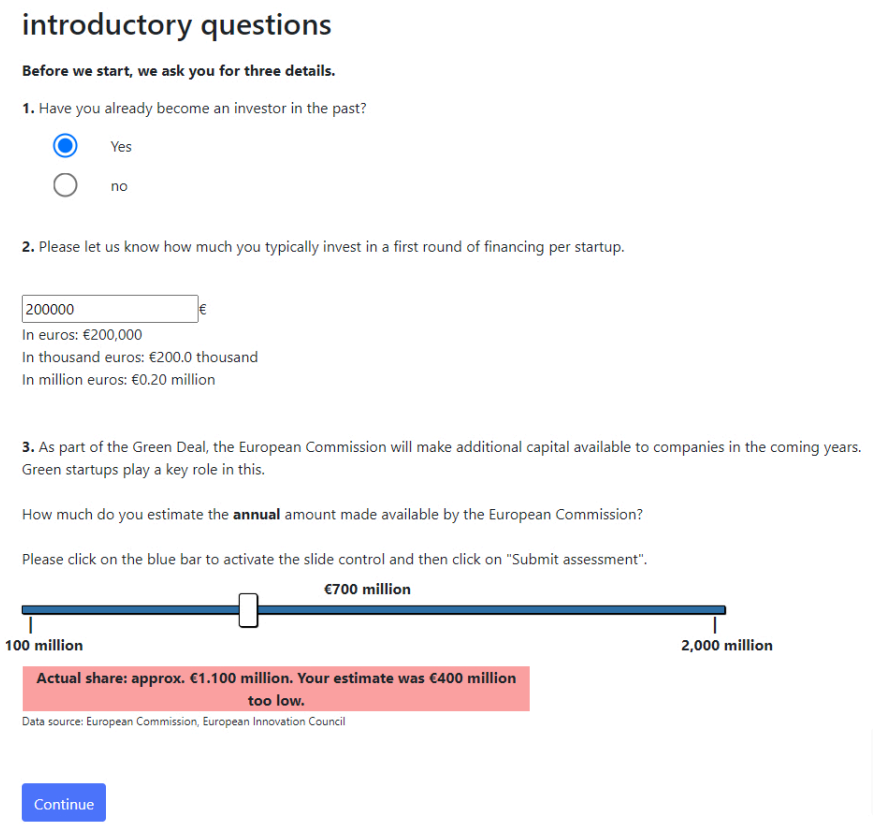
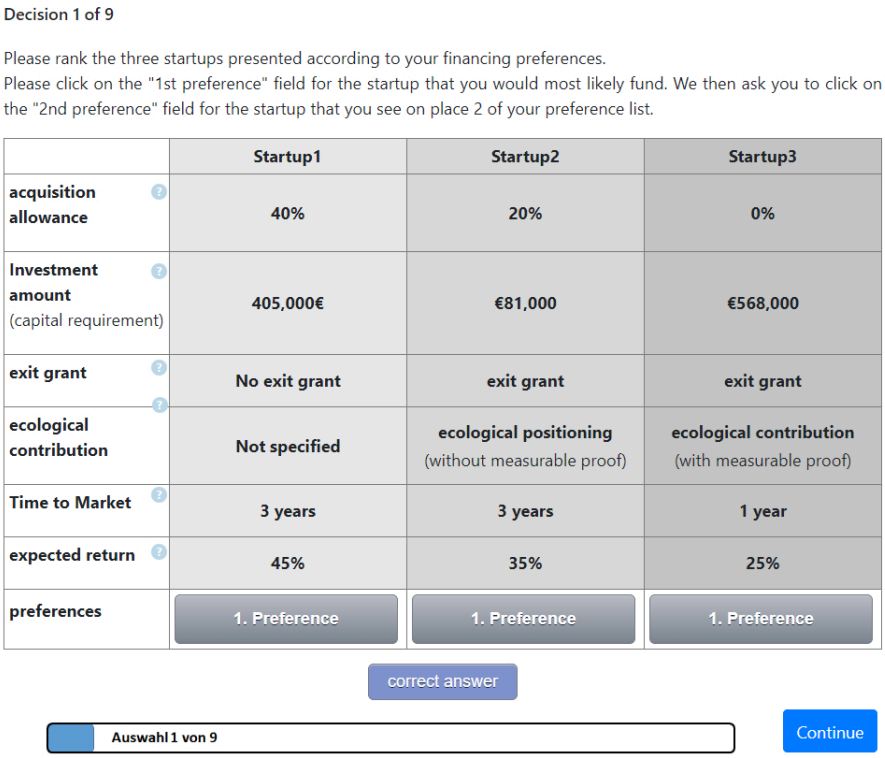

introductory questions
Before we start, we ask you for three details.
1. Have you already become an investor in the past?
Yes
no
2. Please let us know how much you typically invest in a first round of financing per startup.
€
3. As part of the Green Deal, the European Commission will make additional capital available to companies in the coming years. Green startups play a key role in this.
How much do you estimate the annual amount made available by the European Commission?
Please click on the blue bar to activate the slide control and then click on "Submit assessment".
100 million
2,000 million
make an assessment
If slider is not movable, please click here
Continue

Figure 8


introductory questions
Before we start, we ask you for three details.
1. Have you already become an investor in the past?
Yes
no
2. Please let us know how much you typically invest in a first round of financing per startup.
200000
€
In euros: €200,000
In thousand euros: €200.0 thousand
In million euros: €0.20 million
3. As part of the Green Deal, the European Commission will make additional capital available to companies in the coming years. Green startups play a key role in this.
How much do you estimate the annual amount made available by the European Commission?
Please click on the blue bar to activate the slide control and then click on "Submit assessment".
€700 million
100 million
2,000 million
Actual share: approx. €1.100 million. Your estimate was €400 million too low.
Data source: European Commission, European Innovation Council
Continue

1.3 The discrete choice experiment

Figure 9



Decision 1 of 9

Please rank the three startups presented according to your financing preferences.
Please click on the "1st preference" field for the startup that you would most likely fund. We then ask you to click on the "2nd preference" field for the startup that you see on place 2 of your preference list.

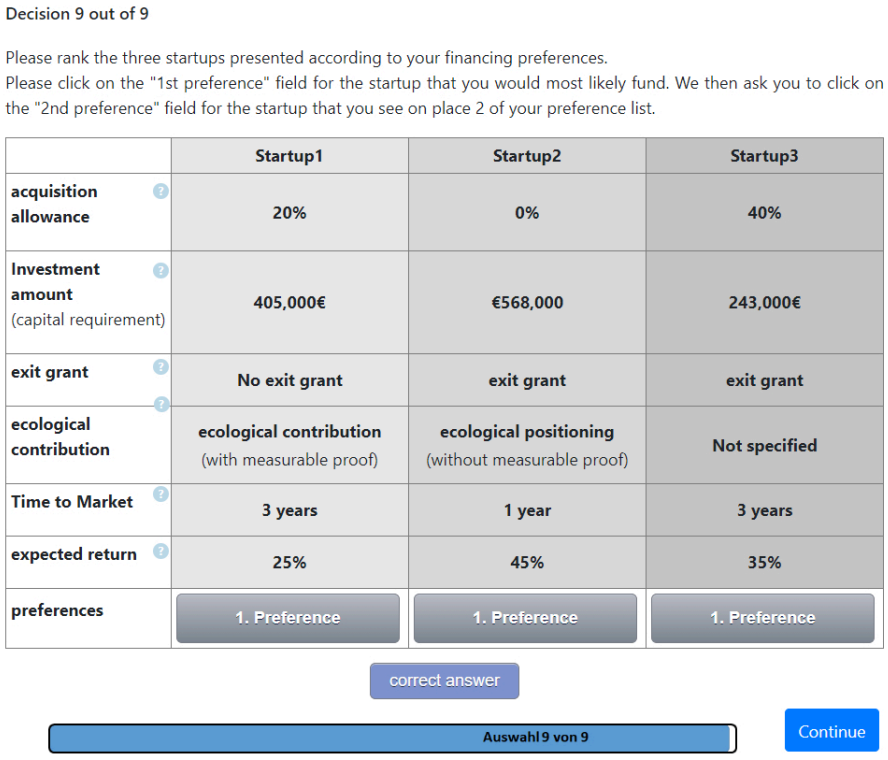
	Startup1	Startup2	Startup3
acquisition allowance	40%	20%	0%
Investment amount (capital requirement)	405,000€	€81,000	€568,000
exit grant	No exit grant	exit grant	exit grant
ecological contribution	Not specified	**ecological positioning** (without measurable proof)	**ecological contribution** (with measurable proof)
Time to Market	3 years	3 years	1 year
expected return	45%	35%	25%
preferences	1. Preference	1. Preference	1. Preference

correct answer

Auswahl 1 von 9

Continue

Figure 10



Decision 9 out of 9

Please rank the three startups presented according to your financing preferences.
Please click on the "1st preference" field for the startup that you would most likely fund. We then ask you to click on the "2nd preference" field for the startup that you see on place 2 of your preference list.

	Startup1	Startup2	Startup3
acquisition allowance	20%	0%	40%
Investment amount (capital requirement)	405,000€	€568,000	243,000€
exit grant	No exit grant	exit grant	exit grant
ecological contribution	ecological contribution (with measurable proof)	ecological positioning (without measurable proof)	Not specified
Time to Market	3 years	1 year	3 years
expected return	25%	45%	35%
preferences	1. Preference	1. Preference	1. Preference

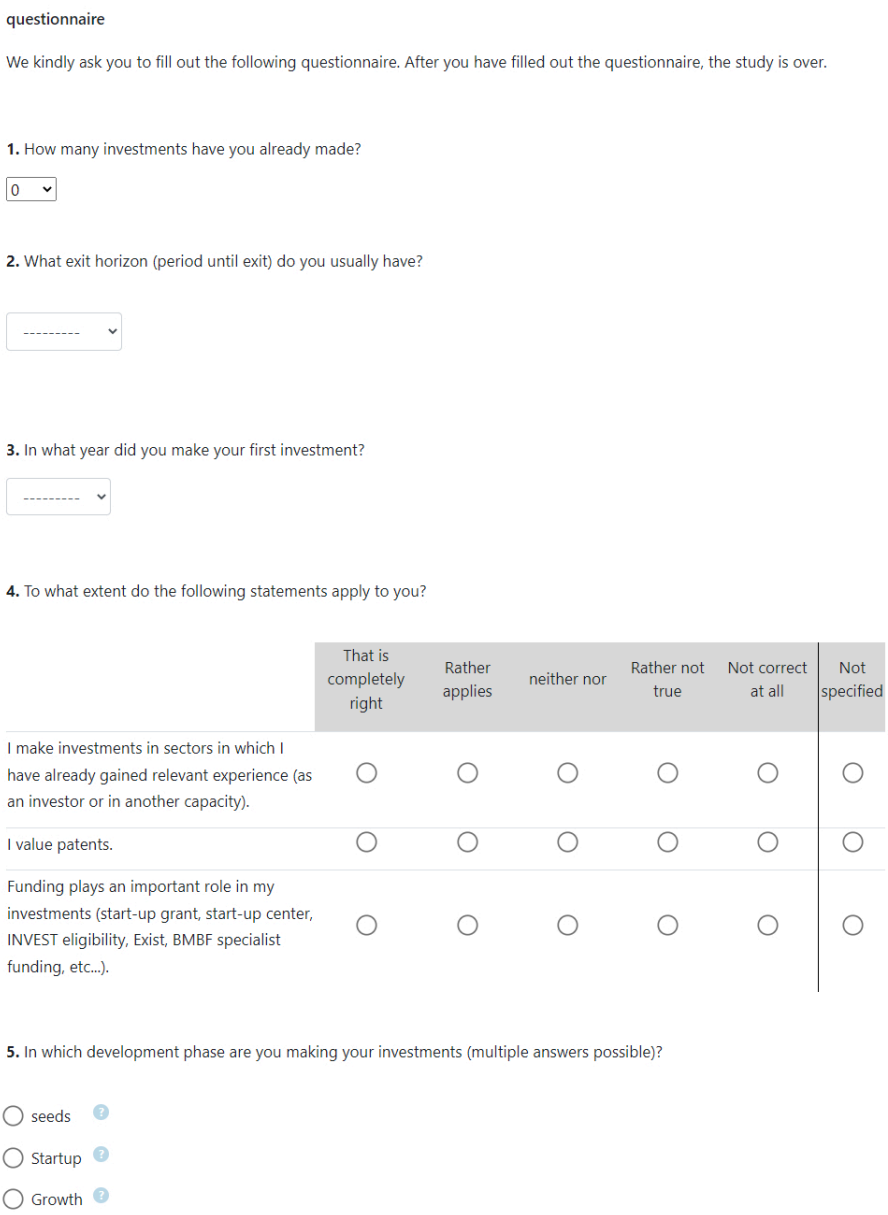
correct answer

Auswahl 9 von 9

Continue

1.4 The post-questionnaire

Figure 11



questionnaire

We kindly ask you to fill out the following questionnaire. After you have filled out the questionnaire, the study is over.

1. How many investments have you already made?

0

2. What exit horizon (period until exit) do you usually have?

----

3. In what year did you make your first investment?

----

4. To what extent do the following statements apply to you?

	That is completely right	Rather applies	neither nor	Rather not true	Not correct at all	Not specified
I make investments in sectors in which I have already gained relevant experience (as an investor or in another capacity).	○	○	○	○	○	○
I value patents.	○	○	○	○	○	○
Funding plays an important role in my investments (start-up grant, start-up center, INVEST eligibility, Exist, BMBF specialist funding, etc...).	○	○	○	○	○	○

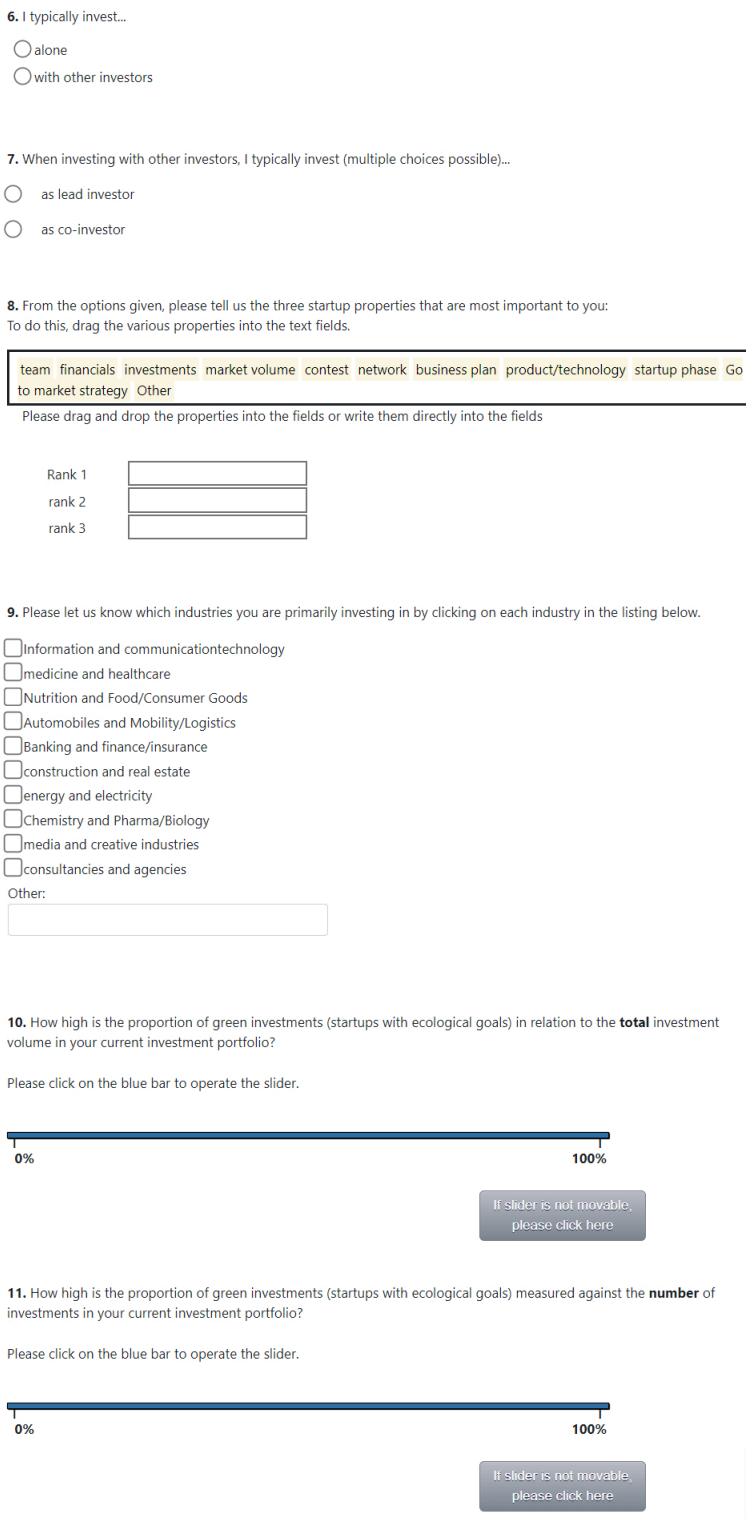
5. In which development phase are you making your investments (multiple answers possible)?

○ seeds

○ Startup

○ Growth

Figure 12



6. I typically invest...

- alone
- with other investors

7. When investing with other investors, I typically invest (multiple choices possible)...

- as lead investor
- as co-investor

8. From the options given, please tell us the three startup properties that are most important to you:
To do this, drag the various properties into the text fields.

team financials investments market volume contest network business plan product/technology startup phase Go to market strategy Other

Please drag and drop the properties into the fields or write them directly into the fields

Rank 1
rank 2
rank 3

9. Please let us know which industries you are primarily investing in by clicking on each industry in the listing below.

- Information and communicationtechnology
- medicine and healthcare
- Nutrition and Food/Consumer Goods
- Automobiles and Mobility/Logistics
- Banking and finance/insurance
- construction and real estate
- energy and electricity
- Chemistry and Pharma/Biology
- media and creative industries
- consultancies and agencies

Other:

10. How high is the proportion of green investments (startups with ecological goals) in relation to the **total** investment volume in your current investment portfolio?

Please click on the blue bar to operate the slider.

0% 100%

If slider is not movable, please click here

11. How high is the proportion of green investments (startups with ecological goals) measured against the **number** of investments in your current investment portfolio?

Please click on the blue bar to operate the slider.

0% 100%

If slider is not movable, please click here

Figure 13

12. To what extent do you allow your investment decisions to be influenced by the decisions/recommendations of other investors? Please use a scale from 0 to 10. 0 means 'Not at all' and 10 means 'I pay attention almost exclusively'.

	0	1	2	3	4	5	6	7	8th	9	10	
Not at all	○	○	○	○	○	○	○	○	○	○	○	I pay attention to that almost exclusively

13. What do you think...

	That is completely right	Rather applies	Neither nor	Rather not true	Not correct at all	Not specified
Startups make a substantial contribution to ecologically sustainable development.	○	○	○	○	○	○

	Much more profitable	Tends to be more profitable	No difference	Less profitable	Much less profitable	Not specified
How profitable are green business models compared to other business models at the moment?	○	○	○	○	○	○

	Much higher demand	higher demand	Unchanged	Tendentially less demand	Much less demand	Not specified
How will the demand for green products change in the future?	○	○	○	○	○	○

14. What do you think...

	Yes	Rather yes	partly, partly	Rather no	no	Not specified
Do you have a special social responsibility in your role as an investor?	○	○	○	○	○	○

15. Imagine the following situation: today you unexpectedly received 10,000 euros. How much of this amount would you donate to a good cause? (Values between 0 and 10,000 are allowed)

16. Please imagine the following situation: you have the choice between a secure payment of a certain amount of money or a draw where you have an equal chance of winning 300 euros or nothing at all. In the following, we will present five different situations in this regard.

Figure 14

16. Please imagine the following situation: you have the choice between a secure payment of a certain amount of money or a draw where you have an equal chance of winning 300 euros or nothing at all. In the following, we will present five different situations in this regard.

Additional questions will appear once the first question has been answered.

16.1

Which would you prefer: a draw with a 50% chance of receiving 300 euros and the same 50% chance of receiving nothing, or the amount of 160 euros as a secure payment?

- ◯ 50/50 chance
- ◯ Secure payment

16.2 16.3 16.4 16.5

17. How do you rate yourself personally: are you generally a risk taker or do you try to avoid risks?

	0	1	2	3	4	5	6	7	8th	9	10	
not risky at all	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	very risky

18. Suppose you were given the choice of making a payment today or making a payment in 12 months. We will now introduce you to 5 situations. Today's payment is the same in each of these situations. Payment in 12 months is different in every situation. For each of these situations, we would like to know which one you would choose. Please assume that there is no inflation, ie future prices are the same as today's prices.

Additional questions will appear once the first question has been answered.

18.1

Please make a decision about the following: Would you rather receive 100 euros today or 154 euros in 12 months?

- ◯ 100€ today
- ◯ 154€ in 12 months

18.2 18.3 18.4 18.5

19. To what extent do you agree with the following statements?

	Totally agree about	I rather agree	I'm undecided	Rather disagree	Disagree at all	Not specified
People have the right to adjust the environment according to their needs	◯	◯	◯	◯	◯	◯
Humans severely abuse the earth	◯	◯	◯	◯	◯	◯
Plants and animals have the same right to exist as humans	◯	◯	◯	◯	◯	◯
Nature is strong enough to deal with the effects of modern industrialized nations	◯	◯	◯	◯	◯	◯
Humans are destined to dominate the rest of nature	◯	◯	◯	◯	◯	◯
The balance of nature is very delicate and easily upset	◯	◯	◯	◯	◯	◯
In general, people can be trusted	◯	◯	◯	◯	◯	◯
You can't rely on anyone these days	◯	◯	◯	◯	◯	◯
When dealing with strangers, it is better to be careful before trusting them	◯	◯	◯	◯	◯	◯

	That is completely right	Rather applies	neither nor	Rather not true	Not correct at all	Not specified
Doing good makes me feel positive.	◯	◯	◯	◯	◯	◯

Figure 15

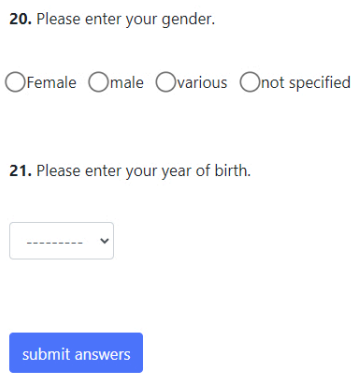


Figure 16

2 Additional estimates

Table 1: DCE estimation results in conditional logit models for the choice among three different startups to invest in

	(All treatments)	(*Baseline*)
Volume invested	-0.001**	-0.001
	(0.000)	(0.001)
Expected return	0.047***	0.045***
	(0.002)	(0.003)
No Contribution/Evidence	0.000	0.000
	(.)	(.)
Environmental contr. (without measurable evidence)	0.112**	-0.015
	(0.053)	(0.090)
Environmental contr. (with measurable evidence)	0.849***	0.821***
	(0.051)	(0.083)
Time to marker: 1 year	0.000	0.000
	(.)	(.)
Time to marker: 3 year	-0.480***	-0.454***
	(0.043)	(0.072)
Inv. subsidy: 0%	-0.612***	-0.478***
	(0.055)	(0.091)
Inv. subsidy: 20%	0.000	0.000
	(.)	(.)
Inv. subsidy: 40%	0.388***	0.497***
	(0.045)	(0.076)
No exit subsidy	0.000	0.000
	(.)	(.)
Exit subsidy	0.573***	0.543***
	(0.057)	(0.096)
Observations	10017	3564

Note: We use data across 9 choice sets as a basis for the estimation of the conditional logit model. Column 1 presents the estimation results for the entire sample. Column 2 reports the estimation results for the *Baseline* treatment only. Standard errors are reported in parentheses with significant levels reported as follows: * $p < 0.05$, ** $p < 0.01$, ***.

Table 2: Correlation between green startups in investors' portfolios and environmental choices in DCE

	Dependent variable:			
	Portfolio share: green invest.			
	(1)	(2)	(3)	(4)
Individual env. wtp	0.027	0.038*	0.053**	0.077**
		(0.016)	(0.020)	(0.028)
Green: profitable		−0.160		0.041
		(0.273)		(0.496)
Green: contribute		0.051		−0.791*
		(0.243)		(0.376)
Green: demand		−0.140		−0.442
		(0.379)		(0.455)
Altruism		0.00001		0.0001
		(0.0001)		(0.0002)
Environ. attitudes		0.116		−1.589
		(0.510)		(1.005)
Warm glow		−0.100		1.874**
		(0.364)		(0.634)
Risk		0.139		0.081
		(0.114)		(0.206)
Gender		−0.537		0.218
		(0.619)		(0.952)
Patience		0.009		0.018
		(0.025)		(0.054)
Age		0.024		0.014
		(0.015)		(0.026)
Trust		−0.085		0.335
		(0.258)		(0.344)
Volume invested		−0.00000		−0.00000
		(0.00000)		(0.00000)
Exit horizon		0.067		−0.066
		(0.055)		(0.095)
Focus patents		−0.016		−0.058
		(0.186)		(0.214)
Peer influence		0.074		0.220
		(0.089)		(0.154)
Invest synd.		−0.525		0.674
		(0.509)		(1.033)
Invest phase seed		−0.113		−1.545+
		(0.388)		(0.807)
Invest phase start		−0.321		−1.698*

		(0.377)		(0.821)
Focus subsidy		−0.250		−0.645*
		(0.156)		(0.306)
Invest passive		−0.405		−1.270*
		(0.415)		(0.621)
Experience		0.008		0.112*
		(0.025)		(0.055)
Invest virign		0.831		−15.092***
		(0.912)		(1.750)
Industry: ICT		−0.306		−0.211
		(0.380)		(0.622)
Industry: med. tech.		−1.170**		−0.672
		(0.416)		(0.886)
Industy: food		−0.335		−1.326+
		(0.428)		(0.740)
Industry: finance		0.669+		0.285
		(0.366)		(0.865)
Industry: real est.		−0.709+		−0.739
		(0.407)		(0.761)
Industry: energy		0.775*		1.020
		(0.337)		(0.888)
Industry: biotech		−0.926		−0.112
		(0.591)		(1.255)
Constant	−2.845***	−2.450	−3.527***	−3.171
	(0.027)	(2.267)	(0.501)	(4.454)
Control Variables		X		X
Observations	306	255	115	95
Log Likelihood	−168.787	−115.694	−59.623	−32.917

Note: The dependent variable is given by the share of green startups in the portfolios of investors according to the data in the MUP. The main explanatory variable is given by the individual parameter estimates of the environmental contribution attribute in the DCE. We use a Fractional Response Model (data censored: [0,1]) to estimate the respective dependence. Column 1 presents the estimation results for the regression using the entire sample of participants. Column 2 additionally controls for the influence a wide range of other co-variates. Column 3 uses participants from the *Baseine* treatment only and column 4 repeats that estimation including also control variables. Standard errors are robust and statistical significance is reported as follows: * $p < 0.05$, ** $p < 0.01$, ***.

Table 3: Treatment effects in comparison to *Baseline*

	Dependent variable:	
	Individual env. beta	
	(1)	(2)
Peer	2.443	1.832
	(2.195)	(2.342)
Public	2.620	3.635
	(3.359)	(3.876)
Peer update	-3.906^{*}	-4.278^{*}
	(1.984)	(2.134)
Public update	-3.874^{+}	-5.644^{*}
	(2.232)	(2.578)
Peer x Green portf. share	23.451^{***}	23.315^{***}
	(6.310)	(5.182)
Public x Green portf. share		-0.205
		(1.056)
Peer update x Green portf. share		0.654
		(0.867)
Public update x Green portf. share		3.158^{+}
		(1.775)
Green portfolio share		0.0002
		(0.0003)
Green: profitable		4.651^{*}
		(1.992)
Green: contribution		1.309
		(1.335)
Green: demand		0.319
		(0.457)
Altruism		-3.167
		(3.563)
Environ. attitudes		-0.152
		(0.142)
Warm glow		-0.049
		(0.079)
Risk		1.393
		(1.291)
Gender		0.00000
		(0.00000)
Patience		0.090
		(0.305)
Age		0.048

		(0.740)
Trust		−0.007
		(0.350)
Volume invest		2.581
		(2.828)
Exit horizon		−0.640
		(1.843)
Focus patents		−0.582
		(2.090)
Peer influence		2.394***
		(0.687)
Invest syndicate		1.648
		(2.536)
Phase: seed		−0.106
		(0.121)
Phase: start		−5.316
		(3.832)
Focus subsidy		−1.844
		(1.808)
Invest passive		0.394
		(1.745)
Experience		1.269
		(2.199)
Virgin investor		−4.970*
		(2.000)
Industry: ICT		1.908
		(2.508)
Industry: med. tech.		3.591+
		(2.017)
Industy: food		1.716
		(2.484)
Industry: finance		−3.106
		(2.507)
Industry: real est.	−21.923*	−19.691*
	(10.384)	(9.336)
Industry: energy	0.943	5.505
	(7.703)	(7.352)
Industry: biotech	−20.652*	−27.009
	(10.452)	(16.984)
Industry: consulting	−33.978**	−31.498*
	(10.724)	(12.606)
Constant	13.304***	−30.699**

	(1.398)	(11.317)
Control Variables		X
Observations	306	255
R^2	0.083	0.287
Adjusted R^2	0.055	0.158

Note: Estimates based on an OLS-Model. The dependent variable is given by the individual valuation parameter of the environmental contribution attribute in the DCE. The main explanatory variables are given by the respective treatment indicators. Robust standard errors in parentheses. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.$^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

Table 4: Treatment effects in comparison to *Peer*

	Dependent variable:	
	Individual env. beta	
	(1)	(2)
Baseline	−2.443	−1.832
	(2.195)	(2.342)
Public	0.177	1.804
	(3.492)	(4.017)
Peer update	−6.349**	−6.109*
	(2.202)	(2.435)
Public update	−6.317**	−7.476**
	(2.427)	(2.748)
Baseline x Green portf. share	2.799	−3.694
	(8.333)	(16.304)
Public x Green portf. share		−0.205
		(1.056)
Peer update x Green portf. share		0.654
		(0.867)
Public update x Green portf. share		3.158+
		(1.775)
Green portfolio share		0.0002
		(0.0003)
Green: profitable		4.651*
		(1.992)
Green: contribution		1.309
		(1.335)
Green: demand		0.319
		(0.457)
Altruism		−3.167
		(3.563)
Environ. attitudes		−0.152
		(0.142)
Warm glow		−0.049
		(0.079)
Risk		1.393
		(1.291)
Gender		0.00000
		(0.00000)
Patience		0.090
		(0.305)
Age		0.048

		(0.740)
Trust		−0.007
		(0.350)
Volume invest		2.581
		(2.828)
Exit horizon		−0.640
		(1.843)
Focus patents		−0.582
		(2.090)
Social influence		2.394***
		(0.687)
Invest syndicate		1.648
		(2.536)
Phase: seed		−0.106
		(0.121)
Phase: start		−5.316
		(3.832)
Focus subsidy		−1.844
		(1.808)
Invest passive		0.394
		(1.745)
Experience		1.269
		(2.199)
Virgin investor		−4.970*
		(2.000)
Industry: ICT		1.908
		(2.508)
Industry: med. tech.		3.591+
		(2.017)
Industy: food		1.716
		(2.484)
Industry: finance		−3.106
		(2.507)
Industry: real est.	−1.270	7.318
	(11.724)	(17.926)
Industry: energy	21.596*	32.514+
	(9.432)	(16.900)
Industry: biotech	20.652*	27.009
	(10.452)	(16.984)
Industry: consulting	−13.325	−4.489
	(12.026)	(20.801)
Constant	15.747***	−28.867**

	(1.693)	(10.590)
Control Variables		X
Observations	306	255
R^2	0.083	0.287
Adjusted R^2	0.055	0.158

Note: Estimates based on an OLS-Model. The dependent variable is given by the individual valuation parameter of the environmental contribution attribute in the DCE. The main explanatory variables are given by the respective treatment indicators. Full estimation results can be retrieved from Table 4 in the Supplementary Material, Section 2. Robust standard errors in parentheses. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.$^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

Table 5: Treatment effects in comparison to Public

	Dependent variable:	
	Individual env. beta	
	(1)	(2)
Baseline	−0.177	−1.804
	(3.492)	(4.017)
Peer	−2.620	−3.635
	(3.359)	(3.876)
Peer update	−6.526^{+}	−7.913*
	(3.363)	(3.864)
Public update	−6.494^{+}	−9.280*
	(3.515)	(4.195)
Baseline x Green portf. share	−10.527	−8.183
	(8.671)	(11.341)
Peer x Green portf. share		−0.205
		(1.056)
Peer update x Green portf. share		0.654
		(0.867)
Public update x Green portf. share		3.158^{+}
		(1.775)
Green portfolio share		0.0002
		(0.0003)
Green: profitable		4.651*
		(1.992)
Green: contribution		1.309
		(1.335)
Green: demand		0.319
		(0.457)
Altruism		−3.167
		(3.563)
Environ. attitudes		−0.152
		(0.142)
Warm glow		−0.049
		(0.079)
Risk		1.393
		(1.291)
Gender		0.00000
		(0.00000)
Patience		0.090
		(0.305)
Age		0.048

		(0.740)
Trust		−0.007
		(0.350)
Volume invest		2.581
		(2.828)
Exit horizon		−0.640
		(1.843)
Focus patents		−0.582
		(2.090)
Social influence		2.394***
		(0.687)
Invest syndicate		1.648
		(2.536)
Phase: seed		−0.106
		(0.121)
Phase: start		−5.316
		(3.832)
Focus subsidy		−1.844
		(1.808)
Invest passive		0.394
		(1.745)
Experience		1.269
		(2.199)
Virgin investor		−4.970*
		(2.000)
Industry: ICT		1.908
		(2.508)
Industry: med. tech.		3.591+
		(2.017)
Industy: food		1.716
		(2.484)
Industry: finance		−3.106
		(2.507)
Industry: real est.	12.055	11.807
	(11.967)	(13.608)
Industry: energy	34.921***	37.004**
	(9.732)	(12.906)
Industry: biotech	13.325	4.489
	(12.026)	(20.801)
Industry: consulting	33.978**	31.498*
	(10.724)	(12.606)
Constant	15.924***	−27.064*

	(3.054)	(11.423)
Control Variables		X
Observations	306	255
R^2	0.083	0.287
Adjusted R^2	0.055	0.158

Note: Estimates based on an OLS-Model. The dependent variable is given by the individual valuation parameter of the environmental contribution attribute in the DCE. The main explanatory variables are given by the respective treatment indicators. Robust standard errors in parentheses. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.$^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

Table 6: Influence of belief updating on the valuation of the individual environmental betas

	Dependent variable:			
	Individual env. beta			
	(*Peer update*)	(*Peer update*)	(*Public update*)	(*Public update*)
Prior belief	-0.209^{*}	-0.518^{***}	0.006^{*}	0.004
	(0.088)	(0.061)	(0.003)	(0.003)
Green portfolio share	2.446	10.129^{*}	22.232^{***}	18.812^{**}
	(7.561)	(5.075)	(4.254)	(6.466)
Green: profitable		1.893^{*}		-0.134
		(0.959)		(3.279)
Green: contribution		2.159		
		(1.755)		
Green: demand		-6.317^{**}		
		(2.209)		
Altruism		0.002^{***}		-0.001
		(0.0004)		(0.001)
Environ. attitudes		13.705^{***}		6.980
		(3.198)		(6.264)
Warm glow		1.683		
		(1.874)		
Risk		-0.913		
		(0.847)		
Gender		9.751		
		(6.819)		
Patience		-0.148		-0.002
		(0.347)		(0.188)
Age		-0.204^{+}		
		(0.113)		
Trust		-7.587^{***}		
		(2.159)		
Volume invest		0.00000^{**}		-0.00003
		(0.00000)		(0.00004)
Exit horizon		0.646		
		(0.433)		
Focus patents		-1.546^{+}		
		(0.844)		
Social influence		1.741^{***}		
		(0.379)		
Invest syndicate		0.627		
		(3.294)		
Phase: seed		-10.722^{***}		

		(2.526)		
Phase: start		4.581^{+}		
		(2.724)		
Focus subsidy		3.942^{***}		
		(0.832)		
Invest passive		2.797		-6.555
		(2.945)		(4.109)
Experience		0.387^{+}		
		(0.204)		
Virgin investor		-11.749^{*}		
		(4.706)		
Industry: ICT		-5.742^{*}		
		(2.427)		
Industry: med. tech.		1.374		
		(2.382)		
Industy: food		4.374		
		(3.474)		
Industry: finance		-10.227^{***}		
		(2.323)		
Industry: real est.		-11.231^{*}		
		(4.869)		
Industry: energy		8.020^{**}		
		(3.068)		
Industry: biotech		-6.774		
		(4.926)		
Industry: consulting		-14.067^{**}		
		(5.138)		
Constant	14.810^{***}	-7.039	3.707	-11.785
	(2.567)	(19.632)	(3.149)	(21.353)
Observations	60	54	28	24
R^2	0.095	0.806	0.347	0.444
Adjusted R^2	0.063	0.509	0.294	0.147

Note: The table presents an OLS-regression result, regressing the individual valuation parameter of the environmental contribution attribute in the DCE on the prior beliefs of investors' in the treatments Peer update (column 1 and 2) and the Public update treatment (column 3 and 4). In columns 2 and 4, we additionally control for the influence of a range of different other co-variates. Robust standard errors in parentheses. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.$^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

Table 7: Influence of belief elicitation on the valuation of the individual environmental betas

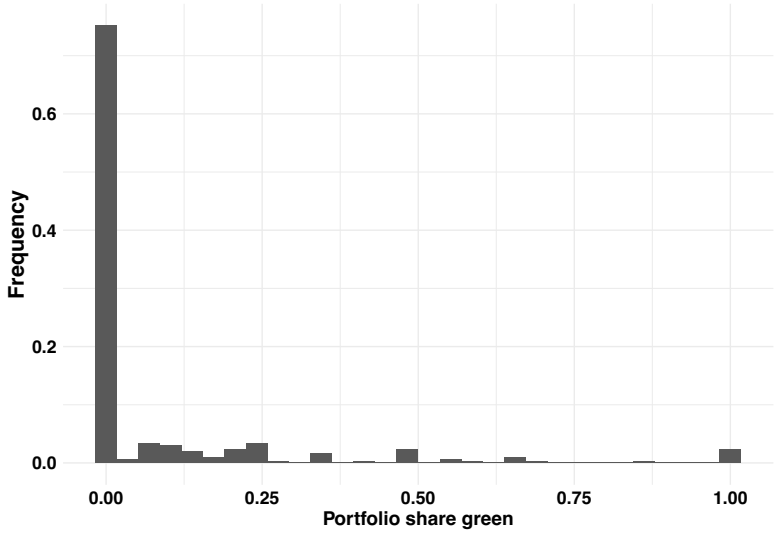
	Dependent variable:			
	Individual env. beta			
	(*Peer*)	(*Peer*)	(*Public*)	(*Public*)
Prior belief	−0.050	0.002	−0.006	−0.010*
	(0.068)	(0.075)	(0.005)	(0.005)
Green portfolio share	2.273	−15.541	−4.955	−16.684
	(8.249)	(13.625)	(10.307)	(18.031)
Green: profitable		−3.758*		2.852
		(1.561)		(3.951)
Green: contribution		1.735		
		(2.559)		
Green: demand		5.398+		
		(2.866)		
Altruism		−0.001+		0.002
		(0.001)		(0.002)
Environ. attitudes		0.251		−1.806
		(3.488)		(4.755)
Warm glow		2.442		
		(2.627)		
Risk		2.194*		
		(0.905)		
Gender		1.261		
		(4.348)		
Patience		−0.456*		1.682
		(0.178)		(1.084)
Age		−0.115		
		(0.139)		
Trust		−0.984		
		(2.560)		
Volume invest		−0.00004*		−0.00001
		(0.00002)		(0.00003)
Exit horizon		0.057		
		(0.515)		
Focus patents		−0.640		
		(1.326)		
Social influence		−2.580**		
		(0.816)		
Invest syndicate		26.938***		
		(5.926)		
Phase: seed		−4.256		

		(3.955)		
Phase: start		−13.652**		
		(4.453)		
Focus subsidy		2.513+		
		(1.305)		
Invest passive		−12.469+		10.600
		(6.952)		(8.471)
Experience		−0.370+		
		(0.221)		
Virgin investor		−29.798***		
		(6.198)		
Industry: ICT		−2.962		
		(3.011)		
Industry: med. tech.		0.703		
		(3.749)		
Industy: food		9.332*		
		(4.042)		
Industry: finance		−0.249		
		(4.590)		
Industry: real est.		−2.871		
		(3.937)		
Industry: energy		2.777		
		(4.931)		
Industry: biotech		2.310		
		(4.104)		
Industry: consulting		−8.286*		
		(4.046)		
Constant	17.170***	−12.796	21.402***	−40.158
	(2.878)	(21.213)	(5.180)	(28.702)
Observations	86	67	17	16
R^2	0.005	0.603	0.142	0.452
Adjusted R^2	−0.019	0.229	0.019	−0.174

Note: The table presents an OLS-regression result, regressing the individual valuation parameter of the environmental contribution attribute in the DCE on the prior beliefs of investors' in the treatments *Peer* (column 1 and 2) and the *Public* treatment (column 3 and 4). In columns 2 and 4, we additionally control for the influence of a range of different other co-variates. Robust standard errors in parentheses. Statistical significance is denoted by $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.$^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

3 Additional figures

Figure 17: Distribution of the variable *Green portfolio share*



Note: The data is based on observations from the MUP and shows the investors' share of green startups in their investment portfolios.

4 Additional information

List of words related to environmental topics (in German)

Abfall, Abluft, Abwasser, Agrar, alternative Antriebe, alternative Kraftstoffe, Artenschutz, Artenvielfalt, Automatisierung, Batterie, Baum, Bike, bio, Boden, Brennstoffzell, carbon footprint, carsharing, car-sharing, Cleantech, CO2, Corporate Responsibility, CSP, Deponie, E-, e-bike, elektr, Elektrofahr, elektror, Energie, Energieeffizient, Energiespeicher, Entsorgung, Erneuerbar, Euro 5, Euro 6, Euro 7, Fahrrad, Feinstaub, Filter, Fotovoltaik, Garten, green, Grün, Heizs, Heiztech, Holz, hybrid, Immission, intelligient, Isolierung, Klima, Kohle, Ladeinfra, Landschaft, LED, Lithium, Meer, Mehrweg, Müll, nachhaltig, Natur, Netzausbau, Netzinfra, Offshore, Öko, Organic, Passivh, pedelec, pellet, Pflanze, Photovoltaik, Plastik, power, Pumpspeicher, PV, Radfahrt, Radweg, Recycl, regenerativ, ressource, Rotorbl, schadstoff, second hand, smart home, smart meter, smarthome, smartmeter, Solar, Sonne, Strom, Tier, Transformation, treibhausgas, Umwelt, upcycling, vegan, vegetarisch, Verwertung, Wald, Wärme, Wärmepumpe, Wasser, Wasserstoff, Windkraft, Windpark, Aufbereitung, Biogas, CSR, Dämmen, Emission, Umwelt

Table 8: Sample characteristics

	pooled	**Baseline**	**Peer**	**Peer update**	**Public**	**Public update**
Portfolio share green	0.08	0.08	0.07	0.11	0.08	0.07
	(0.2)	(0.19)	(0.19)	(0.25)	(0.16)	(0.2)
Average amount inv.	186162.91	121348.86	73767.03	204097.98	750909.09	319232.31
	(1095894.64)	(445166.49)	(102225.13)	(1090000.07)	(3183896.1)	(1593261.21)
Experience	8.01	8.46	7.25	8.07	8.14	8.08
	(6.95)	(6.86)	(6.89)	(6.72)	(7.04)	(7.96)
Risk	7.33	7.2	7.45	7.47	7.33	7.16
	(1.82)	(1.97)	(1.92)	(1.64)	(1.77)	(1.4)
Male	0.91	0.92	0.87	0.95	0.86	0.95
	(0.28)	(0.27)	(0.34)	(0.22)	(0.36)	(0.23)
Age	54.91	55.74	53.82	55.61	54.1	53.89
	(10.08)	(10.66)	(9.64)	(8.83)	(11.63)	(10.89)
Patience	25.89	25.15	25.69	26.99*	27.19	25.79
	(7)	(7.68)	(7.29)	(5.63)	(7.12)	(6.42)
Env. Attitudes	3.65	3.61	3.69	3.68	3.6	3.66
	(0.48)	(0.49)	(0.48)	(0.5)	(0.47)	(0.39)

Note: The table reports the means of the respective parameters pooled across treatments and by individual treatment. *Average amount inv.* reported in EUR; *Experience* reported in years; *risk* reported on Likert-Scale from 0 (fully risk avers) to 10 (fully risk seeking); Patience reported on scale from 0 (fully impatient) to 32 (fully patient); *Env. attitudes* reported on a Likert-scale from 0 (very low environmental attitudes) to 5 (very high environmental attitudes). Standard deviations are reported in parenthesis. Stars indicate significant differences between the intervention treatments and the *Baseline* treatment, $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001.

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