

**Nijmegen School of Management**  
**Department of Economics and Business Economics**  
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# **Investor preferences and ESG ratings**

By Tijs Janssen (S481902)

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Supervisor: Dr. J.M. Schmitz

**Radboud Universiteit**



## **Abstract**

The importance of SRI investment strategies is growing. ESG ratings are a measure of how well a company performs on SRI issues. We know investors look to invest according to their social preferences, and can use ESG ratings to do so. Little is known though about which dimensions of ESG ratings they value most. This information can be valuable to companies. Companies can lower their cost of capital by attracting more investors. More investors can possibly be attracted by improving their E, S or G rating. This study uses a factorial survey with a sample of Dutch individuals. This is to learn if ESG ratings are material to the likelihood to invest, and which of the three dimensions is most important to investors. Results show respondents in this study significantly positively valued companies with higher environmental and social ratings. But governance ratings had no significant effect. The results imply that companies looking to improve their ratings to interest new investors should prioritize on increasing their environmental and social rating.

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# 1. Introduction

Socially responsible investing (SRI) is an investment strategy in which investors incorporate their social or environmental goals and preferences into their investments. Investors include or exclude assets based on ecological, social, corporate, governance or ethical preferences (Renneboog et al., 2008). This way of investing has become increasingly popular, as evidenced by an increasing amount of SRI assets globally. In 2017, of the 46.6 trillion US dollars which were professionally managed in the US, 12 trillion or 26% was invested in SRI assets (Boffo & Patalano, 2020). This is matched by an increasing amount of companies in, for example, the S&P500 who report sustainability or corporate responsibility reports, rising from 20% in 2011 to 86% in 2018 (Gillan et al., 2021).

One way to quantify and materialize SRI investing is through the use of environmental, social and governance (ESG) ratings. These are ratings of firms, made by third-party organizations or rating providers. They consider a large number of different factors related to environmental, social and governance issues. The environmental rating deals with how companies manage for example their carbon emissions, natural resource usage or air pollution. The social rating is most concerned with issues like human rights, work environment, diversity and other stakeholder related issues. Finally, the governance rating is comprised of issues like shareholder rights, board compensation and board independence for example. Each factor is given a certain weight and these are then combined to form one overall ESG rating for a company. These ratings are meant to give investors an overall view of a company's non-financial performance. The ratings are made and provided by ESG rating providers. There are a lot of different rating providers, such as Refinitiv, Bloomberg, Sustainalytics (Morningstar), MSCI and S&P Global. Each of these rating providers uses their own framework, which leads to firms having many different ESG ratings.

Having a high ESG rating can lead to a wide range of advantages for firms. For example, a high ESG rating can lower a firm's exposure to all kinds of risks, such as litigation cases, regulatory penalties, lower productivity, fraud and corruption etc. (Giese et al., 2019). A high ESG rating can also reduce a firm's financing constraints (Bai et al., 2022), as well as firms voluntarily disclosing ESG information being able to lower their cost of capital (Dhaliwal et al., 2011; Raimo et al., 2021). Furthermore, in a review of ESG/CSR literature, Gillan et al. (2021) find that firms with high ESG ratings can lower systematic risks due to them being more resilient during periods of crisis. Finally, a lot of research has been done on the relationship between ESG/CSR and firm performance or value. Often studies on this relationship have mentioned that the relationship is unclear or that results from studies are often mixed or conflict with each other (Gillan et al., 2021; Revelli & Viviani, 2015). However, Friede et al. (2015) did a review of over 2000 studies on the relationship between ESG ratings and Corporate

Financial Performance (CFP). They found that over 90% of studies reported at least a nonnegative relationship between ESG and CFP, and the large majority of studies reported positive findings. The mixed results in these studies perhaps are due to problems regarding using ESG ratings as a measurement tool. For example, Kotsantonis and Serafeim (2019) point to ESG data having four main issues, and, Berg et al. (2022) and Chatterji et al. (2016) find that data on six of the largest providers of ESG ratings shows that the ratings for companies differ significantly across rating providers. Also, Drempetic et al. (2020) find that firm size has a positive effect on the ESG rating of firms, leading to disadvantages to smaller companies who do not have the resources to report data on a lot of ESG issues.

In conclusion, firms can benefit by having high ESG ratings, or by increasing their ESG ratings. This can lower firm risks, lower cost of capital, and potentially increase CFP. Whereas a lot of research focuses on ESG ratings as a whole, little research is done comparing the three dimensions within ESG ratings. As mentioned, ESG ratings consist of three dimensions, an environmental, social and governance component. An important question for firms is then, which of these three dimensions they should focus on and look to improve first. Take for example the potential that investors care more about a firms' environmental rating than their social or governance rating. In this case, in terms of attracting new investors, it would be most efficient for that firm to use resources on improving their environment rating first.

This study thus tries to explain where firms should look to improve their ESG rating by looking at what dimension of ESG ratings are most important to investors. By improving the ESG rating, or a part of the ESG rating, a firm can look to attract more investors. This can lead to a wider investor base and ultimately a lower cost of capital (El Ghouli et al., 2011; Hong & Kacperczyk, 2009). According to Heinkel et al. (2001) a smaller investor base leads to lower risk-sharing and lower stock prices and thus a higher cost of capital. By knowing what factors are important to potential investors, firms can thus look to improve in these areas and ultimately lower their cost of capital.

Previous literature on the preferences of investors when it comes to the three dimensions of ESG ratings is limited and has led to mixed results. Some studies show evidence of the governance rating being valued most (de Zwaan et al., 2015; Lopez de Silanes et al., 2022; Sultana et al., 2018), while others show social ratings to be preferred (Pérez-Gladish et al., 2012), and yet another study shows evidence that respondents valued environmental issues most (Benuzzi et al., 2022). This study then looks to add to this body of scientific literature by determining which dimensions of ESG ratings are valued most when making investment decisions. We use an experimental survey with a sample of

Dutch individuals. This is to find if attracting new investors to decrease the cost of capital for firms is possible through increasing their ESG rating, or part of their ESG rating.

First, the results of the statistical analysis show evidence that investors will increase their likelihood to invest when a company increases its environmental and social rating. Increasing the governance rating, does not yield similar increases in likelihood to invest as increasing the environment and social rating. Second, investors show that they value the environmental and social rating significantly over the governance rating. Although there is no clear difference between the value investors put into the environmental and social ratings. Therefore, companies should prioritize improving environmental and social ratings over governance ratings. But there is no clear advantage in prioritizing either improving the environmental rating over the social rating, or the other way around.

This paper will first review relevant previous literature in order to develop a set of hypotheses and a research question. Next, the research method is explained and supported, including an overview of the variables, sample and statistical analysis done in this study. Then the results of the statistical analysis will be shown and discussed in regards to the hypotheses, and research question, that are formulated in the second section. Finally, conclusions will be drawn based on the results. And the limitations of the study, as well as recommendations for future research will be discussed.

## 2. Literature review & Theoretical background

So, this study tries to understand which of the three dimensions of ESG ratings investors value most when making investment decisions. But, in order to do so we first need to understand if and why investors even use ESG ratings when assessing their likelihood to invest. Do investors include ESG ratings in their investment strategy along with firms' risk, returns and liquidity. What utility can investors derive from investing in firms with high ESG ratings.

### 2.1 ESG ratings and investor utility

Traditionally, economic theory assumes that humans are rational agents looking to maximize their utility. When it comes to investing, this means that investors would only base their investment strategy on the risk-return profiles of companies (Mutswenje, 2009). Their utility function would only be based on the amount of risk they take, and the returns they get. However, research has shown that in practice this is often not the case. Investors also care about the social impact their investments have (Heeb et al., 2023; Riedl & Smeets, 2017). These investors derive utility from investing in firms who have positive social impact (and thus likely a high ESG rating), as this would be similar to them contributing to a charity, which is already a common way to satisfy pro-social preferences (Graff Zivin & Small, 2005). This would add a new variable to the utility function of investors, making it a function of risk-adjusted returns as well as social value. In this section we will go over what effects ESG ratings have on each part of this utility function of investors.

#### 2.1.1. ESG ratings and risk

Companies with high ESG rating often have better risk management. Because of better risk management they lower their exposure to risks such as litigation cases, fraud, embezzlement, corruption and regulatory penalties (Giese et al., 2019). According to Giese et al. (2019) having less of such incidents can lower companies' stock tail risk. They compared companies in the highest quintile of ESG ratings with companies in the lowest quintile of ESG ratings. Companies in the top quintile had severe risk incidents that lead to a 95% decrease in stock price less often than companies in the bottom quintile. Lopez de Silanes et al. (2022) found that governance ratings are related to stock's beta, and thus are related to lower systematic risk for a company. If we look at what investors from a global survey of senior investment professionals believe, risk is one of the main reasons investors think ESG information is material to their investment decisions. They believe that ESG information is relevant for making assessments of a company's reputational, legal and regulatory risks (Amel-Zadeh & Serafeim, 2018).

The findings that companies with high ESG ratings are better protected against tail risks is supported by numerous studies analyzing the risk-adjusted returns of companies during periods of

economic downturn. For example, Wu et al. (2017) found that a portfolio of SRI investments performed better, and recovered faster, after the 2008 financial crisis. They conclude that portfolios build around SRI principles are more resilient to systematic risks. Similar results were found by a study comparing German green mutual funds to their conventional peers. Here, the green mutual funds did not outperform conventional funds over the entire sample period. However, during the crisis period green mutual funds performed slightly better (Fernández et al., 2019). In the more recent financial crisis during the Covid period, Broadstock et al. (2021) found moderate evidence that stocks with high ESG ratings in the Chinese CSI300 showed lower stock price volatility. Also, they reported ESG ratings to be positively related to short term returns around the announcement of the lockdown in China. A similar study on US stocks, using the Refinitiv ESG database, also showed that there is a positive relationship between the ESG rating and returns, as well as return volatility, during the first quarter of 2020 (Albuquerque et al., 2020). In contrast to these studies, Demers et al. (2021) did not find similar results. Instead, they argue that for the first quarter of 2020 as well as the whole year, ESG ratings are insignificantly related to returns. They argue previous studies on the topic did not include all necessary controls. Perhaps, since the covid crisis is a relatively young topic compared to the financial crisis of 2008, more research is needed to come to a consensus. But to sum up, there is evidence in the literature of firms with higher ESG ratings having lower risks. So, for investors this would mean investing in such companies has the potential to increase their utility by lowering the risks they take.

### 2.1.2 ESG ratings and returns

The link between SRI/CSR/ESG ratings and the financial performance of firms has often been studied in previous literature. If firms with higher ESG ratings can also offer investors higher returns, all investors should logically look to incorporate ESG ratings into their investment's strategies. Friede et al. (2015, p. 211) note that "researchers often claim that results are ambiguous, inconclusive or contradictory" when talking about the ESG-CFP relationship. For example, Revelli and Viviani (2015) conclude in their meta-analysis of 85 studies on the relationship between SRI and CFP that there is no difference in Risk-adjusted return in so-called SR (Socially Responsible) stocks and conventional stocks. However, Friede et al. (2015) provide aggregated results of over 2200 individual studies on the relationship between ESG and CFP. They found that 90% of these studies found at least a nonnegative relationship, while 47.9% of vote-count studies and 62.6% of meta-analyses showed a positive relationship. This is compared to only 6.9% and 8% of studies respectively finding negative results. This study also looked at the sub-effects of the three dimensions of ESG ratings and found a relatively even positive relation for the environment, social and governance pillar. Similar results were found by a more recent study. Here, 58% of corporate studies showed a positive relationship between ESG ratings

and financial performance (Whelan et al., 2021). Meanwhile, only 8% of studies in this review reported a negative relationship. Corporate studies in this review focused on studies reporting measures such as ROA, ROE or stock prices. For the portfolio studies, which focused on risk adjusted measures such as a stocks alpha or Sharpe ratio, only 33% of studies reported a positive relationship, while 26% showed neutral and 28% showed mixed results (Whelan et al., 2021). So, while results for these studies are mixed, a majority of studies does report a positive relationship. The reason for the mixed results in these types of studies possibly lies in the different methodologies used, or the use of different ESG data. There are several providers of ESG ratings, and multiple studies have shown that these rating providers do not agree with each other, leading to large differences in ESG ratings for one company between rating providers (Berg et al., 2022; Chatterji et al., 2016). In conclusion, investors implementing ESG ratings in their investment strategy can likely expect higher returns and thus higher utility. On top of that, even in the case of a nonnegative relationship between ESG ratings and CFP, the additional advantages discussed in this chapter should lead investors to prefer including an ESG investment strategy to construct their portfolio.

### 2.1.3 ESG ratings and social preferences

There are 3 types of investors who use ESG data in their investment approach. The first type uses ESG data to improve their portfolio return, and is thus mainly financially motivated. According to a global survey of senior investment professionals this is the primary motivation for using ESG data (Amel-Zadeh & Serafeim, 2018). The second and third type are investors who use ESG data to align their personal beliefs and values with their portfolio. Or, they want to use their investment to trigger social or environmental changes, called impact investing (Giese et al., 2019). Investors with such type of social preferences expect to have lower return on their investments. They are thus willing to forgo some part of their financial returns in order to fulfill their social preferences (Bauer et al., 2021; Riedl & Smeets, 2017). Also, investors are willing to pay higher management fees on SRI funds, showing they are willing to pay a premium for stocks and funds with higher ESG ratings. However, this finding that respondents expect lower returns from ESG/SRI investments is not true for all studies. As Amel-Zadeh and Serafeim (2018) report that respondents believe ESG information is financially material to their investment performance. Moreover, de Zwaan et al. (2015) reported that respondents in their study expected no financial penalty from ESG investing.

If we assume investors expect to gain a certain level of utility from their investments and want to keep this utility at the same level. Then the potential expectance of lower returns on their investments means they gain some utility from the social or environmental impact of their investments. The increase in utility gained from their social preferences would have to be large enough to compensate their expected loss in utility from the lower returns. This would imply there is a trade-

off between their utility gained from financial returns and social preferences. This is confirmed by an analysis of retail investors' investment-decision making process. They trade-off between their financial returns and their pro social objectives, meaning they are inclined to invest in companies with higher ESG ratings in which they would not invest if they only considered their financial returns (Benuzzi et al., 2022).

## 2.2 Hypotheses

Now that we have established that using ESG ratings in an investment strategy can have several potential benefits to investors, we can take a more detailed look at previous literature in line with the scope of this study. In order to develop useful hypothesis to answer the research question of this study, we need to see what previous empirical literature shows about the preferences of investors between the three dimensions of ESG ratings.

Similarly to Bauer et al. (2021), de Zwaan et al. (2015) found that pension fund members in Australia are interested in ESG investing, and investors showed a preference for governance issues rather than environmental or social issues. Respondents of a study in Bangladesh questioning retail investors found similar results. Here, all three dimensions of ESG ratings had a positive relationship with the investment decision of respondents. But, the effect size was largest for the governance dimension (Sultana et al., 2018). Lopez de Silanes et al. (2022) found that institutional investors in the U.S. are also interested in ESG investing, as evidenced by the positive relationship between ESG ratings and total holdings. They also found that these holdings are mostly driven by a company's governance score, and negatively impacted by environmental score. From these studies we might then expect that, for this study, the governance rating will be the most important dimension when it comes to the likelihood to invest. However, the sample of respondents used in this study is different, and can possibly lead to different results. In addition, these studies are not conclusive when it comes to which dimension investors find most relevant. For example, a different study from Australia using a sample of socially responsible investors found that these type of investors find social issues to be the most relevant (Pérez-Gladish et al., 2012). Meanwhile, research on the Brazilian stock market from 2010 through 2015 shows that investors do significantly value environmental and governance performance of firms, but social performance is not significantly important (Miralles-Quirós et al., 2018). Yet another study, focused on the investment decision-making process of retail investors, concluded that which dimensions is most important depends on the perspective of the investor. When considering an investor with a sustainable perspective, the environmental rating is most important. But, when considering a financial perspective, the social rating is most important (Benuzzi et al., 2022).

Based on the conflicting research results of previous empirical studies, it is difficult to hypothesize ex-ante what dimension of ESG ratings will be valued most by respondents of this study. Previous studies have shown that preferences for certain issues can differ based on what type of investors are considered or what country the respondents or study is from. This study uses a sample of Dutch individuals, and it is therefore useful to consider the social values and preferences of Dutch people, when hypothesizing which dimension of ESG ratings will be most valued. We know from Bauer et al. (2021) that Dutch pension fund members have strong social preferences that led to the desire for their pension fund to invest more in sustainable investments. A different study considering Dutch households who are obligated to have a pension fund, finds that the majority of households “derive positive utility from environmental and social pension investment screens” (Borgers & Pownall, 2014, p. 27). On top of that, the majority are willing to give up part of their pension income to make the investments more in line with their social preferences. In conclusion, Dutch investors typically have social preferences that they take into account when making investment decisions. But we cannot tell from these studies which of the pillars of ESG ratings they find relatively most important.

Based on the previous literature we can tell higher ESG ratings can have benefits for risk, returns and can satisfy investors social preferences. Therefore, it is expected that the likelihood to invest for investors is positively related to all three dimensions of ESG ratings. A company with a low rating on one or all of these dimensions should be able to attract more investors by improving one of these ratings. However, when it comes to previous literature on which of the three dimensions investors find relatively most important, the results are conflicting. Thus, we pose an exploratory research question to find an answer to which dimension is most important to the likelihood to invest.

**H1a:** *Improving the environmental rating of a firm will have a positive effect on the investment likelihood of individual investors.*

**H1b:** *Improving the social rating of a firm will have a positive effect on the investment likelihood of individual investors.*

**H1c:** *Improving the governance rating of a firm will have a positive effect on the investment likelihood of individual investors.*

**Research question:** *Which of the three dimensions of ESG ratings do individual investors find most important when assessing their likelihood to invest?*

## 3. Research method

### 3.1 Research design

This study gathered empirical data via an online factorial survey. A factorial survey combines elements from survey research as well as experimental research. With a factorial survey, researchers can control and manipulate the dimensions (independent variables) that influence the answers by respondents, which reflects the element of experimental design. Meanwhile, respondent-specific information is also collected reflecting the elements of survey research (Oll et al., 2018). Factorial survey research makes use of so-called vignettes. These are carefully designed hypothetical situations, which can more closely match reality than direct questioning used in typical survey research. Also, it gives the researcher more control over the independent variables he wishes to study (Alexander & Becker, 1978). The judgements of the vignettes by respondents are assumed to be affected by the vignette dimensions, the individuals' personal characteristics and the social context (Degenholtz et al., 1999). Using a factorial survey design has several further potential advantages. First, it is easier to gather a larger sample compared to traditional experimental design. This is due to the fact that in this type of study, typically, the vignettes are considered the unit of analysis. Each respondent is required to give a rating for multiple vignettes, 10 per respondent in this study. Second, it increases representativeness and external validity. However, external validity is also limited because the hypothetical vignettes cannot contain the entire complexity of a real-life setting. On top of that, ratings by respondents are hypothetical and might be different in a real-life setting (Oll et al., 2018). Third, "Judgements are less susceptible to social approval and desirability biases compared with traditional surveys" (Oll et al., 2018, p. 49). Wallander (2009) mentions that this might be due to respondents most likely not being fully attentive to the controlled variation of the vignettes. In this study, the independent variables, environment rating, social rating and governance rating are manipulated. Each respondent is asked to rate 10 vignettes which are randomly assigned to them out of a pool of 16 total vignettes. **Error! Reference source not found.** shows a summary of all the variables used in this study, including control variables.

#### 3.1.1 Dependent variable

Respondents are asked to make judgements or in the case of this study ratings about the vignettes. These ratings represent the dependent variable for this study which is the investment decision. The investment decision is measured by the respondents' likelihood to invest. The likelihood to invest is measured on a Likert-type scale with a range of 5 options, from very unlikely to very likely. This means this study deals with an ordinal dependent variable. A Likert-type scale is the most used rating task form in factorial survey studies (Wallander, 2009). The total amount of vignettes is

calculated by multiplying all dimensions values with each other (Oll et al., 2018). This means this study uses a total of 16 ( $4^2$ ) vignettes. However, respondents are limited to answering only 10 vignettes when taking the survey. This is to limit boredom, fatigue and information overload effects that might occur due to potential respondents' limited processing capacity (Oll et al., 2018).

### 3.1.2 Independent variables

The vignettes consist of dimensions and levels. The dimensions are the factors or independent variables, which can vary on different levels. In this study the vignettes consist of 4 different dimensions: An Environment, Social, Governance rating and annualized expected returns. These are given for the hypothetical company that is presented in each vignette. These factors vary randomly between two levels (high/low). For the E, S and G ratings, the scale is 0-100, with 80 representing a high rating and 20 representing a low rating. These ratings are based on the framework of Refinitiv, an ESG rating provider. The reason for using the Refinitiv framework is because it is easy to use and understand for respondents. Other rating providers such as MSCI use a framework where AAA is best and CCC is worst, with options such as AA, A, BBB etc. in between. Sustainalytics uses a rating that indicates risk levels with 0 being low, and anything above 40 being high risk. Thus, Refinitiv' rating framework is more comprehensible and intuitive to use for respondents which can help with the internal validity of the factorial survey. For the annualized expected return, 9% represents the high level, while 3% represents the low level. These percentages are not based on historical long term annualized returns on stocks. Rather, by making sure there is a distinct gap in expected returns, respondents will take this into account when making their rating, leading to sufficient variation in results.

### 3.1.4 Control variables

When making judgements about certain hypothetical situations, both individual factors as well as vignette dimensions are expected to have an effect on the dependent variable (Hox et al., 1991). In this study respondents are susceptible to certain heuristics, biases and fallacies. These can potentially have a significant effect on the ratings given by respondents in this study. This study controls for a few of these biases. In order to ensure the effects of the independent variables of interest on the dependent variable are not observed due to these biases. In a systematic review of the research on the effect of behavioral finance on financial decision making, Shah et al. (2021) found that overconfidence, loss aversion and herding effect to be some of the factors that most commonly influence the financial decision making process. Loss aversion states that "A salient characteristic of attitudes to changes in welfare is that losses loom larger than gains" (Kahneman & Tversky, 1979, p. 279). Loss averse respondents are less likely to invest due to the chance of losing the hypothetical investment. Overconfidence causes investors to trade more, and is thus expected to have a positive

relation to the likelihood to invest of respondents. Also, Men are overconfident more often than women, which causes them to trade relatively more (Barber & Odean, 2001). Last, regret aversion or regret theory was first studied by Loomes and Sugden (1982). They suggest that individuals are capable of anticipating any future regret in decisions they make now. Regret averse respondents in this study might anticipate any regret they might have in the future about the decision or judgement they are making now, and thus be less likely to invest.

Two questions per variable are added to the survey to measure individual level responses to these control variables. These questions are similar to those used by a study researching the effect of many different behavioral factors on investors decision making process (CAO et al., 2021). The questions are answered on a 5-point Likert scale ranging from strongly disagree to strongly agree. The answers are then aggregated to come to a unique overconfidence, loss aversion and regret aversion level for each respondent.

Finally, to control for previously mentioned fatigue effects in respondents a dummy variable is added to the statistical analysis for the period each rating was done. Meaning the first vignette a respondent rated is labeled as period 1, while the last rating the respondent did is labeled as period 10. If fatigue effects do not occur in this study, we should see no significant effects of the period the rating was done within the survey on the likelihood to invest.

Table 1: Summary of variables

<b>Dependent variable</b>	<b>Label</b>	<b>Levels</b>
Investment decision	Likelihood to invest in the hypothetical firm	1 = very unlikely to 5 = very likely
<b>Independent variables</b>		
Environment rating	Rating based on environmental issues such as greenhouse gas emissions, pollution & waste, natural resource depletion	High = 80, Low = 20
Social rating	Rating based on social issues such as human rights, human capital, discrimination	High = 80, low = 20
Governance rating	Ratings based on governance issues such as board independence, board diversity, shareholder rights	High = 80, low = 20
Expected returns	Annualized expected return for a company	High = 9%, low = 3%
<b>Control variables</b>		
Age	Respondent age	Youngest = 20, oldest = 60
Gender	Respondent gender	1 = male, 2 = female
Overconfidence	Level of confidence of respondent	1 = strongly disagree, 5 = strongly agree
Loss aversion	Level of loss aversion of respondent	1 = strongly disagree, 5 = strongly agree
Regret aversion	Level of regret aversion of respondent	1 = strongly disagree, 5 = strongly agree

### 3.2 Statistical analysis

Most factorial survey studies use a multivariate OLS regression analysis (Lauder, 2002; Wallander, 2009). The first model is thus an OLS regression including only the independent variables of interest to this study. Next the control variables are added. This includes added dummy variables to

control for the timing of the vignette rating in order to control for rating fatigue effects under respondents. To be able to answer the research question, Wald tests were done postestimation to evaluate any significant differences in coefficients between independent variables in the models. This analysis was done for four different conditions. In the first condition, a company scoring low on each independent variable was compared to companies with only a high environment rating, only a high social rating or only a high governance rating. The second condition tests the difference in likelihood to invest for a company with only a high environmental rating, compared to a company with a high environmental rating and a high rating on one of the other independent variables. The third and fourth condition were similar, but the reference company had only a high social rating in the third, and then only a high governance rating in the fourth condition. By changing one of the ratings to high at a time, it allows us to see the changes in likelihood to invest for when a company improves their rating on one of the three dimensions, keeping all other independent variables constant. Thus, making it possible to see where companies should focus to improve their ESG ratings in order to attract more investors.

Since this study makes use of an ordinal dependent variable, we also use an ordered probit model. The problem with using a linear model it makes the assumption that the difference between each answer is similar (Daykin & Moffatt, 2002). This means the difference between the answer 1 (very unlikely) and 2 (unlikely) is the same as the difference between answer 4 (likely) and 5 (very likely). However, we cannot infer the interval between the values of the answers of an ordinal variable (Liddell & Kruschke, 2018). The differences can vary between respondents and are not measurable, as is the case with metric variables. This makes it hard to interpret the coefficients of a linear regression model such as OLS. Since the coefficient of such a model assumes the number of units with which we expect the dependent variable to change, given a one unit increase in the independent variable (Daykin & Moffatt, 2002).

### 3.3 Sample

This study gathered data via a factorial survey distributed to my personal network. In factorial surveys, the vignettes are commonly considered the unit of analysis. With each respondent rating multiple vignettes, the number of observations gets inflated quickly, with factorial survey studies averaging 8 vignette ratings per respondent (Wallander, 2009). Therefore, a factorial survey does not need as many respondents as a typical survey study (Oll et al., 2018). This study had 49 respondents each rating 10 vignettes, leading to 490 observations. The vignettes that respondents were asked to rate were randomly picked out of the full vignette sample. This led to some vignettes getting rated more often than others.

The respondents of the survey were not given a monetary incentive to answer the survey. According to Singer and Ye (2013) this can lead to a low response rate. However, they also note that the reason people respond to surveys can be divided in 3 categories. One of which is altruistic responses, meaning individuals respond to the survey because they want to be helpful to the researcher. This can be seen as a likely motive for respondents to answer given the nature of the sample is the personal network of the researcher. Singer and Ye (2013) further note that incentives do not have an effect on the response quality, although the research on this topic is limited.

As mentioned, the ratings of the vignettes are based on 3 characteristics, one of which is the respondents personal characteristics (Degenholtz et al., 1999). By drawing respondents from the researchers' personal network, it is more likely that personal characteristics of respondents are similar to each other. This is due to respondents potentially having similar social views or other characteristics, which can affect the ratings of the vignettes possibly skewing results. This can potentially hurt the external validity of the sample used in this study, making it less generalizable to the target population. A possible shortcoming is thus that the accessible population for this study might differ significantly compared to the target population this study tries to draw conclusions about.

The sample skews slightly more to male respondents rather than female, with 57% males and 43% females. While the mean age of a participant was 32, this does not reflect the overall sample well. 73.5% of respondents were under the age of 30, making the survey skew towards a very young population. Also, another 22.5% of the respondents were above the age of 50. Meaning only 2 respondents were within the 30 to 50 years old range. This shows that in this sample a large portion of the target population is not represented well, limiting the potential for results of this study to be generalized to the target population. Furthermore, the oldest respondent was 60, meaning this study does not include any pension eligible respondents. This can be problematic, since generally speaking pension eligible persons in the Netherlands have the highest savings (CBS, 2022, p. 68). Making them more likely to invest part of these savings (excl. their pensions being invested by pension funds), and thus a sizeable part of the target population for this study.

Table 2: descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Likelihood to invest	490	2.835	1.427	1.000	5.000
Environment rating	490	0.524	0.500	0.000	1.000
Social rating	490	0.482	0.500	0.000	1.000
Governance rating	490	0.533	0.499	0.000	1.000
Expected return	490	0.535	0.499	0.000	1.000
overconfidence	490	4.898	1.994	2.000	9.000
Loss aversion	490	6.429	0.949	5.000	9.000
Regret aversion	490	6.102	1.634	2.000	9.000
age	490	32.327	13.522	20.000	60.000
gender	490	1.429	0.495	1.000	2.000

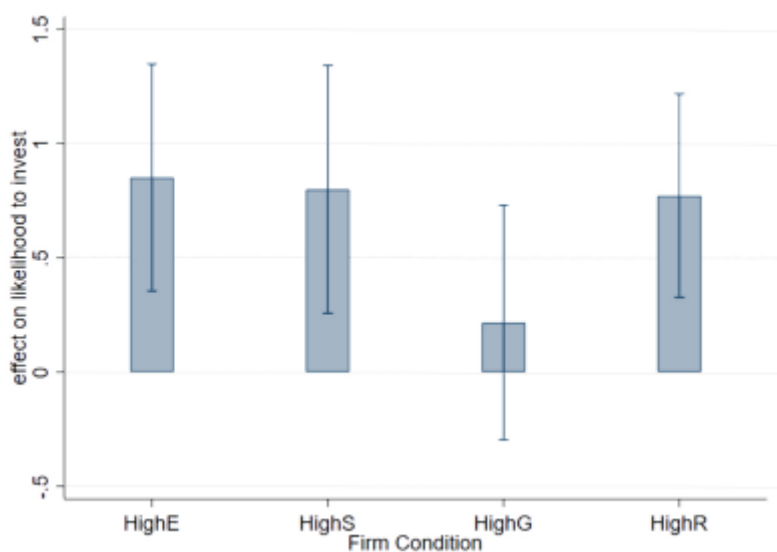
## 4. Results

### 4.1 OLS regression results

Figure 1 shows the results of an OLS regression analysis with clustered standard errors at the individual level (see appendix, table 7, column 1). In this model, the reference condition is compared to four independent dummy variables. The reference condition represents a company with low ratings on each of the three dimensions of the ESG rating, as well as low expected annualized returns. The independent variable. The independent variables in this model represent companies with high ratings on only one of the four dimensions. For example, HighE represents a company with a high environment rating and low social, government and return ratings, HighS represents a company with only a high social rating etc. Hence, the regression coefficients of the independent variables represent changes in likelihood to invest between a company with low ESGR ratings, and a company with one of these ratings being high. The constant of the model in table 7 presents the base likelihood to invest of respondents for the low ESGR condition. In column 2 and 3 of table 7, the results include control variables. Adding control variables to the model did not substantially change the fit of the model for any of the models. The significance levels of coefficients were also unaffected by adding control variables to any model.

Figure 1 then displays evidence that for a company with a low E, S, G and R, increasing either one of these ratings has a positive relationship to the likelihood to invest. However only increasing their environment ( $p = 0.002$ ), or social rating ( $p = 0.006$ ). has a statistically significant effect. These results support the expectations of hypotheses 1a and 1b. Although, since this study deals with an ordinal dependent variable, we cannot interpret the magnitude of the coefficients. Postestimation, Wald tests of significance were done to check for significant differences between coefficients in the regression. Here, there was no significant difference found between the HighE condition and HighS condition,  $F(1,48) = 0.02$ ,  $p = 0.878$ . However, compared to the HighG condition, both the HighE and the HighS condition are significantly different,  $F(1,48) = 5.86$ ,  $p = 0.0193$  and  $F(1,48) = 3.90$ ,  $p = 0.0542$  respectively. In conclusion, increasing the environmental rating and social rating significantly increases the likelihood to invest for a company with low ratings. It is unclear however which is relatively more important to respondents. Thus, we cannot say which of these two ratings companies should look to prioritize.

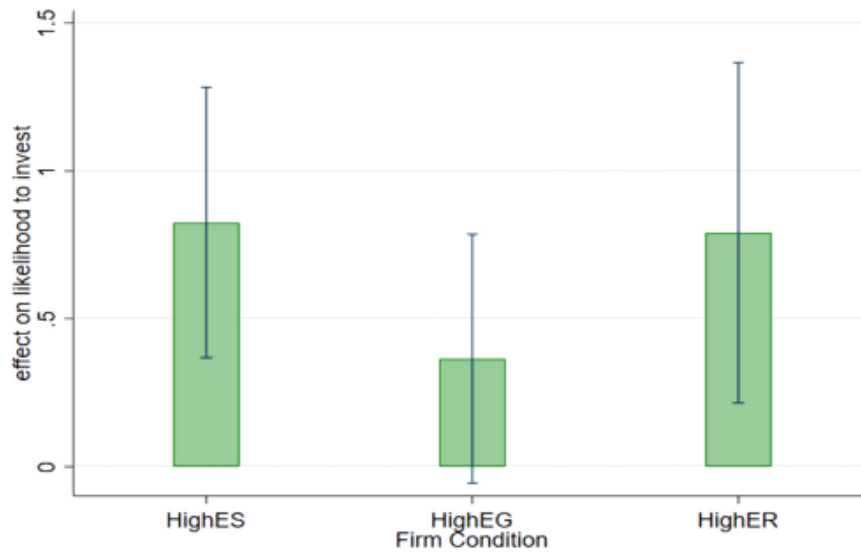
Figure 1: Effect of firm condition on likelihood to invest, Low ESGR as reference



Notes. Figure 1 visualizes the results from table 7 in the appendix. The figure plots the coefficients of the independent dummy variables. These independent dummy variables are compared to the reference dummy variable, which represents a company with low ratings for each ESG dimension and returns. The independent dummy variables represent companies with only a High E, S or G rating respectively.

Next, we look at multiple different models where the reference condition only has one of the dimensions set to high. This way we can see how a company improving on one of the other ratings affects the likelihood to invest. For instance, how does the likelihood to invest change when a company already has a high environment rating, but also improves either their social or governance rating. Figure 2 shows the results of an OLS regression (table 8, model 1) where the reference condition has only a high environment rating. For this condition, improving the social rating has a significantly positive effect at a 1% significance level ( $p < 0.01$ ). Meanwhile, improving the governance rating was only significantly positive at the 10% level ( $p = 0.087$ ) (table 8, model 1). The difference between coefficients for the HighES and the HighEG conditions is also only significant at the 10% level (Wald test:  $F(1,48) = 3.44$ ,  $p = 0.0698$ ). Again, this evidence shows support for hypothesis 1b, while also showing modest support for hypothesis 1c. However, due to the large sample size we have to keep in mind the higher likelihood of type 1 errors when considering a 10% significance level. To sum up figure 2, for a company with a high environment rating, improving the social rating will likely be a more efficient way to attract more or new investors compared to improving the governance rating.

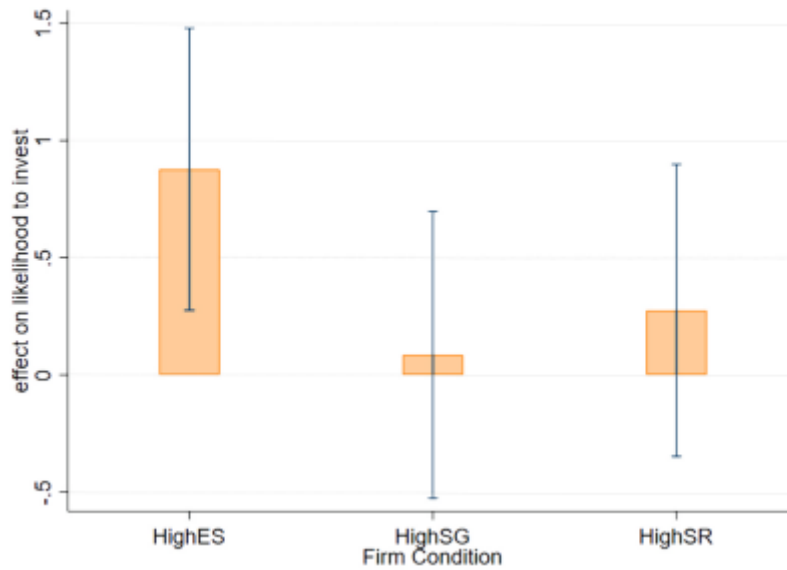
Figure 2: Effect of firm condition on likelihood to invest, HighE as reference



Notes. Figure 2 visualizes the results from table 8 in the appendix. The figure plots the coefficients of the independent dummy variables. These independent dummy variables are compared to the reference dummy variable. For this plot the independent variables represent companies with a High E and S, and a High E and G rating respectively. The reference dummy variable represents a company with only a High E rating.

Figure 3 again shows the results for an OLS regression (table 9, model 1). This time with the reference condition being a dummy variable with a high social rating only, all other dimensions are set to low. This condition is compared to conditions where companies add a high environmental rating and a high governance rating on top of this. For such companies, only improving their environmental rating has a significant positive effect ( $p < 0.01$ ). Improving only the governance rating had no such effects ( $p = 0.780$ ) (see appendix, table 9). The difference between the coefficients of the HighES and HighSG conditions was just above the 1% significance level (Wald test:  $F(1,48) = 6.74$ ,  $p = 0.0124$ ). Therefore, a company with only a high social rating should likely prioritize on increasing their environmental rating if they want to increase their investor base. The evidence of this graph supports hypothesis 1a, but not 1c.

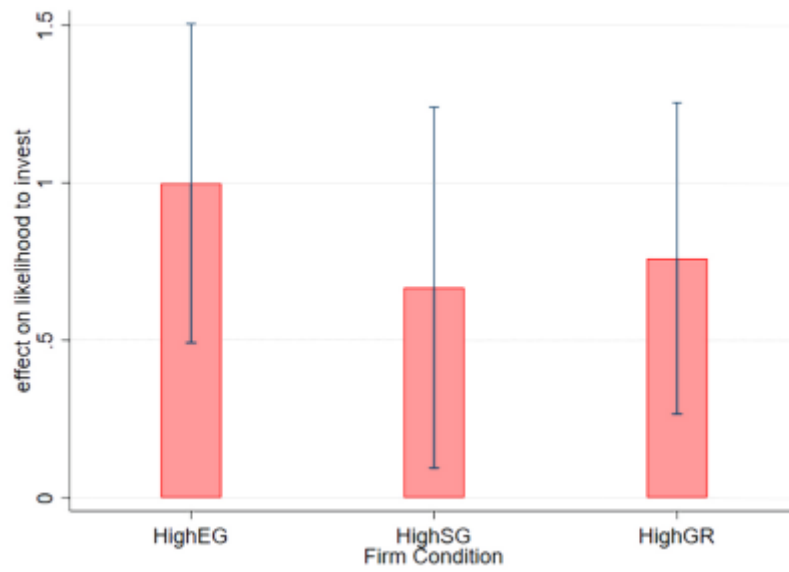
Figure 3: Effect of firm condition on likelihood to invest, HighS as reference



Notes. Figure 3 visualizes the results from table 9 in the appendix. The figure plots the coefficients of the independent dummy variables. These independent dummy variables are compared to the reference dummy variable. For this plot the independent variables represent companies with a High E and S, and a High S and G rating respectively. The reference dummy variable represents a company with only a High S rating.

Figure 4 presents similar OLS regression results (table 10, model 1) as figure 2 and 3. This time the reference dummy variable only has a high governance rating. This reference company is then compared to companies where either a high environment rating or high social rating is added, while keeping other variables constant. The results then show how the likelihood to invest for respondents changes when one dimension is improved from low to high. Both conditions significantly improve the likelihood to invest. The bar where the environmental rating is added in figure 4 is significant at the 1% level ( $p < 0.01$ ). The bar where the social rating is added in figure 4 is significantly positive at the 5% level ( $p = 0.023$ ). So, for a firm with a good governance rating only, it can be useful to increase both the environment and the social rating. Which of these two ratings is most efficient to focus on for a company is not clear. Because, the difference in coefficients between the HighEG and HighSG condition is not significant (Wald test:  $F(1,48) = 1.10, p = 0.3003$ ).

Figure 4: Effect of firm condition on likelihood to invest, HighG as reference



Notes. Figure 4 visualizes the results from table 10 in the appendix. The figure plots the coefficients of the independent dummy variables. These independent dummy variables are compared to the reference dummy variable. For this plot the independent variables represent companies with a High E and G, and a High S and G rating respectively. The reference dummy variable represents a company with only a High G rating.

## 4.2 Ordered probit results

In the next section we look at the results from the ordered probit models. As mentioned in the methods section, the dependent variable in this study is an ordinal variable. Hence, we consider the results of the ordered probit models as well, to be able to give a clear answer to the research question posed in section 2.2. Since the coefficients of the independent variables in an ordered probit model cannot be directly interpreted, instead the marginal effects are reported (see appendix for tables 11-14 for output with coefficients). Table 3-6 show these marginal effects for different reference conditions. The levels express the different answer categories for the dependent variable. Level 1 means very unlikely, while level 5 means very likely. The reported numbers illustrate the change in probability that a respondent will choose a certain answer category for one condition over the other. For example, in table 3 the probability that a respondent picks very likely for the HighE condition, over picking very likely on the low ESGR condition is 27.5% higher.

Table 3 then shows the result of the marginal effects of an ordered probit model, where the Low ESGR dummy variable was left out. We can then tell that, for the HighE condition, respondent probability to answer very likely or likely was 39.1% higher compared to the low ESGR condition. Simultaneously, they were 33.7% less likely to answer very unlikely or unlikely. Results were similar for the HighS condition. Though for the HighG condition, probabilities are considerably lower. This shows more evidence in support of investors in this sample valuing the environment and social rating significantly higher than the governance rating. And with that, it supports the idea that it is most efficient for companies to focus on increasing environment and social ratings to attract investors. Overall, the negative probabilities for the lower levels and the positive probabilities for the higher levels support the hypotheses in section 2.2.

*Table 3: Marginal effects of ordered probit model for Low ESGR condition*

Variables	Level 1	Level 2	Level 3	Level 4	Level5
HighE	-0.182	-0.155	-0.054	0.116	0.275
HighS	-0.171	-0.145	-0.049	0.114	0.251
HighG	-0.095	-0.058	-0.007	0.078	0.083
HighR	-0.177	-0.149	-0.050	0.117	0.259

*Notes:* This table present the marginal effects of the ordered probit model. The dependent variable is the likelihood to invest. Level 1 equals the answer category very unlikely, while level 5 equals the answer category very likely. The reference dummy variable represent a company with a low E, S, G and R rating. The HighE condition represents a company with a high environmental rating only etc. the reported numbers then reflect the probability changes of answering one category for the reference condition vs the shown conditions.

For table 4 the independent dummy variable left out of the model was the company with a high environmental rating, but low social, governance ratings and expected returns. Again, we see similar results. Adding a high social rating to such company increases the probability for respondent to be likely or very likely to invest in this company by 26.1%, compared to giving such answer for the reference condition in this table. Adding a high governance rating only increased such chances by 10.1%. All probabilities move from being negative for the very unlikely and unlikely answer categories to positive for the likely and very likely categories. Meaning that, generally speaking, the chance of investing increases when a company improves its social or governance score. Although, the probabilities for the governance score are relatively small, and might thus not lead to significant increases in likelihood to invest.

Table 4: Marginal effects of ordered probit model for High E condition

Variables	Level 1	Level 2	Level 3	Level 4	Level 5
HighES	-0.139	-0.100	-0.023	0.108	0.153
HighEG	-0.065	-0.035	-0.002	0.053	0.048
HighER	-0.140	-0.101	-0.024	0.109	0.156

Notes: This table present the marginal effects of the ordered probit model. The dependent variable is the likelihood to invest. Level 1 equals the answer category very unlikely, while level 5 equals the answer category very likely. The reference dummy variable represent a company with a high E rating and a low S, G and R rating. The HighES condition represents a company with a high environmental and social rating only etc. the reported numbers then reflect the probability changes of answering one category for the reference condition vs the shown conditions.

Table 5 compares the companies with a high environment and social rating, and with a high social and governance rating, with a company with only a high social rating. Here, we see that adding a high environment rating has higher positive probabilities for the likely and very likely answer category than adding a high governance rating. This table highlights similarly to the previous results the value investors have for the environmental rating as compared to the governance rating. Table 6 then shows the results for the last company condition. Where only the governance rating is high. For such a company both improving their environmental and social rating can help significantly to interest investors. But we do see a sizeable difference (22.4% vs 13.6%) in the probability for respondents to answer 'very likely' between the HighEG and HighSG condition over the HighG condition.

Table 5: Marginal effects of ordered probit model for High S condition

Variables	Level 1	Level 2	Level 3	Level 4	Level 5
HighES	-0.150	-0.112	-0.029	0.113	0.178
HighSG	-0.015	-0.006	0.000	0.012	0.009
HighSR	-0.065	-0.035	-0.002	0.053	0.048

Notes: This table present the marginal effects of the ordered probit model. The dependent variable is the likelihood to invest. Level 1 equals the answer category very unlikely, while level 5 equals the answer category very likely. The reference dummy variable represent a company with a high S rating and a low E, G and R rating. The HighES condition represents a company with a high environmental and social rating only etc. the reported numbers then reflect the probability changes of answering one category for the reference condition vs the shown conditions.

Table 6: Marginal effects of ordered probit model for High G condition

Variables	Level 1	Level 2	Level 3	Level 4	Level 5
HighEG	-0.167	-0.134	-0.041	0.118	0.224
HighSG	-0.129	-0.090	-0.019	0.102	0.136
HighGR	-0.148	-0.106	-0.024	0.114	0.164

Notes: This table present the marginal effects of the ordered probit model. The dependent variable is the likelihood to invest. Level 1 equals the answer category very unlikely, while level 5 equals the answer category very likely. The reference dummy variable represent a company with a high G rating and a low E, S and R rating. The HighEG condition represents a company with a high environmental and governance rating only etc. the reported numbers then reflect the probability changes of answering one category for the reference condition vs the shown conditions.

## 5. Conclusion & Discussion

### 5.1 Conclusion

This study researched the preferences of investors when it comes to the three different dimensions of ESG ratings. Using a factorial survey design, with a sample of 49 Dutch individuals between the age of 20-60. It looked to answer if these dimensions are material to the investment likelihood of respondents, and which of these dimensions is valued most. From previous research we know that investors can gain utility from satisfying their social preferences, as well as from the risk-adjusted returns they gain (Bauer et al., 2021; Riedl & Smeets, 2017). Results from this study shows evidence in line with this thought. A company improving either their environmental or social rating from low to high, with other variables being held equal, is material information for the likelihood to invest of respondents in this study. This does oppose some findings of previous literature where environmental ratings had a negative impact on total holdings (Lopez de Silanes et al., 2022). Possibly, the problem that hypothetical answers in a survey do not always reflect real-life decisions could explain this discrepancy. As total holdings reflect information where investment decisions are already made, while this study only exhibits hypothetical investment decisions.

Improving the governance rating from low to high, did not significantly impact the investment likelihood of companies positively. It did not impact the investment likelihood negatively either though, meaning companies are not penalized for improving this rating. These results directly conflict with results found in earlier studies where the governance rating was the most important factor for investors (de Zwaan et al., 2015; Lopez de Silanes et al., 2022; Sultana et al., 2018). A possible explanation for the overall conflicting results is the differences in cultures between studies. The previously mentioned studies were done in Australia, Bangladesh, Brazil and the US. Countries with vastly differing cultures. If we assume social values or preferences to be partly driving the decision to invest in ESG products. Then consequently, what values are important in different cultures could determine the differences in what dimensions are important to investors in these studies. This would be a possible avenue for future research to focus on.

When assessing their likelihood to invest, it is thus evident that respondents in this sample valued a companies' environmental and social rating over their governance rating. Yet, the results did not show evidence of a significant difference between the environmental or social rating. Therefore, we can make some conclusion for companies looking to lower their cost of capital by attracting more investors. For these companies, focusing on improving their environmental and social rating should be the priority, over focusing on improving their governance rating.

## 5.2 Discussion

It is important to note that this study has certain limitations, some general concerns that come with factorial survey research, and some concerns that are more specific to this study. First, as mentioned in the conclusion, the vignettes that are used as part of the factorial survey design are only a simplified, hypothetical version of reality. Meaning the information presented in the vignettes do not or cannot cover all of the variables that go into the decision-making process an investor would have in a real-life setting. For example, the vignette design did not include a measure of risk for the hypothetical company, or did not present the respondents with a budget. These factors would normally be of significant importance in investment decisions. Because of this, the investment decisions of respondents in real life situations, might differ significantly compared to the hypothetical answers given in this survey. They may choose to not even use ESG ratings when making their investment decisions. This could be because they have no access to such information, or might not have known of the existence of such information before taking this survey. Second, the sample of this study used individuals in the personal network sphere. Therefore, the chance that the sample of respondents fairly represents the entire investing population is not very high, all respondents were Dutch, and most respondents were relatively young (20 – 30 years). Also, because of the use of the personal network it is unlikely the sample included professional investors, and that the financial literacy of respondents is possibly low. Third, the survey did not collect any information on the investing experience of the respondents. A low average financial literacy in the respondent sample might mean that results will differ from when similar questions are asked to respondents who do have investing experience.

Future research could then improve on these limitations to obtain evidence that is more generalizable to the overall target population. This can be done by adding more relevant independent variables to the vignettes, giving them a more realistic design. Or, by obtaining a global sample, instead of a national one, generalizations about the whole investing population can potentially be made. As the potential noise from the effect that culture has on the social values of investors would diminish. Further, this study focused on retail investors. It would be interesting to see if similar results are found when a sample of institutional or professional investors is surveyed. These type of investors might have completely different preferences or utility functions, since they often invest money from other people (pension funds, fund managers). This gives them incentives different incentives when investing money compared to retail investors.

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## 7. Appendix

### 7.1 Regression results tables

*Table 7: OLS Regression results for Low ESG + R reference condition*

	(1) OLS	(2) OLS with Controls	(3) OLS with Period controls
HighE	0.851*** (0.247)	0.822*** (0.254)	2.572*** (0.925)
HighS	0.799*** (0.270)	0.818*** (0.283)	2.601*** (0.858)
HighG	0.217 (0.255)	0.241 (0.253)	1.996** (0.807)
HighR	0.772*** (0.221)	0.828*** (0.238)	2.509*** (0.735)
Constant	1.462*** (0.187)	1.395* (0.719)	-0.324 (1.134)
Obs.	490	490	490
R-squared	0.307	0.335	0.357
Controls	No	Yes	Yes
Period FE	No	No	Yes

*Notes:* This table presents OLS regression results with robust clustered standard errors on the individual respondent level. The dependent variable is the likelihood to invest. The reference dummy variable left out in the table represents a company with low ESG and R ratings. HighE represents a company with a high E rating, but low SGR ratings etc. Model 2 includes control variables. Model 3 includes period fixed effects. Standard errors are in parenthesis.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 8: *OLS Regression results for high E rating as reference condition*

	(1)	(2)	(3)
	OLS	OLS with Controls	OLS with Period controls
HighES	0.825*** (0.227)	0.855*** (0.213)	0.760 (0.539)
HighEG	0.365* (0.209)	0.363* (0.211)	0.182 (0.572)
HighER	0.791*** (0.286)	0.846*** (0.279)	0.542 (0.648)
Constant	2.313*** (0.224)	2.217*** (0.714)	2.248*** (0.665)
Obs.	490	490	490
R-squared	0.307	0.335	0.357
Controls	No	Yes	Yes
Period FE	No	No	Yes

*Notes:* This table presents OLS regression results with robust clustered standard errors on the individual respondent level. The dependent variable is the likelihood to invest. The reference dummy variable left out in the table represents a company with High E rating and low SGR ratings. HighES represents a company with a high E and S ratings, but low G and R ratings etc. Model 2 includes control variables. Model 3 includes period fixed effects Standard errors are in parenthesis.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 9: OLS Regression results for high S rating as reference condition

	(1)	(2)	(3)
	OLS	OLS with Controls	OLS with Period controls
HighES	0.877*** (0.299)	0.859*** (0.292)	0.731 (0.449)
HighSG	0.085 (0.304)	0.027 (0.321)	-0.444 (0.554)
HighSR	0.275 (0.310)	0.256 (0.322)	-0.409 (0.632)
Constant	2.261*** (0.254)	2.213*** (0.662)	2.277*** (0.642)
Obs.	490	490	490
R-squared	0.307	0.335	0.357
Controls	No	Yes	Yes
Period FE	No	No	Yes

Notes: This table presents OLS regression results with robust clustered standard errors on the individual respondent level. The dependent variable is the likelihood to invest. The reference dummy variable left out in the table represents a company with High S rating and low EGR ratings. HighES represents a company with a high E and S ratings, but low G and R ratings etc. Model 2 includes control variables. Model 3 includes period fixed effects Standard errors are in parenthesis.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 10: OLS Regression results for High G rating as reference condition

	(1) OLS	(2) OLS with Controls	(3) OLS with Period controls
HighEG	0.999*** (0.252)	0.945*** (0.258)	0.758* (0.407)
HighSG	0.668** (0.285)	0.604** (0.279)	0.162 (0.468)
HighGR	0.760*** (0.246)	0.784*** (0.233)	0.051 (0.573)
Constant	1.679*** (0.201)	1.636** (0.702)	1.672** (0.741)
Obs.	490	490	490
R-squared	0.307	0.335	0.357
Controls	No	Yes	Yes
Period FE	No	No	Yes

*Notes:* This table presents OLS regression results with robust clustered standard errors on the individual respondent level. The dependent variable is the likelihood to invest. The reference dummy variable left out in the table represents a company with High G rating and low ESR ratings. HighEG represents a company with a high E and G ratings, but low S and R ratings etc. Model 2 includes control variables. Model 3 includes period fixed effects Standard errors are in parenthesis.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 11: Ordered probit regression results for Low ESGR rating as reference condition

	(1)	(2)
	Ordered Probit	Ordered probit with controls
HighE	1.062*** (.296)	1.039*** (.308)
HighS	.931*** (.312)	.96*** (.338)
HighG	.385 (.353)	.407 (.36)
HighR	.927*** (.259)	.992*** (.283)
Observations	490	490
Pseudo R <sup>2</sup>	.124	.137
Controls	no	yes

Notes: This table presents the results of an ordered probit regression with robust clustered standard errors at the individual level. The dependent variable is the likelihood to invest. The reference dummy variable left out in the analysis represent a company with a Low E, S, G and R rating. HighE represent a company with a high environment rating, but low ratings on all other variables etc. Model 2 includes control variables. Standard errors are in parentheses. \*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

Table 12: Ordered probit regression results for High E rating as reference condition

	(1)	(2)
	Ordered Probit	Ordered probit with controls
HighES	.626*** (.194)	.668*** (.19)
HighEG	.254 (.185)	.259 (.189)
HighER	.611*** (.235)	.676*** (.233)
Observations	490	490
Pseudo R <sup>2</sup>	.124	.137
Controls	no	yes

Notes: This table presents the results of an ordered probit regression with robust clustered standard errors at the individual level. The dependent variable is the likelihood to invest. The reference dummy variable left out in the analysis represent a company with a high environment rating but a low S, G and R rating. HighES represent a company with a high environment rating and social rating, but low ratings on all other variables etc. Model 2 includes control variables. Standard errors are in parentheses. \*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

Table 13: Ordered probit regression results for High E rating as reference condition

	(1) Ordered Probit	(2) Ordered probit with controls
HighES	.757*** (.256)	.747*** (.252)
HighSG	.119 (.267)	.053 (.286)
HighSR	.278 (.256)	.259 (.272)
Observations	490	490
Pseudo R <sup>2</sup>	.124	.137
Controls	no	yes

Notes: This table presents the results of an ordered probit regression with robust clustered standard errors at the individual level. The dependent variable is the likelihood to invest. The reference dummy variable left out in the analysis represent a company with a high S rating but a low E, G and R rating. HighES represent a company with a high environment rating and social rating, but low ratings on all other variables etc. Model 2 includes control variables. Standard errors are in parentheses.

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

Table 14: Ordered probit regression results for High E rating as reference condition

	(1) Ordered Probit	(2) Ordered probit with controls
HighEG	.931*** (.251)	.892*** (.256)
HighSG	.664** (.28)	.606** (.277)
HighGR	.677*** (.248)	.712*** (.242)
Observations	490	490
Pseudo R <sup>2</sup>	.124	.137
Controls	no	yes

Notes: This table presents the results of an ordered probit regression with robust clustered standard errors at the individual level. The dependent variable is the likelihood to invest. The reference dummy variable left out in the analysis represent a company with a high governance rating but a low E, S and R rating. HighEG represent a company with a high environment rating and governance rating, but low ratings on all other variables etc. Model 2 includes control variables. Standard errors are in parentheses.

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

# Master Thesis Survey

---

Start of Block: Block 1

Introduction Dear participant,

Hello and welcome to this survey. I am a Master student from the Radboud University, and currently working on my Master thesis in Corporate Finance. I would appreciate it if you are willing to complete this short anonymous survey on ESG investments. The survey will take about 5-10 minutes to complete.

Please do answer the questions in this survey honestly and to the best of your ability. In case you are unsure or do not know what to answer, give your best guess. The answers you give will be processed anonymously and analyzed at an aggregate level, meaning your personal choices will not be visible. None of your answers or data will be communicated to third parties.

Participation in this survey is completely voluntarily, and if you wish you can stop answering the survey at any time. In case you do wish to participate in this survey please read the instructions and press "yes" below. I appreciate your time and thank you in advance for participating.

This survey consists of two parts. In part 1 you will be asked to answer how likely you are to invest in a set of companies. The companies are rated on a few different characteristics. These characteristics are an environmental rating, a social rating, a governance rating and their expected return for the next year. Below is an overview with a few examples of issues that the different ratings are based on. Each characteristic is rated on a score between 0-100, with 100 being the best possible rating and 0 the worst. The expected return is expressed as a percentage, so for example company A has an expected return of 10%, meaning if you invest 10 Euro/dollar/pound etc. in this company, this will be worth 11 euro/dollar/pound etc. the next year.

**Environment:** Greenhouse Gas Emissions, Natural resource depletion, Pollution & waste, Air quality

**Social:** Human rights, Diversity, Human capital, Discrimination, Political contributions, Work environment

**Governance:** Board independence, Board diversity, Shareholder rights, Management compensation, Corporate ethics

**Expected return:** The expected return reflects the annualized return that is expected for this company.

So, for example the scores and expected return of company A can have the following characteristics:

Environment score: 90

Social score: 90

Governance score: 30

Expected return: 4%

Part 2 of this survey will consist of more general and demographic multiple choice questions. Please answer these questions honestly.

---

Q Do you agree to the terms explained above?

- Yes, I consent and wish to participate in the survey (1)
- No, I do not consent and do not wish to participate in the survey (2)

End of Block: Block 1

---

Start of Block: Block 2

*Display This Question:*

*If Do you agree to the terms explained above? = Yes, I consent and wish to participate in the survey*

Q How likely are you to invest in a company with the following characteristics:

Environment rating: 80

Social rating: 20

Governance rating: 20

Expected return: 3%

- Very unlikely (1)
- Somewhat unlikely (2)
- Neither likely nor unlikely (3)
- Somewhat likely (4)
- Very likely (5)

---

Page Break

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Q How likely are you to invest in a company with the following characteristics:

Environment rating: 20

Social rating: 20

Governance rating: 20

Expected return: 9%

- Very unlikely (1)
- Somewhat unlikely (2)
- Neither likely nor unlikely (3)
- Somewhat likely (4)
- Very likely (5)

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- Neither likely nor unlikely (3)
- Somewhat likely (4)
- Very likely (5)

End of Block: Block 2

---

Start of Block: Block 2

*Display This Question:*

*If Do you agree to the terms explained above? = Yes, I consent and wish to participate in the survey*

Q What is your age

---

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Page Break

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Display This Question:

*If Do you agree to the terms explained above? = Yes, I consent and wish to participate in the survey*

Q What is your gender

- Male (1)
  - Female (2)
  - Other (3)
  - Would rather not say (4)
- 

Page Break

---

Display This Question:

*If Do you agree to the terms explained above? = Yes, I consent and wish to participate in the survey*

Q You believe that your skills and knowledge of the stock market can help you to outperform the market

- Strongly Disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly Agree (5)

---

Page Break

Display This Question:

*If Do you agree to the terms explained above? = Yes, I consent and wish to participate in the survey*

Q You are confident in your analytical abilities and ability to predict/forecast the market

- Strongly Disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly Agree (5)

-----

Page Break

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Display This Question:

*If Do you agree to the terms explained above? = Yes, I consent and wish to participate in the survey*

Q After a prior gain, you are more risk-seeking than usual

- Strongly Disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly Agree (5)

---

Page Break

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Display This Question:

*If Do you agree to the terms explained above? = Yes, I consent and wish to participate in the survey*

Q After a prior loss, you become more risk-averse

- Strongly Disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly Agree (5)

---

Page Break

Display This Question:

*If Do you agree to the terms explained above? = Yes, I consent and wish to participate in the survey*

Q Other persons' decisions of buying and selling stocks have an impact on your investment decisions

- Strongly Disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly Agree (5)

---

Page Break

Display This Question:

*If Do you agree to the terms explained above? = Yes, I consent and wish to participate in the survey*

Q You usually react quickly to the changes of other persons' decisions and follow their reactions to the stock market

- Strongly Disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly Agree (5)

---

Page Break

Display This Question:

*If Do you agree to the terms explained above? = Yes, I consent and wish to participate in the survey*

Q You avoid selling shares that have decreased in value and easily sell shares that have increased in value

- Strongly Disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly Agree (5)

---

Page Break

Display This Question:

*If Do you agree to the terms explained above? = Yes, I consent and wish to participate in the survey*

Q You feel worse about holding losing stocks too long, than about selling winning stocks too soon

- Strongly Disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly Agree (5)

---

Page Break

End of Block: Block 2

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