MASTER THESIS

PERCEIVED SEVERITY OF CLIMATE CHANGE FOR INDIVIDUAL INVESTORS AND ITS EFFECT ON INVESTMENT BEHAVIOUR

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ABSTRACT

This thesis seeks to understand effect that perceived severity of climate change has on the investment decisions of individual investors. It has been shown that news outlets mostly portray climate change as a negative issue and stress the severity of the negative impact of it. Meanwhile, other studies show that the media profoundly shape individuals perceptions on climate change. With extreme weather phenomena at the core of this. Other research has shown that perceptions also shape investment decisions for individual investors. A study in Sweden even found that climate concern greatly influenced investment decisions for individual investors. Therefore, this thesis aims to examine these perceptions regarding the severity of climate change and investigate whether they have any impact on investment decisions for individual investors. To assess this, a 14-item survey was constructed and handed out to individual investors. Over 100 responses were registered. The findings demonstrated that indeed, perceived severity of climate change affected investment decisions. Most notably on portfolio allocation towards green investment but also on risk perceptions associated with green investment.

PREFACE

This paper will seek to understand the relationship between individual investors' perceived severity on climate change and its corresponding effect on investment behaviour.

To improve readability, I used footnotes for non-literary sources, and I used APA 7 style for literary sources.

Thank you for reading.

SUMMARY

There is an ever-increasing amount of media coverage on the topic of climate change and extreme weather phenomena. Studies show that these news items are mostly focused on the negative impact of climate change. Meanwhile, research shows that public perception regarding climate change are largely determined by media coverage. Perceptions in general play a crucial role in shaping investment decisions. Perceptions lead to changes in risk-perception and return expectations. Also, concern for climate change has been shown to influence investment decisions for individual investors in Sweden. No research has been conducted on perceived severity of this issue, however. Therefore, this thesis seeks to understand what effect the perceived severity of climate change has on investment decisions for individual investors. Chapter 2 included the motivation of this choice and uses existing research to construct our framework. In addition to this, control variables and a-priori beliefs are included in the research to see if there are other factors influencing our dependent variable. In chapter 3, methodology, the research design of this thesis is presented, involving a 14-item questionnaire based on existing literature as well. The results show that a higher perceived severity of climate change leads to a higher portfolio allocation towards green investment. Results also show that high perceived severity of climate change shapes risk perceptions associated with green investment as compared to conventional investment. The discussion part of this thesis entails the discussion of the results in light of existing research and highlights limitations for this study in addition to providing recommendations for future research. The conclusion sums up the results, restating the findings and stating the key supporting ideas that were discussed throughout the thesis. Lastly, in chapter 7, one can find the literary sources, non-literary sources, the complete survey and additional material used in the writing of this thesis.

TABLE OF CONTENT

1. INTRODUCTION

1.1 PROBLEM DESCRIPTION

The current age we are living in involves an ever-increasing amount of media coverage on the topic of climate change and extreme weather phenomena[i]. Often highlighting an increase in these events and attributing this rise to anthropogenic climate change. Vattenfall (2020) conducted a study on this topic, both by examining the tone of the media coverage, and its corresponding effect on individuals' perception regarding the severity of climate change. Their findings included that the majority of the media's portrayal of climate change was aimed at the severity of climate change and its negative impact. Over a third of the respondents believed climate change was the most urgent, global problem of our time. Media coverage on climate change profoundly shapes public perception on this topic, as evidenced by Lauren et al (2016). In her research, she demonstrated that media coverage has a significant potential to influence perception of individuals on certain issues. She also found that news media are an important source of information regarding climate change for the general public. Moreover, extreme weather events are demonstrated to play a crucial role in shaping individual's beliefs regarding climate change, with a survey by the Energy Policy Institute at the University of Chicago and the AP-NORC Center (2017) identifying these events as the most important factor in forming these beliefs. Research by Zanocco et al (2024) further strengthens this claim, demonstrating that the public frequently associated extreme weather phenomena to climate change, most particularly wildfires.

1.2 RESEARCH GAP

Despite a substantial body of research on the impact of media coverage on perceptions in general, and climate change perceptions in general, there is still a notable gap in understanding how perceptions such as these influence individual investment behaviour. Most particularly in the context of green investment. As demonstrated in 1.1, previous studies have established that media portrayals of extreme weather significantly shape and influence public beliefs about climate change (Vattenfall, 2020), (Lauren et al., 2016).

However, while these papers provide us with valuable insights into public perception of climate change, they do not sufficiently address the way in which these perceptions influence specific financial decisions, such as investment behaviour. A recent study by Anderson and Robinson (2024) in Sweden partially offers us an answer by examining the relationship between climate change perceptions and investment behaviour among individual investors. Their results show that concerned individuals tend to rebalance their portfolio towards climate-friendly mutual funds. Whereas less concerned individuals tend to rebalance their portfolio out of these mutual funds. This study, however, primarily focused on the overall concern regarding climate change rather than the perceived severity of its impact.

Existing literature also examined the relationship between perceptions and investment behaviour on a more general dimension. This is seen in the paper by Hoffmann (2012), where they explored how investor perceptions influenced trading and risk-taking behaviour during the financial crisis of 2008-2009. The study highlighted significant fluctuations in investment behaviour that were profoundly driven by investor perceptions. It emphasized the role of perceptions shaping investment behaviour but did not address perceptions of climate change severity.

Moreover, while later studies like the studies by Hoffmann (2015) and Almansour (2022) researched the influence of risk perceptions on investment behaviour, they also did not focus on green investment or the specific impact that perceived severity of climate change has. The study by Brunen (2021) partially provides us with an answer by researching risk perceptions and its corresponding effect on

sustainable investment but did not set out to research the potential effect of perceived severity of climate change. The same is true for Anderson and Robinson (2024), although they did not specifically go for perceived severity of climate change either.

Therefore, this thesis seeks to bridge the gap by researching the extent to which perceived severity of climate change by individual investors affects their investment behaviour. Specifically, this thesis aims to:

1. Measure perceptions of the severity of climate change for individual investors.
2. Examine the impact these perceptions have on three factors: portfolio allocation, risk perception and return expectations towards green investment.
3. Explore non-financial factors that may influence investment decisions in green investment. Here, the framework by Masini and Menichetti (2013) will be utilized.

Our research questions for this thesis shall then be:

Main RQ: What effect does the perceived severity of climate change have on the investment intent in green investment for individual investors?

Sub RQ1: What effect does the perceived severity of climate change have on the risk perception and return expectations associated with green investment for individual investors?

Sub RQ2: What effect do a-priori beliefs regarding green energy have on investment behaviour in green investment for individual investors?

1.3 THESIS STRUCTURE

This thesis is structured as follows:

Chapter 2: Theory
Here, it will be elaborated on how perceptions that individual investors have affect their investment behaviour. Starting by perceptions in general, then narrowing it down to perceptions about sustainable investments and ultimately to perceptions about climate change. It will be demonstrated which literary framework was used to determine perceived severity of climate change. And it will be defined and explained what individual investors are, the target group of our study. Ultimately, the research hypotheses will be presented

Chapter 3: Methodology
This chapter outlines our research design, including survey construction, sampling techniques and our data collection process. Tables will illustrate how each hypothesis will be tested step by step with its corresponding control variables.

Chapter 4: Results
This chapter presents the findings of our data analysis, including descriptive statistics and the answers to the research hypotheses will be provided.

Chapter 5: Discussion
Here, the implications of our research in relation to the existing body of research will be discussed. Drawing conclusions based on the results, addressing limitations for this study and providing recommendations for future research.

Chapter 6: Conclusion
The final chapter will summarize key findings of our thesis, restating the answer to the research question and offer concluding remarks on the contribution of this study to body of research.

Chapter 7: References
Both references to the literature will be shown here in addition to references to non-literary sources. Literary sources are references using APA-7 style. Non-literary sources are references in the text itself with footnotes.

2. THEORY

In the introduction it is explained how news coverage about climate change is mostly negative, with a lot of emphasis on the seriously negative impact of it. This has a profound effect on individuals' perceptions regarding this topic. It was already hinted to how perceptions can influence investment behaviour. This chapter further elaborates on how perceptions of individual investors affect investment behaviour. Also, it will illustrate how perceived severity of climate change will be assessed. Moreover, individual investors will be defined and explained, which are the target group of the survey. And it will conclude with the research hypotheses.

2.1 PERCEPTIONS INFLUENCING INVESTMENT BEHAVIOUR

For this study, when the term investment behaviour is used, the following three dimensions are what is meant by that (Hoffmann et al 2012):

1. Investment intent (percentage of portfolio allocated to green investment)
2. Risk perception associated with green investment
3. Return expectations associated with green investment

Perceptions have a profound effect on individual investors' investment behaviour, as is demonstrated by Hoffmann (2012). They wrote a paper that examined how perceptions of individual investors changed and drove trading and risk-taking behaviour during the 2008-2009 financial crisis. Results showed that perceptions of investors were undergoing significant changes during the course of the crisis. Return expectations changed the most, risk tolerance and risk perception were less volatile. Furthermore, substantial changes in risk-taking behaviour and trading were found that were driven by changes in investor perceptions. Hoffmann et al (2015) also found that investor perceptions are a crucial driver in actual risk-taking behaviour. Risk perception is also shown to be positively associated with risk of their actual portfolio's. In regard to willingness to increase exposure in the stock-market. The study finds that investors that have high levels of upward revision in risk tolerance, while having lower levels of risk perceptions, have higher buy-sell ratios. In other words, risk-tolerant investors incur a greater exposure to the stock market. While investors that perceive a higher degree of risk lower their exposure to the stock market. The research by Hoffmann et al (2012) points out that investor perceptions can play a crucial role in shaping trading and risk-taking behaviour. This is also true for Hoffmann et al (2015). If it so happens that individual investors have a high-risk perception of climate change, this may very well have a huge impact on their investment behaviour. This is relevant to study since individual investors have a stabilizing effect on stock prices during times where there is turmoil in financial markets (Hüfner et al 2022). Almansour (2022) also investigated the effects of risk perception on the investment decisions of individual investors. They found that risk perception is significantly positively related to investment decision making. This study was conducted in Saudi Arabia and the researchers noted that this may not be generalizable to other cultural contexts. This thesis can therefore add to the existing body of research by investigating a similar topic in the Netherlands.

Perceived risk also plays a role in sustainable investment strategies. Brunen (2021) conducted a study that tested whether perceptions influence investment intent. In their study, the researchers surveyed 448 clients of 3 German robo advisors that filled in a survey to study their investment decisions. The robo advisors were Growney, VisualVest and Vividam. Growney is a large provider of digital financial services. Ranking among the larger ones in Germany. Growney adds to the research by only providing conventional investment strategies. VisualVest on the other hand, offers both conventional and sustainable investment strategies. Vividam offers a niche product because they are only providing sustainable investment strategies. With choosing these three German robo advisors, the researchers have managed to draw a multifaceted picture of the German robo advisory landscape. After the results of the study came in, they found that having a high perceived risk was deterring clients from the mixed robo advisor (VisualVest) from investing in a manner that is socially responsible. The researchers added to this that it was not necessarily transferable to sustainable investing in general. The reason for this, they added, was that some investors seem to appreciate SRI as a safe haven. Simultaneously, they found that there is a significant positive marginal probability estimate for low perceived risk on the likelihood that a substantial share of the portfolio is allocated in sustainable assets. Regarding return expectations, one of their findings entailed that the individual investors that expected higher financial returns for sustainable investments, as compared to conventional investments, were more likely to engage in SRI (socially responsible investing). In other words, when expected returns are high, the likelihood of one's portfolio being comprised of sustainable investment strategies was 15,2 to 19,3 percentage points higher. They also found that investors that expect lower returns consider it as rather unlikely that they will use a sustainable investment offer in the future. Higher expected returns also encourage sustainable investments.

Perceptions of climate change have been demonstrated to influence investment decisions in other countries before. Recently, a study was conducted in Sweden where researchers examined perceptions of individuals on climate change and its corresponding effect on investment behaviour (Anderson and Robinson., 2024). Individuals that were more concerned about climate change would rebalance out their portfolios towards more climate-friendly mutual funds. Opposite, those who grew less concerned about climate change would rebalance out of these funds, albeit to a lesser degree. The strongest connections between environmental beliefs and financial decisions were found among those who were financially sophisticated. These effects are not restricted to the individual level. Li et al (2024) investigated the relationship between public perception of climate risk and corporate green investment. They found that public perception of climate risk can aid in promoting green investment among corporations.

The aforementioned literature demonstrates that perceptions have a profound impact on investment behaviour. These perceptions also influence sustainable investment and perceptions regarding climate change are already shown to influence investment decisions for individuals in other countries, and seem to drive investment corporate investments in green investment. This thesis aims to investigate the relationship between perceived severity of climate change and investment behaviour. In order to research this, the following hypotheses were constructed.

H1: Perceived severity of climate change of individual investors is positively associated with investment intent* (percentage of portfolio allocated to green investment) *in green investment.

H2: Perceived severity of climate change of individual investors is positively associated with risk perception associated with green investment.

H3: Perceived severity of climate change of individual investors is positively associated with return expectations associated with green investment.

In all of the above hypotheses, perceived severity of climate change is the independent variable. Investment intent, risk perception and return expectations are the dependent variables.

Lastly, to provide a holistic understanding of this topic, this thesis simultaneously investigates for non-financial factors driving investment decisions in green investment. Considering only the financial factors that are influencing investment decisions in green investment leaves the door open for bias and paints an incomplete picture. It may very well be possible that investors would like to invest in green investment but ultimately steer clear of this because of a priori beliefs. Existing research has already delved into this topic. Masini and Menichetti (2013) performed a study to identify the main non-financial determinants that influences investment decisions in the renewable energy sector (RE). Although there are many environmental, social and economic advantages to renewable energy technologies, private investment in this sector remains insufficient (Masini et al 2013). This indicates that our understanding of the motivations for investors to fund these technologies remains incomplete. Masini (2013) also claimed that the majority of high-tech venture capitalists seem to steer clear of risky green investment. Masini (2013) then proceeded to research which non-financial factors drove the decision to invest in the renewable energy sector. They analysed the investment decisions of a large set of investors with the goal to identify the main determinants of their choices. They proved that investors still have biased perceptions and preconceptions about RE. Status quo energy production models gain favour over innovative alternatives. Their results showed that a priori beliefs have a positive influence on the willingness of investors to diversify their portfolios and to back renewable energy projects. Confidence in renewable energy technological adequacy demonstrated a stronger correlation than confidence in the effectiveness of existing policies with (β=0.49 with $p>0.01$ versus β=0.16 with $p>0.1$) (Masini et al 2013., pp 519/520). In other words, apart from financial factors, non-financial factors also played a role in investment decisions in RE. Both the confidence in RE technological adequacy and confidence in the effectiveness of existing policies were proven to have an effect. The research by Masini (2013) demonstrated that non-financial factors play a key role in determining investment behaviour. Understanding the role that non-financial factors play in investment behaviour has practical implications and can inform the design of more effective policy. Using the framework by Masini (2013) for our own thesis also adds methodological rigor to our research. Validity and reliability are enhanced in addition to checking for external factors.

Our questions to assess non-financial factors influencing investment decisions in green investment will be built on the framework by Masini. Questions will be slightly altered from the aforementioned questions to make it applicable to our line of research.

Our last hypothesis for this thesis shall then be:

H4: Non-financial factors shape investment intent in green investment.

- ***H4a: Greater confidence in the effectiveness of existing policies is associated with a higher share of green investment in the investment portfolio***
- ***H4b: Greater confidence in technological adequacy is associated with a higher share of green investment in the investment portfolio***

2.2 PERCEIVED SEVERITY OF CLIMATE CHANGE

To assess the perceived severity an individual investor has regarding climate change, the framework by Lee et al (2015) will be used. In their study, Lee, Markowitz, Howe and Ko (2015) aimed to investigate what predicted climate change awareness and its correlated risk perception on a global scale. They were looking to identify factors that influenced people's awareness of climate change and

their perceptions of the associated risks involved with it. This same framework will be used for our study which can be found in the methodology section

2.3 INDIVIDUAL INVESTORS

This study will be examining individual investors.

"An investor is any person or other entity (such as a firm or mutual fund) who commits capital with the expectation of receiving financial returns[ii]"

"a person who puts money into something in order to make a profit or get an advantage[iii]"

There are institutional investors and individual investors.

"Institutional investors may be defined as specialized financial institutions that manage savings collectively on behalf of small investors toward a specific objective in terms of acceptable risk, return maximization, and maturity of claims." (Davis & Steil., 2001). Examples of institutional investors can be pension funds, insurance companies, investment funds, associations, foundations, churches, local governments, companies, asset management firms, international organizations, credit institutions and more. Individual investors, also called retail investors or private investors are individuals investing on their own behalf. Examples of why they would do this is to save up for retirement, a child's education fund, avoid putting it in a bank with low interest rates etcetera[iv].

The difference between a private investor and an institutional investor is that private investors are persons investing in stocks, funds or other with their own money. Whereas institutional investors invest with money of others. Also, the assets of institutional investors are far greater than that of private investors. Another difference is the fact that institutional investors tend to have more experience and knowledge than individual investors. It may also be the case that they have access to investment research which is not accessible for individual investors for a lack of funds. Because of this difference in experience and knowledge, the SEC (Securities and Exchange Commission) sets out different rules for institutional investors than it does for individual investors[v]. Additionally, because individual investors tend to invest with their own money, and they are less experienced and have less knowledge than institutional investors, they might be more prone to emotional decision-making compared to institutional investors. On the other hand, institutional investors may be subjected to a decision-making process that involves several people or a committee. This may lead to slow decision-making or herd mentality. Individual investors only answer to themselves and may have an advantage over them at this point. Especially when the investment landscape is changing rapidly. [vi]They are similar in the fact that they try to achieve financial success in the future by the investments they have made[vii].

This research will focus on individual investors.

2.4 RESEARCH HYPOTHESES

The hypotheses that were formulated in chapter 2.1 are listed below in the correct order.

H1: Perceived severity of climate change of individual investors is positively associated with investment intent in green investment.

H2: Perceived severity of climate change of individual investors is positively associated with risk perception associated with green investment.

H3: Perceived severity of climate change of individual investors is positively associated with return expectations associated with green investment.

H4: Non-financial factors shape investment intent in green investment.

- ***H4a: Greater confidence in the effectiveness of existing policies is associated with a higher share of green investment in the investment portfolio***
- ***H4b: Greater confidence in technology adequacy is associated with a higher share of green investment in the investment portfolio***

3. METHODOLOGY

3.1.1 General outline

A 14-item survey will be handed out to participants in order to our aforementioned hypotheses. This thesis aims to test whether perceived severity of climate change influences individual investors investment intent in green investments. Another research objective of this study is to find out whether perceived severity of climate change influences risk perception and return expectations regarding green investment. Furthermore, it will be investigated if there are any other non-financial factors that influence investment intent in green investment. This study uses age, gender, income and educational background as control variables. The survey is constructed via Qualtrics, and the survey has received ethical approval by the ethics committee from the University of Twente.

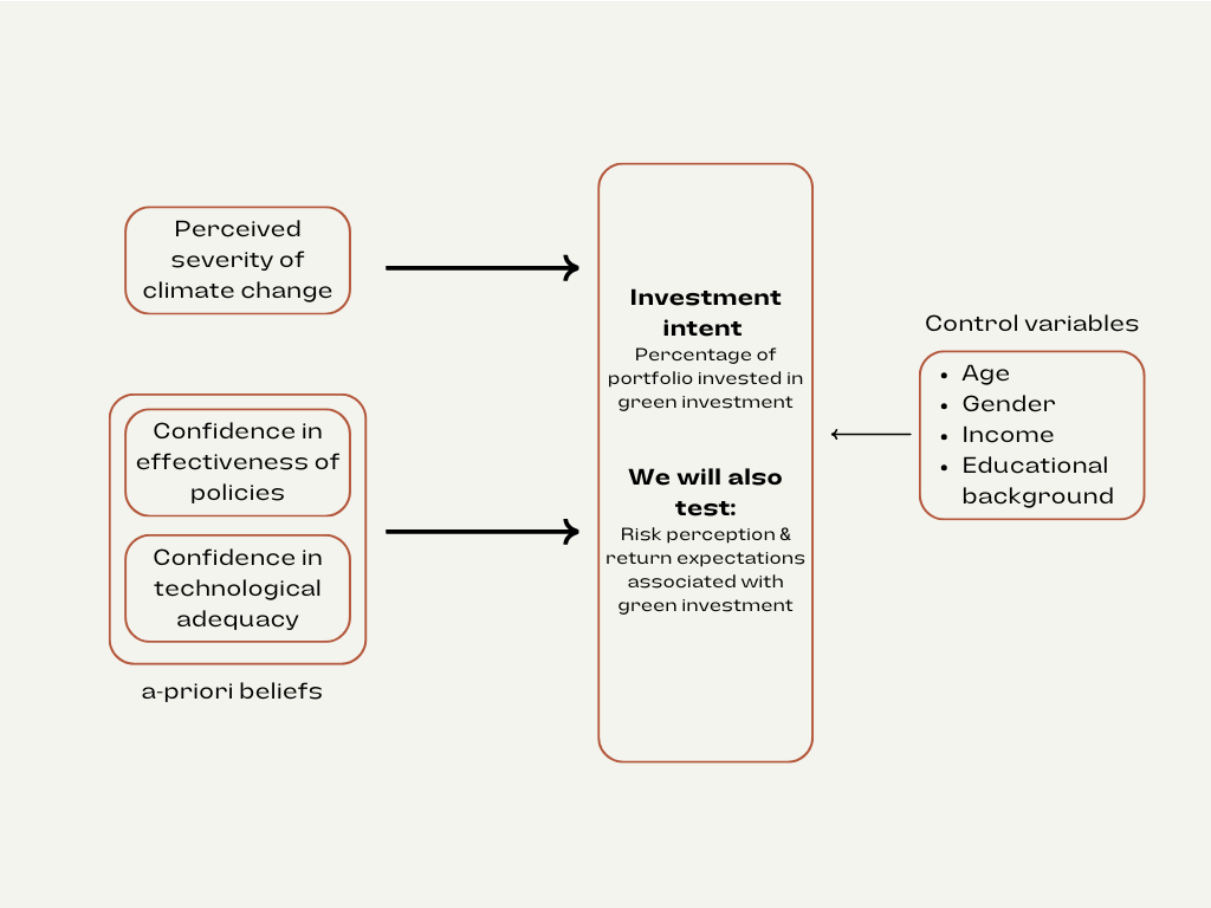
Sampling is one of the processes of a research study where participants are selected. It's important that a sample group is representative to the general population in order to draw accurate conclusions. Our sample group for this study will consist of individual investors who have invested in the stock market. This target group can be hard to reach and therefore the decision was made to use convenience sampling.

*Convenience sampling (also known as Haphazard Sampling or Accidental Sampling) is a type of nonprobability or non-random sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study. (*Dörnyei, Z. ,,2007).

Most participants will be recruited from our personal networks.

3.1.2 Hypotheses testing and operationalization of variables

The data collected in Qualtrics with the survey will be exported and analysed in SPSS. This program allows for analysing vast amounts of data in short time, making it a viable option. I am also personally familiar with the program. In order to summarize the data in the three dimensions, descriptive statistics will be utilized.



Our main objective is to research whether perceived severity of climate change influences investment intent by individual investors. One cannot perceive severity of an issue when one has never heard of it. Therefore, a binary construct was made for section 2 question 1 '*How much do you know about global warming or climate change?*' ---- *W*ith a '0' for people who answer, 'I have never heard of it' or '*I don't know'.* And a '1' for people who have answered either '*I know a little bit about it*' or '*I know a great deal about it'*. Only the participants' answers who receive a 1 after this question will be used for this study.

3.2 RESEARCH FRAMEWORKS H1 – H3

The rest of section 3.2 and in section 3.3 will demonstrate the models that will be used in order to test our hypotheses.

We will start with our main research objective. That is, the effect that perceived severity of climate change of individual investors has on investment intent in green investment.

H1: Perceived severity of climate change of individual investors is positively associated with investment intent in green investment.

> **IV:** A construct will then also be made for section 2 question 2 '*If you are aware of climate change, how serious of a threat do you believe global warming is*? ---- *W*ith a '1' for people who answer *'Not at all serious'* and a 2 for people who answer *'Not very serious. A* '3' for people who have answered '*Somewhat serious'* and a '4' for people who answer '*Very serious*.
> **DV:** Total amount of portfolio in green investment will be the dependent variable. With a continuous variable between 0 to 100.

IV	Perceived severity of climate change.	(Categorized 1 – 4) • 1: Not at all serious • 2: Not very serious • 3: Somewhat serious • 4: Very serious
DV	Proportion of portfolio invested in green investment.	(Continuous variable 0 – 100)
Control Variables	1. Age 2. Gender 3. Income 4. Educational background	• Continuous variable (18 – 100) • Categorized: (0: other, 1: male, 2, female • Categorized (1: 0 – 1499, 2: 1500 – 3500, 3: 3500 – 6000, 4: 6000+) • Categorized (1: High school diploma, 2: Bachelor's degree, 3: Master's degree, 4: PHD)
Regression	Multiple linear regression	Multiple linear regression is the most appropriate regression model since the dependent variable is a continuous variable. Meanwhile, multiple linear regression can handle multiple control variables.
Model specification	GreenInvestment = β0+β1Severity+β2 Age+β3Gender+β4Income+β5Education+ ϵ	• GreenInvestment is the proportion of portfolio invested in green investment. • β1Severity is the perceived severity of climate change • Age, Gender, Income and education are the control variables. • β0, β2Age, β3Gender, β4 Income, β5Education are the coefficients • ϵ is the error term
Steps	1. Data preparation 2. Model Fitting 3. Assumption checking 4. Interpretation 5. Significance testing	• Coding variables • Fit the model for multiple linear regression using SPSS. • Verify for linearity, independence, homoscedasticity, normality of residuals. • Examine coefficients, most particularly β1Severity to determine relationship between perceived severity of climate change and investment intent in green investment. • Check p-values

H2: Greater confidence in technology adequacy is associated with a higher share of green investment in the investment portfolio

IV: *A binary construct will be made for section 4 questions 3 & 4.*

3. Energy supply from new renewable electricity sources (e.g. wind and solar) will grow by more than 10% per year worldwide over the next 20 years

◦ *Yes*

◦ *No*

4. Solar energy is a low-density resource, requiring a lot of land: therefore, it will never achieve a significant share of the world's energy mix (reversed).

◦ *Yes*

◦ *No*

Participants will receive either 1 or 0. Eventually, three groups are formed with values ranging from 0 to 2.

DV: Total amount of portfolio in green investment will be the dependent variable (Section 3, question 2). With a continuous variable between 0 to 100.

IV	Confidence in the technology adequacy	Ordinal variable ranging from 0 to 2
DV	Proportion of portfolio invested in green investment.	(Continuous variable 0 – 100)
Control Variables	5. Age 6. Gender 7. Income 8. Educational background	• Continuous variable (18 – 100) • Categorized: (0: other, 1: male, 2, female • Categorized (1: 0 – 1499, 2: 1500 – 3500, 3: 3500 – 6000, 4: 6000+) • Categorized (1: High school diploma, 2: Bachelor's degree, 3: Master's degree, 4: PHD)
Regression	Multiple linear regression	Multiple linear regression is the most appropriate regression model since the dependent variable is a continuous variable. Meanwhile, multiple linear regression can handle multiple control variables.
Model specification	GreenInvestment = β0+β1 TechConfidence+β2Age+β3Gender+β4 Income+β5Education+ ϵ	• GreenInvestment is the proportion of portfolio invested in green investment • TechConfidence is the binary construct representing confidence in the technology adequacy(0 or 1) • Age, Gender, Income and education are the control variables • β0, B1, β2Age, β3Gender, β4 Income, β5Education are the coefficients • ϵ is the error term

Steps	6. Data preparation 7. Model Fitting 8. Assumption checking 9. Interpretation 10. Significance testing	• Coding variables • Fit the model for multiple linear regression using SPSS • Verify for linearity, independence, homoscedasticity, normality of residuals • Examine coefficients, most particularly β1Severity to determine relationship between perceived severity of climate change and investment intent in green investment • Check p-values

H3: Greater confidence in the effectiveness of existing policies is associated with a higher share of green investment in the investment portfolio

IV: A binary construct will be made for section 4 questions 1 & 2. *Section 4 question 1:* Market forces alone will never lead to a significant exploitation of renewables.

◦ Yes

◦ No

Section 4 question 2: Government intervention does more harm than good, let governments stay out of the way.

◦ Yes

◦ No

Participants will receive either 1 or 0. Eventually, three groups are formed with values ranging from 0 to 2.

DV: Total amount of portfolio in green investment will be the dependent variable (Section 3, question 2). With a continuous variable between 0 to 100.

IV	Confidence in the effectiveness of existing policies	Ordinal variable ranging from 0 to 2
DV	Proportion of portfolio invested in green investment.	(Continuous variable 0 – 100)
Control Variables	9. Age 10. Gender 11. Income 12. Educational background	• Continuous variable (18 – 100) • Categorized: (0: other, 1: male, 2, female • Categorized (1: 0 – 1499, 2: 1500 – 3500, 3: 3500 – 6000, 4: 6000+) • Categorized (1: High school diploma, 2: Bachelor's degree, 3: Master's degree, 4: PHD)
Regression	Multiple linear regression	Multiple linear regression is the most appropriate regression model since the dependent variable is a continuous

		variable. Meanwhile, multiple linear regression can handle multiple control variables.
Model specification	GreenInvestment = β0+β1 PolicyConfidence+β2Age+β3Gender+β4 Income+β5Education+ ϵ	• GreenInvestment is the proportion of portfolio invested in green investment. • PolicyConfidence is the binary construct representing confidence in the existing policies (0 or 1) • Age, Gender, Income and education are the control variables. • β0, B1, β2Age, β3Gender, β4 Income, β5Education are the coefficients • ϵ is the error term
Steps	11. Data preparation 12. Model Fitting 13. Assumption checking 14. Interpretation 15. Significance testing	• Coding variables • Fit the model for multiple linear regression using SPSS. • Verify for linearity, independence, homoscedasticity, normality of residuals. • Examine coefficients, most particularly β1Severity to determine relationship between perceived severity of climate change and investment intent in green investment. • Check p-values

3.2.1 Complete model

The model below takes into account all three aforementioned independent variables.

> ***IV1:*** *A construct will then also be made for section 2 question 2 'If you are aware of climate change, how serious of a threat do you believe global warming is? ---- With a '1' for people who answer 'Not at all serious' and a 2 for people who answer 'Not very serious'. A '3' for people who have answered 'Somewhat serious' and a '4' for people who answer 'Very serious'.*
> ***DV:*** *Total amount of portfolio in green investment will be the dependent variable. With a continuous variable between 0 to 100.*

IV1	Perceived severity of climate change.	(Categorized 1 – 4) • 1: Not at all serious • 2: Not very serious • 3: Somewhat serious

		• 4: Very serious
DV	Proportion of portfolio invested in green investment.	(Continuous variable 0 – 100)
Control Variables	13. Age 14. Gender 15. Income 16. Educational background 17. A-priori beliefs	• Continuous variable (18 – 100) • Categorized: (0: other, 1: male, 2, female • Categorized (1: 0 – 1499, 2: 1500 – 3500, 3: 3500 – 6000, 4: 6000+) • Categorized (1: High school diploma, 2: Bachelor's degree, 3: Master's degree, 4: PHD) • Ranging from 0 to 4 (see survey in appendix)
Regression	Multiple linear regression	Multiple linear regression is the most appropriate regression model since the dependent variable is a continuous variable. Meanwhile, multiple linear regression can handle multiple control variables.
Model specification	GreenInvestment = β0+β1Severity+β2 PolicyConfidence+β3TechConfidence +β4 Age+β5Gender+β6Income+β7Education+ ϵ	• GreenInvestment is the proportion of portfolio invested in green investment. • β1Severity is the perceived severity of climate change • PolicyConfidence is the binary construct representing confidence in the existing policies (0 or 1) • TechConfidence is the binary construct representing confidence in the technology adequacy(0 or 1) • Age, Gender, Income and education are the control variables. • β0, β2Age, β3Gender, β4 Income, β5Education are the coefficients • ϵ is the error term
Steps	16. Data preparation 17. Model Fitting 18. Assumption checking 19. Interpretation 20. Significance testing	• Coding variables • Fit the model for multiple linear regression using SPSS. • Verify for linearity, independence, homoscedasticity, normality of residuals. • Examine coefficients, most particularly β1Severity to

		determine relationship between perceived severity of climate change and investment intent in green investment. • Check p-values

3.3 ADDITIONAL TESTING

Not related to the framework and central research questions, the following hypotheses will be tested.

1. Perceived severity of climate change of individual investors is negatively associated with risk perception associated with green investment.

INV: A construct will then also be made for section 2 question 2 '*If you are aware of climate change, how serious of a threat do you believe global warming is*? ---- *W*ith a '1' for people who answer *'Not at all serious'* and a 2 for people who answer *'Not very serious'. A* '3' for people who have answered '*Somewhat serious'* and a '4' for people who answer '*Very serious'*.

DV: A construct will then be made for section 3 question 2. Where participants who answer section 3 question 2: *"How do you rate the risk of green investments compared to conventional investments?"* with a 1 for participants who answer 'a bit lower' to a 5 for participants who answer much higher and in the rest in between (see table)

Control variables: This thesis will control for age, gender, income and educational background, technological adequacy of green energy, confidence in existing policies for green investment.

IV	Perceived severity of climate change.	(Ordinal 1 – 4) • 1: Not at all serious • 2: Not very serious • 3: Somewhat serious • 4: Very serious
DV	Risk perception associated with green investment	Ordinal variable (1-5) • 1: Much lower • 2: A bit lower • 3: Equal • 4: Bit higher • 5: Much higher • *I don't know is excluded from results
Control Variables	18. Age 19. Gender 20. Income 21. Educational background 22. A-priori beliefs	• Continuous variable (18 – 100) • Categorized: (0: other, 1: male, 2, female • Categorized (1: 0 – 1499, 2: 1500 – 3500, 3: 3500 – 6000, 4: 6000+) • Categorized (1: High school diploma, 2: Bachelor's degree, 3: Master's degree, 4: PHD) • Ranging from 0 to 4 (see survey)

Regression	Ordinal logistic regression	The dependent variable is an ordinal variable. Therefore, do not assume equal distances between the categories and performing an ordinal logistic regression is then the most appropriate choice.
Model specification	$\log(P(Y>j)P(Y\leq j)) = \beta 0j+\beta 1Severity+\beta 2 Age+\beta 3Gender+\beta 4Income+\beta 5Education + \epsilon$	• Y is perceived risk of green investment • β1Severity is the perceived severity of climate change • Age, Gender, Income and education are the control variables. • β0, β2Age, β3Gender, β4 Income, β5Education are the coefficients • B0j are the intercepts for the threshold j
Steps	21. Data preparation 22. Model Fitting 23. Assumption checking 24. Interpretation 25. Significance testing	• Coding variables • Fit the model for multiple linear regression using SPSS. • Verify for linearity, independence, homoscedasticity, normality of residuals. • Examine coefficients, most particularly β1Severity to determine relationship between perceived severity of climate change and investment intent in green investment. • Check p-values

2. Perceived severity of climate change of individual investors is positively associated with return expectations associated with green investment.

INV: A construct will then also be made for section 2 question 2 '*If you are aware of climate change, how serious of a threat do you believe global warming is*? ---- *W*ith a '1' for people who answer *'Not at all serious'* and a 2 for people who answer *'Not very serious'. A* '3' for people who have answered '*Somewhat serious'* and a '4' for people who answer '*Very serious'*.

DV: A construct will then be made for section 3 question 2. Where participants who answer section 3 question 2: *"How do you expect the returns of green investments compared to conventional investments?"* with a 0 for participants who answer, "I don't know". Participants who answer "*Much lower*" or "a *bit lower*" get a 1. Participants who answer "equal" get a 2. Participants who answer with "*a bit higher"* and "*Much higher*" get a 3.

IV	Perceived severity of climate change.	(Ordinal 1 – 4) • 1: Not at all serious • 2: Not very serious • 3: Somewhat serious • 4: Very serious
DV	Expected returns associated with green investment	Ordinal variable (1-5) • 1: Much lower • 2: A bit lower • 3: Equal • 4: Bit higher • 5: Much higher • *I don't know is excluded from results
Control Variables	23. Age 24. Gender 25. Income 26. Educational background 27. A-priori beliefs	• Continuous variable (18 – 100) • Categorized: (0: other, 1: male, 2, female • Categorized (1: 0 – 1499, 2: 1500 – 3500, 3: 3500 – 6000, 4: 6000+) • Categorized (1: High school diploma, 2: Bachelor's degree, 3: Master's degree, 4: PHD) • Ranging from 0 to 4 (see appendix)
Regression	Ordinal logistic regression	The dependent variable is an ordinal variable. Therefore, do not assume equal distances between the categories and performing an ordinal logistic regression is then the most appropriate choice.
Model specification	$\log(P(Y>j)P(Y\leq j)) = \beta 0j+\beta 1Severity+\beta 2 Age+\beta 3Gender+\beta 4Income+\beta 5Education + \epsilon$	• Y is expected returns of green investment • β1Severity is the perceived severity of climate change • Age, Gender, Income and education are the control variables. • β0, β2Age, β3Gender, β4 Income, β5Education are the coefficients • B0j are the intercepts fort he threshold j
Steps	26. Data preparation 27. Model Fitting 28. Assumption checking 29. Interpretation 30. Significance testing	• Coding variables • Fit the model for multiple linear regression using SPSS. • Verify for linearity, independence,

		homoscedasticity, normality of residuals. • Examine coefficients, most particularly β1Severity to determine relationship between perceived severity of climate change and investment intent in green investment. • Check p-values

3.4 ETHICAL GUIDELINES AND LIMITATIONS

To ensure protection and privacy of the participants informed consent will be obtained from all participants prior to taking part in this study. Privacy will be ensured by not obtaining or asking for any information which can personally identify a participant. Participation will be voluntary, withdrawal from the study is possible at any given moment. Further conduct will be according to guidelines of the University of Twente. The ethical committee of the University of Twente gave permission to distribute the survey on *4-7-2024*.

There are multiple limitations to this study. First and foremost is the sampling bias set by approaching some individual investors and not others. It's impossible to use random sampling in this case because not everyone is active in the investment industry. Second, since data will be collected by handing out anonymous surveys, There is the limitation that the data will be self-reported by the participants. This may skew the reliability of the answers. This thesis will try to limit this as much as possible by ensuring confidentiality of the answers as well as anonymity for the participants. But also, allowing a participant to withdraw at any moment will put the lowest amount of pressure on participants as possible. Another limitation is the limited knowledge and experience by the researcher. It is our first time conducting quantitative research and that type of research requires expertise to execute correctly.

3.5 VARIABLE LIST

Section 1: Demographic Information

Gender - Indicator variable taking the value 0 for male investors and 1 for female investors (Hoffman et al 2013)

Age – Continuous variable for age of the investor in years as of May 2024 (Hoffmann et al 2013)

Income - Ordinal variable for the respective monthly net income bracket (up to 1499 euros, 3500 to 6000 euros, above 6000 euros, not reported), with 1500 to 3499 euros as omitted reference group. (Brunen et al 2022)

Highly educated: Ordinal variable. Respondents can indicate what their highest completed educational attainment is. Ranging from high school, bachelor's degree, master's degree, PhD. (Brunen 2022)

Section 2a: Climate Change Awareness (Lee et al., 2015)

Climate Change Awareness – Possible responses included: 'I have never heard of it', 'I know something about it', and 'I know a great deal about it'. A small number of participants refused to answer the question or else said 'Don't know'. The final measure is a binary variable that classifies an individual as being 'aware' ('I know something about it' or 'I know a great deal about it') or 'unaware' ('I have never heard of it' or 'Don't know'). (Lee et al 2015, pp,, 8)

Section 2b: Risk Perception Climate Change (Lee et al., 2015)

Risk Perception Climate Change - Respondents who were 'aware' about climate change were then asked, 'How serious of a threat is global warming to you and your family?' Response categories included: 'Not at all serious', 'Not very serious',

'Somewhat serious', and 'Very serious'. We then created a binary risk perception variable grouping responses into either 'serious' ('Somewhat serious' or 'Very serious') or 'Not serious' ('Not at all serious' or 'Not very serious'). We treat our responses as binary so that they are consistent and comparable with previous studies, and we can detect clear differences between two response classes with sufficient sample size for each class. Admittedly, we may lose some data resolution, but it is beyond the scope of the paper to quantify the effect of collapsing the response classes. (Lee et al 2015, pp,, 8)

Section 4: Investment intent (Brunen 2021)
Investment intent (i.e. percentage of portfolio allocated to green investment) (Brunen et al 2021)

Exp. returns - Ordinal variable from 1 to 5. Respondents can indicate how they expect the returns from green investment to be compared to conventional investments. (Brunen et al 2021)

Exp. risk - Ordinal variable from 1 to 5. Respondents can indicate how they expect the risk of green investment to be compared to conventional investments. (Brunen et al 2021)

4. RESULTS

Data was collected from 115 participants. 14 of the responses were incomplete, either failing to fill in one, or more of the survey questions. Thus, these responses were removed from the complete sample. The average age of the respondents was 41,72. With the youngest participant being 20 years old, and the oldest being 70 years old. Over three quarters of our sample were male, with the rest being female. 67,6% of the participants had either an income between €1500 and €3500 or €3500 and €6000.

4.1 MAIN RESEARCH HYPOTHESES. H1 – H3

H1: Perceived severity of climate change of individual investors is positively associated with investment intent in green investment.

Our first hypothesis was tested by performing multiple linear regression in SPSS. Here, the dependent variable was percentage of portfolio allocated towards green investment. The independent variables were perceived severity of climate change, age, gender, net monthly income and educational background.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,502[a]	,252	,213	24,37396

a. Predictors: (Constant), What is the highest educational degree you have obtained?, If you are aware of climate change, how serious of a threat do you believe global warming is?, Gender, Net monthly income, Age - Drag to your age

The table above shows an R value of 0,502. Indicating a moderate positive relationship between the independent variables (perceived severity of climate change, age, gender, net monthly income and educational background) and the dependent variable (percentage of portfolio allocated towards green investment). Overall suggesting that the model does a moderately good job in predicting the percentage allocated towards green investment.

The R square value, also known as the coefficient of determination, indicates the proportion of the variance in the dependent variable which is explained by the independent variables. Here, the value stands at 0,248. Meaning that 24,8% of the variation in the percentage of individual investors portfolio allocation in green investment is explained by the independent variables. Thus, this model has a moderate explanatory power. Albeit that the majority of the variance (75,2%) is due to other factors not included in the model. Next to this is the Adjusted R square. Which adjusts for the number of predictors (independent variables). This value is slightly lower than the R square value, suggesting that perhaps a small proportion of the model's explanatory power is due to random chance.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19062,172	5	3812,434	6,417	<,001[b]
	Residual	56438,521	95	594,090		
	Total	75500,693	100			

a. Dependent Variable: What percentage of your total securities portfolio is estimated to be invested in green investments? - Drag to the percentage of green investment in your in total securities portfolio

b. Predictors: (Constant), What is the highest educational degree you have obtained?, If you are aware of climate change, how serious of a threat do you believe global warming is?, Gender, Net monthly income, Age - Drag to your age

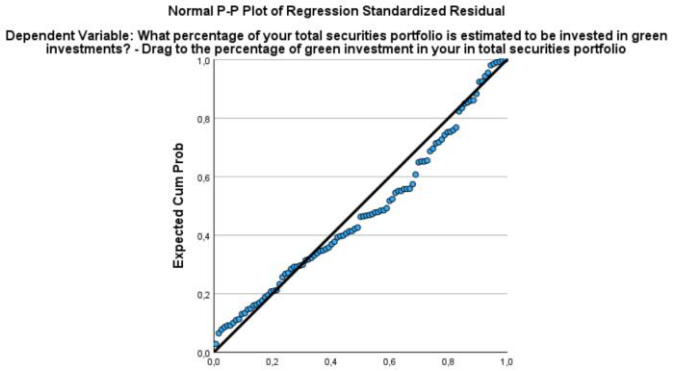
The ANOVA (Analysis of Variance) table shows the following results. The F-value of 5,993 and Sig- value of <0,001 indicate that the independent variables (perceived severity of climate change, age, gender, net monthly income and educational background) are significantly explaining the variation in the percentage that an individual investor is allocating towards green investment in their investment portfolio.

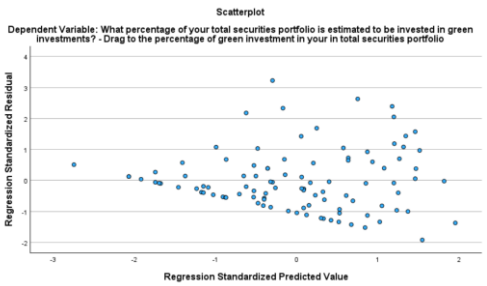
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-47,264	15,311		-3,087	,003		
	If you are aware of climate change, how serious of a threat do you believe global warming is?	10,183	3,315	,280	3,072	,003	,944	1,059
	Age - Drag to your age	,412	,163	,256	2,532	,013	,769	1,300
	Gender	3,754	6,254	,057	,600	,550	,883	1,133
	Net monthly income	-1,158	2,821	-,040	-,410	,682	,828	1,208
	What is the highest educational degree you have obtained?	7,273	3,649	,189	1,993	,049	,873	1,146

a. Dependent Variable: What percentage of your total securities portfolio is estimated to be invested in green investments? - Drag to the percentage of green investment in your in total securities portfolio

variable. In the unstandardized B column, both the magnitude of the relationship, and the direction of it is shown The table above demonstrates the relationship that each independent variable has with the dependent. Whereas the Sig. value represents whether or not the variable is statistically significant.





Furthermore, The VIF-values are all well below 10 and even below 5. Normality is demonstrated with the upper-left image. We see the scatterplot on the right that demonstrates not perfect homoscedasticity.

Here is the interpretation of the results.

1. Perceived severity of climate change:
    a. Unstandardized B: 10,183
    b. Sig. = 0,003
    c. Interpretation: For each one-point in increase in an individual investors' perceived severity of climate change (in other words, the answer to question 2. Not at all serious, not very serious, somewhat serious and very serious) an 10,183% increase in portfolio allocation towards green investment is seen. The Sig. value of 0,003 indicates that this relationship is statistically significant. Meaning there is a very low probability that this is due to random chance and that there is a strong likelihood that perceived severity of climate change for individual investors has a strong impact on portfolio allocation towards green investment.
2. Age
    a. Unstandardized B = 0,412
    b. Sig. = 0,013
    c. Interpretation: For each additional year of age, the individual investor allocates 0,412% more of their investment portfolio towards green investment. The p-value of 0,013 indicates that this effect is statistically significant. Just like perceived severity of climate change.
3. Gender:
    a. Unstandardized B = 3,754
    b. Sig. = 0,550
    c. Interpretation: Male was coded with a 1. Female was coded with a 2. Gender is associated with a 3,754% difference in portfolio allocation to green investments. In the context of coding for this study, this means that female individual investors allocated 3,754% more of their portfolio towards green investment. However, the p-value of 0,550 demonstrates that this effect is not statistically significant. In other words, the observed difference in green investment between genders are likely due to random variation rather than a strong underlying effect.
4. Net Monthly Income:
    a. Unstandardized B = -1,158
    b. Sig. = 0,682

c. Interpretation: It is observed that for our individual investors, each unit increase in net monthly income, they allocated 1,158% less of their portfolio in green investment. However, with a p-value of 0,682, this relationship is not statistically significant, suggesting that this may very well be to random chance and that this may not have a meaningful effect on green investment allocation in this sample.

5. Educational Background:
    a. Unstandardized B = 7,273
    b. Sig. = 0,049
    c. Interpretation: Each higher level of educational attainment that our respondents obtained is associated with an increase of 7,273% in the percentage of the portfolio they allocated to green investments. The p-value of 0,049 is below the conventional threshold of 0,05. Suggesting that educational attainment has an effect on portfolio allocation towards green investment. The p-value is close to the threshold, therefore, future research could further investigate this issue.

Again, the research hypothesis for this model is:

H1: Perceived severity of climate change of individual investors is positively associated with investment intent in green investment.

In summary, results of the analysis provide us with strong support for our hypothesis H1. Confirming that individual investors' perceptions regarding the severity of climate change is positively associated with their investment intent in green investment. However, as the R-squared indicates, 24,8% of the variance is explained by this model. Meaning that 75,2% of the variance is explained by other factors.

H2: Greater confidence in technology adequacy is associated with a higher share of green investment in the investment portfolio.

Our results in the table below shows an R value of 0,444. Again, indicating a moderate positive relationship between the independent variables (confidence in technological adequacy, age, gender, net monthly income and educational background) and the dependent variable (percentage of portfolio allocated towards green investment). Overall suggesting that the model does a moderately good job in predicting the percentage allocated towards green investment.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,444[a]	,197	,154	25,26612

a. Predictors: (Constant), What is the highest educational degree you have obtained?, SumTechAde, Gender, Net monthly income, Age - Drag to your age

The R square value, as explained in 4.1, indicates the proportion of the variance in the dependent variable which is explained by the independent variables. Here, the value stands at 0,197. Meaning

that 19,7% of the variation in the percentage of individual investors portfolio allocation in green investment is explained by the independent variables. Thus, this model has a moderate explanatory power. Albeit that the majority of the variance (80,3%) is due to other factors not included in the model. Next to this is the Adjusted R square (0,154). Which adjusts for the number of predictors (independent variables). This value is slightly lower than the R square value, suggesting that perhaps a small proportion of the model's explanatory power is due to random chance.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14854,898	5	2970,980	4,654	<,001[b]
	Residual	60645,795	95	638,377		
	Total	75500,693	100			

a. Dependent Variable: What percentage of your total securities portfolio is estimated to be invested in green investments? - Drag to the percentage of green investment in your in total securities portfolio

b. Predictors: (Constant), What is the highest educational degree you have obtained?, SumTechAde, Gender, Net monthly income, Age - Drag to your age

The ANOVA table above shows an F-value of 4,654 and Sig. value of <0,001. Indicating that the independent variables reliably predict the dependent variable.

Coefficients[a]

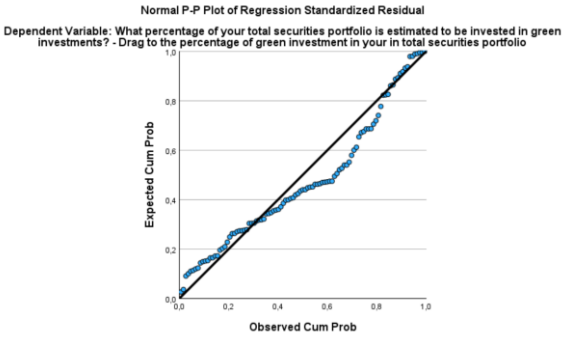
Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-25,391	13,431		-1,890	,062		
	Age - Drag to your age	,467	,168	,290	2,785	,006	,779	1,283
	Gender	5,876	6,486	,089	,906	,367	,882	1,134
	Net monthly income	-2,144	2,911	-,074	-,737	,463	,836	1,196
	What is the highest educational degree you have obtained?	8,211	3,785	,214	2,169	,033	,872	1,147
	SumTechAde	5,903	3,990	,138	1,480	,142	,973	1,028

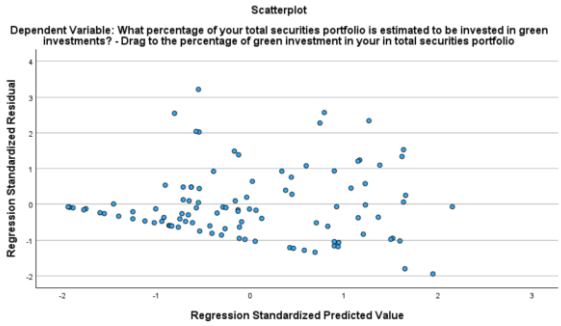
a. Dependent Variable: What percentage of your total securities portfolio is estimated to be invested in green investments? - Drag to the percentage of green investment in your in total securities portfolio

The table above demonstrates the relationship that each independent variable has with the dependent.. In the unstandardized B column, both the magnitude of the relationship, and the direction of it is shown. Whereas the Sig. value represents whether or not the variable is statistically significant. In 4.1 it was elaborated on this relationship in detail which is needless to repeat again. Instead, the main findings are presented. For a clearer explanation, review 4.1.

For this multiple regression, it becomes clear that for every one point-increase in confidence in either technological adequacy, or policy effectiveness, portfolio allocation towards green investment increases by 5,903%. This finding, however, is not statistically significant and requires further examination. Again, age is positively associated with portfolio allocation towards green investment whilst also being statistically significant. Gender and income are again not statistically significant. The

influence of educational attainment is statistically significant. This is similar to what was observed in 4.1.1.





Furthermore, The VIF-values are all well below 10 and even below 5. Normality is demonstrated with the upper-left image. We see the scatterplot on the right that demonstrates not perfect homoscedasticity.

To summarize, when looking at the results of the regression analysis, hypothesis H2 cannot be supported. Although there is a positive association between the confidence in the technological adequacy and portfolio allocation towards green investment, there is no statistical significance. Further research with a larger sample size may shed further light on this phenomenon. Either by confirming it, or dismissing it.

H3: Greater confidence in the effectiveness of existing policies is associated with a higher share of green investment in the investment portfolio.

Similar to our results in H2, our R value is 0,437. Indicating a moderate positive relationship between the independent variables (confidence in technological adequacy, age, gender, net monthly income and educational background) and the dependent variable (percentage of portfolio allocated towards green investment). Overall suggesting that the model does a moderately good job in predicting the percentage allocated towards green investment.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,437[a]	,191	,149	25,35165

a. Predictors: (Constant), What is the highest educational degree you have obtained?, SumConfPoli, Gender, Net monthly income, Age - Drag to your age

Here, the R Square value stands at 0,191 again. Meaning that 19,4% of the variation in the percentage of individual investors portfolio allocation in green investment is explained by the independent

variables. Thus, this model has a moderate explanatory power. Albeit that the majority of the variance (80,6%) is due to other factors not included in the model. Next to this, the Adjusted R square (0,149). Which adjusts for the number of predictors (independent variables). This value is slightly lower than the R square value, suggesting that perhaps a small proportion of the model's explanatory power is due to random chance.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14443,617	5	2888,723	4,495	,001[b]
	Residual	61057,076	95	642,706		
	Total	75500,693	100			

a. Dependent Variable: What percentage of your total securities portfolio is estimated to be invested in green investments? - Drag to the percentage of green investment in your in total securities portfolio

b. Predictors: (Constant), What is the highest educational degree you have obtained?, SumConfPoli, Gender, Net monthly income, Age - Drag to your age

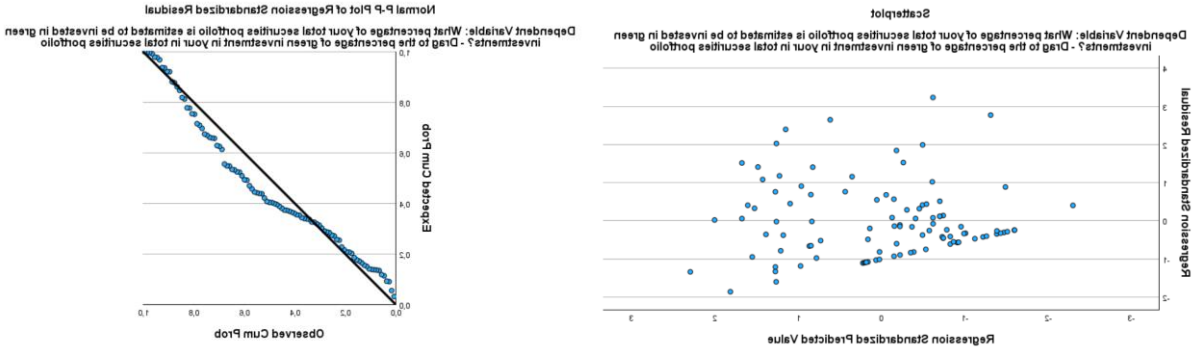
The F-value of 4,495 and Sig. value of 0,001 indicates that the independent variables reliably predict the dependent variable.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-22,037	12,849		-1,715	,090		
	Age - Drag to your age	,495	,167	,308	2,970	,004	,794	1,260
	Gender	4,129	6,539	,062	,631	,529	,874	1,145
	Net monthly income	-1,999	2,920	-,069	-,685	,495	,836	1,196
	What is the highest educational degree you have obtained?	7,758	3,791	,202	2,046	,043	,875	1,143
	SumConfPoli	4,732	3,820	,116	1,239	,218	,978	1,023

a. Dependent Variable: What percentage of your total securities portfolio is estimated to be invested in green investments? - Drag to the percentage of green investment in your in total securities portfolio

The table above demonstrates the relationship that each independent variable has with the dependent.. In the unstandardized B column, both the magnitude of the relationship, and the direction of it is shown. For every one-point increase in confidence in the existing policies (scale 0-2), there is a 4,732% increase in portfolio allocation towards green investment. This finding is not significant though, as it stands at 0,218. Which is well above the conventional 0,05 threshold. Age is statistically significant again, just like for H1 and H2. Educational attainment is again statistically significant. The higher educational attainment, the more portfolio allocation towards green investment. The other variables are again, not statistically significant.



Furthermore, The VIF-values are all well below 10 and even below 5. Normality is demonstrated with the upper-left image. We see the scatterplot on the right that demonstrates not perfect homoscedasticity.

4.1.1 Complete model

Here, all of our variables together and perform a multiple linear regression will be put in one model.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,504[a]	,254	,206	24,48487

a. Predictors: (Constant), What is the highest educational degree you have obtained?, AprioriBeliefs, Gender, Net monthly income, Age - Drag to your age, If you are aware of climate change, how serious of a threat do you believe global warming is?

Here, the dependent variable was percentage of portfolio allocated towards green investment. The independent variables were perceived severity of climate change, confidence in the technological adequacy of green energy, confidence in the existing policies, age, gender, net monthly income and educational background. It shows an R-value of 0,504. Again, demonstrating a moderate positive relationship between the independent variables and the dependent variable. R-square stands at 0,254, meaning that 25,4% of the variance in the model is explained by the independent variables.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19146,870	6	3191,145	5,323	<,001[b]
	Residual	56353,823	94	599,509		
	Total	75500,693	100			

a. Dependent Variable: What percentage of your total securities portfolio is estimated to be invested in green investments? - Drag to the percentage of green investment in your in total securities portfolio

b. Predictors: (Constant), What is the highest educational degree you have obtained?, AprioriBeliefs, Gender, Net monthly income, Age - Drag to your age, If you are aware of climate change, how serious of a threat do you believe global warming is?

With the F-value at 5,323 and Sig. standing at <0,001, it can be said that the independent variables reliably predict the dependent variable.

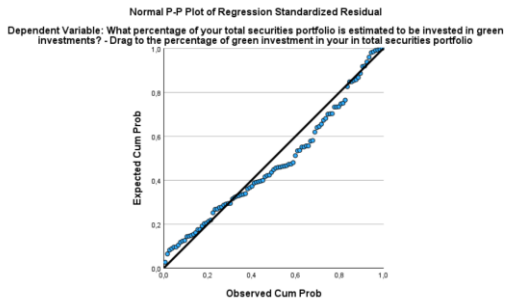
Coefficients[a]

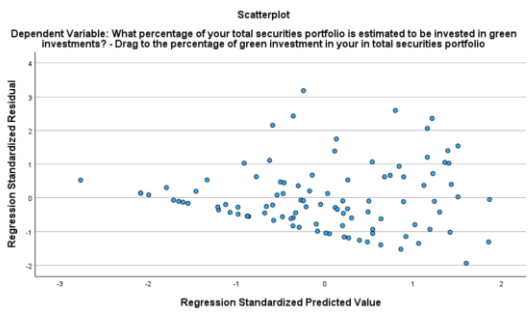
Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-48,038	15,518		-3,096	,003		
	If you are aware of climate change, how serious of a threat do you believe global warming is?	9,445	3,866	,260	2,443	,016	,701	1,427
	Age - Drag to your age	,411	,164	,255	2,513	,014	,769	1,300
	Gender	3,759	6,283	,057	,598	,551	,883	1,133
	Net monthly income	-1,234	2,841	-,043	-,434	,665	,824	1,214
	What is the highest educational degree you have obtained?	7,360	3,673	,192	2,004	,048	,869	1,150
	AprioriBeliefs	1,103	2,933	,039	,376	,708	,728	1,373

a. Dependent Variable: What percentage of your total securities portfolio is estimated to be invested in green investments? - Drag to the percentage of green investment in your in total securities portfolio

The table above demonstrates the relationship that each independent variable has with the dependent.. In the unstandardized B column, both the magnitude of the relationship, and the direction of it is shown. Per every one-point increase in perceived severity of climate change. There is a 9,445 increase in portfolio allocation towards green investment. This finding is statistically significant, standing at 0,016 which is well below the 0,05 threshold. Furthermore, age is a reliable predictor of green investment. Standing at 0,411% increase in portfolio allocation towards green investment per year. Also, being statistically significant at 0,014. Being female predicts green investment again, however, the findings are by no means significant. Income negatively predicts green investment, but the findings are not statistically significant either. Educational attainment also predicts green investment, and the findings are just below the conventional threshold of 0,05. Our construct confidence in technological adequacy and existing policies (AprioriBeliefs) also predict portfolio allocation towards green investment but are not statistically significant either.

Because all of the VIF values are below 10 there is no multicollinearity and in the table below we show that the normality assumption is met. The data is shown to not be complete homoscedastic as the scatter of the variance follows a cone shape. This aligns with the finding that 25% of the data is explained by this model and indicates that there is need to find the other 75%.





Therefore, it can be said that a-priori beliefs, as explained in 2.1, do not play a significant role in predicting portfolio allocation towards green investment for individual investors. H1 is accepted, H2 and H3 are rejected.

4.2 ADDITIONAL TESTING

In chapter 3.3, the research framework for our additional hypotheses was laid out. These were centered around whether perceived risk had any effect on risk perceptions or return expectations of green investment. First, the effect that these three independent variables have on risk perceptions associated with green investment will be demonstrated. Then, the effect these three independent variables have on return expectations associated with green investment will be shown. Cases that answered 'I don't know' are excluded from the sample.

The first three additional hypotheses had risk perception associated with green investment as its dependent variable. For that reason, the model presented below takes into account all these independent variables into a complete model.

R-square value stands at 0,151. Meaning that 15,1% of the variance is explained by the independent variables. In the ANOVA table it is shown that the result is statistically significant because the Sig. value stands at less than 0,05.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,388[a]	,151	,093	1,020

a. Predictors: (Constant), AprioriBeliefs, What is the highest educational degree you have obtained?, Gender, Net monthly income, Age - Drag to your age, If you are aware of climate change, how serious of a threat do you believe global warming is?

b. Dependent Variable: How do you rate the risk of green investments compared to conventional investments?

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16,407	6	2,735	2,630	,022[b]
	Residual	92,551	89	1,040		
	Total	108,958	95			

a. Dependent Variable: How do you rate the risk of green investments compared to conventional investments?

b. Predictors: (Constant), AprioriBeliefs, What is the highest educational degree you have obtained?, Gender, Net monthly income, Age - Drag to your age, If you are aware of climate change, how serious of a threat do you believe global warming is?

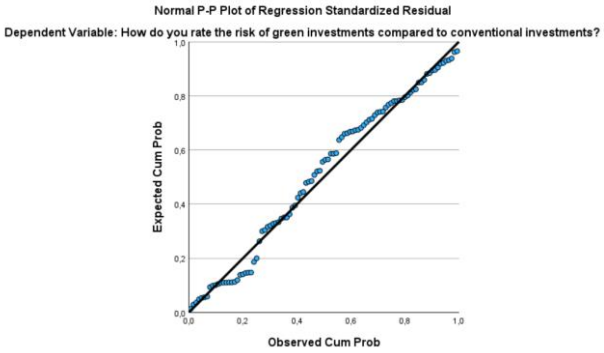
Coefficients[a]

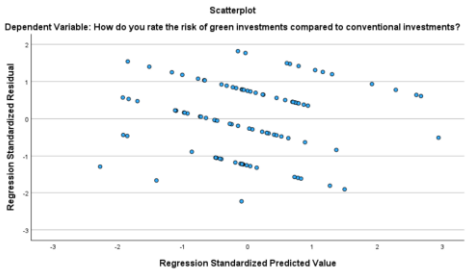
Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	5,614	,662		8,482	<,001		
	If you are aware of climate change, how serious of a threat do you believe global warming is?	-,333	,164	-,238	-2,034	,045	,694	1,440
	Age - Drag to your age	,004	,007	,065	,564	,574	,719	1,391
	Gender	-,565	,272	-,219	-2,078	,041	,858	1,165
	Net monthly income	-,253	,124	-,226	-2,050	,043	,784	1,276
	What is the highest educational degree you have obtained?	,036	,154	,024	,232	,817	,878	1,139
	AprioriBeliefs	-,033	,125	-,030	-,264	,792	,721	1,387

a. Dependent Variable: How do you rate the risk of green investments compared to conventional investments?

In the coefficients table above shows that perceived severity of climate change negatively predicts the risk perceptions that our respondents associate with green investments as compared to conventional investment. Meaning that the higher our respondents perceived the risk of climate change, the lower they tended to perceive the risk of green investment compared to conventional investment. This result is also statistically significant as the Sig. value is below 0,05. The same is true for gender and income, where a negative correlation is found that is statistically significant.

The VIF-values indicate no multicollinearity and the plot below on the left demonstrates normality. The scatterplot below on the right shows





Furthermore, the survey also tested for return expectations of green investment compared to conventional investment. The model presented below illustrates the findings on that regard.

A weak positive relationship exists between the independent variables and the dependent variable because the R-square value stands at 0,067. Meaning that 6,7% of the variance in our model is explained by the independent variables. However, in the ANOVA table it shows that the Sig. value stands at 0,374. Meaning that the relationships between the independent variables and the dependent variables are not statistically significant.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,259[a]	,067	,006	1,159

a. Predictors: (Constant), AprioriBeliefs, What is the highest educational degree you have obtained?, Gender, Net monthly income, Age - Drag to your age, If you are aware of climate change, how serious of a threat do you believe global warming is?

b. Dependent Variable: How do you expect the returns of green investments to be as compared to conventional investments?

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8,789	6	1,465	1,091	,374[b]
	Residual	122,241	91	1,343		
	Total	131,031	97			

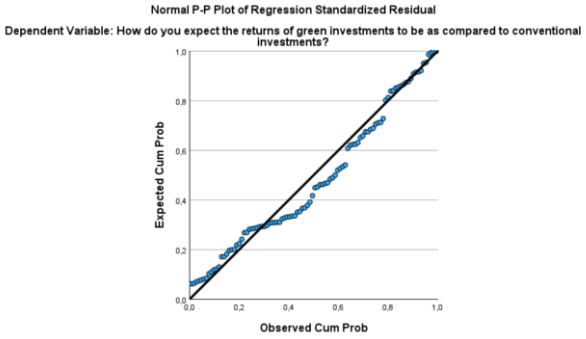
a. Dependent Variable: How do you expect the returns of green investments to be as compared to conventional investments?

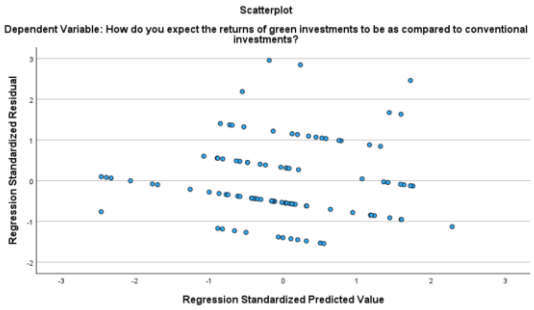
b. Predictors: (Constant), AprioriBeliefs, What is the highest educational degree you have obtained?, Gender, Net monthly income, Age - Drag to your age, If you are aware of climate change, how serious of a threat do you believe global warming is?

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1,868	,751		2,488	,015		
	If you are aware of climate change, how serious of a threat do you believe global warming is?	,173	,185	,113	,935	,352	,696	1,436
	Age - Drag to your age	,012	,008	,177	1,500	,137	,732	1,366
	Gender	-,367	,306	-,130	-1,200	,233	,870	1,149
	Net monthly income	,034	,138	,028	,245	,807	,805	1,242
	What is the highest educational degree you have obtained?	-,081	,174	-,050	-,464	,644	,877	1,140
	AprioriBeliefs	,070	,140	,060	,504	,615	,728	1,373

a. Dependent Variable: How do you expect the returns of green investments to be as compared to conventional investments?





The VIF-values indicate that there is no multicollinearity. The plot above on the left indicates normality. On the right, we see the plot for homoskedasicity, which shows to be scattered but not randomly.

Furthermore, in the coefficients table above it is clearly shown see that none of our independent variables have a Sig. value that is below the conventional threshold of 0,05. Therefore, this thesis rejects the hypothesis that either perceived severity of climate change or A-priori beliefs regarding green energy are associated with return expectations regarding green investment.

5. DISCUSSION

The findings in chapter 4 largely align with previous literary research on multiple dimensions. Just like the research by Hoffmann (2012), the results of this study show that investor perceptions shape investment behaviour. With perceived risk of green investment as compared to conventional investment being influenced by perceptions. A notable difference is that this study found no effect of either perceived severity of climate change, or a-priori beliefs on return expectations. Whereas in the paper by Hoffmann (2012) they found return expectations to be the most volatile of the factors they researched. The findings of this study align closely with the research paper from Anderson and Robinson (2024). They found that for individual investors, concern for climate change led to a rebalancing of their portfolio towards climate-friendly mutual funds. The dependent and independent variables for this study are slightly different but the findings are very similar since a higher perceived severity of climate change led to higher portfolio allocation towards green investment. Surprisingly, the a-priori beliefs regarding green investment, based on the literary framework by Masini (2013), were not affecting investment decisions for the respondents of this study. Although correlations were found, the Sig. value consistently remained above the conventional threshold of 0,05.

In regards to our main research objective, it is important to note that only a quarter of the variance in our model is explained. Meaning that perceived severity predicts 25% of the total variance of portfolio allocation towards green investment. Suggesting that although we identified an important variable, other significant influences on green investment are not taken into account for this study as 75% of this variance remains to be determined and is due to other factors.. As we talked about the media and the news in the introduction, perhaps the specific source of the news that the individual investor is absorbing will play a large role in determining their view on the severity of climate change. Economic status may also be an important factor that requires further investigation. Oftentimes, we found that income was negatively associated with portfolio allocation towards green investment. The findings were, however, not statistically significant. Therefore, it would be interesting to further research this occurrence. Other factors may be specific knowledge of green investment, political views and so on. Future researchers on this topic are recommended to further investigate other factors that predict portfolio allocation towards green investment.

This thesis adds to the body of research by examining the specific effect of perceived severity of climate change on portfolio allocation towards green investment for individual investors. the existing body of research focused on perceptions or the degree to which individuals were concerned about climate change, but not to the perceived severity of it.

One of the limitations for this study was the sample size. In order to make statements about complex issues such as perceptions influencing investment decisions, one needs a large sample size. Many of the findings were shown to be statistically significant, sometimes even at the 0,01 level. However, several other findings of this paper, as demonstrated in chapter 4, were edging just below or above the conventional threshold of statistical significance that stands at 0,05. With a larger sample size, one could rule out these insecurities. Either dismissing them fully, or proving they actually play a role. We therefore recommend future researchers who wish to investigate this issue further to perform research using more respondents.

Another limitation was my limited knowledge as a researcher which was demonstrated during multiple moments in the writing of this thesis. For example, not having in-depth knowledge on all the important papers and writers on this topic. My supervisor Mrs. Huang often recommended papers to me that were valuable in the writing of this thesis. Furthermore, I could have foreseen that there would be a discrepancy between surveys sent, and surveys filled in which I estimate to be between 60 and 80%. Therefore, if I were to do this again, I would take into account that if one needs to hit 100 respondents to have a viable result, one would have to reach out to at least 150 people.

Another limitation for this study is the fact that I, the researcher, do not speak many languages at a scientific level. During the course of this research, I found several interesting articles in foreign languages that I could not analyse because it was written in Turkish, Bahasa Indonesia or another language. Usually, the abstract and/or the introduction was written in English. For that reason, I knew it would have been a potentially useful article. Google translate could provide a solution and I happen to use that a lot actually but that is why I know that sometimes google translate does not exactly translate what it says. Which is a risk if I then interpret it the wrong way.

6. CONCLUSION

In this thesis, we examined the effect perceptions on the severity of climate change held by individual investors can have on their portfolio allocations towards green investment. Control variables were age, gender, income and educational background. A-priori beliefs were tested by examining views on the technological adequacy of green energy and the confidence in existing policies regarding green energy.

Our results indicate that perceived severity of climate change plays a profound role in portfolio allocation towards green investment for individual investors. Explaining roughly 25% of this decision. Age played an important role here as well. Increasing the portfolio allocation towards green investment by around 0,4% per year of age. This finding was statistically significant in all of our hypotheses regarding the portfolio allocation towards green investment. The same is true for educational attainment. The higher educational attainment, the higher share of green investment in the portfolio for our respondents. Furthermore, perceived risk on the severity of climate change negatively predicts risk perceptions associated with green investment. Meaning that individual investors who perceive climate change to be of high(er) risk, tend to associate lower values of risk to green investment as compared to conventional investment. The same is true for both gender and age as independent variables and risk perception of green investment as dependent variable. Where negative associations between the two are found. The findings of this study show that perceived risk of climate change is not associated with return expectations of green investment as compared to conventional investment. The findings were not statistically significant. A-priori beliefs were also shown to play no role in predicting one of our three independent variables. The findings were never statistically significant.

Recognition
Lastly, we would like to thank our supervisor Xiaohong Huang for her help and effort in the writing of this thesis. We had regular meetings, and she gave sharp feedback keeping me on the right track. It's easy to get lost in needless details and lose track of the big picture. Xiaohong provided a bird's-eye view which helped out a lot. Furthermore, a while after linking up with Xiaohong, I decided to travel to South America for almost six months, meaning I was not frequently available. Xiaohong was never in the way of this and still provided feedback whenever I requested so. This flexibility was a warm welcome for me. I would also like to thank my second supervisor Lingbo Shen for providing feedback in the end when the thesis already had its core structure settled.

7. APPENDICES

7.1 SURVEY

The survey will consist of four parts.

First, we will ask questions about investors' awareness and perception on climate change using the framework by Lee et al (2015). Second, we will ask about risk perception, return expectations and investment intent on green investment, this time using questions used in the paper by Brunen et al (2021). Third, we will ask for non-financial factors influencing investment behaviour. For this, questions of Masini (2013) will be used. Lastly, demographic information will be asked like age, gender, income and educational background. Like mentioned before, the information will be completely confidential and anonymous, we will not ask for a name.

Section 1a: Climate Change Awareness and Risk Perception(Lee et al., 2015)

1. How much do you know about global warming or climate change?

a. I have never heard of it.
b. I know something about it.
c. I know a great deal about it.
d. I don't know.

2. If you are aware of climate change, how serious of a threat do you believe global warming is?

a. Not at all serious

b. Not very serious
c. Somewhat serious
d. Very serious

Section 2: Investment intent (Brunen 2021)

1. How do you rate your knowledge of green investments?

◦ I've never heard of that before.
◦ Very weak
◦ Low
◦ Average
◦ Well
◦ Very good

2. How do you rate the risk of green investments compared to conventional investments?

◦ Much lower
◦ A bit lower
◦ Equal
◦ A bit higher
◦ Much higher
◦ I don't know.

3. How do you expect the returns of green investments to be as compared to conventional investments?

◦ Much lower
◦ A bit lower
◦ Equal
◦ A bit higher
◦ Much higher
◦ I don't know.

4.What percentage of your total securities portfolio is estimated to be invested in green investments?

Drag the arrow to the percentage point of your total securities portfolio estimated to be invested in green investments.

Section 3: Confidence in existing policies and technological adequacy of renewables (Masini, 2013)

1. Market forces alone will never lead to a significant exploitation of renewables

◦ Yes
◦ No

2. Government intervention does more harm than good, let governments stay out of the way

◦ Yes
◦ No

3. Energy supply from new renewable electricity sources (e.g. wind and solar) will grow by more than 10% per year worldwide over the next 20 years

◦ Yes
◦ No

4. Solar energy is a low-density resource, requiring a lot of land: therefore, it will never achieve a significant share of the world's energy mix

◦ Yes

◦ No

A construct will be made for section 4 questions 1 & 2.
Section 4 question 1: Market forces alone will never lead to a significant exploitation of renewables. (reversed)
◦ Yes
◦ No
Section 4 question 2: Government intervention does more harm than good, let governments stay out of the way.
◦ Yes
◦ No
Participants will receive either 1 or 0. Eventually, three groups are formed with values ranging from 0 to 2.

A construct will be made for section 4 questions 3 & 4.

3. Energy supply from new renewable electricity sources (e.g. wind and solar) will grow by more than 10% per year worldwide over the next 20 years
◦ *Yes*
◦ *No*
4. Solar energy is a low-density resource, requiring a lot of land: therefore, it will never achieve a significant share of the world's energy mix (reversed).
◦ *Yes*
◦ *No*
Participants will receive either 1 or 0. Eventually, three groups are formed with values ranging from 0 to 2.

Eventually, respondents will be grouped by the sum of this and receive a score between 0 and 4 under A-priori beliefs.

Section 4: Demographic Information

1. Age

____

2. Gender

a. Male
b. Female
c. Other

3. Net monthly income

d. 0-€1499
e. €1500 – €3500
f. €3500 – €6000
g. More than €6000

4. Educational background

h. High school diploma
i. Bachelor's degree
j. Master's degree
k. PHD

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