The next step of involving pension beneficiaries in SRI policies

A Discrete Choice Modelling Research

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TU Delft

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A Discrete Choice Modelling Research

Master thesis submitted to Delft University of Technology in partial fulfilment of the requirements for the degree of

Master of Science

In **Complex Systems and Engineering Management**

Faculty of Technology, Policy, and Management

By

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To be defended publicly on Friday November 11, 2022 at 2:00 PM.

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Preface

Dear reader,

This thesis concludes my study in the master of Complex Systems, Engineering and Management (CoSEM) at the Delft University of Technology. This thesis would not have been possible without the help I received throughout the process.

First, I would like to thank my master graduation committee. I am very grateful for my supervisors Dr. Mr. Niek Mouter and Dr. Af. Aad Correlje from the TU Delft. Thank you for providing me with the support needed to succeed in this thesis. You not only helped me to complete this thesis but also to become a better researcher.

Secondly, I would like to thank Prof. Dr. Ir. Caspar Chorus and Nicolaas Heyning from Councyl. I am very grateful to you for the opportunity to start from Councyl as a graduate intern and have been given the freedom here to find my own use-case. This has given me the opportunity to work on a subject of great interest to me. In addition, I would like to thank you for the help and feedback that helped in the quality of this study.

Third I would like to thank Yvette Hellegers, Anne Kock and John de Waal. Your help and expertise on the subject helped me a lot. Without your help and trust in this research this study would not have been possible.

Finally, I would like to sincerely thank my family and friends. A big thanks to my parents, who have supported me throughout my whole educational journey. And all of my friends who have made my time as a student very enjoyable but also inspired me throughout the way.

Mark Slootweg
Amsterdam, October 2022

Executive summary

In the history of pension funds, investment policies were aimed at gaining capital growth with limited investment risks. This goal was part of their fiduciary duty, the legal responsibility to act in the beneficiary's best interest. In recent years, the purpose of pension funds has shifted to aim for long-term social gains in addition to focusing on financial returns. Pension funds have increasingly integrated social, environmental, and ethical considerations in their investment process. This has been attributed to various factors, such as the positive correlation between environment, social and governance (ESG) and financial performance, but also external pressures from non-governmental groups fuelling public opinion through the media and actions to act more responsibly. The participants must support decisions relating to a responsible investment policy for the pension funds. However, pension fund beneficiaries' preferences for integrating responsible criteria have not been sufficiently investigated.

The aim of this study can be split up into three parts. First, a better understanding of the preferences on the sustainable criteria from the beneficiaries of ADP needs to be gained. Secondly, based on research findings and interviews, a suitable approach to implementing SRI criteria in the investment strategy of ADP needs to be researched. Lastly, recommendations will be made on other stakeholders' steps for a successful SRI implementation.

To better understand the preferences, this research sets up a choice experiment. It then uses discrete choice modelling to determine participants' preferences and willingness to trade financial profits against SRI goals using Random utility maximisation (RUM). With this method, we find that participants are willing to contribute part of their pension income to implementing Sustainable Development Goals (SDGs). Furthermore, we can see that participants think it is especially important that pension funds focus on reducing inequality. There are several motives for integrating ESG into the decision-making process. However, the execution of policy is different per motive. When participants want to integrate ESG to achieve higher returns, the implementation differs from when the motive is to impact the world positively. Therefore, additional analysis has been executed.

To determine whether the participants consider an equal contribution between the step from no attention to do no harm and do no harm and do good. The utility contribution of each attribute level is also measured; we can observe that for most SDGs, there is little willingness to trade financial performance to make a positive contribution to the SDGs, except for reducing inequality. The RUM model is very good for calculating the weights given to the attributes that best fit all participants' answers. However, the model does not reflect whether there is heterogeneity in the population. Therefore, interaction effects on individual characteristics are estimated; this methodology allows for heterogeneity between different groups based on their characteristics. However, when using this methodology, an issue could arise. Observable covariates may not produce some heterogeneity. Therefore, latent class analysis was used to measure this.

Through the analysis of interaction effects, we find that there are many differences in preferences based on individual characteristics. In the latent class analysis, we see three distinct groups. In these classes, we find a large group that gives little utility to pension income and finds all the SDGs important. The 2nd and 3rd groups are smaller, containing about 18% of the population. Group 2 finds retirement income very important, and group 3 finds reducing inequality very important. In this analysis, we find that the strong preference of groups 2 and 3 greatly impacts the RUM model. From these analyses, we find that there is heterogeneity in

the population. We can use this input when we look at how participants' preferences can be implemented in the investment policy.

By first analysing the factors and stakeholders involved, we can find which obstacles to overcome when implementing policy. When analysing stakeholders, we find three different groups. First, we find the societal actors; these mainly influence the shaping of policies. Secondly, we find the political actors who influence the rules of the game. Lastly, we find the economic actors who influence the policy's implementation. In this analysis, several challenges have been found.

Lastly, we have looked broadly at options for implementing participants' preferences. In conclusion, the analysis shows that there are different ways in which a pension fund can develop an SRI policy. This can be done differently, depending on the participant's wishes and preferences and the pension fund's contract form. The pension fund first needs to develop a vision of how they want to achieve a sustainable world. Subsequently, they can create an investment strategy and investment mandate. Policymakers also have a role to play in changing the financial sector. Besides implementing policies to improve transparency, they could implement financial incentives so it will be more financially attractive to adopt ESG practices.

We can conclude that participants are willing to contribute part of their pension income to the implementation of SDGs. Furthermore, we can see that participants think it is especially important that pension funds focus on reducing inequality. Based on the latent class analysis results, we can see that different groups within the population have other preferences. This is important to take into account when formulating policies.

Literature on the motives for socially responsible investing for retail investors and pension fund participants is still limited and not unambiguous. The previous studies mainly test whether participants want to be involved in decisions and whether they consider SRI important. To implement good policies based on preferences, insights into the willingness to pay for such policies are also needed. This research enriches the literature by having better insights into the preferences of pension beneficiaries and their willingness to pay for SRI. We base the preferences of the participants on a very commonly used method in other fields: Discrete choice modelling. Through this study, we find the extent to which pension participants are willing to trade financial profits for SRI goals. In this analysis, we also apply interaction effects and latent class analysis to measure the heterogeneity of the population. We find that measuring these effects is especially important as the preferences vary a lot within the population.

We learn that choice modelling helps identify SRI preferences among participants with little prior knowledge. And can be used as a starting point for better understanding the pension beneficiaries' preferences. The model results and our analysis are subject to limitations. The model could be improved by allowing participants in a choice experiment to allocate money between different investment options, including policies only focusing on returns. Furthermore, the results could be influenced by self-selection and the population focus. Therefore, we recommend studying a more diverse population with participants from different pension funds. Lastly, we focused on how the results could be implemented and what tools the pension fund could use to accomplish an impact, as most of these recommendations are based on qualitative research. It may be interesting to conduct a quantitative analysis of the established objectives based on implemented policies.

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List of abbreviations

SRI	Sustainable Responsible Investing
DCM	Discrete Choice Modelling
ESG	Environment, Social and Governance
ADP	Ahold Delhailze Pensioenfonds
RUM	Random Utility Maximization
MNL	Multinomial Logit
LCA	Latent Class Analysis
BAIT	Behavioral Artificial Intelligence Technology
AI	Artificial Intelligence
SC	Stated Choice
AD	Ahold Delhaize
UN	United Nations
ETF	Exchange Traded Fund
ABP	Algemeen Burgerlijk Pensioenfonds
DCE	Discrete Choice Experiment
COSEM	Complex Systems Engineering and Management
RRM	Random Regret Minimization
LCM	Laten Class Model
BIC	Bayesion Information Criterion
AOW	Algemene Ouderdomswet
LL	Log-Likelihood
WtP	Willingness to Pay
NGO	Non Gouvernmental Orginization
AFM	Authority Financial Market
DNB	Dutch National Bank
SFDR	Sustainable Finance Disclosure Regulation
CSR	Corporate Social Responsibility
SME	Small and Medium-sized Enterprises

1. Introduction

Two years ago, a company called Councyl was founded; in collaboration with the TU Delft, Councyl developed a self-learning decision support system that provides advice on a specific complex decision that is being made repetitively. They have developed a new AI approach called BAIT (Behavioural Artificial Intelligence Technology) for these complex decisions. BAIT uses choice experiments to codify the knowledge of experts to provide an understanding of their decisions and to support future decisions. Councyl has been looking for opportunities in different industries to use its technology. Councyl did not have any projects within the finance/investment industry, so prior to this research a challenge has been sought where the technology is applicable. After reading literature and conversations with various actors, a challenge has been found where the methodology from Councyl is suitable. It is essential to put a disclaimer on this thesis as we have not been searching for the best method applicable to a challenge but for a challenge where the method from Councyl is suitable.

1.1 Background

One of the biggest challenges within the investment industry is the integration of Sustainable Responsible Investing (SRI). SRI has increasingly gained momentum among different investors over the past few years. Institutional investors, such as pension funds, are integrating these practices into their investment strategies. Initially enforced by legislation and regulations, then increasingly on the initiative of pension funds themselves. Pension funds have become increasingly active in sustainable investment based on the idea that sustainable investment contributes positively to returns, can have a limiting effect on risk, and contributes to the public interest. A society-wide change is taking place; the world is transitioning to a more low-carbon economy while also giving more importance to other social and environmental concerns. As global allocators, pension funds can evaluate these challenges and mobilise capital to steer them (Nikulina, 2021).

Pension funds promise to deliver secure and appropriate investment strategies for the retirement incomes of participants. But in most cases, the participants are not involved in any of these strategic decisions. In recent years, the pressure from participants on pension funds has increased; participants and trade unions indicate that pension funds should do more with regard to the climate transition. Bauer and Smeets (2021) conclude that irrespective of a fund's legal and board beliefs and preferences, it is valuable to understand how participants think about the topic of sustainable investments. A better understanding and implementation of the beliefs and preferences is an important instrument in restoring trust in the financial sector. Since pension funds are experiencing more pressure, paying attention to their preferences could provide better long-term plans.

In April 2021, the European Commission clarified the current rules of fiduciary duties on the financial instruments directive. They are stating that investment advisors are required to obtain the sustainability preferences of their clients which are taken into account to assess the financial instruments and products. This empowers retail investors to decide where and how their savings should be invested (European Commission, 2021). In addition to this amendment, they issued a consultation document in which the Commission asked if the EU should further improve the integration of beneficiaries' ESG preferences in the investment strategies. This clearly indicates that pension funds may have to interact with their beneficiaries on ESG preferences.

Nevertheless, the pension fund beneficiaries' preferences to satisfy their responsible criteria have not been sufficiently researched. Montae & Partners has done research that shows that 74% of the respondents consider sustainable investing important (CFA society, 2021). Hartzmark and Sussman (2019) show, for example, that investors value sustainability. They show that investors move to funds with a higher sustainability score in the event of an economic shock. They conclude from this that sustainability is a predictor of good performance. Bauer et al. (2018) surveyed pension participants about their sustainability preferences. This research shows that the majority of those surveyed prefer sustainable investments and that more than 40% of the respondents believe that this may even come at the expense of financial returns.

These studies show an interest in SRI, but it is essential to understand the participants' motives for pension funds. Do they want to invest in sustainable companies because they think it is more profitable, or do they also want to invest sustainably when the returns are lower? Do they want to invest in companies that do no harm to environmental and social issues, or do they want to invest in companies that positively impact these issues? Do the participants prefer sustainability or social issues? And when they have these results, how do they implement them?

An important step is made in the Netherlands; 80 pension funds agreed on a new pension system where participants can make more individual choices. Pension funds are obliged to measure the preferences of their participants. In this way, personal preferences are included in establishing the investment portfolio based on a unique risk profile or a risk profile per cohort. This applies not only to preferences of risk and return but also, for example, to preferences regarding sustainability.

When including the preferences of participants in the design of the investment policies, particularly in terms of SRI in the long term. It is essential to mention the phenomenon of psychological distance on individual preferences. An example can explain this phenomenon: when people are asked about their preferences regarding sustainable animal production, they can easily identify with criteria which say farmers have to comply with this. However, when the same people have to decide in the supermarket, they choose the cheaper option. People often state their support for sustainable options but do not purchase these products in real life. This is the difference between stated preference and real choices. Exploring actual behaviour and not just hypothetical choices is crucial. Therefore, the participants must make trade-offs between sustainable options and their future pensions while the pension funds will also integrate these results into their policy.

When asking participants their opinion on the importance of sustainable investments, they may find it challenging to answer this question; therefore, in this study, a discrete choice-modelling (DCM) framework is used to measure the trade-offs between SRI and the additional costs of SRI. With DCM, we used stated choice (SC) data. SC data are hypothetically created choice situations in which the participants must choose between hypothetical alternatives to select one. The focus of the choice experiment is based on prior research executed by Ahold Delhaize Pensioenfonds (ADP). This research resulted in the criteria for the choice experiment.

There are several motives for integrating ESG into the decision-making process. However, the execution of policy is different per motive. When participants want to integrate ESG to achieve higher returns, the implementation differs from when the motive is to impact the world positively. Because of this differentiation, it is essential to explore how these preferences can be implemented in the investment strategy.

1.2 Ahold Delhaize Pensioenfonds

Ahold Delhaize (AD) belongs to one of the biggest food retailers worldwide. AD weekly has around 54 million customers online and in supermarkets. They are active in 10 countries with about 7000 retail locations and 380.000 employees. ADP is the pension fund of AD with around 80.000 pension beneficiaries, of whom about 12.000 are pensioners. ADP's invested assets are around €6.5bn. For many years, a pension fund mainly focused on investing the pension contributions at the best possible financial return and on correct administration (pension administration). Recently, two important themes have been added: optimal service provision to participants (especially communication and digital administration) and a sustainable pension. This last strategic objective is the most relevant concerning this thesis. ADP has multiple strategies, one of which is a sustainable pension scheme for beneficiaries of ADP.

Starting in 2021, ADP has focused on two themes close to Ahold Delhaize - food solutions and climate solutions - to contribute to solutions for specific social issues. After discussions with Ahold Delhaize and the board, these thematic areas were prioritised and selected as core themes for ADP. The themes were also discussed during two-panel discussions with a select group of ADP participants. Together with Ahold Delhaize and the board's vision, the resulting input was used to link the two themes to several Sustainable Development Goals (SDGs) formulated by the United Nations (UN). ADP wants to know the participants' preferences towards SDG, which can be connected to these themes. This research is conducted together with ADP.

1.3 Objective

Pension funds are under social and political pressure to make their investment policies more sustainable. European and national legislation will increasingly require pension funds to be transparent about the sustainability of their investments. This forces pension funds to measure their participants' preferences for responsible investment policies. If so, are they prepared to pay for it and on which SRI themes should the pension fund focus? In most pension funds, pension plan beneficiaries are not involved in any strategic choices made by fund managers (Bauer R. et al., 2022). There are multiple reasons why beneficiaries aren’t included in the decision-making. Firstly, investing is very complex, and beneficiaries lack financial knowledge. Secondly, there is unwillingness from the decision-makers. However, some pension funds have started conversations with their participants, and many funds and asset managers have already decided to dispose of their investment in the tobacco industry.

In retail investments, investors can invest their money themselves. In this industry, there is an increase in funds and ETFs with a sustainability profile. Many, especially young, investors prefer socially responsible investments (SRI) even if this leads to lower expected returns and higher management fees. (Riedl, Smeets, 2017).

Some pension funds have already measured the preferences of their participants using surveys. One of these funds is ABP, which reported that 59% of its participants favoured sustainable investments (ABP, 2020). However, this was found by asking whether participants think it’s necessary to implement sustainable investments. This could lead to socially preferable choices; simultaneously, respondents might find it challenging to answer direct questions about a subject's importance. As mentioned before, this research is executed with Councyl; Councyl uses discrete choice experiments (DCE) to measure these preferences and trade-offs. This method has already proven in other fields to be an excellent way to measure the weights of criteria in decision-making. For example, when deciding if they will operate in the medical

sector. The model calculates the weights the UMCG physicians attach to different attributes when making this decision (Ten Broeke A., 2020).

The goal of this research can be split up into three parts. First, to understand the preferences on the sustainable criteria from the beneficiaries of ADP. Secondly, based on research findings and interviews, find a suitable approach to implementing this in the investment strategy of ADP. Lastly, recommendations will be made on steps other stakeholders should take for a successful SRI implementation.

1.4 Research approach

This research uses discrete choice models to measure the preferences, which will be more thoroughly discussed in Chapter 2. Pension funds are searching for ways to include participants in their decision-making. Therefore, a case study is being carried out for ADP, the pension funds from Ahold Delhaize. This case study can yield valuable insights into this method for ADP and other pension funds.

Keeping both the Discrete modelling and the holistic research in mind, the following main question will serve as a guideline for this research:

To what extent are different segments of participants from pension funds willing to trade financial profits against SRI goals, and how can this be implemented in the investment strategy of pension funds?

Before the choice experiment was executed, an explorative literature search was conducted to determine what should be essential elements in this study. This first research has been done to understand the field of ESG contains. This research shows almost no literature on integrating ESG data into investment decisions. The available literature mainly focuses on the financial risk and the financial returns of the ESG ratings. When searching for ESG and investing, most of the literature is about the investment performance of ESG; this literature has been studied but is out of scope for this research. Besides the academic literature, investors have guidelines on how to use ESG; this has been studied to better understand the integration of ESG. This was a starting point for the literature approach; this knowledge is used for discussions with experts. Because ESG is very new, there isn't much information about improving ESG ratings and integration. Therefore, further discussions with industry experts have been conducted to determine how ESG data and ratings are implemented in investment decision-making and what challenges they contain. The literature review is necessary to have the proper knowledge of ESG and what the playing field looks like.

To implement the preferences of the investment strategy, we first have to measure the participants' trade-offs and the SRI goals' relative importance. As the pension funds don't invest for every participant individually, it is also necessary to investigate how the trade-offs differ across the different segments. Thirdly we need to find out what SRI goals the participants find most important and what goals they want to achieve on this SDG. Do they want the pension funds to focus on investing in companies that do not harm the environment, or do they need to invest in companies that actively contribute to these goals? When we have specified all these aspects of the preferences, research must be conducted on the aspects and actors playing a role when implementing these preferences into the investment strategy. This study needs to answer multiple intermediary research questions to answer the main research question.

1. *What aspects does SRI contain, and how to measure SRI preferences in a comprehensible way for participants in a pension fund?*

   An explorative literature review is conducted to analyse what aspects SRI contains and are important to pension funds and their beneficiaries. This includes the motives for pension funds and their beneficiaries.

2. *How do pension fund participants trade off between different SDGs and potential financial profits, and what is the importance of doing good compared to not harm when choosing an investment portfolio?*

   A choice model is performed to measure the preferences and the trade-offs beneficiaries make. The methodology for the choice model is elaborated in chapter 2. The data is collected by sending a survey to all the participants of the ADP.

3. *How do trade-offs in the investment portfolio vary across different segments of the pension fund participants?*

   To measure the differences between the different segments, an analysis is performed on the differences between the various groups. To measure to what extent the individual characteristics influence the preferences on SRI, interaction effects on the individual characteristics are estimated. However, heterogeneity can also be caused by non-observable factors, therefor also a latent class analysis is performed.

4. *What aspects and actors play a role in implementing SRI strategy in a pension funds strategy?*

   To answer the main question on how to implement participants' preferences in the investment strategy, research is necessary on the aspects and actors influencing this strategy. As there is not much literature on this field, market research is conducted to investigate the influence of different elements and actors. This market research is carried out with the help of several experts.

5. *What possibilities are there to implement SRI in the pension funds' policy?*

   After measuring the preferences and analysing the important aspects and challenges involved in implementing the SRI policy, we will answer what a pension fund can do to implement the preferences.

1.5 Societal and scientifical relevance

The goal of this research is to be both societally and scientifically valuable. **Societally** this research provides many contributions. Firstly, Councyl has developed a new AI approach called BAIT. Bait utilises discrete choice modelling to codify knowledge. Councyl is looking for opportunities in various industries to deploy their method. Through this research, they can demonstrate that they can provide insight into participants' knowledge and, as a follow-up step, they can help pension funds with decision support. Secondly, ADP's pension fund would like to know what participants expect regarding SRI and what role social preferences and participant characteristics play. In this study, we show that participants get the most utility from the strategy to do no harm and that making a positive contribution does not lead to much more utility. In addition, this study also shows significant differences in participants' preferences

within the population. They also want to know how to translate these expectations into an appropriate SRI policy. In this study, we hand the pension fund a tool that can provide good insight into the preferences of its members. Thereby, through market research, recommendations have been made on how this can be integrated into an SRI policy. Besides ADP's pension fund, many other pension funds are figuring out how to measure participants' SRI preferences correctly. They cannot use the results of this survey because all participants are employees of the same company, which may affect their preferences. However, they can build on this research by using this method for their analysis. Lastly, many other decision-makers are interested in gathering information on people's social and sustainable preferences, such as other pension funds or policymakers. This research provides them with a method to collect and analyze this information.

The **scientific** contributions of this thesis are as follows:
Despite the aforementioned studies and literature on responsible investments and research on the preferences of pension beneficiaries, literature on the motives for socially responsible investing for retail investors and pension fund participants is still limited and not unambiguous. The previous studies mainly test whether participants want to be involved in decisions and whether they consider SRI important. To implement good policies based on preferences, insights into the willingness to pay for such policies are also needed. This research enriches the literature by having better insights into the preferences of pension beneficiaries and their willingness to pay for SRI. We base the preferences of the participants on a very commonly used method in other fields: Discrete choice modelling. Through this study, we find the extent to which pension participants are willing to trade financial profits for SRI goals. In this analysis, we also apply interaction effects and latent class analysis to measure the heterogeneity of the population. We find that measuring these effects is especially important as the preferences vary a lot within the population. As mentioned earlier, the results of this study cannot be extended to the entire population. However, we learn that choice modelling helps identify SRI preferences among participants with little prior knowledge. And can be used as a starting point for better understanding the pension beneficiaries' preferences. With the possibility of real data becoming available to further possibilities to investigate actual choices and outcomes can lead to more insights. We can gain more general knowledge of pension participants' preferences through more studies of the same kind. In addition to measuring participants' preferences, we conducted empirical research on the implementation of SRI policies. Combining stakeholder interests and key factors in implementing SRI policies gives us a better understanding of the processes at work in the relationship between societal, policy and economic stakeholders. This research provides a clear overview of the challenges that can be further explored.

1.6 Fit with COSEM requirements

As this thesis is written for the master's programme Complex Systems Engineering and Management, it is essential to understand why this research fits within the programme and why it is relevant from this perspective. This subject is a challenge within a complex system within a technical environment. Aspects such as regulations, interests, human behaviour and a changing environment must be considered. Using choice, modelling insights could be given into which environmental, social, and governance factors are important to participants of pension funds. By examining the complex system, a good policy for implementing the choice experiment can be determined. At the same time, research is done in the investment field regarding sustainable investments for pension funds. In the study COSEM, students learn to look at how technological developments fit into complex systems; Within this research, an analysis is made of the critical stakeholders to help pension funds implement the insights of this research.

1.7 Report Outline

In this section, we provide an overview of the research outline. A summary of the chapters included in this research is posed in Figure 1.1. Within this overview, the research chapters are posed, and an indication is given as to where each sub-question (SQ) is answered. By doing so, we can perform the research in a structured way.

The research contains five overarching phases. The first one is seen as the discovery phase, this phases consist of an introduction including the problem definition, the methodology to answer the research questions by presenting a conceptual model, data analysis framework and analysis steps for this research. Lastly, this phase contains the results of the literature review which are conceptualized into the factors that can be used to answer SQ1. Next in the operationalization phase, we discuss the choice modelling set up and the analysis used. After that, we will discuss the sample and the model estimation procedure. The next phase is the analysis phase, in these chapters we discuss the outcomes of the modelling & analysis steps of the choice models and the analysis of the market research. By doing so, we can answer SQ2, SQ3 and SQ4. In the implementation phase we use the insights of chapter 6 and 7 to discuss the implementation of the results to answer SQ5. At last, in the evaluation phase, we analyse the outcomes and discuss the results and the relevance of this thesis. In chapter 10, the answers to the research questions are indicated, and the conclusions of this research are shown. This chapter gives policy recommendations for other stakeholders and recommendations for further research. Figure 1.1 shows a comprehensive overview of the research outline

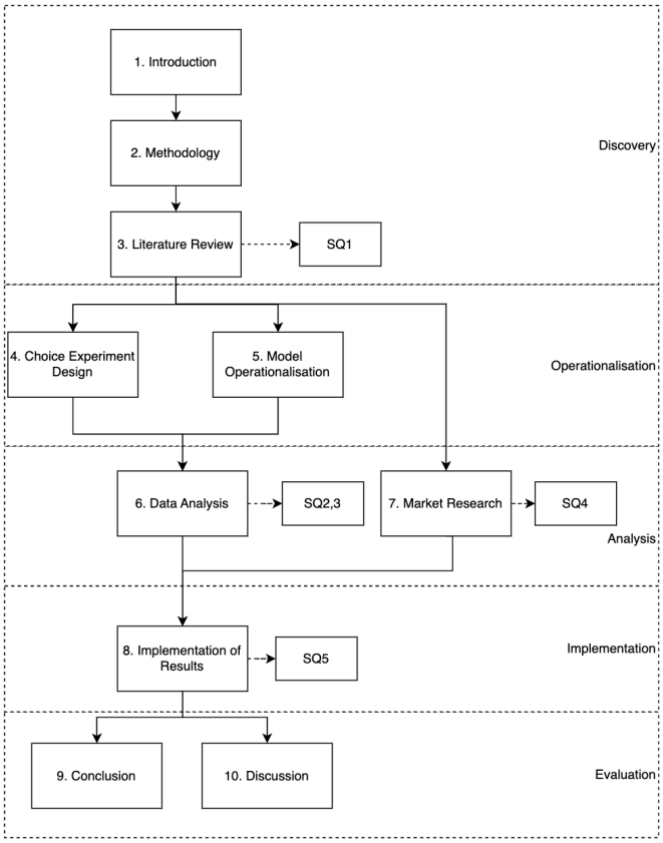

Figure 1.1Research outline with sub-questions

2. Methodology

This chapter will describe the methodology used to answer the main research question. Several sub-questions have been described to answer the main question. The methodology used to answer these questions will be discussed in this chapter, including an explanation of why this method was used in the first place.

2.1 Research definition

The first phase aimed to comprehend the problem situation and discover the knowledge gap to contribute to the scientific and societal domains. In this phase, scientific literature, reports from companies and interviews with various actors were used. This resulted in chapter 1.

2.2 Identification of SRI aspects.

For a long time, policy within companies and the government was based on the disciplines such as law, economics, political science, and public administration. Psychological knowledge is much less common. This could be seen as remarkable because politics and policies are about human choices. This is a subject on which economics and psychology have something to say. The significant problems of the future, such as climate, a healthy lifestyle, and equality, can only be solved if people make sustainable choices. Insight into the causes of choice behaviour is therefore required. How do people make decisions?

Because a good policy starts with the correct image of people, much policy is assumed on the reasoning that all people are homo economicus. This means they go for the best option for their interests and every choice a person makes. Much research has already shown that this is not the case, and people are looking beyond their self-interest. Much literature describes a variety of decision-strategy and other theories on why individuals make certain decisions. Knowing what interests people have allows the right policies to be implemented, and the proper communication methods can be used.

Chapter 3 first examines SRI's developments and which aspects are important for a pension fund and its participants. This was done utilising an exploratory literature review to determine the important SRI aspects for beneficiaries. This chapter will also describe the methods similar studies have used and the limitations of other research so they can be overcome in this research.

For the research to be a good representation of the entire population of ADP beneficiaries, it's important to have high participation from every segment. Therefore the survey needs to be understandable and relatively simple to answer; simultaneously, the survey should not take too much time. To reach these goals, the survey is carefully tested and evaluated with the following steps:

- The first version will be tested online with employees from the ADP and acquaintances; their feedback will be implemented in the second version.
- A test panel will fill in the second version from Flycatcher, the research institute responsible for the technical implementation of the survey.
- The final version will be sent out in two steps. The first step is to share the survey with 10% of the participants. If it can be established that everything is working correctly, the survey will be sent out to the rest of the 90%.

By testing the survey frequently and investigating how people interpret the questions, we ensure that the survey measures the right aspects.

Constructing the survey to gather data from pension beneficiaries from ADP requires several considerations. This survey is created together with the board from ADP, Montae & partners (consultants with a focus on pension funds), Flycatcher (a research institute), and Rob Bauer and Paul Smeets (Professors at Maastricht University). They have focused on the non-DCM part.

The survey consists of 5 different elements:

- First, there will be an introduction to sustainability and responsible investing. In this part, the knowledge about the current policy from ADP will be tested, and their view on it.
- The second part will include the participants' opinions on the current SDG focus. In this section, ADP gives a clear commitment up front, which helps ensure the relevance of the rest of the Survey responses.
- Section 3 asks questions that align with the Goal of Framing theory and social identification. Only scientifically validated questions are used in this part. Parts 1, 2, and 3 deal with the current situation, where the participant has no choice in the sustainability profile of ADP's investment portfolio.
- Part 4 (DCM experiment) deals with the situation where the participants would have this choice and thus with a future situation that could become relevant within the new pension system.
- In part 5, there will be concluding questions on communication and the follow-up of the study results.

2.3 Method Suitability DCM

This research was conducted for Councyl to look at challenges within the investment market where insight into people's knowledge or preferences is needed. There are several ways to do this. Councyl uses Choice modelling, which gives weight to the attributes of people's choices. ADP would like to know participants' preferences on investment policy regarding the inclusion of various SDGs and how this outweighs potential financial gains. In doing so, they also want to gain insight into the importance participants gives to the portfolio by doing no harm or making a positive contribution to the SDGs. In this study, we are going to investigate whether the use of choice modelling is an excellent way to assess participants' preferences

The participants will be asked to make a moral choice in this research. In the field's economics and psychology, the study of moral choice behaviour has gotten more attention. It is difficult for people to point out what they think is more important. For example, if, in this case, we ask whether the respondent thinks climate or education is important, they will find this problematic. But if we give the option to choose between 2 alternatives, they can make this choice. The discrete choice approach identifies decision strategies based on observed decisions. At the same time, this is mainly used in non-moral decision-making, such as for logistics or consumer surveys. Choice models combined with econometric techniques could effectively identify decision strategies. This leads to which rule of moral decision applies when and for whom by using the latent class approach (Chorus, C., 2015). Besides the decision strategy, DCM can also pick up subtle effects; it quantifies the impact of choice behaviour that would otherwise

not have been picked up with other methods. With DCM, we can express the prioritizations in magnitudes, which will also improve the usability of the research findings.

When setting up a choice experiment, two types of choice data can be used; revealed preference and stated preference. Revealed preference is working with data from real situations; the advantage of revealed preferences is the reliability of the data (ChoiceMetrics,2018). With revealed preferences, we use the data of people's choices in real life. For example, we could ask when the last time was when they invested money and whether they also included sustainable criteria in their decision. Councyl applies their BAIT on decisions where most of the time no data is available and therefore make use of stated preferences. In this case, a participant's daily life choices and preferences about pension fund policies may also differ.

2.4 Theory discrete choice modelling

As mentioned earlier, we can observe influences that shape an individual's choice behaviour with every participant's decision. The factors which influence the population may deviate across the population of individuals. There is a significant amount of variability, called heterogeneity, in the reasoning behind an individual's decision-making. The goal is to capture as much of this heterogeneity as possible (observed heterogeneity). There will also be a part that cannot be measured because the factors cannot be measured or because there is no information that these factors exist (unobserved heterogeneity). The goal is to minimise this unobserved heterogeneity (Hensher et al., 2005).

Participants apply a specific decision-making strategy in which the attributes involved are used to select the better option. There are two well-known choice models to measure the decision strategy; Random Utility Maximization (RUM) and Random Regret Minimization (RRM). We cannot use the RRM model in this study because we used a decision between 2 alternatives. To use the RRM model, at least three alternatives are necessary.

The RUM method is based on Lancaster's attribute-based utility theory (Lancaster, 1991). The theory assumes that consumers will always attempt to maximise individual utility (Hess & Daly, 2014). When participants choose between several alternatives, each alternative has a specific utility that depends on the attribute levels of all attributes in that alternative. The participants will prefer the alternative with the highest level of utility. The utility can be quantified as:

$$U_\iota = V_\iota + \varepsilon_\iota$$

Where:

U_ι = total utility obtained from alternative ι
V_ι = observed utility obtained from alternative ι
ε_ι = unobserved utility obtained from alternative ι

The observed utility obtained from the alternative depends on the attributes; together, those attributes complete the observed utility V_ι. The traditional form of the equation for V_ι is as follows for an alternative with k attributes:

$$V\iota = \beta_{0,\iota} + (\beta_{1,\iota} * x_{1,\iota}) + \cdots + (\beta_{k,\iota} * x_{k,\iota})$$

Where:

V_ι = observed utility obtained from alternative ι
$\beta_{0,\iota}$ = alternative-specific constant for alternative ι
$\beta_{k,I}$ = the weight attributed to attribute k in alternative ι

In the equation $\beta_{k,i}$ represent the participants' weights to this attribute. The alternative has multiple attributes, and every attribute has a specific contribution to the utility of that alternative. Every attribute has relative importance to the utility obtained from an alternative by an individual.

The likelihood maximisation principle is used to find the parameters' values: the set of parameters that make the data most likely. The likelihood of a model is calculated by multiplying the likelihood for all the alternatives and observations. The likelihood ranges from 0 to 1, so their product becomes a very small number. To simplify the computation, the natural logarithm of the likelihood is used.

In many studies using choice experiments, the RUM method is used to measure the choice strategy of participants.

With the described methodology, we can answer the sub-question: *How do pension fund participants trade-off between different SDGs and cost dimensions, and what is the importance of doing good compared to not harm when choosing an investment portfolio?*

2.5 Measuring Heterogeneity

The RUM model is very good for calculating the weights given to the attributes that best fit all participants' answers. From this, you get the average utility participants give to the attributes. However, the model does not reflect whether there is heterogeneity in the population. If there are large differences in participants' preferences, the pension fund may decide to adopt a different policy. For instance, one possibility could be to give members options for how their pension is invested. In addition, the pension fund will also have to communicate its policy decisions. When participants have different preferences, they might react differently to this communication. The pension fund could decide to communicate its decision-making differently according to the participants' preferences. For these reasons analyses will have to be conducted to measure whether there is heterogeneity within the population.

2.5.1 Interaction effects

The literature review described in chapter 3 showed that individual factors might influence people's preferences regarding their SRI preferences. Other research showed, for example, the gender gap or differences between generations. To measure to what extent the individual characteristics influence the preferences on SRI, interaction effects on the individual characteristics are estimated. One characteristic is analysed at a time to investigate if participant characteristics are significant to their preferences. This method allows heterogeneity between different groups based on their characteristics.

2.5.2 Latent class cluster analysis

Many studies have used the interactions between utility parameters and observable characteristics to measure heterogeneity. However, when using this methodology, an issue could arise. Observable covariates may not produce some heterogeneity. A latent class model (LCM) could be used to measure choice heterogeneity between individuals. According to Kroesen (2021a), an LCM is a model-based probabilistic clustering method aimed at finding groups of research units that are similar based on observed characteristics and unobserved characteristics. The goal of latent class clustering is to describe complex behaviour or preferences and to better understand behaviour due to holistic profiles. Identifying different clusters in this study offers the possibility of designing policies suited to these identified clusters' specific needs or preferences. When a policy is drawn up based on the averages, this could lead to less support among the beneficiaries. However, for the pension fund applying the LCM is relevant because it enables them to identify the clusters and design investment strategies.

The LCCM is estimated using the software LatentGold. This analysis aims to find the optimal number of classes, determined by the goodness of fit. The log-likelihood is used to measure the best fit of the RUM model. However, every class in the model adds an extra parameter to improve the model fit. Therefore, the BIC index is used; this index weighs both the model fit and the parsimony of the model. Besides the BIC index, we will use the Wald statistic to confirm whether the variables are collectively significant for the model.

2.6 Market research

The first step for pension funds is understanding what their participants want them to do. The next step is to develop an investment strategy and policies based on these results. However, it is not easy to implement these results. Besides the fact that many actors with different interests influence investments, there are also many developments in the field of SRI. Therefore the last subquestion will be answered: “What aspects and actors play a role in implementing SRI in a pension funds strategy?”

To answer this question, market research is conducted. The first step in this market research is gathering information by reading company papers and scientific literature. This approach was used to define the initial factors, which actors are important, what tools are available and how they influence a pension fund's investment policy.

Data was then collected in the form of interviews with experts in the field. These interviews took place with persons who held positions for several important stakeholders identified in the first section. The purpose of these interviews and data collection was to understand the motives of the different actors, their role in this playing field and, how they have implemented ESG, their challenges and expectations for the future. The method used for the interviews was unstructured interviews. The input for these interviews was the literature review and the output from previous interviews. Using the previously conducted interviews made it possible to have an opinion on the same challenges from a different point of view.

2.7 Conclusion

After answering the subquestions, the two parts of the main question can be answered. Through the choice experiment and the data analysis, we can answer: “To what extent are participants from pension funds willing to trade financial profits against SRI goal.” With market research, we know which aspects are essential for implementing a new policy. This allows us to answer the question, "how can this be implemented in the investment strategy? In conclusion, we will reflect on these research questions, the limitations of the research and possible future studies.

3. Literature review

Performing adequate research to gain insight into the implementation of ESG at pension funds and gain insight into the preferences of its participants, a deep understanding of several concepts is necessary. This background information is required as many aspects discussed in this thesis have different interpretations. The results of the literature study will be addressed in this chapter, reflecting on the available literature regarding the topic of this thesis. Lastly, within this chapter, the knowledge gap is further defined.

3.1 History of sustainability and social foundations in Finance

Our economic models were developed in times when resources were abundant. There were plenty of natural resources, and the carbon emissions emitted were limited. As no environmental concerns are factored into these models, the financial theory does not account for the value of natural resources beyond their short-term cash flows. These models are still widely used but are no longer maintainable (Schoemaker, Schramade, 2019). After the industrial revolution, mass production in a competitive economic system led to long working days, child labour, bad working conditions and underpayment. Social regulations have been introduced to promote decent work and access to education and healthcare. But many people are still living below the social foundations and are living in hunger without access to education and other living standards. Finance can play a leading role in allocating investment to accelerate the improvements on social and sustainable issues.

While ESG is a new term introduced in 2004, sustainable finance can be traced back 3500 years when Jewish investors aligned their actions with their belief system (Louche et al. 2012). They applied exclusion criteria based on their religious beliefs. This approach of screening portfolios based on exclusion criteria is used to this day. Investors have some impact by refraining from financially supporting undesirable business activities, but it doesn't change business activities. The motivations of this first phase of sustainable investing are ethical, and this period is named sustainable finance 1.0 in the literature.

With the introduction of ESG in 2004 by a study called Who Cares wins (Kell, 2018), we have entered the next era of sustainable finance 2.0. ESG measures the environmental, social and governance performance of investable firms and considers these when choosing investments. With this introduction, investors have changed their economic models and factored in environmental and social concerns.

3.2 A Break-down of SRI

Within the era of sustainable finance 2.0, investors consider non-financial factors that can affect the performance of investments. By emphasising the relevance of ESG data from a financial point of view, sustainability became increasingly important in mainstream financial markets. This includes facets related to the company's response to sustainable and social practices such as pollution, biodiversity, human rights and local stakeholder relationships, governmental aspects such as anti-corruption policies, board diversity and compensation.

3.2.1 The empirical literature on SRI

The literature of the last 20 years on SRI mainly focused on how ESG considerations affect the value of the investor's portfolio. How does ESG information affect the risk-return of an investor's portfolio? Within the literature, different categories can be found: the performance of sin-stocks, the returns of stocks with high and low ESG ratings, the focus exclusively on the

performance of one of the environmental, social or governance aspects, the value creation of active ownership, and meta-studies of ESG investing. The main takeaways from the literature can be summarised as follows:

- Sin stock shows high returns over a long period, and there is evidence that they exhibit outperformance relative to many benchmarks.
- Most research proves that stocks with high ESG ratings result in higher returns. The most significant influence on these returns is the governmental aspects.
- Lastly, research shows active ownership can create value for shareholders and other stakeholders.

So, the majority of the literature concludes that sustainable investments do not lead to negative financial performance on average.

3.3 Research on SRI motives

There already have been some studies on SRI which study the behaviour and motives of retail investors. For example, Rossi (2019) analyses the preferences of households for socially responsible investing in investigating the demand for SRI products. Hartzmark and Susan (2019) found that retail investors value sustainability; they reported that funds categorised as low sustainability experienced a significant outflow in contrast to those categorised as high as they experienced substantial inflows. Riedl and Smeets (2017) found that the main driver of SRI is social preferences; retail investors invest in SRI despite expecting a lower return.

However, other research on SRI showed that financial attributes still are more often preferred than SRI attributes. Brimble et al. (2013) and Vyvyan et al. (2007) Describe that investors, regardless of whether they are described as environmentalists, ranked financial performance as the most important. Their results provide that there is an attitude-behaviour gap between their environmentalist attitude and their investment decision-making. However, it is important to note that these studies are older and that the general preferences may have changed over time.

3.3.1 SRI characteristics

SRI considers ESG criteria when making investment decisions. But there are many ways to describe these criteria. When measuring the beneficiaries' preferences, it’s crucial to understand which characteristics of SRI they find important. In previous research, different ways of describing and questioning the attributes of SRI have been used. Rossi et al. asked Dutch households whether they would choose SRI products over non-SRI products. Apostalkis et al. used a discrete choice experiment with attributes of SRI with investing in a particular subject, excluding industries, and impact investments in combination with costs. Bauer et al. allowed beneficiaries to add an extra SDG to the pension fund's investment strategy. They asked whether they wanted the pension funds to do more engagement and screening. There are many ways to describe the SRI characteristics, when you conduct a survey among participants of a pension fund, it is crucial to describe these characteristics understandably. With ESG, you can go into very deep detail; with ESG analysts, there are even experts on certain aspects of ESG. For surveying participants' preferences, we can't go into that much depth because the survey becomes incomprehensible. But they should be able to indicate on the topic exactly which aspects they find important.

3.3.2 Situational factors

In addition to the previously discussed SRI characteristics, individual factors might influence people's preferences regarding their SRI preferences. These factors can be divided into social, demographic, and financial.

Financial: willingness to pay, income, money managed by pension fund
Social: ideological preference
Demographic: Gender, age, education

Pension funds have a very diverse group of beneficiaries with different backgrounds. Different groups may have different expectations and needs for their investments and how investment managers address them. Other research has shown that social factors could influence SDG preferences; this research mainly focused on political voting behaviour towards SDGs'.

The three demographic factors influencing SDG preferences have been thoroughly investigated. First of all, the topic of gender has already been studied since the 1980s; this research defined differences in voting behaviour between males and females. Studlar showed that the reasons underlying this "gender gap" differ per country (Studlar, 1998). The age of beneficiaries can also play a role in their preferences; studies have shown that ideologies differ per generation (Van der Brug, 2010). When the ideologies differ, this can also have an effect on which SDGs' they prefer. Besides their ideologies, younger people often have less money which can influence their Willingness to pay. Age is also crucial with a pension fund because, for young people, retirement is a subject they are not yet concerned with. After all, it is still far away. Other surveys show that there is much more response from people closer to retirement. Lastly, education plays a role; research on investing in SRI often indicates that individuals with higher education are more likely to invest in SR assets than low-educated people (Rossi, 2019).

Financial drivers can greatly influence SDG preferences and their willingness to pay. The willingness to pay is a concept that measures the interest or preference for a particular good or service and the utility someone enjoys from consuming more. Their willingness to pay depends on the welfare change an individual has. There has been a research at the pension funds of "Detailhandel" in the Netherlands on preferences for SDGs, but the financial drivers weren't part of this study.

3.4 Conclusion

SRI originated as ethical investing; this meant, for example, excluding investments in specific industries. However, in today's society, there are major challenges in terms of nature and society that have made these also become parts of SRI. Besides having a good impact on society, much research also shows that ESG integration does not lead to negative financial results and can even lead to positive Results.

There is much literature on ESG, but this is mainly about financial performance. Literature on the motives for socially responsible investing for retail investors and pension fund participants is still limited and not unambiguous. The previous studies mainly test whether participants want to be involved in decisions and whether they consider SRI important. To implement good policies based on preferences, insights into the willingness to pay for such policies are also needed. For measuring preferences, there should be a good balance between making the questions understandable and also getting outcomes that are useful to the pension fund. Lastly, previous studies show that situational factors can influence participants' preferences, and therefore there are differences between participants' preferences. The findings of this literature review will be used as input for the choice model and analyses.

4. Choice experiment design

A questionnaire with a choice experiment is developed to measure the preferences of pension beneficiaries. This chapter first presents the development of the survey, then the selection and operationalisation of the criteria and the choice experiment. The design of this experiment will be used to measure the beneficiaries' preferences.

4.1 Survey Structure

The survey contains the following elements:

- An introduction to the survey, before the respondents fill in the survey, has an introduction to explain to the participants why ADP is having this survey and what the theme of the study is.
- A questionnaire on the current view of the participants on their opinion on the SRI policy of ADP, questions on social identification to measure if there is a link between personal behaviour and participants' preferences about ADP's policies and personal characteristics to measure heterogeneity between different segments
- The stated choice experiments and a question whether they find it positive or negative that they can choose how sustainably their pension money is invested.
- Concluding questions on communication and the follow-up of the study results.

4.2 Design Approach

Different groups were involved in designing the survey; firstly, there were focus groups with participants to discuss important SRI themes. The board of ADP has been included to discuss the possibilities and focus of the survey. Lastly, Montae & Partners (Pension funds Consultants), Rob Bauer, and Paul Smeets (Professors at Maastricht University) have been included as they are experts on participants' surveys for pension funds. For this research, the experimental design must be understandable for every participant, and the correlations between the attributes must be limited. To ensure that the survey was not too complicated, it was tested with different participant groups, and a communications expert provided feedback. In addition, the survey should not be too long; otherwise, many participants will drop out while completing it. Section 4.3.3. provides a further explanation of the motivation to use an efficient design.

4.3 Stated choice experiment

This section will discuss the construction of the choice experiment. Firstly section 4.3.1 will deliberate on the introduction of the choice experiment. Moreover, section 4.3.2 will elaborate on the criteria selection, and the attribute levels of the choice experiment and finally, section 4.3.3 will further discuss the construction of choice set generation.

4.3.1 Introduction

The choice experiment contains an introduction before the stated choice experiment. The introduction is drafted in collaboration with the communications department of ADP. The introduction explained that ADP currently invests all participants' pension money equally. However, participants may be given a choice on how their money is invested, including the impact of investments on nature, the environment, and people. The introduction also explained that the choice scenarios concerned how they want their money to be invested. The two alternatives differ in the expected monthly pension income and the extent to which your pension investments contribute to sustainability goals. The introduction, which is shown to the participants, is in Appendix B.

4.3.2 Criteria selection choice experiment

When constructing the survey to gather data from the participants from ADP, several considerations should be made when selecting the criteria for the DCM part. Firstly, it should be determined which attributes are included and which attributes should be broken down. This section will explain this selection process and why certain elements are included and excluded.

Expected pension income: Much research concludes that ESG integration leads to lower risk and higher expected income, but some studies also conclude the opposite. If the ADP included ESG tools in their strategy, it would bring extra costs. Introducing individual choices for socially responsible investing will increase administrative costs, and although it could yield higher returns, it also increases the costs for screening investments. Financial returns are translated into the expected average net pension income to make the decision more understandable. The decision is made to go for the attribute levels: 375, 400, and 425.
The reason for this decision is based on different aspects. First, we have chosen an expected revenue of ±400 because the average expected revenue for beneficiaries is around 400, with the AOW state pension excluded. After deciding on the amount, we had to decide on the range. Earlier research has shown that many participants choose a more sustainable option even though they expect to be financially worse off (R., Bauer, T., Ruof, 2021). This research doesn't show how much worse the participants think they are worse off. We do want to measure the willingness to pay for this research. We have chosen a difference of 5% because we assumed this range would be within a reasonable range where this criterion wouldn't be the only criteria participants base their decision on. This will be tested in the first two steps of the survey testing.

SDGs: As mentioned in chapter 4, ESG contains a vast range of factors and is very complex, but the description has to be understandable for every participant of ADP. The United Nations have determined multiple long-term goals for the planet. These goals have been constructed into 17 goals. These goals make a measurable base to make progress in the ESG dimension. Each goal has its challenge within these domains. These SDGs have been discussed with the board of ADP and with a small panel of participants. This input has been used to create a focus on six of the goals. These six goals lay within the two themes of climate solutions and food solutions. Because there are many different perceptions of ESG integration/investing, it is very important to investigate in what form the participants want their money to be invested. Do they want their money to be invested in companies without considering sustainable criteria? Do they want attention, but only so that the companies do not suffer additional damage, or do they want to be invested in companies that make a positive contribution? Therefore different attributes are given to the SDGs. The first attribute for this criterion is no attention: this would mean that ADP doesn't research this topic when deciding whether to invest in a company. The second attribute is to prevent extra damage. Preventing extra damage is mainly about avoiding profits made at people's and the environment's expense. In addition to short-term and long-term damage to nature and the environment, this also involves treating people and organisations unethically. This would mean that ADP doesn't invest in companies harming this SDG. The last attribute is making a positive contribution: Making a positive contribution is about actively contributing to a better world by focusing on impact investing in companies that play a leading, innovative role in the themes a pension fund has chosen to focus on. This would mean that ADP would focus on investing in companies contributing to this SDG. It is interesting to find out what motives participants have when considering responsible investing.

Risk: In the new pension system, investment risks will lie more with individual choices. Individual preferences based on a personal risk profile or a risk profile per cohort can be

included in the investment portfolio design. To determine investment and other policies, pension providers now want to know what risks participants are willing to run. At the beginning of this research, the risk would also be included in the choice experiment. However, explaining investment risk to participants without a financial background would be very difficult and could reduce the response rate. Therefore the decision is made to exclude risk in this research and set up additional research specifically focused on risk.

ESG Tools: As mentioned in 3.4.1, investors can use different tools when integrating ESG in their investment decisions. Some pension funds have asked their participants about using these tools in the pension funds' strategy. For this research, the decision is made to exclude these in the study because it would take much time to explain how these tools work and their effect on the participants. We already get information on whether participants think SRI may come at the expense of expected revenue from the criteria expected revenue, from the criteria of SDG. Explaining the tools and giving the participants a decision on this subject would complicate the questionnaire.

Another consideration when choosing the criteria is the inclusion of an 'opt-out' alternative. With this alternative, the participant has the opportunity not to choose any of the other alternatives. This could be an option when the respondent doesn't want the pension funds to spend any money on responsible investment. However, a respondent could have various reasons for not wanting to choose; one reason could be because it's the easiest way out. Therefore, the choice was made not to include the opt-out alternative, but we asked later in the survey whether they wanted the pension funds to focus on SRI and if they would like to use their input for the strategy of ADP. An overview of the translated attributes and levels is given in Table 4.1.

Table 4.1 Attributes and levels

Attribute	**Level 0**	**Level 1**	**Level 2**
Net pension income per month (after retirement)	€375 (+ your AOW payment)	€400 (+ your AOW payment)	€425 (+ your AOW payment)
Climate Action	No extra attention	Preventing damage	Making a positive contribution
Responsible consumption and production	No extra attention	Preventing damage	Making a positive contribution
Good health and well-being	No extra attention	Preventing damage	Making a positive contribution
Quality education	No extra attention	Preventing damage	Making a positive contribution
Zero hunger	No extra attention	Preventing damage	Making a positive contribution
Reducing inequality	No extra attention	Preventing damage	Making a positive contribution

4.3.3 Choice set generation

Each choice set contains the 6 SDGs ADP wants to measure and the expected income. The reason for showing all the 6 SDGs is that fewer choices are necessary by showing all of them simultaneously, and the outcomes are more reliable.

After determining the criteria and attributes, the next step is to generate choice sets. When designing the choice sets, choosing the right experimental design is essential. Experimental design refers to generating specific combinations of attributes and levels that respondents evaluate in choice questions (Johnson, R. et al., 2013). There are different ways to design the choice set; the objective of designs is to create a stated choice experiment that minimises the standard errors of the estimated parameters. Besides the statistical efficiency, we also must think about the response efficiency. If the number of questions becomes too large, the

respondents can get fatigued. The full factorial design consists of all possible ways the attribute levels can be combined to make different choice sets, but this design is very large and impractical. An orthogonal design is more efficient; the orthogonal design method is developed to sample a small but representative set of combinations for experimentation to obtain good combinations. The design includes a fractional factorial array of numbers arranged in rows and columns. Each row represents the levels of factors in each combination, and each column represents a specific factor that can be changed from each combination. The array is called orthogonal because all columns can be evaluated independently. The main effect of one factor does not bother the estimation of the main effect of another factor (G., Wenjing, et al., 2008). With the orthogonal design, the aim is to minimise the correlations between the attributes to zero.
An alternative design approach allows the researcher to specify combinations that shouldn't appear in the design. These designs are called efficient designs. These designs are considered more efficient because they can produce more reliable parameters with an equal or lower sample size (van den Broek-Altenburg, E., Atherly, A. 2010). Where orthogonal designs minimalise the correlations between the attributes, D-efficient designs aim to minimise the (co)-variance between the parameter estimates. There are also S-efficient designs aimed to minimise the sample size and still have statistically significant parameters, and A-efficient designs aim to minimise only the variance. Efficient designs can only be used when there are prior estimates of the parameters. These can be based on the researchers' estimates, literature, or sample data.

The generation of choice sets happened via a program named Ngene; this program automatically generates a design of choice sets. The number of choice sets necessary depends on the number of parameters and the information obtained. In this experiment, we want to test if there is a non-linear effect for the SDGs. More decisions are necessary when measuring a non-linear effect on the attributes.

Table 4.2 Example choice experiment

	Option 1	**Option 2**
Net pension income per month (after retirement)	**€400 (+ je AOW-uitkering)**	**€425 (+ je AOW-uitkering)**
Climate Action		
Responsible consumption and production	make a positive contribution	No extra attention
Good health and well-being	make a positive contribution	No extra attention
Quality education	Prevent harm	Prevent harm
Zero hunger	Prevent harm	No extra attention
Reducing inequality	No extra attention	Prevent harm
Net pension income per month (after retirement)	Make a positive contribution	No extra attention

12a t/m j. Which option has your preferences

- Option 1
- Option 2

4.4 Characteristics participants

Besides the choice experiment, questions on personal characteristics variables are included. The variables included are based on the literature review discussed in section 3.3.2. This literature review shows that individual factors might influence people's preferences regarding their SRI preferences. The available studies, however, have provided results on the influence of these characteristics on the SRI preferences but not in the context of pension funds. This research will investigate whether these characteristics influence the impact on their personal pension income investment decisions. Besides the influence on the preferences, the characteristics can also be used to measure whether the sample of the participants is a representative sample of the population of the pension funds. Table 4.3 shows the personal characteristics.

Table 4.3 Personal characteristics

Variable	**Level**	**Coding**
Education	Low (only primary or elementary)	0
	Mid (Lower education)	1
	High (Higher education, University)	2
Children	Don't have children	0
	Do have children	1
Income	Low (€2.999 or less)	0
	Mid (€3.000 – €5.999)	1
	High (€5.999 or more)	2
Gender	Male	0
	Female	1
Age	21-29 years	0
	30-39 years	1
	40-49 years	2
	50-64 years	3
	65 > years	4
Status	active	0
	pensioner	1
	deferred / former member	2

To prevent filling in this information from becoming a barrier, the participants always had the option to choose I don't want to tell. The questions for the characteristics in the table above are very straightforward. However, the measurement of ideological preferences is a bit more complicated. This characteristic contains multiple aspects. To measure these aspects, respondents can indicate how much consideration they give to certain sustainability issues, their willingness to give up something to benefit from it in the near and distant future and give to charity without getting anything in return.

5. Model operationalisation

This chapter will first describe the descriptive statistics of the respondents that participated in the experiment. Then the procedure of the discrete choice model estimation is discussed. Here we will discuss the general model, the effect of the prospect theory and lastly how we will measure the heterogeneity in the population.

5.1 Description of the collected data

The Survey was conducted over a time period of two weeks. The survey was sent to all the pension fund's active and former members and the pensioners whose email address was available, which existed of 46,362 persons. From this group, 3036 respondents completed the questionnaire. Before data analysis could be executed, the raw data containing textbased answers was levelcoded following Tables 4.1 and 4.3. For each participant, every answer for the choice experiment is treated as a single data record; every record is coupled with the choice task and the respondent's demographics. In total, we have 31227 records. It is important to note that when the analysis of the heterogeneity in demographics is executed, the dataset is smaller as some people didn't want to answer these questions. The size of these datasets differs per analysis. Table 5.1 shows the sample's known descriptive statistics and the ADP population for each demographic variable.

Table 5.1 Distribution of demographics

Variable	**Level**	**Respondents**	**Percentage**	**Total population**	**Percentage**
Gender	Male	1717	56,5%	39.228	46,7%
	Female	1322	43,5%	44.846	53,3%
Age	21-29 years	446	14,68%	23.472	27,96%
	30-39 years	310	10,20%	13.055	15,55 %
	40-49 years	342	11,25%	10.790	12,85%
	50-64 years	1053	34,65%	22.621	26,96%
	65 > years	888	29,22%	14024	16,70%
Status	active	1966	64,69%	37.796	45,0%
	pensioner	872	28,69%	12.817	39,8%
	deferred / former member	301	6,61%	33.461	15,2%

As is often seen in surveys of pension funds, there is an over-representation of pension beneficiaries and an under-representation of deferred members. In this case, there is also an over-representation of men. To give the research a representative representation of the real population, a representative sample was therefore taken from the respondents so that all groups are fairly represented in the analysis. This was done by sampling by the ratio of active members and pensioners of the total population. However, the active and the deferred members are merged as this group overlaps in age. To achieve a representative group, we ended up with a sample of 1,500 participants. These participants were drawn randomly with the condition that it was in the right proportion of status.

5.2 Discrete Choice model estimation

In this section, the general MNL (Multinomial Logit) model estimation is discussed. First, the determination of the model fit and the interpretation of the results are discussed. This section also indicates how to determine whether the difference between the two parameters is significant. Then the estimation procedure for the parameters is discussed, along with the estimation of linearity.

5.2.1 Model fit

Based on the chosen design, all the parameters in the experiment can be estimated as non-linear. Performance indicators will show the model fit for each model, which will be discussed later. The Log-Likelihood and the Rho-square can determine the model fit. The Log-likelihood is used to measure how well a model fits the data; the higher the LL (closer to zero), the better the model fits. The Rho-square indicates whether the model fits better than a model in all which parameters are equal to zero. The relative model fit is denoted in the model from R but can be determined with the formula (1).

Rho-square Value	Model fit
$\rho^2 \leq 0.1$	Limited
$0.1 \leq \rho^2 \leq 0.3$	Reasonable
$0.3 \leq \rho^2 \leq 0.5$	Reasonably good
$\rho^2 \geq 0.5$	Good

$$(1)\quad \rho^2 = 1 - \frac{LL_{model}}{LL_{zero}}$$

5.2.2 MNL parameter linear estimates

From the respondents' answers, using discrete choice models can estimate what criteria affect the decision made. To estimate the added utility per criteria, the principle of the Log-Likelihood is used in R with the Appolo package to maximise the likelihood. The equation used for the utility function to measure the linear parameters is:

$$(2)\quad V_A = \beta_{Income} * Income.1 + \beta_{Climate\ action} * Climateaction.1 + \beta_{Consumption} * Consumption.1 + \beta_{Health} * Health.1 + \beta_{education} * Education.1 + \beta_{Hunger} * Hunger.1 + \beta_{Inequality} * Inequality.1$$

$$(3)\quad V_B = \beta_{Income} * Income.2 + \beta_{Climate\ action} * Climateaction.2 + \beta_{Consumption} * Consumption.2 + \beta_{Health} * Health.2 + \beta_{education} * Education.2 + \beta_{Hunger} * Hunger.2 + \beta_{Inequality} * Inequality.2$$

For every attribute, it is important to discuss the following terms:

Parameter utility: The value of each parameter estimates the weight of the attribute, with the weights of all the attributes, we can show the relative importance of the attributes on the decision. With this utility, it is also possible to measure the willingness to pay for an increase in an attribute value. To determine the willingness to pay (WTP) for a level of increase, the following equation is used:

$$(4)\ WTP = \frac{\beta_{attribute}}{\beta_{income}}$$

Parameter significance: This value indicates whether the parameters can be generalised to the population. This significance is measured with two values; the p-value and the t-value. The p-

value should be below 0.05, or the t-value should be equal to or higher than 1.96. If the parameter doesn't comply with these values the parameter is considered not statistically significant on a 5% significance level.

Parameter significant difference: Because we are not measuring the whole population, it is possible that on another sample, we would have obtained different values for the parameters and. To conclude that a specific criterion is more important on a population level than another, we need to determine whether the difference is significant. To resolve this, we need to compute the associated t-ratio, which is calculated as follows:

$$(5)\ t-ratio = \frac{(\beta_a - \beta_b)}{SE(\beta_a - \beta_b)}$$

Where,

$$(6)\ SE(\beta_a - \beta_b) = \sqrt{VAR_{ab}}$$

$$(7)\ VAR_{ab} = VAR_a + VAR_b - COV_{ab}$$

5.2.3 MNL parameter non-linear estimates

Loss aversion, the assumption that people are more sensitive to losses than gains, is a central element of the Prospect Theory (Tversky and Kahneman 1992). In this study, the step from "do no harm" to "no extra attention" could be seen as a loss, while the step from "do no harm" to "making a positive contribution" could be seen as a gain. If this is the case, there would be an unequal contribution from each level within a criterion. In order to consider whether this loss aversion influences the choice, we need to measure the utility function of the attribute levels separately. To measure this effect, a coding scheme for each attribute is indicated in table 5.2.

Table 5.2 Dummy coding attribute levels

Variable	Level	Dummy Coding	
SDG	No attention	0	0
	Do no harm	1	0
	Making a positive contribution	0	1

The equation used for the utility function to measure the non-linear of the parameters is very similar to formula 1, the linear utility function, but the $\beta_{attribute} * attribute$ is replaced with $\beta_{attribute\_dummy0} *$ dummy0 + $\beta_{attribute\_dummy1} *$ dummy1.

Similar parameters for every attribute will be discussed as with the linear analysis.

5.2.4 Segment heterogeneity

To measure to what extent the individual characteristics influence the preferences on SRI, discrete models are estimated, including the effects of participant characteristics. One characteristic is analysed at a time to measure if participant characteristics have a significant effect to their preferences. For example, to analyse the interaction effect of gender with the income criteria, the choice is indicated by $\beta_{gender_{income}}$. To estimate whether the effect is significant, the utility function has been adjusted. For the income parameter, this results in $(\beta_{income} + \beta_{gender_{income}} * gender) * income$

For income, education and age, two coding schemes have been analysed; firstly this is done with a linear effect. This measures if there is an effect of a higher income, higher education and higher age on the criteria. Secondly, an analysis is done on whether there is a difference between the groups. For example, what is the effect of a low, middle and high education? To estimate this, the $\beta_{ecudation_{income}}$ is split up into $\beta_{ecudation\_mid_{income}} * (Education==1)$ $\beta_{ecudation\_high_{income}} * (Education==2)$. The coding scheme for the individual characteristics is indicated in table 4.3. Two categories are included: demographic and economic factors. An overview of the factors used is given in Table 5.3.

Table 5.3 Overview Factors

Category	Variable	Unit
Demographic and economic factors	Education	Low/Mid/High
	Children	Yes/no
	Income	€/month
	Gender	Male/female
	Age	Age
	Status	Active/Deferred/Pensioner

5.2.5 Latent-class analysis

A Latent-class Logit model uses a probabilistic class allocation model, where respondent n belongs to class s with probability πns. In the most basic version of the Latent Class Logit model, the class allocation probabilities are constant across respondents. This structure is often referred to as a discrete mixture model. With this model, various subpopulations within the overall population can be found. This analysis shows which groups exist within the population, their preferences, and what part of the population belongs to this group (Hess S. et al. 2011). The next step is to use the class allocation model; this model is used to link these probabilities to the characteristics of the respondent. Covariates are added to the model to assess the effect of those variables that precede the latent variable on class membership. The three same categories as with the interaction effects are used. To identify the optimal model, subsequent models were estimated with 1 to 6 latent classes. Each class consists of a linear-additive Multinomial Logit (MNL) model. The BIC index represents both the model's fit and the model's parsimony. Based on these parameters, the best-fitting model will be chosen.

5.3 Conclusion

The basis estimated model for the preferences is a model in which all the attributes are considered linear. As the prospect theory suggests, there might be a non-linear effect because of the loss aversion in the levels of the SDGs. A second model will estimate the levels of these attributes separately. Finally, the effects of individual characteristics will be measured.

6. Data analysis

This research focuses on measuring the participants' preferences of ADP regarding SRI. Because the participant survey aims to develop a policy based on these preferences, it is essential to know which topics the pension fund should focus on and how far it should go. Next, the pension fund board wants the policy to properly represent the preferences of all participants, which is why we also investigate whether there are differences between specific segments of the participants. Section 6.1 shows the linear parameters that indicate the average preference for the criteria.

6.1 MNL parameter linear estimates

Table 6.1 shows the parameters that have been estimated by R with the use of the package apollo. As mentioned before, for the criteria to be significant at 5% significance, the t-value has to be bigger than 1.96; in this model, every parameter is significant. It can therefore be concluded that the value of every attribute is different from zero. The model fit for this estimated model is a Log-likelihood of -19,784.49 and a Rho-square of 0.086.

Table 6.1 MNL parameter linear estimates entire population

	Estimate	Std.err.	t-ratio	Willingness to pay
Net pension income per month (after retirement)	0.2891	0.0126	22.830	
Climate action	0.2063	0.0088	23.272	€17.84
Responsible consumption and production	0.2071	0.0093	22.131	€17.92
Good health and well-being	0.2300	0.0086	26.487	€19.89
Quality education	0.1757	0.0087	20.182	€15.20
Zero hunger	0.1554	0.0087	17.762	€13.44
Reducing inequality	0.3155	0.0087	36.017	€27.29

In this model the utilities are estimated to be linear, this indicates that participants gain the same utility from no attention to no harm as from no harm to making a positive contribution. In this analysis, we can see that participants consider reducing inequality twice as important as zero hunger. As we have the utilities per parameter, the willingness to pay can be calculated, as shown in Table 6.1. Participants are willing to pay €27.29 for the investments of ADP to prevent extra damage, since we estimate this model linearly, the model says that the willingness to pay is €54.59 for ADP to make a positive contribution to reducing inequality.

As mentioned in 6.2.2. to conclude whether a criterion is more important on a population level than another, we need to determine whether the difference is significant. We, therefore, use formula 5 to measure this. For responsible consumption and climate action, the t-value for the difference is 1.6, which is smaller than 1.96, therefore we cannot say that responsible consumption is more critical than climate action. The results of the significant difference between parameters can be found in Appendix E. The pension fund can consider this when they form policies and have to make choices between different SDGs. The results of this analysis can be found in Appendix E. But as mentioned in the previous chapter, there is an over-representation of retirees which can cause the results to misrepresent the preferences of all participants. Therefore, we are going to do the same analysis on the representative group to

see whether there are big differences. In table 6.2 we can see the estimates based on the representative group. The model fit for this estimated model is a Log-likelihood of -9347.18 and a Rho-square of 0.096.

Table 6.2 MNL parameter linear estimates representative sample

	Estimate	Std.err.	t-ratio(0)	Willingness to pay
Net pension income per month (after retirement)	0.2778	0.0184	15.124	
Climate Action	0.1861	0.0129	14.413	€16.75
Responsible consumption and production	0.2125	0.0137	15.499	€19.12
Good health and well-being	0.2338	0.0126	18.519	€21.04
Quality education	0.1923	0.0127	15.119	€17.31
Zero hunger	0.1836	0.0128	14.334	€16.52
Reducing inequality	0.3708	0.0129	28.823	€33.37

We observe that reducing inequality is still the most important. However, the proportions of preferences have changed. The willingness to pay is higher on average than the outcomes of the whole population. In addition, climate action is less important and quality education more important than across the whole sample. Again, we examined whether the parameters were significantly different from each other. We see that climate action, good health and well-being, quality education and zero hunger do not differ significantly from each other except for climate action and good health. This does not mean that the results are not good, but the pension fund needs to know that they cannot say with certainty which SDG the entire population considers to be more important. Therefore, for policy purposes, they can treat these SDGs equally. As the results of the smaller representative group are still significant on a 5% level, we will use this sample for the rest of the analyses.

6.2 MNL parameter non-linear estimates

To determine whether the participants consider an equal contribution between the step from no attention to do no harm and from do no harm to making a positive contribution. The utility contribution of each attribute level is also measured in this model as shown in table 6.3. Per attribute, two levels are included. Based on the base attribute, no attention to the utility change per SDG is measured. Also, the willingness to pay per step is indicated. For example, for preventing extra damage to inequality, the participants are willing to pay €27.32, and for making a positive contribution the participants are willing to pay €41.82. As we can see from this example and graph 1, there is no equal contribution in this attribute. The step from no attention to preventing extra damage is adding much more utility to the participants. As mentioned in section 6.2.2, for the criteria to be significant the T-value has to be bigger than 1.96. In this model every parameter is significant. It can therefore be concluded that the value of every attribute is different from zero. The model fit for this estimated model is a Log-likelihood of -9334.73 and a Rho-square of 0.096. We observe a minor improvement in the likelihood, which means this model fits better to the decisions than the linear model.

Table 6.3 Parameter non-linear estimates

	Estimate	Std.err.	t-ratio(0)	Willingness to pay
Net pension income per month (after retirement)	0.4463	0.0437	10.2194	
Climate action no harm	0.3031	0.0382	7.9410	€16.98
Climate action do good	0.3698	0.0267	13.8421	€20.71
Responsible consumption and production no harm	0.3024	0.0353	8.5731	€16.94
Responsible consumption and production do good	0.4207	0.0292	14.4270	€23.57
Good health and well-being no harm	0.3569	0.0372	9.6063	€19.99
Good health and well-being do good	0.4743	0.0260	18.2498	€26.57
Quality education no harm	0.2920	0.0381	7.6711	€16.36
Quality education do good	0.3718	0.0263	14.1383	€20.82
Zero hunger no harm	0.3651	0.0397	9.1897	€20.45
Zero hunger do good	0.3611	0.0262	13.8037	€ 20.22
Reducing inequality no harm	0.4874	0.0354	13.7765	€27.30
Reducing inequality do good	0.7466	0.0263	28.4218	€41.82

In Figure 6.1, we can clearly see the progression of the utility function. It is clear that this gradient is not linear except for the SDG reducing inequality. This phenomenon has long been known as prospect theory and loss aversion. People tend to prefer avoiding loss than to acquiring equivalent gains. The results are important for pension fund policy. It indicates that a pension fund can invest money to ensure that its portfolio does not harm the SDGs. We can see that for most SDGs, there is a willingness to put in a little extra money to make a positive contribution to the SDGs, except for zero hunger. We see that the utility for making a positive contribution is smaller than for doing no harm. However, this difference is not significant so we cannot say that participants consider no harm more important. Using this information the pension fund can invest in companies making a positive contribution to these SDGs as long as it is not at the expense of returns. For the SDG reducing inequality, this is not the case, participants are willing to pay more if there is a positive contribution to reducing inequality.

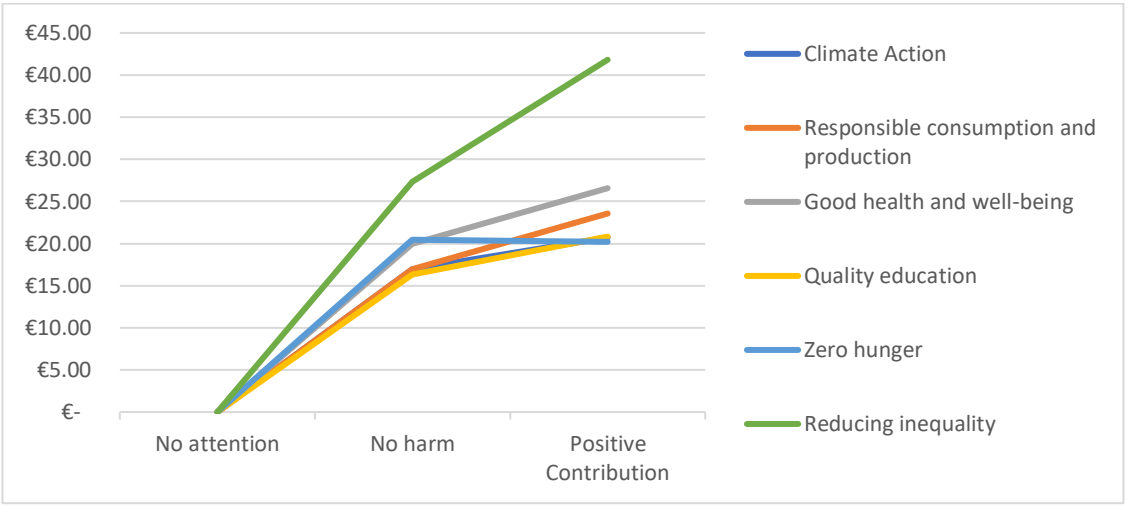

Figure 6.1 Utility function SDGs

6.3 Segment heterogeneity

This section presents the result of the estimated MNL model and the interaction effect of participant characteristics on their SRI preferences. This model explains to what extent there is heterogeneity in preferences among certain participant groups. The significant characteristics investigated are determined based on the characteristics discussed in Chapter 3.

Separate analysis was done for each characteristic. In this analysis, we look at whether the groups have differences in utility. For example, we can observe that Women find pension income and reducing inequality less important than men but find climate action more important. No significant difference was found between men and women for the other attributes. With age groups, income, education and status, however, there are three categories. For these groups, we examine whether there is a significant difference with one group. This is compared to young age, for education to low education, for income to low income and for status to active participants. For example, we observe with the characteristics of age that Mid age finds net income more important and high age finds income less important than low age. The result of this model is shown in Table 6.4.

Table 6.4 Effect characteristics on preferences

	Estimate	Std.err.	t-ratio(0)
Net pension income per month (after retirement)			
Mid Age (35-50)	0.134	0.052	2.572
High Age 50+	-0.050	0.020	-2.460
Pensioner	-0.154	0.049	-3.134
Sleeper	-0.062	0.027	-2.252
Female	-0.136	0.037	-3.687
High Education	0.136	0.043	3.161
Climate Action			
No Children	-0.049	0.023	2.155
Female	0.065	0.026	2.510
Mid Education	0.128	0.034	3.800
Responsible consumption and production			
Sleeper	-0.041	0.020	-1.994
Mid Education	0.083	0.036	2.317
Good health and well-being			
High Education	0.074	0.030	2.494
Zero hunger			
High Age	-0.036	0.014	-2.522
No Children	0.045	0.022	2.027
Reducing inequality			
Mid Income (€3000-€5000 per household)	0.135	0.050	2.678
Mid Age (35-50)	-0.096	0.036	-2.631
High Age 50+	-0.102	0.014	-7.066
Pensioner	-0.130	0.034	-3.826
Female	-0.088	0.026	-3.406
High Education	0.279	0.030	9.205

We can observe that there are many differences between different groups. For instance, we can see that people with a high education on average consider their retirement income, good health and well-being more important than people with lower education. But the biggest difference is in the importance of reducing inequality. From all the effects, we can better understand the preferences of certain groups within the population. However, there is still the possibility of heterogeneity within the groups where observable covariates are not the cause. Therefore, in

the next section, we will perform an LCA to get an even better understanding of the groups that exist in the population and the preferences they have.

6.4 LCA

In this section, we will estimate the clusters in the population. This analysis aims to find the number of classes in which the indicators are associated. The goodness of fit determines the optimal number of classes. The estimation was done on the basis of the representative sample and the individual characteristics. To identify the optimal model, subsequent models were estimated with 1 to 6 latent classes, as shown in Table 6.5. Aach class has an MNL model with its own attributes. The BIC index indicates that the 5-class model is optimal for the experiments. We will look at the 3-,4-, and 5-class models as the 3-class model is the last model with a significant improvement in BIC, and the 5-class model is the optimal model as it is the last class with an improvement of the BIC.

Table 6.5 Model estimation LCA

		LL	BIC(LL)	Npar	df	p-value	Class.Err.	ρ^2
Model1	1-Class Choice	-4643.2833	9332.81	7	733	0.000	0.000	0.1171
Model2	2-Class Choice	-9022.3424	18198.26	21	1479	0.000	0.0690	0.2509
Model3	3-Class Choice	-8804.1615	17864.28	35	1465	0.000	0.1115	0.3072
Model4	4-Class Choice	-8737.2766	17832.90	49	1451	0.000	0.1247	0.3315
Model5	5-Class Choice	-8682.2252	**17825.18**	63	1437	0.000	0.1788	0.3821
Model6	6-Class Choice	-8640.327	17843.77	77	1423	0.000	0.1981	0.3972

6.4.1 Attributes 3-,4- and 5- class model

First, we look at the class size and attributes to see what the classes care about and how big this class is. In the 3-class model, we see three distinct classes. The first class represents 63% of the population. In this class, we observe that the most important criteria are climate and health but that the differences between the SDGs are not very big. In addition, we see that the criteria income is not very important compared to the base model. In class 2, we see that retirement income is mainly looked at; the other criteria are not important. In the last class, on the contrary, we see that reducing inequality is the most important attribute. It is interesting to note that classes 2 and 3 provide strong parameters for retirement income and reduce inequality in the base model.

Table 6.6 Attributes 3-class model

Class size	63%	19%	18%
Attributes	**Class1**	**Class2**	**Class3**
Net pension income per month (after retirement)	-0.0157	2.8949	-0.3004
Climate Action	0.2764	0.3823	-0.0722
Responsible consumption and production	0.2108	0.1979	0.4307
Good health and well-being	0.2588	0.2532	0.3939
Quality education	0.1927	0.2438	0.4323
Zero hunger	0.169	0.0428	0.8283
Reducing inequality	0.2021	0.1046	1.9366

We then also look at the 4- and 5-class models, the results of these models are in Appendix F. Looking at the outcomes of the 4-class model, we see that class 2 of the 3-class model is split into two classes. However, the new class only contains 4% of the population and does not differ much from class 2. Next, we looked at the 5-class model.

In the last model, we have five classes. If we compare these with the 3-class model, we see that there is still a class that only looks at income (class 2), and then we have a class that finds Inequality most important (class 3). And finally, we see that class 1 of the 3-class model is split into three classes. It is especially important to note that class 1 of the 3-class model consists of people who do not base their choices much on retirement income but mainly on SDGs, where there is still a difference in the extent to which they consider the different SDGs important
Looking at the BIC, the 5-class model improves the model very little. Besides this, the 5-class model gives us little new information on the segments. Therefore, we decided to continue with the 3-class model to implement the preferences in the pension fund's policy.

6.4.2. Latent class model results

Now we will take a closer look at the results of the 3-class model. Before this, we only observed the insights we gained from the attributes of the different models. However, it is also important to look at the performance of the latent class model. To determine this, we look at the Wald statistics and the p-values. The Wald test is a measure to confirm whether the variables are collectively significant for the model. The Wald statistics and the associated p-values indicate that all seven marginal utilities are significantly different from one another (across classes).

Looking at the attributes of the classes, we see that class 2 and class 3 have an impact on the utility in the basis RUM model. Due to the high utility they gain from reducing inequality and pension income, these attributes in the base model also have a high value. So, this means that most of the population finds reducing inequality less important but that, except for class 2, the willingness to pay is much higher for the whole sample.

Table 6.7 Overview significance attributes

Attributes	Class1	Class2	Class3	Wald	p-value
Net pension income per month (after retirement)	-0.0157	2.8949	-0.3004	171.314	0.00
Climate Action	0.2764	0.3823	-0.0722	274.492	0.00
Responsible consumption and production	0.2108	0.1979	0.4307	201.415	0.00
Good health and well-being	0.2588	0.2532	0.3939	303.099	0.00
Quality education	0.1927	0.2438	0.4323	213.710	0.00
Zero hunger	0.1690	0.0428	0.8283	149.641	0.00
Reducing inequality	0.2021	0.1046	1.9366	174.022	0.00

In the membership mode,l observable characteristics of the decision-makers are used to explain membership of a particular class, potentially providing behaviour insights (Hess et al., 2011). To determine whether the covariates are significant in the model, we look at the p-value. In Table 6.8, we find that education, age and gender are smaller than 0.05. We can therefore say with a significance level of 5% that these characteristics explain the membership model.

Table 6.8 Overview significance covariates

Covariates	Class1	Class2	Class3	Wald	p-value
Education	-0.3009	-0.018	0.3189	28.841	0.00
Monthly income per household	0.0135	0.0508	-0.0643	3.407	0.18
Age	0.0159	0.0111	-0.027	30.520	0.00
Gender	0.3137	-0.1545	-0.1592	10.447	0.01
Children	0.0909	0.0683	-0.1592	1.680	0.43
Status	0.0896	-0.1812	0.0917	4.464	0.11

Table 6.9 shows the latent class profiles. For example, an individual belonging to the third class has a probability of 71% of having a higher education or university education. Looking at characteristics of the classes, we see that in class 1, there are mostly older female participants of all educational levels. In class 2, we observe younger people with more highly educated males than in class 1. In class 3 we observe that there are many highly educated young participants with an even higher proportion of men.

Table 6.9 Profile classes

Profile	**Class1**	**Class 2**	**Class3**
Class size	63%	19%	18%
Education			
Primary School	2%	2%	0%
Elementary School	32%	20%	16%
Lower education	30%	25%	10%
Higher education/universitity	31%	47%	71%
Don't want to say	5%	6%	3%
Age			
18-23	17%	19%	32%
23-33	17%	19%	32%
34-49	19%	26%	20%
50-60	22%	18%	10%
60+	25%	17%	7%
Gender			
Male	42%	54%	55%
Female	58%	46%	45%

6.5 Conclusion

This chapter presents empirical insights into ADP pension participants' preferences for integrating SDGs into the investment strategy. Our results show that in the context of trading financial profits for integrating SDGs, a vast majority of the participants have a strong preference for integrating SDGs and are willing to contribute a part of their pension income. Yet when we look at the extent to which they want the pension fund to integrate this, we observe that the participants are willing to pay a little more to contribute positively to the SDGs. Moreover, using Latent class analysis and interaction effects we investigate the presence of heterogeneity in the population with respect to their preferences. With the interaction effects we find that much heterogeneity is explained by the individual characteristics. With the Latent class analysis, we found that the population can be split up in 3 segments, these segments are explained by education, age and gender. Based on the analyses in this chapter and we can answer sub-questions 3 and 4.

7. Market Research

There is no strict legal obligation yet to explicitly include participants' preferences in the socially responsible investment policy design. Still, Dutch pension funds have committed themselves through the Pension Funds Code to create support for the proposed approach. This commitment is the first step, but integrating SRI into the investment strategy is very complex. This section presents the important aspects that influence the SRI policy of pension funds. This analysis will answer research question 4: what factors play a role in implementing the SRI strategy in pension funds?

7.1 Actors

This section gives an overview of how a pension fund's SRI investment policy is organised and which actors are involved. A network analysis is executed to identify the relationships between the actors in the different networks and the pension fund. Figure 2 shows the actors and the linkages they have with each other.

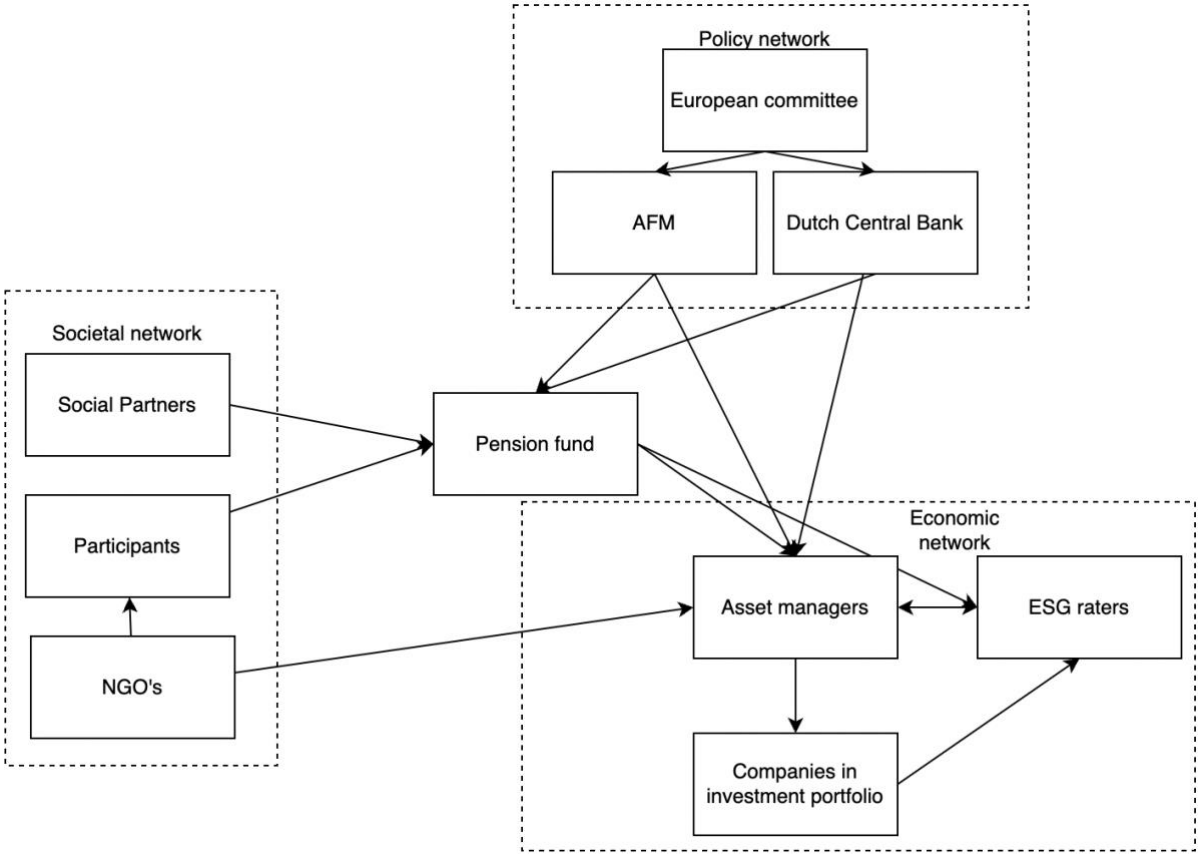

Figure 7.1 Involved actors SRI policy

7.1 Societal network

For years, the strategy of pension fund policies has been based on risk and return. During this time there was less interference from society with pension funds. Socially responsible investment (SRI) has gained momentum among pension funds in recent years. Legislation and regulations are placing increasing emphasis on paying attention to environmental, social and governance (ESG) factors in the investment process. When formulating an SRI policy, there are many more choices to be made. Due to the economic crisis and developments in the field of sustainable investment, beneficiaries, NGO's and social partners are increasingly voicing their opinions when they disagree with pension funds' policies.

7.1.1 Participants

More and more action groups are speaking out about their pension fund policies. For example, employees of public broadcasters have started a petition to stop all investments in fossil companies. However, this is just a small part of the population, while the pension fund invests the money of more than 30,000 people. Pension funds have a fiduciary responsibility towards their beneficiaries (DIRECTIVE 2014/65/EU Article 53(1)). Fiduciary responsibility is an obligation to act honestly and responsibly in another person's (financial) interest. But this would mean for everyone in the pension fund, not only the activists. To be able to draw up a policy in the interest of the participants, pension funds need to find ways to acquire their preferences. All the pension funds in the Netherlands have signed the covenant which says: "The priorities that emerge from the participants' preferences are taken into account by the pension funds.", So pension funds will have to consider the preferences. Inquiring about participants' preferences involves several challenges:

1. Investing is a highly complex subject. Firstly, many components are involved, such as risk allocation in relation to returns and allocation across asset classes. Secondly, ESG contains a vast range of factors. It is, therefore, impossible to ask in detail for every aspect the importance to the participants. Therefore, the challenge is to let participants participate in the decision-making on such a complex subject.
2. When major events occur, public opinion on ESG themes can change rapidly, thus including the themes that participants consider important. Studies regarding the strategic investment policy usually take place periodically (e.g. every three years). In which long-term goals are set.
3. There are several motives for integrating ESG into the decision-making process. However, the execution of policy is different per motive. When participants want to integrate ESG to achieve higher returns, the implementation differs from when the motive is to impact the world positively.
4. It is important to report clearly and openly for pension funds. What happened in the investment area, what choices were made and why. Because a participant survey was conducted and participants participated in this, it is also expected that something is done with it. A pension fund must clearly communicate how this has been implemented. If this is not done carefully or not done at all, you can lose the trust of participants. This may lead to members taking action against the pension fund. In addition, the pension fund is also monitored on this, and legislation is forthcoming to ensure greater transparency on how sustainable its investments are

7.1.2 NGO's

The Dutch pension funds entered a cooperation with NGOs. Together with the NGOs and the Dutch government, they have signed the IMVB covenant. This cooperation mainly focuses on understanding risks such as human rights abuses or environmental damage. NGOs better understand these risks and can help develop solutions to abuses in pension funds' investment chain. It is crucial for pension funds to keep in mind that NGOs have different agenda that does not align with the agenda of the pension funds. NGOs are more value-led stakeholders, while pension funds are market-led stakeholders. For NGOs, SRI can help achieve their goals which do not include financial performance. If pension funds work too closely with NGOs, this could be perceived as becoming a political organisation that breaches its fiduciary duty. This means that pension funds are obliged to obtain the best financial return on their assets for their beneficiaries.

7.1.3 Social partners

In the area of SRI, social partners do not have much influence over the details of how this should be implemented. However, social partners remain responsible for the employment condition of pensions. This is done through consultation at a collective level between employers' and employees' organisations. Due to the new pension law, pension accrual is now only possible under the solidarity premium scheme (formerly the new contract) or the flexible premium scheme (formerly WVP+). The social partner decides which form of contract this will be. The choice of contract form ultimately affects the extent to which freedom of choice can be created for participants.

7.1.4 Influence Societal network

The actors in the societal network do not have much influence on policy implementation but more on policy-making. The NGOs can help the pension fund understand the risks of their investments. Based on the preferences and goals of the participants, the pension fund can create a sustainable policy, where it is very important to ask about the rationale of these participants. The social partners' contract choice affects the freedom of choice that can be given to participants.

7.2 Policy Network

In the Netherlands, almost every worker is automatically affiliated with a pension fund. Therefore, pension funds are public organisations, pension funds are subject to binding rules and policies. These include international and national regulations, the lower-level regulations associated with national regulations, the binding supervisory regulations, and policy rules. The central government is encouraging banks, insurers, pension funds and asset managers to invest more in sustainability.

7.2.1. Policy network actors

The policy network has 3 main actors: the AFM, the Dutch bank and the European committee.:

The Dutch Central Bank (DNB) has been asking the sector to identify financial risks of climate change since 2018. In this way, DNB makes the financial sector aware of these costs. This makes investing in green projects more attractive. De Nederlandsche Bank (DNB) supervises pension funds' prudential and material compliance with pension regulations. There are two legal obligations that the DNB verifies in the area of ESG. First, pension funds are not allowed to invest in companies involved in the production of cluster munition (Artikel 34 Pw). Secondly, Section 135(4) of the Pw or section 130(3) of the Wvb stipulates that a pension fund

must state in its management report the extent to which the environment and climate, human rights, and social relations are taken into account in the investment policy.

The AFM supervises pension providers based on the Pensions Act, the Mandatory Professional Pension Schemes Act, and the Financial Supervision Act. The Financial Markets Authority (AFM) looks at whether institutions correctly report on the sustainability of their financial products and services.

The European Commission is developing guidelines for member states to ensure greater transparency on SRI. In 2016, the European Commission introduced the Sustainable Growth Financing Action Plan. This marked the beginning of further regulation to achieve the sustainability goals of the European Union's ambitious environment, social and governance (ESG). With this further regulation, the European Union is introducing ESG classification and disclosure requirements for financial market participants (such as investors, fund managers and pension funds). Since March of 2021, new European laws and regulations have been important for the financial markets; The Sustainable Finance Disclosure regulation (SFDR) and the EU Taxonomy.

The SFDR's goal is to have more transparency in the financial market on how sustainability risks and opportunities are integrated into investment choices and recommendations. The SFDR introduces a classification system with information requirements for investment products.

The EU Taxonomy should ensure a European classification system in which companies and investors should gain a common understanding of the extent to which the economic activities of companies contribute to sustainability. The taxonomy is a detailed list of activities that are labelled green. This list helps investors allocate capital and companies understand the expected environmental obligations. The taxonomy defines the level of performance that economic activity must have to be classified as a green activity, which is defined as:

- Making a substantive contribution to one of six environmental objectives
- Do no significant harm to any of the other objectives while respecting basic human rights and labour standards.

As the taxonomy will take effect in 2023, we can already anticipate it in this study by measuring preferences on the classes. A more detailed explanation of the regulations can be found in the appendix.

7.2.2 Influence policy network

Public policy is critical in regulating and framing the relationship between companies and their investors. The policy sets the rules of the game; it defines roles, responsibilities and accountabilities. Public actors, mainly the European Commission, want pension funds to develop their sustainability policies further. These actors cannot decide how to invest their money. However, they can support pension funds by ensuring more transparency. Currently, there are still challenges in data and transparency, which will be further discussed in the economic network. With regard to policy implementation, public actors can mainly help pension funds effectively implement their responsible investment policy. However, the goal of the regulators is not only to achieve transparency but mainly to achieve impact.

7.3 Economic network

Pension funds can draft policies based on participants' preferences and input from social partners within the laws and regulations of the policy network. However, the implementation of the policies and investments are outsourced to other actors. This asset management is outsourced to a fiduciary manager or directly to asset managers. In this section, we look at the relationship between the asset managers and the pension fund and the further implementation of the policy.

7.3.1. Asset managers

A pension fund often sets a strategic investment policy for the longer term. The strategic investment policy contains; the description of the investment objective, the composition of the target investment portfolio, and the extent to which there can be deviations from the intended investment portfolio. ESG is playing an increasingly important role in this investment policy. Implementation of the policy is carried out by the asset managers. These asset managers are selected by the pension fund or a fiduciary manager.

Based on Section 34 Pw and Sections 13 and 14 of the PW Implementation Decree, the mandate given by the pension fund to the asset manager (the investment mandate) must be in line with the strategic investment policy and the investment plan. A conclusive set of agreements and guidelines is needed between the pension fund and asset manager to limit the mandate in line with the established policy. In addition, pension funds should establish in advance a concrete qualitative and quantitative selection and evaluation procedure for external asset managers with concrete performance indicators. By doing so, the pension fund prevents the asset manager from taking more risks in the execution of its mandate than the pension fund did not intend or foresee.

7.3.1.1 Choosing asset manager

Pension funds can choose to invest assets in a fund or benchmark created by an asset manager, or they can choose to have an asset manager create a fund based on the pension fund's preferences.

Development of fund/benchmark When a pension fund chooses to develop a fund based on its goals. This is done on the basis of investment objectives, the composition of the target investment portfolio and the extent of the deviation. These could include guidelines on priorities, targets, benchmarks, risks, and what type of assets should be chosen or avoided. So, this could include the avoidance of industries. Often avoidance of industries such as tobacco or weapons. Besides excluding specific industries, they can also have targets concerning ESG objectives, such as companies aligned with the Paris agreement, a CO2 goal for the portfolio, and excluding companies with a certain ESG score. The asset managers will have to apply the mandate's rules and are free to operate within these rules. It is important to note that creating a benchmark or fund for one pension fund brings extra costs for developing the fund/benchmark.

Investing in existing Fund/Benchmark: When pension funds aren’t developing their fund themselves. They must find a benchmark which is most aligned with their strategy and beliefs. They will have to agree on the balance between risk and returns, how ESG factors are implemented, what tools they use, and how they use them. When choosing an existing benchmark, the costs are lower, only you will never find a fund that perfectly matches the requirements.

The selection and evaluation of the external managers (asset managers) can be very complex; without diving too deep into this process, the main criteria of this selection process are (IFSWF)

- Asset manager meets minimum criteria (size, experience, stability, etc.)
- The investment style fits the desired profile.
- The asset manager has a minimum and maximum amount of assets under management.
- The asset manager has knowledge of specific industries
- Performance of investments (information ratio, Sortino ratio, win-loss ratio, etc.)
- Risk management
- Legal and fiscal structure
- ESG integration, the manager must have a minimum level of ESG integration

7.3.1.2. Monitoring and evaluation of asset managers

As we have seen in the selection, choosing an asset manager is determined by several criteria. An asset manager could claim that they are integrating ESG factors in their portfolio, but it is crucial to monitor whether they do it properly. Asset managers have different "tools" to integrate ESG in their decision-making and portfolio:

- **Negative screening:** excluding companies that do not meet specific criteria
- **Positive screening:** including companies which have a high ESG score or the inclusion of companies that are, for example producing renewable energies or showing a commitment to promoting healthy working conditions
- **ESG integration:** Investors base their investment decisions on criteria such as market-to-book value, risk, growth potential etc. ESG integration means that investors are factoring in ESG criteria in their investment decisions.
- **Sustainability-themed/impact investing:** investing in companies which contribute or offer solutions to particular social or environmental challenges.
- **Engagement/shareholder action:** Asset managers hold a stake in companies and could influence companies on their policies. Investors can prompt firms to change their policies by voting and engaging regarding social and environmental issues.

A more detailed description of these tools can be found in the Appendix.
It is important that objectives – including long-term objectives – are set, and results are measured, monitored and reported. These results should then also be shared with the pension beneficiaries. Pension funds should asses investors in the way they use these tools so they can find the asset manager which aligns the best with the participants' and other stakeholders' motives. Based on these motivations, pension funds formulate objectives for sustainable investing. Every tool and method has significant differences in the extent to which an investor can apply them. Participants and stakeholders will have different motives for ESG, such as values alignment, financial performance, and saving the planet.

The main goal for asset managers is to obtain invested capital and maximise assets under management. To achieve assets under management, they try to maximise the value of an investment portfolio over time while maintaining an acceptable level of risk. So asset managers aim to maximise returns. Many asset managers, therefore, integrate ESG to measure risks and factor them in to achieve more returns. This does not immediately mean that only sustainable investments are made or that the companies within the portfolio have a good impact on the world.

To use the tools, asset managers need much information on the company's performance and environmental and social impact. In practice, it is a challenge for investors to give shape to SRI because you need to be able to assess the non-financial performance. For the financial performance, there are standardised reports available. Companies communicate their non-financial performance to investors through annual CSR (corporate social responsibility) reports. However, these reports are not standardised and are therefore difficult to compare between companies. This creates uncertainty and an information asymmetry, which allows companies to report their non-financial performance in a selective and 'optimistic' way (Fatemi et al., 2018). To circumvent this information deficit, institutional investors often use ESG ratings to measure the non-financial performance of their (target) SRI (Hartzmark & Sussman, 2019).

7.3.2 ESG Raters

Investors need reliable and comparable data to be able to integrate the performance of companies. Pension funds and investors do not have enough resources to collect this data. Due to this trend, investors increasingly rely on ESG ratings to obtain a third-party assessment of a corporation's ESG performance. This results in ESG raters significantly influencing investment decisions and potentially affecting asset prices and corporate policies.

7.3.2.1 ESG rater challenges

Critics identify an overarching flaw in the evolving ESG assessment industry: the lack of transparency and the substantial difference between the rating of the providers. Research shows that the ESG ratings of 6 of the largest ESG raters: KLD, Sustainalytics, Moody's ESG, S&P Global, Refinitiv, and MSCI, correlate with a range of 0.38 and 0.71. For example, at MSCI, Facebook scored 90% percentile, and at Sustainalytics, 39%. The methodologies used by raters vary in scope and tend to have low transparency, with few generally accepted, consistent, comparable, and verifiable indicators on which to base assessments.

ESG ratings are often compared to credit rating agencies as they are similar. They are external analysts who assess companies and governmental entities on financial aspects. However, there are two critical differences between these agencies. Firstly, the definition of ESG is much more subjective than creditworthiness. ESG is a concept based on values which are also evolving. This leads to the fact that the analysis of ESG agencies includes interpreting what ESG performance means. Secondly, Financial reporting and its standards have matured and converged over the past century, and precise regulation is in place. ESG reporting is still in its infancy, and there is no clear jurisdiction yet. This gives companies much freedom in whether and what they report.

The yardstick for measuring non-financial performance greatly influences the execution of the investment strategy of pension funds. (Bams and Van der Kroft, 2022) Showed that ESG ratings are mainly determined by the availability of internal ESG policy documents, targets and plans. So only on paper. In practice, it showed that ESG promises do not materialise - not even if these promises are monitored over a period of five, ten or fifteen years. Companies that promise more on these issues often fail to deliver on their promises. Or do so less often, historically speaking - so they exhibit a form of 'greenwashing'. As a result, companies can easily achieve high ESG ratings through the optimistic approach to their ESG reports.

The last critique of ESG ratings that influences the policy's implementation is the effects that ESG raters measure. The biggest challenge is that with any ESG consideration, the unit of analysis for asset managers is the company's performance. Many rating agencies only focus on

material solutions to environmental and societal challenges; this means ESG is measured to manage financial risks. While this data is critical to measure environmental and social aspects in investment appraisals, this doesn't lead to investments that positively contribute to the real world. However, measuring the effect on real-world changes requires incorporating impacts considering positive and negative externalities. When pension funds want their investments to positively contribute to the real world, it is essential to evaluate the asset manager and the ESG data they use to shape their portfolio.

7.3.3. Companies

The last actor in the economic network is the companies. It is important to distinguish between the impact investors have and the impact on the companies. Investors do not directly have an impact on ESG parameters. Instead, investors have an impact on the companies they invest in and might have an impact on the companies they don't invest in. The company's impact is the change a company's activities achieve regarding social and environmental causes in the world. Suppose the participants want the pension fund to invest sustainably to positively impact the world. Then it is essential to consider how an investor impacts a company's activities and to implement policies to achieve this impact. The investor impact can be brought back to 3 main themes (Kölbel F. et al. l, 2020):

1. **Capital Allocation:** Capital allocation may influence company impact by two mechanisms. Firstly, investing in more sustainable companies could create incentives for companies to improve their ESG practices. Secondly, capital allocation may affect a company's growth by changing its financing conditions.
2. **Engagement:** Engagement is already mentioned before, but shareholders' active engagement may cause companies to improve their impact on the world. With the pressure of shareholders, they could, for example, improve working conditions or reduce their environmental impact.
3. **Indirect impacts:** There are also indirect impacts investors can have on companies. Firstly, the inclusion and exclusion of a company could lead to stigmatisation. For example, people might be deterred from working at a company or buying products from a company when big investors announce divestments. It also works the other way around; including companies in their portfolio for their social or environmental performance may improve a company's reputation. Lastly, by investing more sustainably, pension funds might encourage other funds to do the same.

7.4 Conclusion

In this chapter, an analysis is made on implementing a pensions fund SRI policy and the challenges this brings along. To answer the question, what factors play a role in implementing the SRI strategy in pension funds?

Firstly, Societal actors and major events have an influence on participants' preferences. These preferences should be measured and implemented by a pension fund. The regulators set the rules of the game and try to achieve transparency in pension funds' policy. Based on the preferences, a pension fund can develop an investment policy. To implement this policy, asset managers must be selected and monitored based on the pensions fund policy. The pension fund sets up a mandate to ensure asset managers invest as they see fit. Lastly, the aim is to have a positive impact through the SRI policy. This is done through the impact an investor has on companies. The impact companies have on the world is measured by ESG raters; asset managers assemble this data to make better investment decisions. The overview of this implementation is shown in figure 3

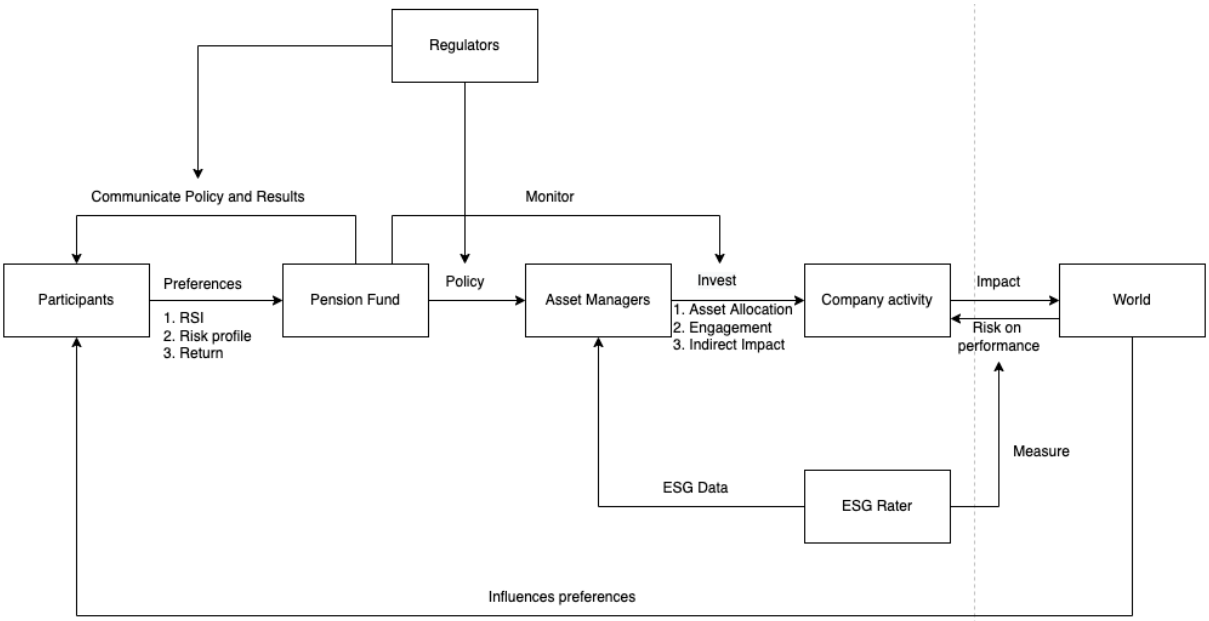

Figure 7.2 Overview of policy implementation

For the implementation of the SRI policy, several challenges have been found:

The first challenges occur when shaping the investments strategy:
The first challenge occurs when examining preferences. ESG is a very complex subject, with asset managers needing several experts to understand the whole field of ESG. Therefore, it is a challenge to ask participants without prior knowledge of their preferences in an understandable way. After examining their preferences, it is also important to understand the motives behind the choices because different motives lead to other policies.

In drafting the policy, the following challenges come up. In the experiment, we look at whether participants are willing to pay to contribute to SDGs; however, things are not so black and white in the real world. Many companies contribute to one SDG but harm another SDG; how should they weigh this up? Lastly, participants' opinions may change. A major event can cause preferences on specific social or sustainability topics to change rapidly. However, a pension fund's policies are often set for several years.

After the policy has been drafted, it must also be implemented. This is where new challenges come in. Agreement with asset managers on the investment strategy, including ESG integration. However, it is often opaque how this is integrated and how it affects their decision-making. The main goal for asset managers is to obtain invested capital and maximise assets under management. To achieve assets under management, they try to maximise the value of an investment portfolio over time while maintaining an acceptable level of risk. So asset managers aim to maximize returns. Many asset managers, therefore, integrate ESG to measure risks and factor them in to achieve more returns. This does not immediately mean that only sustainable investments are made or that the companies within the portfolio have a good impact on the world. Investors need reliable and comparable data to be able to integrate the performance of companies. Investors increasingly rely on ESG ratings to obtain a third-party assessment of a corporation’s ESG performance. But the methodologies used by raters vary in scope and tend to have low transparency, with few generally accepted, consistent, comparable, and verifiable indicators on which to base assessments. Finally, there may be problems in communicating the policy. As we have seen, participants' preferences vary widely. This ensures that there will

always be participants who disagree with the policy. This could lead to them taking action against the pension fund.

After drafting and implementing the policy, the final step for the pension fund is to monitor the investments. The pension fund sets targets to be achieved by the investments however, it needs to monitor whether the investments actually have an impact. However, measuring the effect on real-world changes requires incorporating impacts considering positive and negative externalities. Measuring these effects is still very challenging.

In addition to the challenges for pension funds, we also found challenges for policymakers. Public actors, mainly the European Commission, want pension funds to develop their sustainability policies further. These actors cannot decide how to invest their money. However, they can support pension funds by ensuring more transparency. Policy is necessary on data availability as many companies do not report on ESG and how companies report varies greatly. However, the goal of the regulators is not only to achieve transparency but mainly to achieve impact. Transparency on ESG doesn't automatically lead to better results. Pension funds can take more account of ESG but even for them, the main goal remains to invest members' money to achieve higher returns. If policymakers want investors to consider sustainable and social aspects, they will also have to use other tools to promote this.

The input from this analysis is used first for the design of the choice experiment. In addition, in chapter 8, there will be a discussion of how the results can be implemented based on the analysis described in this chapter.

8. Implementation of the results

In this research, besides an in-depth analysis of the participants' preferences, an analysis of the actors influencing the possible policy implementations has been executed. After the participant survey, the pension fund will have to decide how they want to implement the preferences in its policy. This means they have to choose from the various possible policy instruments. This chapter will first discuss the following steps to be taken. Then the possibilities, the advantages and disadvantages of certain policies, and how specific challenges from chapter 4 can be overcome.

8.1 Insight into participants' preferences

The results from chapter 7 demonstrate the utility the participants get for each level of the attributes. In addition, there is an insight into each attribute's importance and willingness to pay for it. In this respect, 64% indicate that they are positive about influencing how their money is invested, and 10% are negative. The pension fund could form a new policy based on the experiment. When implementing these results, one challenge could occur. SDGs were used for the attributes to make the experiment understandable for all participants. Although this is desirable, SDGs' are broad themes, and people's perceptions of SDGs may differ. Secondly, we do know their preferences but not their motivation. Other researchers have observed three reasons among investors for pursuing ESG approaches:

1. Values alignment: These are the type of investors who is loth to invest in firms that pollute the planet or mistreat workers; they want to invest in a way that aligns with their concerns on SDG themes
2. Financial outcomes or risk management: These investors want to integrate ESG in their decision-making because they think ESG funds outperform mainstream funds. This could be achieved by incorporating ESG ratings as they measure how exposed a company is to non-financial risk.
3. Impact and better real-world outcomes: ESG should be integrated to invest in businesses to solve society's problems.

Therefore, ADP could use focus groups to get more insight into what goals the participants want to achieve with the SDGs and to get more detailed insight into the participants' perceptions when the investment portfolio is doing no harm or making a positive contribution. A focus group is a group of individuals assembled by the researcher to discuss en comment on the topic. A focus group is helpful when the subject is complex, and additional data is required to ensure validity or when clarification and elaboration is required (Powel. R, Single H. 1996).

The advantage of using a focus group is that participants' perspectives are exposed differently from individual interviews. Focus groups involve discussion, with participants asking questions to each other and arguing their points of view. This leads to deeper insights than personal interviews or surveys, where the participant is less challenged to think about his perspective. In addition, setting up a focus group can be time efficient as it takes less time to interview more participants.

Focus groups do bring along challenges; the researchers must be aware of the potential self-censoring and group effects. Participants might join the group decision by adjusting their contributions to their individual needs and preferences to the social expectations of the group. In addition, the results are currently clear; there is a willingness to pay per theme that can be implemented in the policy. When using focus groups, unclear effects may arise. When focus

groups are organized, the participants expect the pension fund to use this. This could be very difficult with fuzzy results.

The steps of understanding the preferences of participants on SRI are shown in figure3. First, a policy set-up is developed. These are used as input for focus groups to understand the most important subjects for participants. These subjects, and in this case, SDGs' are used for a choice experiment to measure the preferences of the whole population. These results can be implemented directly or discussed in focus groups to understand the perspectives better. The implementation of the policy can again be used as input for focus groups to develop new guidelines after a certain period.

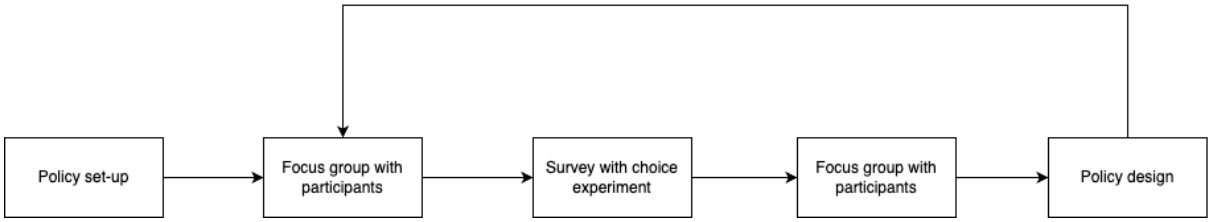

Figure 8.1 Implementation preferences

8.2 Solidary-based or flexible contract

In the Netherlands, a new pension law will come into force in 2023 and, with it, a new pension system. This new pension system consists of two contract forms: the solidary premium scheme (formerly the new pension contract) and the flexible premium scheme (formerly the Act on Improved Premium Schemes). The solidary premium scheme is a collective scheme in which participants invest the pension capital together and share the risks. The flexible premium scheme offers more choices; this could include SRI. In the survey, 64% indicated that they would like to choose how sustainably their money is invested. There are big differences regarding investments, risk, return and how the pension fund could handle its reserves. If investment returns are disappointing, they can rely less on others. This is because there are fewer risks to share. In the solidary premium scheme, more risks are shared. Regarding SRI, with a flexible contract, the pension fund is able to give options to the beneficiaries on how sustainable they want to invest this for them individually. With a solidary-based contract, the beneficiaries' preferences can be included, but there is no difference between participants. However, the choice of contract form lies not with the pension fund or the participants but with the social partners. These are the employers' organizations and the trade unions. Based on their decision the pension fund can execute a specific policy.

When a flexible contract is chosen, the choice experiment can be used to design different investment strategies. The LCA shows that preferences differ between participants, based on the found groups investment options could be developed. These options can vary in impact investing/ damage limitation but also on the amount of risk taken. Participants can then choose which option best suits their needs.

8.3 Investment policy

When a pension fund conducts a participant survey, the ultimate goal is to incorporate the opinions and preferences of participants into the policy. Implementing SRI policies is not as simple as including willingness to pay in the investment strategy. There are many possibilities, taking into account the whole population, the effect of the policy, the feasibility of the policy and the cost of the policy. The investment policy of pension funds concerns objectives regarding the composition and development of the investment portfolio and how the investment risk associated with the portfolio is managed. Sharpe (1976) provides an integrated view of financial institutions' investment policies, describing how strategic investment policy, tactical and portfolio insurance are positioned. This is illustrated in figure 8.2. The left-hand section shows the asset market, the right-hand section the investors' characteristics, the middle part is aspects of the asset market and the financial institution's position. The integrated model is a traditional approach to developing an investment policy based on the risk profile and expected return of the fund. When integrating SRI into the policy, it is important to know the participants' rationale. Do they want to invest because they think it will give them a higher return, or do they want to invest sustainably even if it is at the expense of return? If the participants' objective is to return, ESG instruments should only be integrated if this does not lead to a lower expected return or an unnecessarily higher risk.

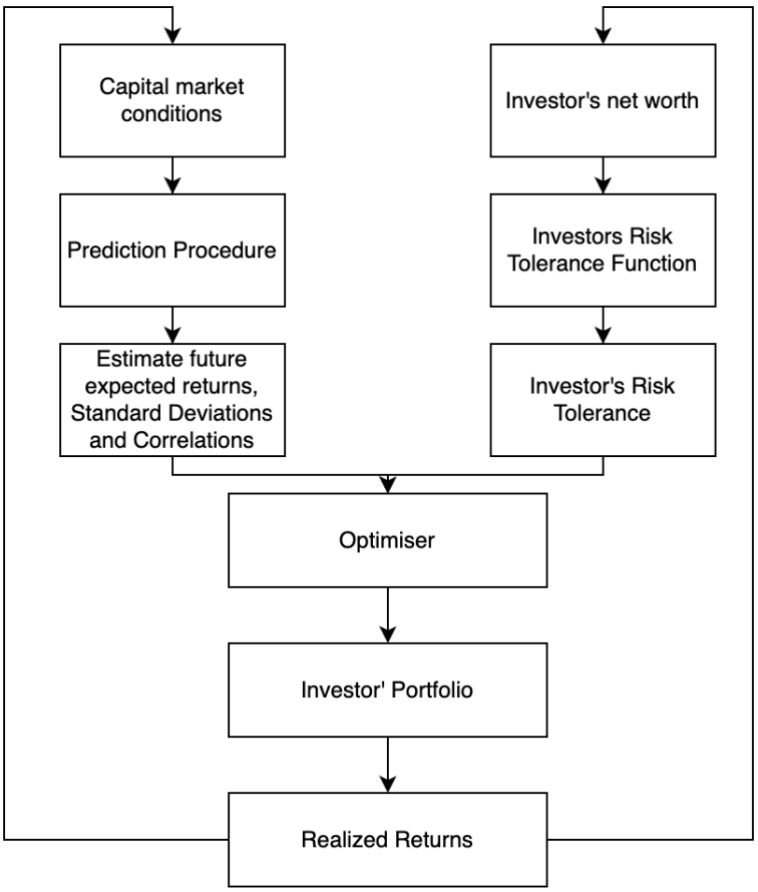

Figure 8.2 Integrated asset allocation model

Based on this study's choice experiment, the pension funds have different possibilities for designing the SRI policy. Firstly, they depend on their social partners for the form of contract. In the case of the flexible contract, they can develop three investment strategies for participants to choose from:

1. **Return focused:** In the LCA, we found that 19% of the population is only interested in the highest possible return. For this group, a fund can be developed where the return is the only goal. This would mean integrating ESG only to measure the risks on companies and paying no attention to the impact companies have on the world.
2. **Doing No Harm:** We found that the second group, which was 69% of the population, showed they were willing to exchange financial income when the scores of the SDGs improved, especially when the portfolio was doing no harm. For this group, an investment strategy can be developed where the companies in the portfolio do not cause additional harm to the SDGs. Here, additional attention can be given to climate and health as these were found to be the most important.
3. **Positive contribution:** The last group contains 11% of the population. In this group, we found that they drew much additional importance from making a positive contribution. The most important SDG is inequality, but they found hunger, health and consumption very important. So, this group finds the social SDGs particularly important. A strategy could be to follow Group 2's benchmark and set up an impact fund for these social SDGs. This is not done for all the money because the risks of an impact fund are very high and could also lead to meager returns.

More participants will agree with the options policies when developing three different strategies. However, creating three different strategies can take much time and monitoring it all will be challenging. In the case of a solidarity contract, there is not even the possibility for the pension fund to give members the choice of strategy. With the solidarity contract, the pension fund still has several policy options.

They can create a policy based on the RUM model, this model measures which utility is most likely for the whole population. So this allows you to create a policy which, on average is best for the population. A drawback of this policy could be that, in the end, precisely no one agrees with the policy you implement. Another possibility could be that you create the policy based on the largest group. In this case, you get the largest group of your population to go along with your policy. In addition, in this case it is also the least extreme policy. Therefore, this could also be another good possibility

The most important aspect of every strategy is to develop a vision of impact. The targets should affect the real world. We found that ESG is very popular among investors, but this doesn't mean the ESG integration automatically leads to a positive impact. After developing the investment strategy, the first step in the process is the selection of asset managers. In this selection process, the pension funds first must assess whether the asset managers adhere to the minimum requirement of ESG knowledge. ESG contains very complex topics, such as the influence on ecosystems and biodiversity. These are not the typical knowledge areas of an investment manager. When the right asset managers have been selected, it is essential to communicate the strategy and include explicit requirements for the asset managers through mandates and fund selection.

8.3.1 Development of Mandate

Based on the choice experiment, a pension fund can apply various strategies. The pension fund develops an investment mandate consistent with the strategic policy and the investment plan. This is a comprehensive set of agreements and guidelines between the pension fund and the asset manager. Agreements they could include are:

- **A certain percentage of the investments must contribute positively to a specific SDG**.
  Asset managers invest in different asset classes, such as shares, loans, real estate and bonds. In the case of shares, loans to companies and bonds, an analysis can be made of whether these companies or countries contribute positively to an SDG. The pension fund can include in the mandate that a certain percentage of the portfolio makes a positive contribution. The percentage and themes are based on the participants' preferences.
- **An under- and over-weighting of companies performing well and less well in terms of the chosen SDGs.**
  When constructing the portfolio, the asset manager can analyse whether a company positively or negatively impacts an SDG. Based on the chosen sustainability categories, a company is scored on these SDGs, resulting in a total impact score. This total impact score can also be weighted based on the utility given by the participants. Based on the total impact score, high-scoring companies can be overweight, and companies with no positive impact can be underweight.
- **Maximum CO2 emissions portfolio.**
  CO2 emissions are a measurement of the climate in particular. The outcomes from the experiment show that climate action is not the most important issue. However, it is an easier theme to measure. Therefore, the pension fund could set a maximum emission or a reduction target.
- **Divestment strategy**
  The experiment results show that participants reduce inequalities and achieve good health and well-being. The participants also gain the most utility when these themes have no extra damage or harm. Instead of investing more money in assets that contribute positively to the SDGs, pension funds could also choose to divest assets that harm these themes. This means the reduction of investments in assets that do not align with the SDG objectives.
- **Engagement.**
  Although for many people, divestment sounds like a good strategy to achieve sustainable goals, it can lead to poorly performing companies continuing to perform poorly. For divestments to work, they must change the cost of capital of affected firms. For an investor to sell a share, another investor must buy it. By thinning out the number of shareholders who pressure boards to achieve sustainable goals, could have a negative impact. Therefore, there is currently a trend of activist investors. An activist investor is an investor who buys shares in a company with the intention of positively influencing that company. A pension fund can also do this by increasing engagement and positively influencing companies through discussions and votes at shareholder meetings. Although engagement can have a good impact, there is sometimes less understanding of this strategy among pension fund participants. The pension fund can make agreements with the asset manager on how to apply engagement.
- **Development of an Impact fund**
  Impact investments are investments with an intention to make a positive, measurable social and environmental impact in addition to a positive financial return. This fund can invest in, for example, start-ups or SMEs that develop solutions for achieving or contributing to SDGs. Although impact funds have a positive impact on people, the environment and society, the financial risk and return often differ from those of regular investment funds. The pension fund can therefore choose an asset manager that has to invest a percentage of the money with this goal.

- **Sustainability incentives**
  The main goal for asset managers is to obtain invested capital and maximize assets under management. To achieve assets under management they try to maximize the value of an investment portfolio over time while maintaining an acceptable level of risk. This goal isn't always aligned with having a positive impact on the world. By giving asset managers incentives to achieve as much impact as possible within a certain range of risk, pension funds could achieve much more impact with their investments.

When formulating the mandate, multiple methods could be used. The pension fund should include explicit requirements in the mandate. But it is also important to evaluate and monitor the implementation.

8.3.2 Monitoring/evaluation

The last part of the policy is perhaps the most important. Monitoring and evaluating asset managers. The mandate includes agreements on exclusion criteria, ESG integration, engagement, voting, impact investing and agreements on the goals the pension fund wants to achieve.

The first part of the evaluation is simple, does the asset manager implement the exclusion criteria throughout the portfolio. It is also important to evaluate whether you want to change them. It may be that wars in certain countries prohibit investment, but other motives can also lead to a change in the exclusion criteria.

The second part of the evaluation is much more difficult; this includes the ESG integration. The pension fund should inspect the integration before hiring an asset manager, but it is also important to monitor how the asset manager is using ESG integration. If the goal is to achieve real-world impact, ESG integration should also be focused on this part.

The third part of the evaluation should be on the engagement and voting strategy. Asset managers mostly carry out the process of engagement. It is important for pension funds to engage with their asset managers on how they use these tools. What will their voting and engagement strategy be and what steps do they take when there is a failed engagement?

The last part of the evaluation depends on whether a pension fund decides to implement impact investing in their portfolio. The goal of impact investments is to achieve a positive measurable environmental and social impact while generating a financial return. More and more green bonds and impact funds are emerging. When evaluating such a fund, it is necessary to look closely at what the purpose of the investments is, what the targets are and how it is measured. For example a funds that holds companies that have implemented best practices regarding environmental and social aspects could have a high rating. But if a funds holds companies with bad practices but drives them towards improvements, this fund could score low but could eventually have a better impact.

with each step in the review process, we should always look at what the SRI policy is, what its goals were and whether they are being achieved in a current way. Besides the evaluation of the asset managers, asset owners should also monitor the wider investment market to investigate whether their practices align with the best practices in the investment industry.

8.4 Rating Agencies

As we have seen in Chapter 4, rating agencies and ESG providers are playing an important role in the investment industry. However, they could also play an important role in changing the industry. The current way of ESG ratings focuses mainly on non-financial aspects that can affect the financial returns of companies. These aspects are very important and should remain so. However, these ratings are often seen as measuring points to assess whether a company is having a good impact in the real world. Therefore, ESG raters need to develop impact metrics in addition to current metrics. They could then help investors understand how companies are supporting the achievement of the SDGs.

8.5 Policymakers

The EU wants the financial sector to contribute to preventing climate change and making the wider economy more sustainable. Pension funds play a major role in this and must comply with new European information obligations. Also, within the Netherlands, the national government indicates that financial institutions should take more account of costs resulting from climate change.

Policymakers are now focusing mainly on the transparency of financial institutions and requiring them to provide information on the impact of their investments. Policymakers should be aware that it is unlikely these policies will result in a drastic transformation in for example the decarbonization of the economy. SRI and ESG integration are effective for finding more sustainable businesses. Yet more fundamental changes are required to change the viability of economic activities with poor climate impact. By implementing more taxes and minimum standards companies will have to adopt ESG practices and new business models. This would lead to investors encouraging the ESG practices and allocating their investments to companies who perform well to anticipate on future regulation. This way, investors can ensure a distorted effect of the regulations. For example, an investment in replacing gas with hydrogen in a situation where hydrogen prices are too high to justify the investment is not "materials ESG". But when gas prices rise through regulation, it can become material.

8.6 Conclusion

In this chapter, we have looked broadly at options for implementing participants' preferences. In conclusion, the analysis shows that there are different ways in which a pension fund can develop an SRI policy. This can be done in different ways, depending on the wishes and preferences of the participants and the contract form of the pension fund. The pension fund first needs to develop a vision of how they want to achieve a sustainable world. After this, they can develop an investment strategy and investment mandate. These two steps must be taken in close consultation with the participants and with asset managers. The mandate has to be clear and to the point, with agreements on exclusion criteria, ESG integration, engagement, voting, impact investing and agreements on the goals the pension fund wants to achieve. The policy should be monitored and evaluated at least once a year.

Policymakers also have a role to play in changing the financial sector besides implementing policy to improve transparency they could also implement financial incentives so it will be more financially attractive to adopt ESG practices.

9. Conclusion

This thesis presented empirical insight into APD participant's preferences for SRI investing. In addition, research has been conducted on the challenges when implementing ESG in the investment strategy so we can answer the main question of how these results can be implemented in policy. In the following we answer each sub-question which in combination with each other provides a holistic perspective which helps to answer the main research question.
SQ 1: What are the main aspects of SRI and how can these best be measured for participants of pension funds?

To determine what aspects SRI contains, an exploratory literature review was done. To get a good understanding of SRI, we first looked at the history of SRI. Here we see that the origins of SRI were based on ethical investing, which mainly avoided certain industries such as the arms industry. This has evolved into the kind of SRI we are in now. Many investors believe that ESG integration can lead to positive financial results so the topic has gained a lot of traction.

With these developments, ESG has also become a lot more complicated. ESG is now about all the risks companies face in the three aspects. When asking participants their preferences, a good balance must be found between measuring understandable elements but not so general that it cannot be integrated.

When ESG is integrated, it can be done in different ways; ESG can be integrated to improve financial performance, focus on limiting portfolio damage, and finally, the goal can be to invest in companies that will enhance the world. For this reason, it is essential to know whether participants are interested in financial returns and if they want to invest sustainably, what goal they have.

Based on this analysis, we designed the choice experiment. To measure ESG in a comprehensible way, we chose the UN's SDGs. These goals make a measurable base to make progress in the ESG dimension. Each goal has its challenge within these domains. ADP chose 6 SDGs in consultation with participants prior to the experiment.

To gain insight into participants' rationale, we chose to include the expected retirement income of the policy opportunities as an attribute. In this way, we gain insight into whether participants want to invest sustainably even if the financial returns are negative.

Finally, we wanted to know what the participants' goal is when the pension fund integrates ESG. We, therefore, chose the following attribute levels: no attention, no extra harm and making a positive contribution. Finally, we find in the literature that individual characteristics can still influence participants' preferences. Therefore, we will also analyse whether there is heterogeneity in the population and whether individual characteristics influence this.
In Sub-question 2 we show how the participant's preferences and in Sub-question 3 we will measure the heterogeneity in the population.

SQ 2: How do pension fund participants trade-off between different SDGs and potential financial profits, and what is the importance of doing good compared to not harm when choosing an investment portfolio?

To determine the trade-offs of the participants, we sent out a choice experiment to all participants of the pension fund. We received a response of 3036 participants. However, as is often seen in participant surveys of pension funds, the response from retirees was much higher than from non-retirees. To avoid the overrepresentation of this group, a representative sample of 1500 participants was taken from all responses. The choices of these respondents were analyzed by means of a RUM model.

We can conclude that participants think it is important for the pension fund to include SDGs in its policies and are also willing to contribute part of their pension income for this implementation. Participants also think it is especially important to focus on reducing inequality.

We then used dummy coding to analyse what participants consider necessary when these SDGs are integrated. Based on this analysis, we can conclude that participants find it important that the pension fund's investment portfolio does not harm the world. We can see this from the non-linearity of the utility function, as not much extra utility is gained from making a positive contribution to the SDGs. Now that we know what the participants' collective preferences are, it is necessary to understand how the preferences vary across the population.

SQ 3: How do trade-offs in the investment portfolio vary across different segments of the pension fund participants?

To understand how the preferences vary across different segments of the participants we used two different analysis methods. First, we measured the interaction effect of individual characteristics on preferences. We found that all individual characteristics have an effect on preferences. For each characteristic, however, there is a difference in the size of the effect and the number of attributes it affects. Through this analysis, the pension fund has a better understanding of how participant characteristics affect policy preferences.

However, there is still the possibility that there is heterogeneity within the groups where covariates are not the reason. To measure this heterogeneity, we conducted a latent Class analysis. To identify these groups, we found that age, education and gender are significant covariates. In this analysis, we were able to identify 3 groups:

Group 1: This group is the largest part of the population, we can see in this group that retirement income is not a very important attribute and there are no significant differences in the extent to which they consider the SDGs important. This group has on average the highest age and has a high proportion of women. This group is not identified on a particular level of education as it varies a lot.

Group 2: Group 2 is about 18% of the population and is the same size as Group 3. Group 2 This group has based its choices mainly on retirement income and considers sustainable investment less important. The average age in this group is lower than in group 1, has a higher proportion of men and a large part of this group is highly educated.

Group 3: The last group has a very strong preference for reducing inequality. We can see those policy choices are mainly based on these SDGs and very little importance is given to retirement income. We can see that this group is very young and highly educated and this group has the highest proportion of men.

So we can conclude that a large part of the population has the same preferences and 2 groups differ from them. If we look at the RUM model, we see that group 2 caused the beta retirement income to be much higher making the average willingness to pay much lower and then group 3 influenced the high beta reducing inequality. Now that we know participants' preferences, we can look at how the pension fund can implement them.

SQ 4:What aspects and actors play a role in implementing SRI strategy in a pension funds strategy?

When we look at shaping and implementing policies, we find that influence comes from 3 networks. The societal, policy and economic network. Whereas the societal network mostly influences the shaping of SRI policies, the policy network is how policies can and may be shaped and the economic network influences the implementation and impact of policies.
In doing so, several aspects are found to be important in implementing an SRI strategy

Shaping strategy:

- Participants' opinions can change quickly but a policy is made over the long term.
- Companies can have a good impact on 1 aspect and a bad impact on another, how should you weigh this up.
- The motives behind SRI preferences are very important as different motives lead to different policies.
- There are many different tools to implement ESG which vary in effectiveness and purpose.

Policy:

- Policy is necessary on Data Availability as many companies do not report on ESG and the way how companies report varies a lot.
- Transparency doesn’t automatically lead to better results.

Implementation:

- Untransparent ESG integration, asset managers integrate ESG but very often it is untransparent how they integrate this and how it affects their decisions,
- Measurement methods ESG raters: The methodologies used by raters vary in scope and tend to have low transparency, with few generally accepted, consistent, comparable, and verifiable indicators on which to base assessments.
- The goal of asset managers is to have a high return, they don’t have incentives to achieve a good impact with their investments.
- Communication with participants could lead to them taking action against the pension fund.

Monitoring:

- How to achieve actual impact with investments.

The input from this analysis is used to formulate the challenges that SQ 5 must answer.

SQ 5: What possibilities are there to implement SRI in the pension funds’ policy

We have looked broadly at options for implementing participants' preferences. In conclusion, the analysis shows that there are different ways in which a pension fund can develop an SRI policy. This can be done in different ways, depending on the wishes and preferences of the participants and the contract form of the pension fund. The pension fund first needs to develop a vision on how they want to achieve a sustainable world. After this, they can develop an investment strategy and investment mandate. These two steps must be taken in close consultation with the participants and with asset managers. The mandate has to be clear and to the point, with agreements on exclusion criteria, ESG integration, engagement, voting, impact investing and agreements on the goals the pension fund wants to achieve. The policy should be monitored and evaluated at least once a year.

Main research Question: *To what extent are different segments of participants from pension funds willing to trade financial profits against SRI goals, and how can this be implemented in the investment strategy of pension funds?*

The results of the choice experiment can be used to formulate policies that are in line with participants' preferences. Based on the results of the RUM model, we can conclude that participants are willing to contribute part of their pension income to the implementation of SDGs. Furthermore, we can see that participants think it is especially important that pension funds focus on reducing inequality. Next, we found that participants found it mainly important that the pension fund does not harm the SDGs studied. For achieving a positive contribution, participants are not willing to pay much more than preventing harm. However, we did find that participants' preferences vary. Based on the results of the latent class analysis, we can see that there are three different groups within the population with different preferences. In these groups, there is a large group that is willing to trade financial profits for all the SDGs, a second group that does not look at retirement income at all and attaches great importance to reducing inequality, and finally, a group that only looks at pension income in their decision-making. This is important to take into account when formulating policies.

In this study, several analyses were done on the choice experiments. The pension fund will have to make a choice which model they will use to draft the policy. First, they can use the basic model because it measures the average preference of all participants. However, we find that participants' preferences differ from this base model through interaction effects and the LCA. Therefore, the pension fund could, for example, choose to draft the policy based on the largest group in the LCA. This could ensure that most people agree with the policy.

First, the pension fund can implement policies where there is a focus on preventing harm to the SDGs from investments. The survey shows that many pension members are willing to sacrifice pension income if investments do not cause additional damage. Since many participants consider it very important for the pension fund to focus on reducing inequality, the pension fund may also choose to include this specifically in the investment strategy. Strategies they could include are:

- A certain percentage of the investments must contribute positively to a specific SDG.
- An under- and over-weighting of companies performing well and less well in terms of the chosen SDGs.
- Maximum CO2 emissions portfolio.
- Divestment strategy
- Engagement and voting
- Development of an impact fund
- Sustainability incentives for asset managers

When implementing the policy, communication with participants is important. First, what choices the board made and why. Next, it is important for the pension fund to properly monitor the impact of the policy. This impact can be used as input to measure participants' future preferences and make adjustments to the policy based on this.

10. Discussion

10.1 Discussing the results in context

This thesis researches pension beneficiaries' preferences regarding SRI and their willingness to accept a lower pension income. This is done by developing choice experiments based on academic literature and conversations with ADP. After the design of the choice experiments, various analysis methods have been applied in order to unravel the participants' preferences. Also, their willingness to accept a lower pension in order to achieve more responsible investments has been investigated. Secondly, heterogeneity between different segments has been examined. The research goal of this thesis stipulates that it aims to retrieve insights into the trade-offs of the whole population of ADPs' beneficiaries and to use these to implement a new investment strategy. The results of this study can give a direction to the SRI strategy of the investment policy which is part of the overall policy. The first step for pension funds is to measure the preferences, the results show that participants value the SDG themes very highly in their investment decisions. Also, the survey asked whether participants wanted to be involved in the decision-making process in which >70% answered yes. This showed that participants want to be involved in decision-making. The next step could be to engage in a dialogue with participants about their implementation of SRI policies. For the implementation, an analysis is done on the different actors influencing their approach and the challenges. Hence, this section discusses the findings of this thesis from the perspective of pension funds and how they could use this. For effective implementation, there are still many steps to be taken to achieve effective implementation of the policy, which will be further discussed in 8.1.2.

10.1.1 Results in relation to prior scientific work

Prior research on the SRI literature has focused on other parts, such as whether you should include participants in the funds' sustainable investments (Bauer, Smeets, 2021). Whether households have preferences for SRI financial products for their bank accounts (Rossi M., 2019). Past research on pension preferences mainly focused on pension plans (van Rooij, Kool, Prast, 2007) or other personal retirement preferences (Millar, Devonish, 2009).

The importance of analysing the beneficiaries SRI preferences is shown by Montae & Partners who showed that 74% of the respondents consider sustainable investing important (CFA society, 2021). Hartzmark and Sussman (2019) showed, for example, that investors value sustainability. They show that investors move to funds with a higher sustainability score in the event of an economic shock. Bauer et al. (2018) surveyed pension participants about their sustainability preferences. This research shows that the majority of those surveyed prefer sustainable investments and that more than 40% of the respondents believe that this may even come at the expense of financial returns.

Because pension funds want to involve participants more in their policies, they need more than just their opinion on what subjects they find important. They need a scientifically proven method with which they can test and set up their policy. With this research, we contribute to the literature on SRI and provide a tool for the development of investment strategies. Additionally, this research contributes to behavioural decisions as the results of the preferences' give an interesting insight into the current preferences of pension beneficiaries.

10.1.2 Interpretation of the results

It is a good step to measure participants' preferences. The results of this survey also show that participants are willing to contribute part of their pension income to the implementation of SDGs .The majority of asset owners have yet to ensure that their commitments to responsible investment are effectively implemented, which limits the development of responsible investment throughout the market. By implementing their commitments with sufficient scale and depth, asset owners can accelerate the development of responsible investments. Pension funds should take the lead in the implementation, the pension fund is singled out as responsible to invest pensioner's money. In doing so, the pension fund determines how it is invested. The asset managers' job is to manage this as effectively as possible, not to take the lead in how sustainably they invest it. They should advise asset managers to:

1. Use ESG metrics that focus on impact materiality instead of financial materiality
2. Deviate from the benchmark by actively targeting high ESG assets.
3. Explain to companies which metrics are used to construct the portfolio

Impact of policy

The current understanding of impact investing is too narrow and doesn't consider the full potential of financial markets for sustainable development. Impact investments should be defined as investments that contribute to solutions to environmental and societal challenges, and a standardized framework for determining and measuring real-world impacts is needed.

So for the policy implementation, it is important to consider what the purpose of SRI is. If the goal is achieve a positive impact, this will have to be included in every step of the process. When does ESG investing have an impact:

1. When ESG ratings measure the company's impact on society
2. When ESG integration ensures that asset investments are also investing more in high ESG ratings than the benchmark
3. That the ESG premium ensures a higher valuation of companies
4. That companies can also grow faster than brown companies due to the higher valuation and therefore brown companies will also invest more in ESG performance

Another question that needs to be raised is the following: under which scenario do you have a better impact? In scenario 1, you invest in a fund that aims to buy shares only in companies that are already doing everything best on environmental and social issues. In scenario 2, shares are bought in companies where there is still much to be gained on these issues and the investor puts pressure on the companies to improve. You can argue that in scenario 2, the ultimate impact achieved is a better impact on society. It is important to remember that in the end, an important goal for pension funds is also to achieve a good return for participants.

Regulators

The aim of regulators is that through pension fund investments, the world improves on environmental and social issues. Currently, they are trying to achieve this by making sure there is more transparency on how companies score on their non-financial aspects and by making more transparent how pension funds invest. These policies are necessary to make it possible for investors to invest. However, this doesn’t automatically lead to investors investing more “sustainable”. Therefore, governments should implement more economic tools to reward companies that do well and punish those that do poorly. When there are more penalties and

costs from governments for companies that do not do well, they will become less profitable, this will then cause investors to factor this into their valuations. The pension funds will then provide an amplifying effect, in addition, other shareholders of companies will then also exert pressure to change business practices to remain profitable in the future.

10.2 Limitations and recommendations for future research

The analysis setup and the methodology used are subject to limitations:

The first limitation is due to the method used. In DCM, hypothetical choices are used, so it is possible that respondents may react differently than they will in real life. Ding et al. showed that participants have a lower price sensitivity in conventional conjoint tasks. We have reduced this effect by indicating in the survey that the responses will affect the policy. However, in real-life decisions, participants are immediately affected by the decision; this is not the case in this research. The following limitations were created with the design of the experiment:

Pension Income: in the choice experiment, we chose to vary pension income by ±8%. This was done to measure willingness to pay correctly, however, the integration cost may be much lower.

SDGs: In the choice experiment, we used the SDGs. These were used because participants could easily understand them. However, SDGs are still very general. As mentioned earlier, through case studies or interviews, additional research can be done to determine what the participants find important. This research can then be used as input for the study

Location: Previous research has shown that the location where the impact is achieved also influences the decision. This study only looked at the effects on society in general.

Opt-out: While the choice was deliberately made to exclude the opt-out option, it does entail certain risks. The most obvious reason is that it might lead to inaccurate results that might lead to misleading policy recommendations. For this experiment, it could be possible that participants would have to choose between 2 investment strategies they both didn't want.

A possibility for a future study could be to allow participants in a choice experiment to allocate money between different investment options. This could include the case of policies that only focus on returns.

A third limitation is a bias that occurs due to the data-gathering method. The process of data gathering was done by sending an email to all the participants. Using this method involves the risk that comes with the self-selection of the respondents. It is possible that only those participants who attach high importance to sustainable investments responded. This could lead to the priority given to SDG integration being higher in the sample than in the population.

A fourth limitation is based on the population. This survey was conducted among employees of Ahold Delhaize and view not necessarily something about the whole population; if the same experiment is conducted at another pension fund, very different results may come out. So this study cannot say anything about pensioners' general preferences. To better understand this, a survey can be done where the participants are not from 1 pension fund.

A fifth limitation is due to myopia: people often make decisions that affect them well now but find it harder to see what it means in the long term. Behavioural economists stress that because

behavioural biases and bounded rationality anchor the choices of individuals, they are not always rational decision-makers. Inconsistent behaviour is frequently attributed to self-control problems, bounded rationality, and myopic views (Apostalkis et al., 2018). Lynch and Zaubermann (2007) argue that policymakers should frame these individual choices as though they occur in the distant future.

In this study, we also focused on how the results could be implemented and what tools the pension fund can use to accomplish an impact. As most of these recommendations are based on qualitative research. It may be interesting to conduct quantitative analysis of the established objectives based on implemented policies.

Appendix A interview list

Advisor on ESG	Advisor
Invest-NL	Responsible investment manager
Aegon Asset management	Senior Responsible investment manager
DNB	Team Sustainable economics
verzekeraars	Team coordinator financieel-economisch beleid
ABN Amro	Senior ESG manager
KPMG	consultant sustainability reporting & strategy
KPMG	consultant Deals Strategy
FMO	Responisble business leader & sustainability expert
Montae & partners	Consultant risk & investments (Responsible for ESG)
Montae & partners	Consultant risk & investments (Responsible for ESG)
pensioenfederatie	Policy adcisor sustainable investments
Aegon Asset management	Senior investment strategist
Credit Suisse	Global head of sustainable investing
PGGM	Senior advisor responsible investment
3p sustainability	Consultant sustainability strategy
Zanders	Senior manager
Zanders	Senior manager
Actiam	Risk manager and committee ESG
NNIP	Head of investment science
Ahold Dehaize	VP finance, Risk & operations
Achmea asset management	Business development Director
Rail & OV pension funds	investment strategist

Appendix B Survey design specification

Introductory information

Appendix C Regulation

SFDR and EU Taxonomy

The SFDR's goal is to have more transparency in the financial market on how sustainability risks and opportunities are integrated into investment choices and recommendations. The SFDR introduces a classification system with information requirements for investment products. The SFDR aims to make the sustainability profile of investments more comparable and understandable for end investors. This will be reached by having pre-defined metrics for assessing the ESG outcomes of the investment process. More focus will be placed on disclosure, including new rules that must identify any harmful impact made by companies within the portfolio.

The second crucial European regulation is the EU Taxonomy. This environmental taxonomy should ensure a European classification system in which companies and investors should gain a common understanding of the extent to which the economic activities of companies contribute to sustainability. The taxonomy is a detailed list of activities that are labelled as green. This list helps investors allocate capital and companies understand the expected environmental obligations. The taxonomy defines the level of performance that economic activity must have to be classified as a green activity, which is defined as:

- Making a substantive contribution to one of six environmental objectives
- Do no significant harm to any of the other objectives while respecting basic human rights and labour standards.

The six environmental objectives of the Taxonomy are (1) climate change mitigation, (2) climate change adaptation, (3) sustainable use and protection of water and marine resources, (4) transition to a circular economy, (5) pollution prevention and control, and (6) protection and restoration of biodiversity and ecosystems. For each objective Technical Screening Criteria (TSC) have been developed. TSCs define the specific requirements and thresholds for an activity to be considered as significantly contributing to a sustainability objective. These TSCs are being elaborated in secondary legislation called Delegated Acts (DAs) (Doyle, D., 2021). The goal of this taxonomy is to support investment flows into these activities. A social Taxonomy will also follow, as the first draft was presented in July 2021 (European Committee, 2021). Pension funds play a major role in this respect and will have to comply with new European information obligations.

Covenant

The Dutch government has developed, together with 45 other countries, the OECD guidelines. They clarify what the Dutch government expects from companies regarding CSR when doing international business. They offer companies guidance on issues such as chain responsibility, human rights, child labour, the environment and corruption. The OECD guidelines thus form the starting point for Dutch international CSR policy (Ministerie van buitenlandse zaken, 2021). The Dutch government chooses not to do this through legislation and regulations but covenants for different sectors.

The covenant “Internationaal Maatschappelijk Verantwoord Beleggen” (IMVB) is a covenant that is signed by eighty pension funds in the Netherlands. Besides the importance of the IMVB to pension funds, this will also impact the asset managers of the pension funds. The IMVB

covenant sets several requirements for participating pension funds in Socially Responsible Investment (SRI); the provisions in the covenant are:

• Include a commitment to “UN guiding principles on business and human rights” (UNGPs) and “OECD guidelines for multinational enterprises” and an ESG-due diligence procedure in the investment policy.

• Include ESG conditions under “OECD business conduct for institutional investors” in the outsourcing policy.

• Reporting based on the IMVB reporting requirements, including preparing an IMVB ESG report.

• The covenant emphasises the responsibility of pension funds to create support among participants for the SRI policy. Thematic topics are selected by pension funds based on participant preferences and the due diligence of the pension fund.

When formulating the ESG themes, there is an obligation to include the preferences of the pension funds' participants. In the new pension system, participants can make more individual choices. Individual preferences based on an individual risk profile or a risk profile per cohort can be included in the investment portfolio design. This applies not only to preferences regarding risk and return but also, for example, to preferences about sustainability. The first challenge is measuring these preferences. The second challenge is deciding how to use these preferences to change the investment portfolio.

Appendix D

ESG tools

The first tool investors use is negative screening or exclusion. An exclusion means asset managers will exclude companies that do not meet specific social or environmental criteria. Examples include mutual funds that exclude companies involved in producing alcohol, tobacco, or gambling products – also known as sin stocks. In addition, negative screening is also often applied to arms manufacturers, nuclear energy producers, or companies that use child labour. Negative screening can also exclude companies based on their activities and performance in ESG areas. Investors can, for example, exclude companies with the worst 10% ESG rating in the market.

The second tool investors use is positive screening or the best-in-class method. Positive screening is the selection of companies with the best performance and policies in ESG areas. This could for example lead to a strategy of investing in companies in the top 25% of the market based on their ESG score. Or this might include investing in companies producing renewable energies or showing a commitment to promoting healthy working conditions.

The third tool investors use is ESG integration. Investors base their investment decisions on criteria such as market-to-book value, risk, growth potential etc. ESG integration means that investors are factoring in ESG criteria in their investment decisions.

In ESG integration, managers determine a score or weight for the criteria. They can develop this score themselves or use an ESG rater. Every manager builds their own way of doing this integration, but the basis is the same. There are three main stages in the integration model, which we will go through to understand the method and the differences:

The first stage of the ESG integration model is the qualitative analysis of the company. First, the investors need to identify the material factors affecting the company. This is already an important distinction between the external managers. At this stage, it is determined which qualitative criteria the managers consider. The pension fund should properly evaluate this phase to see whether the integration aligns with its values. Many investors use the materiality framework from SASB as a guideline. SASB created a framework per industry to indicate which factors are material. The SASB framework focuses on factors that are material to the financial performance of companies. The investors will gather relevant information from different sources. The sources include primary research, company reports and third-party research. Many investors use the raw data from the ESG rating agencies. They use the data published by ESG raters which they used to produce their scores. Some companies specialise in specific data on social or environmental aspects; these can be used to cross-check or complement the data. The second important source is company reports. Companies are all using different methods to calculate their impact and to show their data. It's complicated to establish universally agreed ESG reporting. To improve this, the International Financial Reporting Standards (IFRS) foundations formally announced the establishment of the International Sustainability Standards Board (ISSB) at the COP26 (IFRS, 2021).

The second stage is the quantitative analysis. At this stage, the investor will assess the impact of the material factors they have identified. Based on their accumulated data, they will adjust their financial forecasts and the valuation models accordingly. The evaluation of this stage is

also essential for pension funds because there are significant differences between the weight investors give to the criteria.

The third stage is the investment decision; the investor uses investment research and financial data to build or update company valuation models to assess a company's value in the first two stages. This leads to buying, holding, or selling the shares. It is important to note that asset managers are weighing in ESG criteria when evaluating the price of a stock, it doesn't mean that an asset manager is only investing in companies which have a good score on ESG criteria.

The fourth tool is sustainability-themed investing or impact investing. Sustainability-themed investing means investing in companies contributing or offering solutions to particular social or environmental challenges. This could include natural resource scarcity, energy security, food scarcity, or wealth inequality. This type of investing focuses on having a positive effect, but these types are often seen as having significantly higher risks than other investments. In the Netherlands, the first moves of pension funds into impact investing have been made. Pensioenfonds Detailhandel has selected an asset manager to manage €100 million with an impact lending strategy contributing to the sustainable economic transition.

The fifth tool asset managers can use is engagement and shareholder action. Asset managers manage the assets of multiple asset owners and therefore have an even more significant influence on companies. For pension funds, assessing how asset managers use their power and analysing their voting behaviour is essential. Many large asset managers pledge to tackle climate change and support sustainable financing. But an investigation of asset managers' ESG voting patterns shows that asset managers predominantly vote against social and environmental proposals. Especially, large and passive asset managers vote the least in favour of these proposals despite the increased attention to sustainability integration (De Groot, W. et al., 2021). When analysing their voting behaviour, an important aspect is understanding the motives behind their voting. The rationale for voting against a proposal may be that the sustainable objective is not ambitious enough.

Appendix E

Table E.1 Significance differences between parameters entire population

Significant difference						
	Climate Action	Responsible consumption and production	Good health and well-being	Quality education	Zero hunger	Reducing inequality
Net pension income per month (after retirement)	5.75	5.58	4.14	7.91	9.33	**1.84**
Climate Action		**0.07**	2.14	2.75	8.16	9.80
Responsible consumption and production			1.997	2.72	4.48	7.95
Good health and well-being				4.94	6.79	6.79
Quality education					**1.83**	12.63
Zero hunger						14.47

Table E.2 Significance differences between parameters representative sample

Significant difference						
	Climate Action	Responsible consumption and production	Good health and well-being	Quality education	Zero hunger	Reducing inequality
Net pension income per month (after retirement)	4.20	2.92	2.03	3.94	4.43	4.26
Climate Action		**1.21**	2.20	**0.28**	**0.11**	8.46
Responsible consumption and production			**1.19**	**1.13**	**1.61**	8.78
Good health and well-being				2.43	2.92	7.96
Quality education					**0.5**	10.32
Zero hunger						10.78

Appendix F

Table F.1 Attributes 4-class model

Class size	59.86%	18.95%	17.84%	3.35%
Attributes	**Class1**	**Class2**	**Class3**	**Class4**
Net pension income per month (after retirement)	-0.0375	-0.2988	2.8744	11.0154
Climate Action	0.2799	-0.0479	0.5148	-5.3438
Responsible consumption and production	0.2071	0.415	0.3127	2.4682
Good health and well-being	0.2213	0.4011	0.2147	2.9945
Quality education	0.1948	0.423	0.3926	-3.0456
Zero hunger	0.175	0.807	0.1038	2.4057
Reducing inequality	0.195	1.8821	0.1941	3.4354

Table F.2 Attributes 5-class model

Class size	46.79%	16.58%	16.56%	10.11%	9.95%
Attributes	**Class1**	**Class2**	**Class3**	**Class4**	**Class5**
Net pension income per month (after retirement)	0.0725	3.3533	-0.1323	-0.1839	-0.2108
Climate Action	0.1444	0.3622	-0.1627	0.486	1.6371
Responsible consumption and production	0.1297	0.2022	0.4923	1.3266	0.6719
Good health and well-being	0.1238	0.2898	0.4128	1.8513	0.3076
Quality education	0.2245	0.2343	0.4147	0.3707	-0.0675
Zero hunger	0.1327	0.0628	0.8772	0.7057	0.7247
Reducing inequality	0.1975	0.1121	2.0525	0.6452	0.678

Appendix G

Utility functions

Basis Rum model:

V[['A']] = Inkomen.1 * beta_Inkomen + Klimaat.1 * beta_Klimaat + Consumptie.1 * beta_Consumptie + Gezondheid.1 * beta_Gezondheid + Onderwijs.1 * beta_Onderwijs + Honger.1 * beta_Honger + Ongelijkheid.1 * beta_Ongelijkheid
V[['B']] = Inkomen.2 * beta_Inkomen + Klimaat.2 * beta_Klimaat + Consumptie.2 * beta_Consumptie + Gezondheid.2 * beta_Gezondheid + Onderwijs.2 * beta_Onderwijs + Honger.2 * beta_Honger + Ongelijkheid.2 * beta_Ongelijkheid

Dummy Coding Do no harm/ Do good:

V[['A']] = Inkomen.1 * beta_Inkomen + beta_Klimaat_dummy0*(Klimaat.1==1) + beta_Klimaat_dummy1*(Klimaat.1==2) + beta_Consumptie_dummy0*(Consumptie.1==1) + beta_Consumptie_dummy1*(Consumptie.1==2) + beta_Gezondheid_dummy0*(Gezondheid.1==1) + beta_Gezondheid_dummy1*(Gezondheid.1==2) + beta_Onderwijs_dummy0*(Onderwijs.1==1) + beta_Onderwijs_dummy1*(Onderwijs.1==2) + beta_Honger_dummy0*(Honger.1==1) + beta_Honger_dummy1*(Honger.1==2) + beta_Ongelijkheid_dummy0*(Ongelijkheid.1==1) + beta_Ongelijkheid_dummy1*(Ongelijkheid.1==2)
V[['B']] = Inkomen.2 * beta_Inkomen + beta_Klimaat_dummy0*(Klimaat.2==1) + beta_Klimaat_dummy1*(Klimaat.2==2) + beta_Consumptie_dummy0*(Consumptie.2==1) + beta_Consumptie_dummy1*(Consumptie.2==2) + beta_Gezondheid_dummy0*(Gezondheid.2==1) + beta_Gezondheid_dummy1*(Gezondheid.2==2) + beta_Onderwijs_dummy0*(Onderwijs.2==1) + beta_Onderwijs_dummy1*(Onderwijs.2==2) + beta_Honger_dummy0*(Honger.2==1) + beta_Honger_dummy1*(Honger.2==2) + beta_Ongelijkheid_dummy0*(Ongelijkheid.2==1) + beta_Ongelijkheid_dummy1*(Ongelijkheid.2==2)

Interaction effect 2 levels (Example having children):

V[['A']] = Inkomen.1 * beta_inkomen + beta_inkomen_children * Kinderen.1 * Inkomen.1 + Klimaat.1 * beta_Klimaat + beta_Klimaat_children * Kinderen.1 * Klimaat.1 + Consumptie.1 * beta_Consumptie + beta_Consumptie_children * Kinderen.1 * Consumptie.1 +Gezondheid.1 * beta_Gezondheid + beta_Gezondheid_children * Kinderen.1 * Gezondheid.1 + Onderwijs.1 * beta_Onderwijs+ beta_Onderwijs_children * Kinderen.1 * Onderwijs.1 + Honger.1 * beta_Honger + beta_Honger_children * Kinderen.1 * Honger.1 + Ongelijkheid.1 * beta_Ongelijkheid + beta_Ongelijkheid_children * Kinderen.1 * Ongelijkheid.1
V[['B']] = Inkomen.2 * beta_inkomen + beta_inkomen_children * Kinderen.1 * Inkomen.2 + Klimaat.2 * beta_Klimaat + beta_Klimaat_children * Kinderen.1 * Klimaat.2 + Consumptie.2 * beta_Consumptie + beta_Consumptie_children * Kinderen.1 * Consumptie.2 +Gezondheid.2 * beta_Gezondheid + beta_Gezondheid_children * Kinderen.1 * Gezondheid.2 + Onderwijs.2 * beta_Onderwijs+ beta_Onderwijs_children * Kinderen.1 * Onderwijs.2 + Honger.2 * beta_Honger + beta_Honger_children * Kinderen.1 * Honger.2 + Ongelijkheid.2 * beta_Ongelijkheid + beta_Ongelijkheid_children * Kinderen.1 * Ongelijkheid.2

Interaction effect 3 levels (Example income groups):

```
P = list()
 Beta_Inkomen_MaandinkomenGroep.1 = ( Beta_Inkomen_IncomeMid * (MaandinkomenGroep.1==1) + Beta_Inkomen_IncomeHigh * (MaandinkomenGroep.1==2))
 beta_Klimaat_MaandinkomenGroep.1 = ( beta_Klimaat_IncomeMid * (MaandinkomenGroep.1==1) + beta_Klimaat_IncomeHigh * (MaandinkomenGroep.1==2))
 beta_Consumptie_MaandinkomenGroep.1 = ( beta_Consumptie_IncomeMid * (MaandinkomenGroep.1==1) + beta_Consumptie_IncomeHigh * (MaandinkomenGroep.1==2))
 beta_Gezondheid_MaandinkomenGroep.1 = ( beta_Gezondheid_IncomeMid * (MaandinkomenGroep.1==1) + beta_Gezondheid_IncomeHigh * (MaandinkomenGroep.1==2))
 beta_Onderwijs_MaandinkomenGroep.1 = ( beta_Onderwijs_IncomeMid * (MaandinkomenGroep.1==1) + beta_Onderwijs_IncomeHigh * (MaandinkomenGroep.1==2))
 beta_Honger_MaandinkomenGroep.1 = ( beta_Honger_IncomeMid * (MaandinkomenGroep.1==1) + beta_Honger_IncomeHigh * (MaandinkomenGroep.1==2))
 beta_Ongelijkheid_MaandinkomenGroep.1 = ( beta_Ongelijkheid_IncomeMid * (MaandinkomenGroep.1==1) + beta_Ongelijkheid_IncomeHigh * (MaandinkomenGroep.1==2))

 V = list()
 V[['A']] = Inkomen.1 * Beta_Inkomen + Beta_Inkomen_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Inkomen.1 + Klimaat.1 * beta_Klimaat + beta_Klimaat_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Klimaat.1 + Consumptie.1 * beta_Consumptie + beta_Consumptie_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Consumptie.1 +Gezondheid.1 * beta_Gezondheid + beta_Gezondheid_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Gezondheid.1 + Onderwijs.1 * beta_Onderwijs+ beta_Onderwijs_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Onderwijs.1 + Honger.1 * beta_Honger + beta_Honger_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Honger.1 + Ongelijkheid.1 * beta_Ongelijkheid + beta_Ongelijkheid_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Ongelijkheid.1
 V[['B']] = Inkomen.2 * Beta_Inkomen + Beta_Inkomen_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Inkomen.2 + Klimaat.2 * beta_Klimaat + beta_Klimaat_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Klimaat.2 + Consumptie.2 * beta_Consumptie + beta_Consumptie_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Consumptie.2 +Gezondheid.2 * beta_Gezondheid + beta_Gezondheid_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Gezondheid.2 + Onderwijs.2 * beta_Onderwijs+ beta_Onderwijs_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Onderwijs.2 + Honger.2 * beta_Honger + beta_Honger_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Honger.2 + Ongelijkheid.2 * beta_Ongelijkheid + beta_Ongelijkheid_MaandinkomenGroep.1 * MaandinkomenGroep.1 * Ongelijkheid.2
```

References

Abiiro, G.A., Leppert, G., Mbera, G.B. et al. Developing attributes and attribute-levels for a discrete choice experiment on micro health insurance in rural Malawi. BMC Health Serv Res 14, 235 (2014). https://doi.org/10.1186/1472-6963-14-235

ABP (2020). 'Duurzaam en Verantwoord Beleggingsbeleid ABP vanaf 2020'. ABP, The Netherlands. https://www.abp.nl/images/dvb-beleid-abp.pdf.

Alexander Bassen, Timo Busch, and Gunnar Friede, "ESG and financial performance: aggregated evidence from more than 2000 empirical studies," Journal of Sustainable Finance & Investment, 2015, Volume 5, Number 4, pp. 210–33.

Apostolakis G., Dijk G, Kraanen F., Blomme R. (2018).
Examining socially responsible investment preferences: A discrete choice conjoint experiment,Journal of Behavioral and Experimental Finance, Volume 17, 2018, Pages 83-96, ISSN 2214-6350, https://doi.org/10.1016/j.jbef.2018.01.001. (https://www.sciencedirect.com/science/article/pii/S2214635018300091)

Aust. Account. Bus. and Finance J., 7 (1) (2013), pp. 23-41

Bauer, Rob, Ruof, Tobias and Smeets, Paul, Get Real! Individuals Prefer More Sustainable Investments (MARCH 21, 2021). The Review of Financial Studies, Volume 34, Issue 8, August 2021, Pages 3976–4043, Available at SSRN: https://ssrn.com/abstract=3287430 or http://dx.doi.org/10.2139/ssrn.3287430
Belief and investing: Preferences and attitudes of the faithful

Bennet, J., & Blamey, R. (2001). The Choice Modelling Approach to Environmental Valuation. Edward Elgar.

Berg, F., KÖLbel, J., & Rigobon, R. (2019). Aggregate Confusion: The Divergence of ESG Ratings. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3438533

Berg, Florian and Kölbel, Julian and Pavlova, Anna and Rigobon, Roberto, ESG Confusion and Stock Returns: Tackling the Problem of Noise (October 12, 2021). Available at SSRN: https://ssrn.com/abstract=3941514 or http://dx.doi.org/10.2139/ssrn.3941514

Bernow, S., Klempner, B., & Magnin, C. (2020, 16 september). From 'why' to 'why not': Sustainable investing as the new normal. McKinsey & Company. Visited on 30 April 2022, from https://www.mckinsey.com/industries/private-equity-and-principal-investors/our-insights/from-why-to-why-not-sustainable-investing-as-the-new-normal

Bloomberg - Are you a robot? (2021). https://www.bloomberg.com/graphics/2021-what-is-esg-investing-msci-ratings-focus-on-corporate-bottom-line/?mc_cid=660abab3e1&mc_eid=4b24cc05a1. Visited on 14 April 2022,

Boffo, R., and R. Patalano (2020), "ESG Investing: Practices, Progress and Challenges", OECD Paris, www.oecd.org/finance/ESG-Investing-Practices-Progress-and-Challenges.pdf

Brimble M., Vyvyan V., Ng C. Bruegel essay and lecture series. https://bruegel.org/wp-content/uploads/2017/07/From-traditional-to-sus-tainable-finance_ONLINE.pdf
Busch T, Bauer R, Orlitzky M (2016) Sustainable development and financial markets: old paths and new avenues. Business Soc 55(3):303–329. https://doi.org/10.1177/0007650315570701

CFA Society Netherlands. (2021, december). Het nieuwe Pensioen akkoord (Nr. 148). VBA.

ChoiceMetrics. (2018). Ngene 1.2 User Manual & Reference Guide. 241. www.choice-metrics.com de Dios Ortúzar, J., & Willumsen, L. G. (2011). Modelling Transport (4th ed.). John Wile & Sons.

Chorus C, A Generalized Random Regret Minimization model, Transportation Research Part B: Methodological, Volume 68, 2014, Pages 224-238, I SSN 0191-2615, https://doi.org/10.1016/j.trb.2014.06.009.

Chorus C., Models of moral decision making: Literature review and research agenda for discrete choice analysis, Journal of Choice Modelling, Volume 16, 2015, Pages 69-85,
Corp. Governance Int. Rev., 15 (2) (2007), pp. 370-381, 10.1111/j.1467-8683.2007.00567.x

de Groot, Wilma and de Koning, Jan and de Koning, Jan and van Winkel, Sebastian, Sustainable Voting Behavior of Asset Managers: Do They Walk the Walk? (February 10, 2021). Available at SSRN: https://ssrn.com/abstract=3783454

Dimitrov, S. (2020). View of Integration of environmental, social, and governance principles in pension funds and insurance companies activities. Http://Www.Papersvuzf.Net/Index.Php/VUZF/Article/View/122/127. Date accessed 14/03/2022

Doyle, D. H. (2021, 12 May). A Short Guide to the EU's Taxonomy Regulation. S&P Global. Visited on 23 May 2022, https://www.spglobal.com/esg/insights/a-short-guide-to-the-eu-s-taxonomy-regulation#:%7E:text=The%20six%20environmental%20objectives%20of,and%20restoration%20of%20biodiversity%20and

Ernst & Young, 2010. Capitalising the Green Investment Bank. Key Issues and Next Steps. Available at:https://www.e3g.org/docs/capitalisingthegreeninvestmentbank.pdf

European Commision. (2021) EUR-Lex - 52021DC0188 - EN - EUR-Lex. Https://Eur-Lex.Europa.Eu/Legal-Content/EN/ALL/?uri=CELEX:52021DC0188. 2022, van https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52021DC0188

European Committee. (2021). Draft Report by Subgroup 4: Social Taxonomy. https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/sf-draft-report-social-taxonomy-july2021_en.pdf

Eurosif. (2010). European SRI study 2010. Retrieved January 18, 2022, from http://www.eurosif.org/research/eurosif-sri-study.

Fatemi, A., M. Glaum en S. Kaiser (2018) ESG performance and firm value: the moderating role of disclosure. Global Finance Journal, 38, 45–64.

Fink, L. (2021). Larry Fink's Annual 2022 Letter to CEOs. BlackRock. Visited on 13 May 2022, van https://www.blackrock.com/corporate/investor-relations/larry-fink-ceo-letter

Frank AJ Wagemans, CSA (Kris) van Koppen & Arthur PJ Mol (2018) Engagement on ESG issues by Dutch pension funds: is it reaching its full potential? Journal of Sustainable Finance & Investment, 8:4, 301-322, DOI: 10.1080/20430795.2018.1485379

Grimm, P. (2010). Social Desirability Bias. In Wiley International Encyclopedia of Marketing. American Cancer Society. https://doi.org/10.1002/9781444316568.wiem02057

Hartzmark, S. M., en A. B. Sussman (2019) Do investors value sustainability? A natural experiment examining ranking and fund flows. The Journal of Finance, 74(6), 2789-2837

Heeb, F., Paetzold, F. & Busch, T. (2020, 25 juni). Can Sustainable Investing Save the World? Reviewing the Mechanisms of Investor Impact. Organization & Environment, 33(4), 554–574. https://doi.org/10.1177/1086026620919202

Hensher, D., Rose, J., & Greene, W. (2005). Applied Choice Analysis | Applied Choice Analysis, A Primer. Cambridge University Press. Retrieved April 22, 2022, from https://www.cambridge.org/fr/academic/subjects/economics/econometrics-statistics- and - mathematical - economics / applied - choice - analysis - primer , %20https ://www.cambridge.org/fr/titles/applied-choice-analysis-primer

Hess, S., & Daly, A. (2014). Handbook of Choice Modelling. Edward Elgar Publishing. https://books.google.nl/books?hl=nl&lr=&id=XghCBAAAQBAJ&oi=fnd&pg=PR1&dq =Hess+S,+Daly+A.+Handbook+of+Choice+Modelling.+Cheltenham,+UK:+%27Edwar d+Elgar+Publishing,+Inc.%27%3B+2014&ots=2BOSmNAYLK&sig=Xdp8Ne_xS6hsu TvWdw2IBsl9YxE#v=onepage&q=maximize&f=false

IFRS. (2021, 3 November). IFRS - IFRS Foundation announces International Sustainability Standards Board, consolidation with CDSB and VRF, and publication of prototype disclosure requirements. Https://Www.Ifrs.Org/News-and-Events/News/2021/11/Ifrs-Foundation-Announces-Issb-Consolidation-with-Cdsb-Vrf-Publication-of-Prototypes/. Visited on 2 May 2022, at https://www.ifrs.org/news-and-events/news/2021/11/ifrs-foundation-announces-issb-consolidation-with-cdsb-vrf-publication-of-prototypes/.
ISSN 1755-5345, https://doi.org/10.1016/j.jocm.2015.08.001.

Koedijk K., Slager A. Investment Beliefs: A Positive Approach to Institutional Investing
Lancaster, K. (1991). Modern Consumer Theory. Edward Elgar.

Louche C, Arenas D, van Cranenburgh KC (2012) From preaching to investing: attitudes of religious organisations towards responsible investment. J Bus Ethics 110:301–320. https://doi.org/10.1007/s10551-011-1155-8

Lynch J.G., Zauberman G. Construing consumer decision making J. Consum. Psychol., 17 (2) (2007), pp. 107-112, 10.1016/S1057-7408(07)70016-5

Martin, W. (2009), "Socially responsible investing: is your fiduciary duty at risk?", Journal of Business Ethics, Vol. 90 No. 4, pp. 549-560.

Millar, M., & Devonish, D. (2009). Attitudes, savings choices, level of knowledge and investment preferences of employees toward pensions and retirement planning: Survey evidence from Barbados. Pensions 14 (4), 299-317.

Ministerie van Buitenlandse Zaken. (2021). Volledige tekst OESO-richtlijnen. Brochure | Nationaal Contactpunt OESO-richtlijnen. Visited on 4th july 2022, https://www.oesorichtlijnen.nl/oeso-richtlijnen/a/algemene-informatie-oeso-richtlijnen/documenten/brochure/201/12/8/volledige-tekst-oeso-richtlijnen

Neubaum, D. O., & Zahra, S. A. (2006). Institutional ownership and corporate social performance: The moderating effects of investment horizon, activism, and coordination. Journal of Management, 32, 108–131.

Nikulina, Luba, Global Pensions and ESG: Is There A Better Way? (August 2021). Wharton Pension Research Council Working Paper No. 2021-17, Available at SSRN: https://ssrn.com/abstract=3914980 or http://dx.doi.org/10.2139/ssrn.3914980

Potters, J., Riedl, A., & Smeets, P. (2016). Towards a Practical and Scientifically Sound Tool for Measuring Time and Risk Preferences in Pension Savings Decisions. (Netspar Industry Paper; Vol. Design 59). NETSPAR. https://www.netspar.nl/assets/uploads/P20160600_des059_Riedl.pdf

PricewaterhouseCoopers. (2021). 2021 Consumer Intelligence Series survey on ESG. PwC. Visited on 13 may 2022, at https://www.pwc.com/us/en/services/consulting/library/consumer-intelligence-series/consumer-and-employee-esg-expectations.html

Reed Johnson, F., Lancsar, E., Marshall, D., Kilambi, V., Mühlbacher, A., Regier, D. A., Bresnahan, B. W., Kanninen, B., & Bridges, J. F. (2013). Constructing Experimental Designs for Discrete-Choice Experiments: Report of the ISPOR Conjoint Analysis Experimental Design Good Research Practices Task Force. Value in Health, 16(1), 3–13. https://doi.org/10.1016/j.jval.2012.08.2223

Powell R. Helen M, Focus Groups, International Journal for Quality in Health Care, Volume 8, Issue 5, 1996, Pages 499–504, https://doi.org/10.1093/intqhc/8.5.499

Riedl, A. and P. Smeets (2017). 'Why do investors hold socially responsible mutual funds?' The Journal of Finance, 72(6): 2505-2550.
Rooij van, M.C.J., Kool, C.J.M., & Prast, H.M. (2007). Journal of Public Economics 91, 701-722.

Schoenmaker, D. (2017). Investing for the common good: A sustainable finance framework.

Schoenmaker, Dirk & Schramade, Willem. (2019). Principles of Sustainable Finance.

Scholtens, B. (2005). What drives socially responsible investment? The case of the Netherlands. Sustainable Development, 13, 129–137.
Socially responsible investing: The green attitudes and grey choices of Australian investors

Studlar, D. T., McAllister, I., & Hayes, B. C. (1998). Explaining the Gender Gap in Voting: A Cross- National Analysis [Publisher: [University of Texas Press, Wiley]]. Social Science Quarterly, 79(4), 779–798. Retrieved May 6, 2021, from https://www.jstor.org/stable/42863847

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION. (2014,). DIRECTIVE 2014/65/EU. Https://Eur-Lex.Europa.Eu/Legal-Content/EN/TXT/?uri=celex%3A32014L0065. Visited on 24 May 2022 at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0065

United Nations Framework Convention on Climate Change (UNFCCC), 2015. The Paris Agreement. Available at:https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

Van den Broek-Altenburg, E., Atherly, A. Using discrete choice experiments to measure preferences for hard to observe choice attributes to inform health policy decisions. Health Econ Rev 10, 18 (2020). https://doi.org/10.1186/s13561-020-00276-x

Van der Brug, W. (2010). Structural and Ideological Voting in Age Cohorts [Publisher: Routledge _eprint: https://doi.org/10.1080/01402381003654593]. West European Politics, 33(3), 586–607. https://doi.org/10.1080/01402381003654593
Volume 206, Issue 1, 2008, Pages 56-69, ISSN 0096-3003, https://doi.org/10.1016/j.amc.2008.08.053
Vyvyan V., Ng C., Brimble M. Walker, J.L., Wang, Y., Thorhauge, M. et al. D-efficient or deficient? A robustness analysis of stated choice experimental designs. Theory Decis 84, 215–238 (2018). https://doi.org/10.1007/s11238-017-9647-3

Wenstøp, F. (2005). Mindsets, rationality, and emotion in Multi-criteria Decision Analysis. Journal of Multi-Criteria Decision Analysis, 13(4), 161–172. https://doi.org/10.1002/mcda.384

Wenyin G., Zhihua C., Liangxiao J., Enhancing the performance of differential evolution using orthogonal design method, Applied Mathematics, and Computation,
Witold J. Henisz and James McGlinch, “ESG, material credit events, and credit risk,” Journal of Applied Corporate Finance, July 2019, Volume 31, pp. 105–17, onlinelibrary.wiley.com;