

MSC THESIS IN BEHAVIORAL ECONOMICS

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## **Digital Nudge and Retirement Savings**

*Choice architecture in Icelandic retirement savings programs*



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The views stated in the thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics, or Erasmus University Rotterdam.

## **Abstract**

When facing decisions, individuals are susceptible to heuristics; mental shortcuts that reduce the cognitive effort of decision making. Though helpful at times, heuristics can develop into systematic cognitive biases that can lead to bad decisions. In complex decision tasks, for example, regarding retirement savings, choice architecture can play a decisive role in mitigating or amplifying the biases. This was the case in Sweden, where changes in choice architecture significantly influenced choices of investment funds and portfolios. Using the Swedish experience as a blueprint in combination with the benefits of the internet, I study the introduction of choice architecture elements in retirement savings in Iceland, presenting individuals with a complete list of available options. The potential effect of this digital nudge was measured with an online survey with 205 participants. In contradiction with hypotheses, the results suggested that presenting individuals with a complete list of options, compared to those presented with a blank field, decreases the probability of making a choice other than the current choice. This contradiction can be explained by the fact that the digital nudge eliminated invalid answers. In contrast, those with a blank field could write down anything resulting in approximately 40% of the answers in the control group being invalid. The results demonstrate how digital choice architecture could eliminate errors in real-life settings and prevent avoidable problems accompanying them while increasing the decision makers' power of agency without restricting their freedom of choice.

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# Table of Content

Abstract .....	2
Acknowledgments .....	3
1. Introduction .....	6
2. Theoretical framework .....	8
2.1. Heuristics and biases .....	8
2.2. Choice architecture.....	10
2.2.1. Choice architecture for the social security system in Sweden .....	11
2.2.3. Choice architecture of retirement savings in Iceland .....	12
2.2. Digital nudges .....	14
3. Methodology .....	15
3.1. Experimental design.....	16
3.1.1. Dependent variables .....	17
3.1.2. Explanatory variable .....	20
3.1.3. Control variables .....	21
3.1.3. Additional questions.....	23
3.2 Participants .....	23
3.3. Materials.....	24
3.4. Procedure.....	25
3.5. Analysis.....	25
4. Results .....	27
4.1. Descriptive statistics.....	27
4.2. Status quo and option overload .....	29
4.3. Potential effect of changing choice architecture .....	31
4.3.1. Pension funds .....	31
4.3.2. Supplementary savings accounts.....	34
5. Discussion .....	38

5.1 Limitations .....	38
5.3. Future research .....	40
6. Conclusion.....	41
References .....	43
Appendix .....	45

Table of Figures

<b>Figure 1</b> Flow diagram of the survey .....	17
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Table of Tables

<b>Table 1</b> Comparison between Icelandic and Swedish choice architecture .....	13
<b>Table 2</b> Requirement limiting number of pension funds available to choose from .....	19
<b>Table 3</b> Variables Measured .....	26
<b>Table 4</b> Frequency distribution of the change of pension funds.....	27
<b>Table 5</b> Number of pension funds available to participants .....	28
<b>Table 6</b> Frequency distribution of the change of supplementary savings accounts .....	28
<b>Table 7</b> Valid and invalid answers of pension funds.....	29
<b>Table 8</b> Valid and invalid answers of supplementary savings accounts.....	29
<b>Table 9</b> Reason for choice of participants that stuck to their current choice.....	30
<b>Table 10</b> Wald test for control variables for age and gender in regressions 1-3 .....	31
<b>Table 11</b> LR test for restricted and unrestricted regressions 1-3 .....	32
<b>Table 12</b> Logistics regressions for pension funds .....	33
<b>Table 13</b> Average marginal effects for pension funds.....	34
<b>Table 14</b> Wald test for control variables for gender, education, and sector in regression 5 ...	35
<b>Table 15</b> LR test for restricted and unrestricted regression 4 and 5 .....	35
<b>Table 16</b> Logistic regression for supplementary savings accounts .....	36
<b>Table 17</b> Average marginal effects for supplementary savings accounts.....	37

# 1. Introduction

When making decisions, individuals use the help of heuristics to guide them in the decision-making process. Though helpful at times, these heuristics can prove harmful, leading to severe and systematic biases resulting in bad decision-making. To counteract these biases, choice architecture can play a significant role. Choice architecture, a term coined by Thaler and Sunstein (2008), is the way options are presented to decision-makers. Those responsible for the choice architecture are called choice architects.

Choice architects can adjust and adapt the choice architecture to influence the decisions made. For example, a school cafeteria can arrange the items to maximize profit or encourage healthy eating. It all depends on what the choice architect aims to achieve. A private school cafeteria could therefore have other motives than a public school cafeteria. Whether recognizing it or not, choice architects influence decision-making one way or another (Johnson et al., 2012; Thaler & Sunstein, 2009).

These aspects of the choice architecture that predictably alter individuals' behavior so-called nudges can encourage better decision making. As a result, policymakers across the globe increasingly look to choice architecture and nudges as an effective way to influence behavior without limiting individuals' freedom to choose. That is especially relevant for intertemporal choices such as consumer insurance, health insurance, and retirement savings. As a result, multiple studies have emerged in the field of retirement savings decision-making. They are ranging from why individuals do not save for retirement (intertemporal choices), how to get them to save (nudging and defaults), to choosing between retirement saving options (choice architecture) (Thaler & Sunstein, 2009).

The most notable research on the choice architecture of retirement savings is from the dawn of the 21<sup>st</sup> century in Sweden, where a change in choice architecture with the privatization of the Swedish social security system, the introduction of a default rule, advertising campaign, and a book with 467 options to choose from heavily influenced choices between pension funds. Since then, the establishment and widespread use of the internet has provided individuals with access to information, changing the situations decision-makers face when making a difficult decision like the choice of a pension fund. Unlike physical nudges, digital nudges open up new possibilities to improve decision-making in this field and others.

When faced with choosing a pension fund, the decision-maker must be able to map and evaluate all the options to make the best possible choice. A digital nudge opens up new alleys that can help the decision-maker map and navigate the options available and increase their comparability (Thaler, Sunstein, & Balz, 2013). Therefore, the digital nudge can act as a technological decision aid that guides the decision-making process (Johnson et al., 2012).

Unlike Sweden, Iceland has not experimented with nudging individuals when it comes to choosing pension funds. When choosing a pension fund, typically when signing an employment contract, the employee is presented with a blank line to write their choice. The responsibility of mapping, evaluating, and choosing is therefore solely in the hands of the employee. Moreover, the pension funds available to choose from are determined by a complex conditional relationship between trade unions, employer organizations, professions, sectors, and laws limiting options for certain employees. In other words, the suitable and available choices are hidden from the decision-maker, leaving it up to himself to gather, evaluate and choose a relevant fund. The task is, therefore, easier said than done.

In addition to the mandatory pension fund program in Iceland, there is an optional supplementary savings system where employees can put up to 4% of their salary into a savings account. The supplementary savings accounts are open to all regardless of the factors mentioned above that determine available options in the mandatory pension system. Having these two-layered retirement savings systems, the former being mandatory with options conditional on background factors and the latter optional with complete freedom of choice, adds another dimension to compare the behavior of individuals between the two. Furthermore, the country's small size, the relatively small number of funds, and the fact that the author is born and raised in the country make Iceland a suitable research subject to measure the possible effect of introducing a digital nudge of this sort.

Based on previously mentioned literature on heuristics and biases, it can be assumed that in the current choice architecture of employment contracts, decision-makers are faced with a mapping problem. A well-structured and organized digital contract environment can help solve this problem with increased navigability. On these grounds, it can be assumed that decision-makers lack information or lack the means to approach relevant information to make an educated decision. Furthermore, the relatively simple nudge of presenting the previously hidden option can increase the decision makers' power of agency without restricting their freedom of choice. Therefore, this change in choice architecture should help decision-makers

choose an alternative that corresponds with or is closer to their preferences. Hence, the proposed thesis research question is the following:

How does a digital presentation of available pension funds and supplementary savings accounts affect employees' decision-making?

## **2. Theoretical framework**

Every day individuals are faced with multiple decisions. These decisions range from regular, insignificant, and straightforward tasks such as choosing lunch in the cafeteria to infrequent, important, complicated tasks such as buying an apartment. The easier decisions can be so trivial that people barely realize that a decision is being made, while the difficult ones can feel insurmountable. Moreover, all these decisions are susceptible to different influences, internal and external, that can affect how decisions are made, how choices are perceived, and how risk and uncertainty are integrated into the decision-making process.

This research addresses multiple relevant aspects of critical real-life decisions and decision-making. First, I discuss the effect of heuristics and biases in decision-making regarding retirement savings. Second, I discuss the role of choice architecture and choice architects when choosing pension funds and supplementary savings accounts. Finally, I research the potential effect of digital nudges in retirement savings decision-making within the broader field of choice architecture from a scientific standpoint.

### **2.1. Heuristics and biases**

Heuristics are mental shortcuts that help decision-makers reach a decision (Thaler & Sunstein, 2009). Heuristics can help decrease the decision-makers' cognitive effort of choosing, especially when choosing between multiple alternatives where multiple attributes determine the best possible decision (Johnson et al., 2012). These heuristics can be helpful but can also lead to severe and systematic cognitive biases resulting in decisions that are not necessarily in the best interest of the decision-maker (Gilovich, Griffin, & Kahneman, 2002).

Research on biases and heuristics in the field of retirement savings has focused on four separate issues; (1) whether to join a retirement savings plan, (2) how much to contribute to the plan, (3) whether people are saving enough, and finally (4) how to invest (Benartzi & Thaler, 2007; Hubbard & Skinner, 1996; Skinner, 2007; Thaler & Sunstein, 2009). This research



focuses on the last issue and, more specifically, how individuals choose between investment options, pension funds, and supplementary savings accounts.

After deciding to join a retirement savings plan (assuming it is optional), individuals face the task of choosing how to invest. The first time individuals choose retirement savings, they become susceptible to availability bias (relying on information that readily comes to mind), anchoring (relying on specific information when deciding), or social proof (relying on peers to inform their decision-making or conform to the same behavior as them). Then, when facing the decision again, individuals become susceptible to confirmation bias (tendency to accept information that confirms one's conclusion) and inertia (preference to maintain current state), to name a few (Johnson et al., 2012; Ly, Mazar, Zhao, & Soman, 2013).

The heuristics that come into play also depend on the complexity of the situation. The number of alternatives is one measurement of complexity. When the number of alternatives becomes extensive, it complicates comparing, evaluating, and choosing. In situations like that, heuristics and biases can play a significant role in simplifying the decision-making process (Johnson et al., 2012). When there are "too many" options, the decision-maker can suffer from the tyranny of choice or choice/alternative/option overload. Option overload happens when the number of options to choose from is so large that the decision-maker has to use simplifying strategies to reach a decision—examples of these simplifying strategies are anchoring, social proof, and inertia, as mentioned previously. However, the final decision is not necessarily the best one (Johnson et al., 2012).

An example of option overload in retirement savings happened in Sweden at the dawn of this century when the Swedish social security system was privatized. At the start of the year 2000, the Swedish labor force had the assignment of choosing an investment portfolio before the end of the year. Each household received a book with 456 investment funds displaying relevant and essential information for each of them. In addition, participants were actively encouraged to choose a portfolio in advertising campaigns. If the participants did not actively choose a portfolio, a default choice would be chosen automatically. The advertising campaigns proved successful, and two-third of participants made an active choice. The rest, one-third, was allocated to the default fund, by far the largest share of any. Since then, the option overload and consequently the default choice effect has proven significantly more influential. In 2006 over 90 percent of new participants in the plan chose the default fund. Moreover, only 1.7, 2.7, and 3.1 percent of participants made at least one change to their portfolio in the years following 2000 (Benartzi & Thaler, 2007; Cronqvist & Thaler, 2004; Thaler & Sunstein, 2009).

That brings us to the subsequent bias, inertia, or "status quo bias." This bias towards doing nothing or maintaining current or previous decisions more frequently than predicted (Samuelson & Zeckhauser, 1988). As illustrated in the example from Sweden, this effect can be strong and hinder individuals' change altogether. Another study from 1980 suggests the same bias in a particular pension plan for college professors in the USA. That study showed that over an entire lifetime, the median change in the asset allocation of this pension program was 0. In other words, over half of the college professors never made changes to their portfolios in their entire lifetime (Thaler & Sunstein, 2009).

This example directly relates to the fact that the decisions of interest are so-called intertemporal choices. The consequences of an intertemporal decision made today will materialize over time or at a specific point in time in the future. This time delay affects the decision-making as (1) individuals tend to be myopic, preferring positive outcomes early and discounting future outcomes, (2) uncertainty about the future reflects in individuals over- or underweighting specific outcomes, and (3) individuals tend to suffer from optimism bias, expecting to achieve more than they will (Johnson et al., 2012). A pension fund or a supplementary savings account is an intertemporal choice, and the decision-makers are exposed to the same influences mentioned above. Employees participate in a pension fund, or supplementary savings account to benefit when they reach particular retirement age.

In combination, the heuristics and biases mentioned in this chapter can significantly influence decision-making when choosing pension funds and supplementary savings account. The number of pension funds and supplementary savings accounts in Iceland is only a fraction of the number available in Sweden. Additionally, multiple pension fund mergers have decreased the number of options to choose from over the last two decades. Hence, it can be assumed that the effect of option overload plays less of a role when faced with the choice of retirement savings in Iceland. To counteract the biases induced by intertemporal choices, many countries, including Iceland, have made participation in a pension fund system mandatory. In addition, an optional supplementary system was introduced with a monetary incentive with additional contributions from employers for those participating in the system.

## **2.22 Choice architecture**

Though decision-makers are ultimately responsible for the final decision, they are not the only actors in the decision-making process. Those responsible for presenting the decision-maker with the choices available also play a significant role in the process. These actors can influence

the decision-making process by changing the presentation of choices available. Thaler and Sunstein (2008) coined the way that choices are presented to decision-makers as choice architecture and, consequently, those responsible for the choice architecture are choice architects.

To explain this responsibility, Thaler and Sunstein use a hypothetical example regarding how food is displayed in a school cafeteria, where the items' order affects the children's choices. The choice architect of this cafeteria is responsible for arranging the items to influence the choices made. For example, the choice architect can arrange the items in random order, arrange them to maximize profits, or can hide them behind the counter, to name a few. These different ways of displaying choice alternatives can influence the children's decisions (Thaler & Sunstein, 2009).

### **2.2.1. Choice architecture for the social security system in Sweden**

Just as the cafeteria manager, those responsible for presenting individuals with the task of choosing a retirement savings plan are choice architects. In the previously mentioned example from Sweden, the Swedish government was a choice architect by (1) privatizing the social security system that increased the number of options, (2) by determining a default rule for participants who did not make an active choice, and (3) by sending a book with 456 portfolios to each household (Cronqvist & Thaler, 2004; Thaler & Sunstein, 2009).

The decision to privatize the social security system allowed new funds to enter the market. From the standpoint of classical economic theory, the combination of free access, choice, and competition this structural change sounds rationale. However, as the example illustrated, this change in choice architecture promoted option overload, making the default rule more attractive than otherwise. On the other hand, too few options can influence the decision-making process by generating context-specific preferences (Thaler & Sunstein, 2009). Thus, this fundamental structural change of the Swedish social security system is a very radical transformation creating a new choice architecture where none existed previously.

Choice architects that are not looking to restructure social security or pension fund systems have multiple tools at their disposal to influence decision-making. Thaler and Sunstein coined these tools as nudges, being "*any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any option or significantly changing their economic incentive*" (Thaler & Sunstein, 2009). Defaults settings or choices are among the most potent nudges available to choice architects. As the example from Sweden, a default choice for

individuals who did not actively choose another fund became the most popular choice by a landslide. Regardless of whether that is a desirable outcome, it depicts how powerful defaults can be (Johnson et al., 2012).

Finally, the Swedish government sent a book containing 456 options to every household in Sweden. Thus, it provided a finite list of alternatives available to the decision-makers with all the relevant information to make an educated decision. Though sounding like an attempt to present the options available in a neutral manner, the reality is that there is no such thing as neutral choice architecture. All choice architecture can and will influence decision-making. Hence, even though sending a thousand-page book to every household every year with a growing number of funds could have the opposite effect on the decision-maker, increasing his option overload and entrenching his status quo bias. Thus, effectively increasing the power of the default rule (Johnson et al., 2012; Thaler & Sunstein, 2009).

### **2.2.3. Choice architecture of retirement savings in Iceland**

The choice architecture for pension funds and supplementary savings account is different in Iceland compared to Sweden. As previously mentioned, the Icelandic retirement savings system has two layers. First, the mandatory pension system, which every employee aged 17 to 70 has to participate in. Employees commonly choose between 1 and 12 funds depending on certain factors. The combined contribution of the employees and employer is a minimum of 15,5% of their salaries in premiums. Employees earn rights for their premiums preserved in the fund or funds they have paid into and are therefore not transferrable between funds when individual moves to another fund. Second, the supplementary savings system is optional, with complete freedom of choice between the 81 accounts. Like in the pension system, both employees and employers contribute to the system, with monthly contributions of up to 6% of the employees' salaries. However, these contributions are personal savings of the employee, and the accumulated sum can be withdrawn at the age of 60 or spread across multiple years (Icelandic pension fund association.).

Employers are responsible for managing the pension fund contributions on behalf of employees. Therefore, the choice of the fund is generally made when the employment contract is signed. However, the employees are free to reconsider their decision at any time, given that they have other options to choose from. When choosing a pension fund, individuals write their choice in a blank line or field on the employment contract form or declare their choice to their employer. Therefore, conversely to Sweden, it is the responsibility of the employee to gather

information on the pension funds and savings accounts available, in addition to evaluating and comparing the options. A complete list of pension funds in Iceland can be found on the Icelandic Pension Fund Association website; however, limited information is available to evaluate and compare funds or discover whether the decision-maker is eligible for a particular fund. Further information can be gathered through contacting the pension funds, trade unions, or the decision-makers' (employee's) employer directly (Icelandic pension fund association.).

Though Icelanders have complete freedom of choice between supplementary savings accounts, it is easier said than done to find a complete list of those alternatives. An Excel sheet on the Central Bank of Iceland website is the only place on the internet the I could find a complete list of supplementary savings accounts (The Central Bank of Iceland.). Therefore, the book of portfolios in Sweden is an exemplary choice architecture compared to the Icelandic blank line.

By providing a finite list of alternatives, the Swedish government used choice architecture to give decision-makers equal access to relevant information to make an educated decision. It is another story whether the decision-makers were susceptible to this nudge. Though having limited success, the book of portfolios was a step in the right direction towards better decision-making, given the available technology. In comparison, it can be argued that in Iceland, there is unequal access to relevant information to make educated decisions; the options are kept hidden behind the counter, only accessible to those that know where to look. The main difference between the Icelandic choice architecture for the supplementary savings accounts and the Swedish choice architecture can be found in the default rule and the book of portfolios, as illustrated in Table 1.

**Table 1**  
*Comparison between Icelandic and Swedish choice architecture*

	<b>Sweden</b>	<b>Iceland</b>	<b>Iceland</b>
System	Social-Security (In the year 2000)	Pension Funds	Supplementary Savings Account
Number of options	456	1-12	81
Default rule	Yes	No	No
Presentation of options	Book	N/A	N/A

*Note.* (The Central Bank of Iceland.; Icelandic Pension Fund Association.; Cronqvist & Thaler, 2004; Thaler & Sunstein, 2009)

Based on this theoretical framework on heuristics, cognitive biases, choice architecture and nudges, and previous studies on decision making regarding retirement savings, the potential

effect of a nudge on the choice of pension funds and supplementary savings account is the topic of interest in this paper. Furthermore, with the Swedish choice architecture as a blueprint, it is interesting to research whether individuals are more likely to reconsider their choice when facing a choice presented with a finite list of alternatives than when having a blank line to fill out. Hence the following hypotheses:

**(H1)** When choosing a pension fund, individuals presented with a complete list of options are more likely to change from their current fund than those not presented with a list of alternatives.

**(H2)** When choosing a supplementary savings account, individuals presented with a complete list of options are more likely to change from their current account than those not presented with a list of alternatives.

## **2.2. Digital nudges**

Since the book of portfolios was sent to every household in Sweden at the dawn of the 21<sup>st</sup> century, technological advancements have opened endless possibilities in choice architecture that previously were only written about in books and seen on television. Furthermore, with the widespread adoption of the internet, reaching every household and every pocket, digital nudges have become an essential part of life.

Digital nudge is any aspect of the digital choice architecture (e.g., user interface design elements) that alters people's behavior predictably without limiting the freedom of choice or altering the economic incentives (Sunstein, 2015; Thaler & Sunstein, 2009; Weinmann, Schneider, & Vom Brocke, 2016). These nudges have made comparing alternatives more accessible with the help of search engines, product recommendations, and filtering options according to preferences, to name a few. These examples are a specific type of digital nudge called interactive or technical decision aids. Technological decision aids help the decision-maker compare alternatives based on specific attributes, attractiveness, recommendations, or preferences guiding the decision-maker through the decision-making process. *"Thus, technology-based decision aids could be designed to steer consumers towards choosing products, services, or activities that are individually and/or socially desirable – i.e., healthy, environmentally friendly, etc. – without restricting their freedom of choice (Johnson et al., 2012)."*

The objective of the book of portfolios in Sweden was precisely to be a decision aid, helping the decision-maker to reach a desirable conclusion without limiting the freedom of

choice. A physical version of this decision aid in the form of a book attempts to solve the mapping problem, which describes the relationship between a choice and the final consumption experience. For example, mapping different ice-cream flavors to choose from is a relatively simple task; even though the ice creams may have exotic flavors, the mapping problem is easily solvable by offering free samples. However, when faced with many obscure alternatives where various relevant attributes can contribute to the decision-making and the consumption experience does not materialize until in the distant future, solving this mapping problem is complex. With the help of technological decision aids solving the mapping problem when choosing between pension fund becomes doable (Thaler et al., 2013).

Another problem that decision-makers face when making a difficult choice between complex alternatives is a lack of navigability. By helping the decision-maker navigate through the options, compare and evaluate, it is possible to help the individual reach a desirable conclusion that aligns with their preferences. One of the most widespread digital nudge that precisely has this purpose is the GPS. Its purpose is to guide the decision-maker to their preferred destination. For example, there can be dozens of routes to reach the preferred destination when sitting down in the driver's seat of a car. If the driver has not tested every possible route to figure out the best one, heuristics will come into play to help him reach a decision. The GPS relieves the heuristics of its duties and presents the decision-makers with the best options available, based on a predetermined objective like "*the fastest route*" (Sunstein, 2015).

Like the GPS, digital choice architecture to choose between pension funds and supplementary savings accounts could increase the decision-maker navigability, leading to the increased power of agency without limiting the freedom of choice. Similarly, such a choice architecture could help individuals solve the mapping problem and collectively counteract behavioral heuristics and biases that may stand in the way of good decisions.

### **3. Methodology**

This study focuses on the effect of a digital nudge on the choice of a pension fund and a supplementary savings account. An economic experiment was created to test whether changing the presentation of available pension funds and supplementary savings accounts would affect employees' decision-making compared to the current choice architecture. Individuals in the Icelandic labor force were asked to participate in a survey containing questions regarding and related to the choice of a pension fund and supplementary savings account. Before accepting to

participate, the individuals were informed that the participation would be anonymous and all the answers treated with confidentiality. Finally, before continuing, it is essential to emphasize that the survey answers are only participants' preferences in a hypothetical situation. They do, therefore, not necessarily reflect their decisions in a real-life situation.

### **3.1. Experimental design**

The economic experiment conducted in this study was an internet survey through the survey platform Qualtrics and was conducted between the 1<sup>st</sup> and 13<sup>th</sup> of July 2021. The experiment was conducted on an individual level, and participants were participants in the Icelandic labor market at the time. The survey aimed to replicate a situation where individuals recently got hired to a new job, similar to the current job of the participants, and faced the choice of a pension fund and, if deciding to do so, a supplementary savings account. Before participating in the survey, individuals were informed that the survey was on employees' choice of a pension fund and supplementary savings account and was part of a master thesis written in the Erasmus School of Economics.

First, the participants were asked about their gender and age. Then, the following 4-5 questions on labor market-related issues that they were not informed about could affect the available pension fund options. First, they were asked about the municipality of the workplace, then sector, trade union, education, then university education for those qualifying for that, and finally, the field of employment.

Then participants were randomly divided into two groups; a control group and a treatment group. First, both groups were informed about the rules of mandatory pension funds in Iceland. Then, they were asked to imagine being offered a new job, similar to their current one but asked which pension fund they wish to choose in this new job. Next, the control group was displayed with a blank field to fill out, while the treatment group was displayed a complete list of options available to them based on their answers to the background questions. Following this question, both participants were asked to explain their choice in an open-ended question.

Then they were asked whether they would like to participate in the supplementary savings plan. If answered "yes", they were asked which percentage of their salary they would like to contribute to a supplementary savings plan in this new job. Finally, which supplementary savings account they wished to join, repeating the set up from the pension fund question. Again participants were asked why they chose this supplementary savings account. For those answering no to participating in the supplementary savings plan, they were pointed straight to



the question of their current pension fund and, if relevant, their current supplementary savings account. The survey ended with thanking the participants for taking part in this survey.

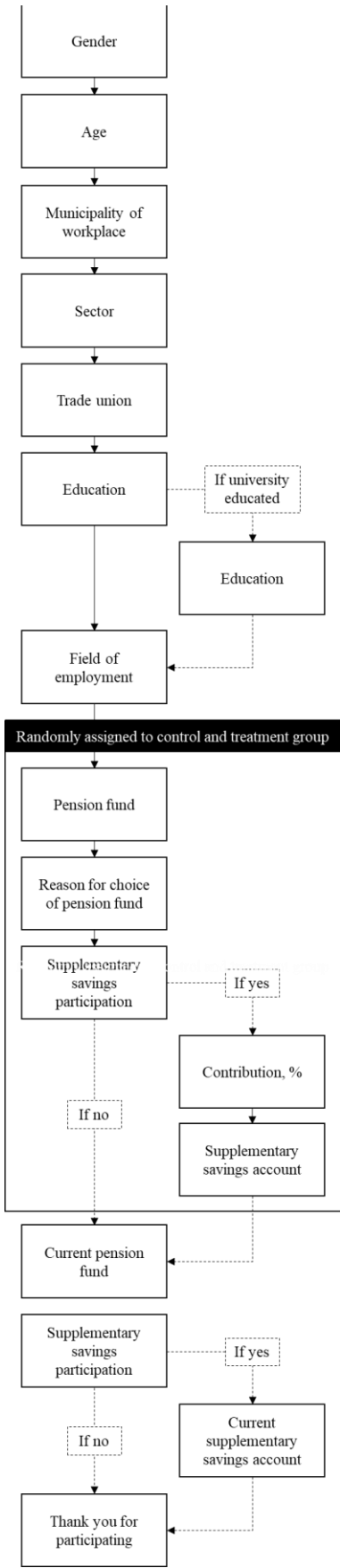
**3.1.1. Dependent variables**

The dependent variables in this survey were divided into two, correspondingly with the two types of retirement savings programs in Iceland; (1) mandatory pension funds and optional (2) supplementary savings accounts.

Participants were asked about their current funds and accounts after answering which pension fund and supplementary savings account they would choose in the hypothetical situations. The current situation was measured at the end of the experiment to avoid possible external validity problems, where the current situation could affect choice in a hypothetical situation. The dependent variables were formulated based on these answers, measuring whether they chose their current fund/account.

Before asking the participants about their choice of these dependent variables following the background questions (described in more detail in chapter 3.1.2.), the participants were randomly assigned to a control and a treatment group. Participants were then asked to imagine that they were offered a job similar to their current job and then asked to choose a fund/account. The control group was presented with a blank line to fill out their preferred choice. The treatment group was presented with a digital nudge, a complete list of options available to them. The primary independent variable in this paper consisted of this allocation into control and treatment groups.

**Figure 1**  
*Flow diagram of the survey*



### **3.1.1.1. Pension fund**

The first dependent variable was determined by comparing the current pension fund of participants with their choice in the hypothetical situation. It is mandatory for all employees in Iceland age 16-70 to participate in a pension fund. Employees pay a 4% contribution of their salary while the employer contributes 11,5%. The principle is that employees are obliged to pay into a specific pension fund determined by the employees' trade union or the law. However, if a collective agreement does not specify a specific occupation or if the terms of employment are not based on a collective agreement, employees are free to choose a pension fund as long as the rules of each fund allow that.

As the available pension fund options can be conditional on factors such as the municipality of workplace, sector, trade union, education, and line of work, freedom of choice was limited for specific participants. The description of these limitations for each pension fund is roughly illustrated in Table 2.

**Table 2***Requirement limiting number of pension funds available to choose from*

<b>Pension Fund</b>	<b>Specific requirements limiting the number of options</b>	<b>Open<sup>1</sup></b>
Almenni Pension Fund	Mandatory for specific jobs.	Yes
Birta Pension Fund	Mandatory for members of specific trade unions. <sup>2</sup>	Yes
Brú Pension Fund	Mandatory for municipality employees (can choose LSR)	No
Eftirlaunasjóður Félags íslenskra atvinnuflugmanna (EFÍA)	Mandatory for members of trade union FÍA.	No
Festa Pension Fund	Mandatory for members of specific trade unions that work in specific municipalities. <sup>2</sup>	Yes
Frjálsi Pension Fund	No requirements.	Yes
Gildi Pension Fund	Mandatory for members of specific trade unions. <sup>2</sup>	Yes
The Icelandic Pension Fund	No requirements.	Yes
Pension Fund for Employees of Akureyri Municipality	Closed for new participants. <sup>3</sup>	No
Bankers Pension Fund	Mandatory for employees at particular workplaces.	No
Farmers Pension Fund	Mandatory for farmers.	Yes
Lífeyrissjóður Rangæinga	Open for members of Verkalýðsfélag Suðurlands.	Yes
Lífeyrissjóður starfsmanna Búnaðarbanka Íslands	Closed for new participants. <sup>3</sup>	No
Lífeyrissjóður starfsmanna Reykjavíkurborgar	Closed for new participants. <sup>3</sup>	No
Pension Fund of Commerce	Open for members of specific trade unions. <sup>2</sup>	Yes
Lífeyrissjóður Vestmannaeyja	Mandatory for employees in Vestmannaeyjar municipality.	Yes
Lífsværk Pension Fund	Open for university-educated individuals.	No
LSR	Mandatory for government employees.	No
SL Pension Fund	No requirements.	Yes
Stapi Pension Fund	Mandatory for members of specific trade unions. <sup>2</sup>	Yes

<sup>1</sup>Open for individuals that are free to choose funds.

<sup>2</sup>Mandatory for members of specific trade unions or terms of employment is based on that collective agreement.

<sup>3</sup>Closed for new participants but open for current participants.

Based on these limitations, the number of options available varied, ranging from only one choice to 12 options available to choose from. Participants in the control group were responsible for taking these limitations into account in their decision in the "new job" situation when writing their choice into a blank field. At the same time, participants in the treatment group were only displayed the options available to them based on their previous answers in the survey, corresponding with these limitations. Additionally, the options displayed to the treatment group were linked to the website of the corresponding pension fund for participants if they would be interested in gathering more information before making a decision. Finally, both groups were asked which pension fund they participate in their current job from a finite list of all the pension funds in Iceland.

These observations were converted into the dependent variable "Change of pension fund," where participants who stuck to their current fund were assigned the value zero. The participants who chose something else were assigned the value one.

### **3.1.1.2. Supplementary savings account**

The second dependent variable was determined by comparing participants' current supplementary saving funds with their choice in the hypothetical situation. Unlike the pension fund system, the supplementary savings system has optional participation and is open to everyone regardless of previously mentioned limitations. Employees have the option to participate in a supplementary savings account where they put up to 4% of their wages into a supplementary savings account of their choosing. Their employer then matches the employees' contribution but a maximum of 2%. In total this amount can sum up to 6% of the employees' wages.

After having decided to join the supplementary savings system, the employee then chooses a supplementary savings account. There are 81 active supplementary savings accounts in Iceland as of 31<sup>st</sup> of July 2021, as illustrated in Table IX in Appendix A. Participants in the control group had to write down their choice into a blank field. At the same time, participants in the treatment group were presented a list of all the 81 supplementary savings accounts, each linked to the website of the corresponding pension fund for participants if they would be interested in gathering more information. Finally, both groups were asked which pension fund they participate in their current job from a list of all the 81 accounts.

These observations were converted into the dependent variable "Change of supplementary savings account," where participants who stuck to their current account were assigned the value zero. The participants who chose something else were assigned the value one.

### **3.1.2. Explanatory variable**

The primary explanatory variable of this paper measures whether the participants belonged to the control or the treatment group.

#### **3.1.2.1 Treatment/control group**

As previously mentioned where participants were randomly allocated into a control and a treatment group. Participants in the control group were asked to choose a pension fund and supplementary savings account by writing their answers into a blank field. Participants in the

treatment group were asked to choose a pension fund and supplementary savings account from a complete list of options. This allocation determined the primary explanatory variable of the research. This allocation of participants was recoded into a binary variable where the control group had the value zero, and the treatment group had the value one.

### **3.1.3. Control variables**

Before facing the choice of a pension fund and a supplementary savings account, participants were asked a series of background questions. The background questions gathered general demographics information of the participants and information relevant to a pension fund and supplementary savings account choice. Because of a causal relationship between some of the background questions and pension funds available to choose from, they are not independent of the dependent variable in all instances. For example, those working for the central government only have the option to choose the pension fund "LSR", as they are legally obliged to do so, with a few exceptions. The control variables that are based on the background questions were the following:

#### **3.1.3.1. Gender**

Participants were asked about their gender. Participants chose between male, female, other, and prefer not to say. All participants that finished the entire survey either answered male or female. Hence, the answers were recoded into a binary variable where males assigned the value one and females assigned the value zero.

#### **3.1.3.2. Age**

The age of participants was measured since only individuals between the age of 17 and 70 years can participate in the pension fund system. The answers to this question were converted into an ordinal continuous variable.

#### **3.1.3.3. Municipality of workplace**

Participants were asked to indicate the municipality of their current workplace. This variable is measured since some pension funds only operate in a specific geographical location. Therefore the answers to this question might influence which pension fund is available to choose from, reflecting in the options displayed for participants in the treatment group. Correspondingly, the answers were converted to an unordered categorical variable where each municipality was assigned a specific number.

#### **3.1.3.4. Sector**

Participants were asked to indicate whether they work in the private sector, for the central government or its institutions, or the municipalities or their institutions. The reason being that government and municipality employees are obliged to choose either "LSR" or "Brú Pension Fund", with a few exceptions. The answers were converted to a binary variable where the private sector was assigned the number one and other sectors were assigned the number zero.

#### **3.1.3.5. Trade union**

Participants were asked to indicate whether and which trade union they participate in. As indicated previously, a trade union membership can influence the pension funds available to participants. Correspondingly, the answers were transformed to an unordered categorical variable where each trade union was assigned a specific number.

#### **3.1.3.6. Education**

Participants were asked to indicate their educational level, choosing between unskilled, journeymans' or other job-specific certificates and university education. The reason being that educational level can influence the pension funds available to the participants. The answers were converted to a binary variable for university education where university-educated participants were assigned the number one and the other zero.

#### **3.1.3.7. University education**

Those with a university education were asked to indicate which university education they have. This variable is measured since some pension funds are strictly open to specific university-educated individuals or, more specifically, university-educated individuals who work in a particular line of work, for example, physicians. The answers to this question were transformed into an unordered categorical variable where each university education was assigned a specific number.

#### **3.1.3.8. Field of employment**

The final background question was on the field of employment. The reason being that some pension funds are only open to individuals in a specific field of employment or that are employed at specific companies or institutions. Therefore, this variable is an unordered between-subject categorical variable. Correspondingly, the answers were converted to an unordered categorical variable where each field of employment was assigned a specific number.

### **3.1.3.9 Contribution to the supplementary savings account**

Conditional on the participants answering "yes" to participating in a supplementary savings account, they were asked what percentage of their salary they are willing to contribute to the supplementary savings plan. The answers were 1%, 2%, 3%, and 4% representing the equivalent numbers in a categorical ordered variable.

### **3.1.3. Additional questions**

Two open-ended questions were used to gain further insight into the reasons for the participants' choices.

#### **3.1.2.2. Reason for choice of pension funds in the hypothetical situation**

Following the background questions, participants were asked to choose a pension fund if they were offered a job similar to their current job (the intervention). After answering that question, participants were asked to explain why they chose this pension fund. This was an open-ended question.

#### **3.1.2.3. Reason for choice of supplementary savings account in the hypothetical situation**

Given that a participant answered "yes" to participating in a supplementary savings account, they were asked to choose a supplementary savings account if they were offered a job similar to their current job (the intervention). After answering that question, participants were asked an open-ended question to explain why they chose this supplementary savings account.

## **3.2 Participants**

I recruited participants for the experiment through my personal network and the personal network of close relatives and friends. The survey was conducted online through the survey platform Qualtrics and was shared using social networks such as Facebook, Facebook Messenger, Whatsapp, and LinkedIn. Eligible for participation were participants in the Icelandic labor market 17 years of age or older.

Two hundred ninety-three individuals started the survey in total. However, only 206 participants completed the entire survey. In addition, one individual that completed the survey claimed to be 0 years old, and therefore the participant was removed from the sample. As participants belonging to the control group wrote their answers to the dependent variables into a blank field, it was impossible to prevent them from writing invalid answers. These answered

ranged from choosing a fund that was not available to them to "I do not know" to "\\_(\ツ)\\_/", to simply some nonsense. However, since the current real-life choice architecture (a blank field) of the dependent variables allows these kinds of answers, they are included in the sample. The final sample size is, therefore, 205 participants.

For the final sample, 108 participants were female (53%) and 97 male (47%). The average age of participants was 32 years with a standard deviation of 8.975, ranging from 17 to 67 years of age. 79% of the participants work in the capital city of Iceland, Reykjavík. 62% work in the public sector, 22% for the government, and 16% for the municipalities. The trade union participation was dispersed, with 23% of participants belonging to VR, 14% not participating in any trade union, and the rest spread across multiple other trade unions, none reaching above 7.3% of participants. 90% of participants had a university education, 6% had other certificates, and 4% were unskilled. 18% of the 184 university-educated participants studied Business Administration, equally as many were lawyers, and other education was below 10%. Finally, 17% worked as specialists, 12% worked in an office job, 11% as lawyers, and 10% as managers. The rest occupied other jobs that did not reach 10% of the total participants. The exact distribution of the answers to these background questions will be presented in Appendix A.

Before conducting the survey, I looked for relevant previous studies with data that could prove helpful in estimating the sample size needed for the survey. Unfortunately, no such research was found. However, after the survey, the preliminary results were used to estimate the sample size needed according to the change rate of participants before and after the intervention. The power was set at 80%, two-sided alpha at 0.05 with an equal sample size for each group. According to a Fisher exact test for the pension funds, the total sample size would have to be at least 310 participants. However, as the effect size was larger for the supplementary savings accounts, the Fisher Exact test estimates a sample size of at least 82 participants.

### **3.3. Materials**

Participation in the survey took 3-8 minutes on average ( $\pm$  one standard deviation), and participants were not compensated for their time as recommended by the thesis program supervisors. However, few participants contacted me after taking the survey and acknowledged not being on top of things regarding their pension and supplementary savings. Instead, the survey nudged them to seek consultation on the matter. By itself, that is compensation in the form of better decision-making and hopefully increased retirement savings in the future.



### **3.4. Procedure**

I recruited participants for this online survey via social media, mainly through Facebook, Facebook Messenger, and LinkedIn. Close relatives and friends also shared the survey on social media. Then the survey was shared on Facebook and LinkedIn and followed up directly with Facebook friends on Facebook Messenger.

When opening the survey, participants received information on the survey itself. Participants were informed that this was a survey on employees' choice of a pension fund and supplementary savings plan in Iceland conducted as a part of a master's thesis written at Erasmus School of Economics. Participants were informed that participation in the survey would be completely anonymous and impossible to trace back to respondents. Therefore, participants were urged to answer honestly. Additionally, the participants were informed that it was allowed to use the internet while filling out the survey. Explicitly mentioning that the use of the internet was allowed as it is only fair that the control group can use the internet since the treatment was displayed with hyperlinks that lead to pension funds and supplementary savings accounts. If the participants accepted to participate in the survey, they were asked to answer 7-8 background questions (eight if university-educated and seven otherwise).

### **3.5. Analysis**

Based on the participants' choices, the two binary dependent variables were constructed, taking zero for status quo and one if they chose something else. This transformation changed the dataset from having two time periods to only one time period. Therefore using the Difference-in-Difference method in the regression analysis would not be considered suitable.

Instead, the analysis will strictly focus on measuring the possible effect of being in the treatment group compared to being in the control group. In other words, the potential effect on decision making when presented a complete list of options compared to being presented a blank line. This transformation calls for Probit or Logistic regressions for binary dependent variables (1) change of pension funds and (2) change of supplementary savings accounts to measure the predicted probability of changing a decision following the treatment.

The variable takes the value zero if the participant sticks to the previous choice after the intervention and the value one if the choices change following the interventions. Before performing the binary logistic regression, the variables must satisfy specific requirements. First, the dependent variables must be binary, as is the case in this research. Third, logistic

regression requires little or no multicollinearity among the independent variable. This multicollinearity will be ascertained in the results chapter. Finally, logistic regressions assume that the observations are independent and assume linearity of the independent variables.

The logistics model estimated in this research is the following:

$$\text{logit}(y) = \beta_0 + \beta_1 * x_1 + \beta_2 * x_2 + \dots + \beta_N * x_N + \varepsilon$$

In addition to the control variables previously mentioned, four binary explanatory variables were generated. The first one was a variable indicating whether the participants belong to the treatment or the control group. The second was on how many pension funds were available to each participant, regardless of whether they were in the control or treatment group. However, since the control group filled out a blank field, it was impossible to prevent participants from writing invalid answers. Hence, the third and fourth variable variables were created to account for valid and invalid answers when choosing pension funds and supplementary savings accounts. Table 4 summarizes the variables used in the regressions.

**Table 3**  
*Variables measured*

<b>Variables</b>	<b>Description</b>
Gender (Control)	Dummy: Female (0); Male (1)
Age (Control)	Continuous: Age of participants
Sector (Control)	Dummy: Public sector (0); Private sector (1)
Education (Control)	Dummy: Other education (0); University education (1)
Pension funds available (Control)	Dummy: 1-2 (0); 10-12 (1)
Valid answer PF <sup>1</sup> (Control)	Dummy: Invalid (0); Valid (1)
Valid answer SSA <sup>2</sup> (Control)	Dummy: Invalid (0), Valid (1)
Type of Choice Architecture/Treatment (IV <sup>3</sup> )	Dummy: Complete list of options/Treatment group (1); Blank field/Control group (0)
Choice of Pension Fund (DV <sup>4</sup> )	Dummy: Status quo (0); Another choice (1)
Choice of Supplementary Savings Account (DV <sup>4</sup> )	Dummy: Status quo (0); Another choice (1)

*Note.* <sup>1</sup> PF stands for Pension Fund, <sup>2</sup> SSA stands for Supplementary Savings Account, <sup>3</sup> IV stands for Independent Variable, <sup>4</sup> DV stands for Dependent variable

Before running regressions, Fisher's exact tests were conducted for each dependent variable and the explanatory variable to measure whether the observations of the two samples (control and treatment group) were evenly distributed over the two classes (status quo and another choice). Finally, after running the regressions, some goodness of fit measures were

conducted. First, to test whether the coefficient coefficients are equal to zero, the Wald test and LR test were used. Then to measure the goodness of fit of the models as a whole, two (log-)likelihood measures were calculated, Akaike information criterion and McFadden's  $R^2$  in addition to the variance measurements Efron  $R^2$  and Count  $R^2$ .

## 4. Results

Two hypotheses were tested to determine the potential effect of presenting a complete list of options to participants compared to a blank field. Five binary logistic regressions were conducted to test these hypotheses.

### 4.1. Descriptive statistics

For the first dependent variable, change of pension funds, of the 205 total answers, 60.5% chose status quo, while 39.5% made another choice. Participants in the treatment group made another choice in 31.1% of the cases, while 68.9% stuck to their previous choice. However, 52.3% chose the status quo in the treatment group, while 57.2% made another choice. A Fisher's exact test was used to measure the null hypothesis that the two samples (control and treatment group) are evenly distributed over the two classes (status quo and another choice) when choosing a pension fund. The test results are significant ( $p=0.023$ ), indicating distribution is not equal between the two classes. Therefore, the null hypothesis can be rejected.

**Table 4**  
*Frequency distribution of the change of pension funds*

Group	Choice in the hypothetical situation compared to the current situation		Total
	Status quo	Another choice	
Control (blank field)	56 (52.83)	50 (47.17)	<b>106 (100.00)</b>
Treatment (complete list)	68 (68.69)	31 (31.31)	<b>99 (100.00)</b>
<b>Total</b>	<b>124 (60.49)</b>	<b>81 (39.51)</b>	<b>205 (100.00)</b>

*Note.* Fisher's exact ( $p=0.023$ ), one-sided Fisher's exact ( $p=0.015$ )

Based on the answers to background questions, the number of available pension funds to each participant was measured with 23.90% of participants only having one option available, 38.54% of participants having two options available, and 37.56% having ten or more options, as illustrated in Table 5.

**Table 5***Number of pension funds available to participants*

<b>Available pension funds</b>	<b>No. of participants</b>	<b>Percentage</b>
1 pension fund	49	23.90%
2 pension funds	79	38.54%
10 pension funds	4	1.95%
11 pension funds	63	30.73%
12 pension funds	10	4.88%

The second dependent variable, the change of a supplementary savings account, also had 205 total answers, where 59.02% stuck to their current account while 41.98% chose something else. In the treatment group, 75.76% of participants stuck to their current account, while 43.40% of participants in the control group chose the status quo. Similarly, a Fisher's exact test was conducted with the second dependent variable, the change of supplementary savings accounts. Again, Fisher's exact test results were significant ( $p=0.000$ ), indicating that the distribution is not equal between the status quo and another choice. Therefore, the null hypothesis was rejected.

**Table 6***Frequency distribution of the change of supplementary savings accounts*

Group	Choice in the hypothetical situation compared to the current situation		Total
	Status quo	Another choice	
Control (blank field)	46 (53.40)	60 (46.60)	<b>106 (100.00)</b>
Treatment (complete list)	75 (75.76)	24 (24.24)	<b>99 (100.00)</b>
<b>Total</b>	<b>121 (59.02)</b>	<b>84 (40.98)</b>	<b>205 (100.00)</b>

*Note.* Fisher's exacts ( $p=0.000$ ), one-sided Fishers's exact ( $p=0.000$ )

However, as participants in the control group were presented with a blank line, they could answer with a pension fund not available to the individual. Therefore, the dummy variables for valid answers were created.

**Table 7***Valid and invalid answers of pension funds*

Group	Valid Answer		Total
	Invalid	Valid	
Control (blank field)	47 (44.34)	59 (55.66)	<b>106 (100.00)</b>
Treatment (complete list)	0 (00.00)	99 (100.00)	<b>99 (100.00)</b>
<b>Total</b>	<b>47 (22.93)</b>	<b>158 (77.07)</b>	<b>205 (100.00)</b>

**Table 8***Valid and invalid answers of supplementary savings accounts*

Group	Valid Answer		Total
	Invalid	Valid	
Control (blank field)	42 (39.62)	64 (60.38)	<b>106 (100.00)</b>
Treatment (complete list)	0 (00.00)	99 (100.00)	<b>99 (100.00)</b>
<b>Total</b>	<b>42 (20.49)</b>	<b>163 (79.51)</b>	<b>205 (100.00)</b>

Invalid answers are answers nevertheless and one of the attributes that distinguish the treatment group from the control group since it was impossible to make invalid choices in the treatment group. It comes without saying that the distribution is not equal between the two classes (valid and invalid) between the control group and the treatment group since the latter group was forced to give valid answers. Therefore regressions were conducted with the invalid answers and compared with regressions where the invalid answers were omitted.

## **4.2. Status quo and option overload**

Previous research from Sweden (choice of a portfolio) and the USA (retirement savings of professors) suggest a strong preference for the status quo when choosing retirement savings portfolios or programs. For example, in 2001, only 1,7% of individuals in Sweden made changes to their portfolios, 2,7% the following year, and 3,1% in 2003 (Thaler & Sunstein, 2009).

The results from this survey also suggest a preference for the status quo when participants were asked to imagine a situation where they would have to choose a pension fund and a supplementary savings account. Of the 205 participants, 60.5% of participants chose the

status quo. Additionally, it must be taken into account that this survey only asked about a hypothetical situation, and therefore, the answer only accounts for preferences. When faced with a real-life choice of a pension fund and supplementary savings account, an even higher percentage may end up sticking to the status quo, especially since the current choice architecture is similar to the blank field in the survey. The 16 observations for the first dependent variable and 43 observations for the second dependent variable would be considered invalid in real-life settings. Therefore, the individuals would have to reconsider their answers.

In the two open-ended questions following answering the dependent variables, participants were asked about the reason for their choice of funds and accounts. Of the 92 participants who stuck to the current pension fund, 49 said the reason was their previous or current relationship with the fund. In addition, 56 participants that stuck to their current supplementary savings account had similar reasons for their choice.

**Table 9**

*Reason for choice of participants that stuck to their current choice.*

Reason for choice	Number of participants	
	PF <sup>1</sup>	SSA <sup>2</sup>
Current or previous relationship with PF/SSA	49 (53.26%)	56 (48.27%)
Good investment return or reasonable interest rates	18 (19.57%)	27 (23.28%)
Accessibility	-	11 (9.48%)
Suitable for my age	-	8 (6.90%)
Other reasons	15 (16.30%)	14 (12.07%)
No reason	10 (10.87%)	-
<b>Total</b>	<b>92 (100.00%)</b>	<b>116 (100.00%)</b>

<sup>1</sup> PF stands for Pension Fund, <sup>2</sup> SSA stands for Supplementary Savings Account  
*Note.* This categorization is based on subjective opinion.

Based on the participants' reasoning that stuck to their previous choices, it can be extrapolated that they rely on experience with their current fund or account when making their choice, and understandably. This reasoning is logical but could also attribute to availability bias that could increase the preferences towards the status quo. Though not conducting any

econometric analysis, the results suggest a preference for sticking to the status quo similar to previous research.

### 4.3. Potential effect of changing choice architecture

The topic of specific interest in this research is whether a change in choice architecture can influence the behavior of decision-makers. Based on previous research on choice architecture and decision-making regarding retirement savings, two hypotheses were formulated. Both hypothesized that individuals presented with a complete list of options are more likely to change from their current choice than those not presented with a list of alternatives. The former hypothesis was for choice of pension funds and the latter for choice of supplementary savings account.

#### 4.3.1. Pension funds

Multiple binary logistic regressions were used to test the hypothesis (H2A). The first regression was conducted using the total sample size, the second only with participants with more than one option and the third only participants with valid answers and more than one choice. The independent variable was the treatment variable, whether the participant was displayed a complete list of options or not. Additionally, control variables for age and gender were included in the regression models.

Wald tests were used to test the null hypotheses that the coefficients of age and gender were simultaneously equal to zero in the three regressions conducted for this dependent variable. However, the results of the tests were not significant, as indicated in Table 10. Therefore we could not reject the null hypotheses that the coefficients were equal to zero.

**Table 10**

*Wald test for control variables for age and gender in regressions 1-3*

WALD TEST	(1) Change of PF	(2) Change of PF	(3) Change of PF
$\chi^2$ [df]	1.05 [2]	2.72 [2]	0.52 [2]
P-value	0.5916	0.2568	0.7695

Dependent variable: Change of pension fund (PF)

(1) Full data

(2) Only participants with a choice

(3) Only valid answers of participants with a choice

Similarly, LR tests comparing regression with multiple control variables with an unrestricted model suggested that the unrestricted model would be a better fit since the p-values were  $>0.05$ . Hence I could not reject the null hypothesis that the effect of the control variables was equal to zero, as indicated in Table 11. Therefore, ending by using the unrestricted model only with the independent variable instead of a restricted one with control variables.

**Table 11**  
*LR test for restricted and unrestricted regressions 1-3*

LR TEST	(1) Change in PF	(2) Change in PF	(3) Change in PF
$\chi^2$ [df]	1.05 [2]	2.80 [2]	0.52 [2]
P-value	0.5910	0.2470	0.7720

Dependent variable: Change of pension fund (PF)  
 (1) Full data  
 (2) Only participants with a choice  
 (3) Only valid answers of participants with a choice

McFadden's  $R^2$  and Efron's  $R^2$  were calculated for the unrestricted models to measure the overall fit of the models. McFadden's  $R^2$  results are close to zero indicating the model is not much improvement over one with just a constant term. The Efron  $R^2$  similarly suggests that the models are not a good fit as its close to 0.



**Table 12**  
*Logistics regressions for pension funds*

VARIABLES	(1) Change of PF	(2) Change of PF	(3) Change of PF
Treatment	-0.672** (0.291)	-0.640* (0.335)	0.209 (0.404)
Constant	-0.113 (0.195)	-0.0953 (0.218)	-0.944*** (0.315)
Observations	205	155	121
Model $\chi^2$ [df]	1.05 [2]	2.80 [2]	0.52 [2]
McFadden's R2	0.020	0.018	0.002
Efron R2	0.026	0.024	0.000
Count R <sup>2</sup>	0.000	0.000	0.000

Standard errors are in parenthesis

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

Dependent variable: Change of pension fund (PF)

(1) Full data

(2) Only participants with a choice

(3) Only valid answers of participants with a choice

The results of the goodness to fit measures indicate that the models are not a good fit. However, the coefficient for treatment in model 1 suggests that being presented with a complete list of pension funds available compared to the blank field decreases the probability of choosing another option after the intervention. The effect is significant at a 5% significance level. This effect contradicts the hypothesis that being presented with the options increases the probability of choosing another option compared to being presented with a blank field. Therefore the results are inconclusive.

**Table 13***Average marginal effects for pension funds*

VARIABLES	(1) margins	(2) margins	(3) margins
Treatment	-0.159** (0.0673)	-0.152* (0.0778)	0.0439 (0.0844)
Observations	205	155	121

Standard errors are in parenthesis

\*\*\*p&lt;0.01, \*\*p&lt;0.05, \*p&lt;0.1

Dependent variable: Choice of pension fund

(1) Full data

(2) Only participants with a choice

(3) Only valid answers of participants with a choice

However, logistic regression analysis does not indicate the magnitude of the effect, only the sign and significance. The magnitude can be measured using marginal effects for model 1, as illustrated in Table 11. On average, in this sample, being in the treatment group compared to the control group decreases the probability of choosing another option after the intervention by 15.86 percentage points. The effect is significant at a 5% significance level. This effect corresponds with the regression and contradicts the effect predicted in the hypothesis.

#### 4.3.2. Supplementary savings accounts

Two binary logistic regressions were used to test the hypothesis (H2). The first regression was conducted using the total sample size, the second only with participants with valid answers. The independent variable was the treatment variable, whether the participant was displayed a complete list of options or not. Additionally, four control variables were included in the final regression for gender, sector, and education.

A Wald test was used to test the null hypotheses that the coefficients of gender, a dummy for university education, and a dummy for the public sector were simultaneously equal to zero in the fifth regressions. For the fifth model, the results from the Wald test indicated I could not reject the null hypothesis that the effect of the coefficients of the control variables was equal to zero, as indicated in Table 14.

**Table 14***Wald test for control variables for gender, education, and sector in regression 5*

WALD TEST	(4) Change of SSA	(5) Change of SSA
$\chi^2$ [df]	-	9.01 [3]
P-value	-	0.0292

Dependent variable: Change of supplementary savings account (SSA)  
(4) Full data  
(5) Only valid answers

Similarly, the LR test indicated that the restricted model would be a better fit since the p-value was  $< 0.05$ . Hence, I could reject the null hypothesis that the effect of the control variable gender was equal to zero, as indicated in Table 15.

**Table 15***LR test for restricted and unrestricted regression 4 and 5*

WALD TEST	(4) Change of SSA	(5) Change of SSA
$\chi^2$ [df]	4.01 [1]	9.71 [3]
P-value	0.0453	0.0212

Dependent variable: Change of supplementary savings account (SSA)  
(4) Full data  
(5) Only valid answers

Therefore, ending by using a restricted model with gender as a control variable. Hence, keeping gender fixed and being presented with a complete list of supplementary savings accounts compared to a blank field decreases the probability of choosing another option after the intervention. Therefore, the effect is significant at a 5% significance level.

**Table 16***Logistic regression for supplementary savings accounts*

VARIABLES	(4) ChoiceSSA	(5) ChoiceSSA
Treatment	-1.449*** (0.311)	-0.272 (0.374)
Gender	0.608** (0.306)	0.987*** (0.377)
EducationDummy		-0.339 (0.553)
SectorDummy		-0.624* (0.376)
Constant	-0.00893 (0.240)	-0.724 (0.643)
Observations	205	163
Model $\chi^2$ [df]	3.95 [1]	9.01 [3]
McFadden's R2	0.096	0.018
Efron R2	0.123	0.024
Count R <sup>2</sup>	0.131	0.000

---

Standard errors are in parenthesis

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

Dependent variable: Choice of supplementary savings accounts (SSA)

(4) Full data

(5) Only valid answers

These results correspond with the calculation of the average marginal effect that, on average in this sample, being in the treatment group compared to the control group decreases the probability of choosing another option after the intervention by 32.65 percentage points. The effect is significant at a 5% significance level.

**Table 17**  
*Average marginal effects for supplementary savings accounts*

VARIABLES	(4) margins	(5) margins
Treatment	-0.327*** (0.0638)	-0.0502 (0.0698)
Gender	0.130** (0.0643)	0.183*** (0.0677)
EducationDummy		-0.0651 (0.111)
SectorDummy		-0.118 (0.0720)
Observations	205	163

Standard errors are in parenthesis

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

Dependent variable: Choice of supplementary savings accounts

(4) Full data

(5) Only valid answers

Finally, the fifth model consisted only of participants with valid choices of supplementary savings account and all four control variables. The Wald test for that model indicated that I could reject the null hypothesis that the effect of the coefficients of the control variables was equal to zero. However, the LR test returned a p-value > 0.05, so the model was adjusted by removing the control variable age. With that adjusted model, the LR test returned a p-value < 0.05 and therefore, rejecting the null hypothesis that the effect of the control variables was equal to zero, as indicated in Table 12. However, the effect of the coefficient of the independent variable was insignificant, and therefore, no difference was observed. Even though the logistic regression number four returned results that can be interpreted as significant, the coefficient sign was opposite to what the hypothesis (H2) suggested. Therefore, the results were inconclusive.<sup>1</sup>

<sup>1</sup> The final topic of interest was the potential effect of the digital nudge of presenting a complete list of alternatives for participants to choose. In the survey, the treatment group was able to use hyperlinks leading to the website of each pension fund or supplementary savings account to gather information to help make a better decision. The intention was to compare choices of those that used the hyperlink to those who did not. However, the Qualtrics survey platform, does not supply the survey maker with data on the usage of those links. Therefore, it was not possible to measure the effect of the digital nudge in other ways than already has been done.

## 5. Discussion

This paper explored the influence of heuristics and biases in decision making and how choice architecture can be used to counteract these biases that can lead to better decision making. This research focuses on the potential effect of changing the choice architecture of employment contracts in Iceland regarding pension funds and supplementary savings accounts.

The current choice architecture displays a blank line or blank field that the decision-maker needs to fill out. At the dawn of the 21<sup>st</sup> century, Sweden privatized its social security, allowing Swedes to choose their investment portfolio. These changes followed that the government delivered a book with a complete list of alternatives to every household to help individuals make an informed decision. However, instead of writing a book, the modern technological medium of the internet was used to create a choice architecture displaying a complete list of alternatives for the Icelandic labor market members.

I studied the impact of a choice architecture element in a hypothetical scenario implemented in a survey. Participants were randomly assigned into two groups in the survey; a control group presented with the current choice architecture a blank line, and a treatment group presented with a complete list of alternatives available. The participants were then asked to imagine they had been offered a new job, similar to their current one, and based on that to choose a pension fund and optionally to choose a supplementary savings account. Those two choices became the measurement used to create the dependent variable for this research to measure whether changing the choice architecture affects participants' decision-making. More specifically, the potential effect of presenting the complete list of alternatives compared to not presenting any alternatives at all.

### 5.1 Limitations

Two hundred and five individuals participated in the survey, 99 in the treatment group and 106 in the control group. The regression analysis of pension fund choices suggested that the probability of choosing another option decreases when presented with a complete list compared to filling out a blank line. Fisher's exact tests indicated a significant difference in the distribution of two classes (the status quo and another choice) between the control and the treatment group. However, the goodness of fit measures of the logistic regressions indicated that the models were not a good fit. The regression analysis of supplementary savings account choices also suggests that the probability of choosing another option decreases when presented

with 81 options compared to a blank line. This time around, the models were a good fit, and the effect was significant. Nevertheless, in all cases, the results were in contradiction with the hypothesis constructed for this thesis.

The two hypotheses that the change in choice architecture would increase participants' probability of changing their minds when choosing a fund or account compared to those with a blank line were based on previous literature on heuristics, biases, choice architecture, and nudges. Heuristics can be helpful mental shortcuts to help individuals with decision-making under risk and uncertainty. It is, however, possible that these heuristics develop into cognitive biases that can lead individuals to make bad decisions (Benartzi & Thaler, 2007). In complex decision-making processes where (1) the number of options is extensive, (2) mapping of options is complicated, and (3) the consequence of this decision unfolds in the future, these biases can play a more significant role in the decision making (Cronqvist & Thaler, 2004; Johnson et al., 2012; Thaler & Sunstein, 2009). That is the case with decisions regarding retirement savings, as previous studies from Sweden and the USA suggest. For example, in the three years following the privatization of the Swedish social security system, less than 4% of individuals made any changes to their portfolios. In a specific retirement savings program for professors in the USA, the median change of asset allocation over an entire lifetime was 0 (Thaler & Sunstein, 2009). These studies suggest a strong preference for keeping the status quo concerning retirement savings.

However, the example from Sweden shows how choice architecture can be used to influence decision-making. First, by sending the book of portfolios to every household, which, together with an active advertising campaign, nudged individuals into making an active choice introducing (2/3 made an active choice the first year). Second, by introducing the default rule for those individuals who did not make an active choice (1/3 the first year). Unlike Sweden, the choice architecture in Iceland does not offer a complete list of alternatives when individuals have to choose a retirement savings plan. Hence, changing the choice architecture in Iceland came along with the hypothesis that it could decrease the decision-makers' preference for the status quo.

As previously mentioned, the results from the regressions contradict these hypotheses. In retrospect, I think there may be two primary explanations for this discrepancy—the first one being that this survey only replicates a real-life decision but is only a hypothetical situation. Hence, the participants are not susceptible to the same heuristics and biases as in real-life situations and are not exposed to the same motivations as deciding their retirement savings on

the line. The second, equally if not more critical factor, is that the survey platform and design made it impossible to force the participants in the control group to choose a valid option. In contrast, the treatment group was forced to give a valid answer.

Since these questions for the control group were open-ended, the participants could write anything they wanted regardless of whether it was a pension fund or something else. Unfortunately, that turned out to be the case, with 44.34% of pension fund choices deemed invalid and 39.62% of supplementary savings accounts choices of the control group. These individuals would be asked to revise their decision in real life until an available pension fund or supplementary savings account would be chosen. Therefore approximately 40% of individuals in the control group would have made another decision than the survey indicated. Hence, the control group could react to the intervention in a different way than the treatment group. Thus, any statistical analysis comparing the two groups based on the survey would be considered inconclusive.

### **5.3. Future research**

Putting all the limitations aside, decision-making and choice architecture of critical intertemporal choices such as retirement savings is a topic that should continue to be researched in behavioral economics. In response to the limitation, I recommend, instead of researching hypothetical situations, research real-life decisions regarding retirement savings similar to the examples from Sweden and the USA. Before changing the choice architecture regarding retirement savings, it is important to understand the current choices and behavior of the labor force. Then it is possible to develop a digital choice architecture for real-life situations and perform a natural field experiment comparing the digital choice architecture with the current one.

The field experiment could be conducted in cooperation with human resource firms or large employers (e.g., companies or municipalities) directly connected with the regular recruitment of employees. Similar to the survey conducted for this paper, the new recruitments would be randomly assigned to two groups; a control group and a treatment group. The control group would receive a typical employment contract form with a blank line to fill out all relevant information, including a pension fund and supplementary savings account. The treatment group would receive a digital contract form with the comparable digital choice architecture created for the survey, choosing a pension fund and supplementary savings account from a complete list of options. Additionally, another treatment group could be presented with a more detailed



choice architecture that would include relevant and comparable information on each fund and account to help solve the mapping and navigability problem. In comparison with the hypothetical situation from the survey, all participants in this field experiment would be making real-life intertemporal choices, be susceptible to actual heuristics and biases, and be exposed to the same motivations. Moreover, all participants would be forced to make a valid decision regardless of whether they would be in the control or the treatment group(s).

## **6. Conclusion**

Choices regarding retirement savings are among the most significant financial decisions individuals take in their lifetime. As in other choices, individuals are susceptible to heuristics and biases that might influence their retirement savings decisions. Previous studies on retirement savings decisions indicate a strong effect of inertia on choosing investment funds and portfolios. The results from the survey conducted for this paper are in harmony with the literature. When asked to imagine being offered a new job similar to their current one, most participants decided to stick to their current pension fund and supplementary savings account. However, when asked about the reason for that choice, most of the answers implied heavy reliance on previous experience, and understandably so. These answers suggest a strong preference for the status quo.

Based on the literature on heuristics, biases, and choice architecture in retirement savings, it was hypothesized that the current choice architecture in Iceland amplifies the preferences for the status quo. Hence the main aim of this paper was to research the potential effect of changing the choice architecture of retirement savings in Iceland. More specifically, whether digitally presenting a complete list of alternatives would affect the choice of pension funds and supplementary savings accounts.

In contradiction with the hypotheses proposed in this paper, the results from the survey suggest that when choosing a pension fund or supplementary savings account, being presented with a complete list of funds/accounts compared to a blank field decreases the probability of making another choice. However, the survey platform and design had made it impossible to force the control group to make a valid choice, while the treatment group was forced to do so. Additionally, the answers only reflect preferences in a hypothetical situation. Therefore, the participants were not susceptible to the same heuristics and biases nor exposed to the same motivations as in real-life situations. These answers significantly skewed the results of the survey and the findings of the regression analysis.

Nevertheless, based on these findings, it can be extrapolated that if a digital choice architecture were introduced in real-life situations, it would be possible to eliminate errors that surfaced in this survey, such as participants trying to choose pension funds not available to them. The relatively simple nudge of presenting previously hidden options could increase the decision makers' power of agency without restricting their freedom of choice. Digital nudges like this will become an essential part of our lives. In critical choices such as retirement savings, they should be developed to help decision-makers map and navigate through the task to make better decisions.

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## Appendix

### Appendix A: Survey specific statistics

**Table I**

*Gender of participants*

<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Male	108	52.68%
Female	97	47.32%

**Table II**

*Age of participants*

<b>Observations</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>Min</b>	<b>Max</b>
205	32.08293	8.975345	17	68

**Table III**

*Municipalities where the participants work*

<b>Municipalities</b>	<b>Frequency</b>	<b>Percentage</b>
Akraneskaupstaður	1	0.49%
Akureyrarbær	2	0.98%
Fjarðabyggð	1	0.49%
Garðabær	8	3.90%
Grindavíkurbær	1	0.49%
Grímsnes- og Grafnínshreppur	1	0.49%
Hafnarfjarðarkaupstaður	4	1.95%
Hveragerðisbær	1	0.49%
Kópavogsbær	12	5.85%
Mosfellsbær	1	0.49%
Múlaþing	1	0.49%
Reykjavíkurborg	162	79.02%
Seltjarnarnesbær	5	2.44%
Stykkishólmsbær	1	0.49%

**Table IV***Sector the participants work in*

<b>Sector</b>	<b>Frequency</b>	<b>Percentage</b>
Public Sector	128	62.44%
Central government or its institutions	45	21.95%
Municipalities or their institutions	32	15.61%

**Table V***Trade Union of participants*

<b>Municipalities</b>	<b>Frequency</b>	<b>Percentage</b>
Blaðamannafélag Íslands	5	2.44%
Brú félag stjórnenda	2	0.98%
Byggiðn – Félag byggingamanna	1	0.49%
Báran Stéttarfélag	1	0.49%
Efling – stéttarfélag	4	1.95%
Eining – iðja	1	0.49%
Flugfreyjufélag Íslands	1	0.49%
Fræðagarður	4	1.95%
Félag framhaldsskólakennara	1	0.49%
Félag geislafræðinga	1	0.49%
Félag grunnskólakennara	9	4.39%
Félag háskólakennara	2	0.98%
Félag háskólamenntaðra starfsmanna stjórnarráðsins	5	2.44%
Félag iðn- og tæknigreina	2	0.98%
Félag kennara og stjórnenda í tónlistarskólum	1	0.49%
Félag leikskólakennara	3	1.46%
Félag lykilmanna	4	1.95%
Félag opinberra starfsmanna á Suðurlandi	2	0.98%
Félag íslenskra atvinnuflugmanna	1	0.49%
Félag íslenskra félagsvísindamanna	2	0.98%

Félag íslenskra hjúkrunarfræðinga	2	0.98%
Félag íslenskra leikara	1	0.49%
Félag íslenskra náttúrufræðinga	2	0.98%
Félag íslenskra rafvirkja	1	0.49%
Kjarafélag viðskipta- og hagfræðinga	4	1.95%
Kjölur	1	0.49%
Lyfjafræðingafélag Íslands	2	0.98%
Læknafræðingafélag Íslands	4	1.95%
Matvís	1	0.49%
Sameyki	13	6.34%
Samtök starfsmanna fjármálafyrirtækja	15	7.32%
Starfsmannafélag Garðabæjar	2	0.98%
Stéttarfélag bókasafns- og upplýsingafræðinga	1	0.49%
Stéttarfélag lögfræðinga	9	4.39%
Stéttarfélag tölvunarfræðinga	1	0.49%
Sálfræðingafélag Íslands	2	0.98%
VM Félag vélstjóra og málmtæknumanna	1	0.49%
VR	48	23.41%
Verkalýðsfélag Grindavíkur	1	0.49%
Verkalýðsfélag Snæfellinga	1	0.49%
Verkfræðingafélag Íslands	7	3.41%
Other trade unions	6	2.93%
No trade union	28	13.66%

**Table VI**  
*Education of participants*

<b>Education</b>	<b>Frequency</b>	<b>Percentage</b>
University education	184	89.76%
Journeymans' or other job-specific certificates	13	6.34%
Unskilled	8	3.90%

**Table VII***University Education of participants*

<b>University education</b>	<b>Frequency</b>	<b>Percentage</b>
Construction engineer	1	0.54%
Librarian or information scientist	1	0.54%
Tourism studies	7	3.80%
Sociologist	3	1.63%
Roentgentechician	1	0.54%
Economist	16	8.70%
Nurse	2	1.09%
Geologist	4	2.17%
Teacher	32	17.39%
Pharmacologist	5	2.72%
Doctor/Physician	4	2.17%
Lawyer	32	17.39%
Anthropologist	5	2.72%
Fishery technologist	2	1.09%
Physiotherapist	1	0.54%
Political scientist	10	5.43%
Psychologist	6	3.26%
Dentist	1	0.54%
Computer science	7	3.80%
Engineer	13	7.07%
Ecologist	1	0.54%
Business Administration	32	17.39%
Other university education	20	10.87%

**Table VIII***Field of employment*

<b>Job</b>	<b>Frequency</b>	<b>Percentage</b>
Pilot	1	0.49%
Roentgentechician	1	0.49%



Economist	4	1.95%
Nurse	2	0.98%
Industrial worker	4	1.95%
Geologist	1	0.49%
Teacher	14	6.83%
Doctor/Physician	4	1.95%
Lawyer	23	11.22%
Combined sales and service job	2	0.98%
Physiotherapist	1	0.49%
Office job	25	12.20%
Job at a reception	1	0.49%
Job at a retail outlet	4	1.95%
An employee of a financial corporation (other than Landsbankinn)	9	4.39%
Manager	20	9.76%
Political scientist	1	0.49%
Psychologist	2	0.98%
Specialist	35	17.07%
Dentist	1	0.49%
Computer scientist	7	3.41%
Engineer	6	2.93%
Foreman/overseer	2	0.98%
Business administration	5	2.44%
Another job	29	14.15%

**Table IX**

*Supplementary savings accounts*

<b>Depository</b>	<b>Supplementary Savings Account</b>
Almenni lífeyrissjóðurinn	<a href="#">Ævisafn I</a>
Almenni lífeyrissjóðurinn	<a href="#">Ævisafn II</a>
Almenni lífeyrissjóðurinn	<a href="#">Ævisafn III</a>
Almenni lífeyrissjóðurinn	<a href="#">Ævileiðin</a>

Almenni lífeyrissjóðurinn	<a href="#">Húsnæðissafn</a>
Almenni lífeyrissjóðurinn	<a href="#">Innlánssafn</a>
Almenni lífeyrissjóðurinn	<a href="#">Ríkissafn stutt</a>
Almenni lífeyrissjóðurinn	<a href="#">Ríkissafn langt</a>
Arion banki	<a href="#">Lífeyrisauki 1</a>
Arion banki	<a href="#">Lífeyrisauki 2</a>
Arion banki	<a href="#">Lífeyrisauki 3</a>
Arion banki	<a href="#">Lífeyrisauki 4</a>
Arion banki	<a href="#">Lífeyrisauki 5 - Innlend skuldabréf</a>
Arion banki	<a href="#">Lífeyrisauki - Erlend verðbréf</a>
Arion banki	<a href="#">Lífeyrisauki - Innlán</a>
Arion banki	<a href="#">Ævilína</a>
Birta lífeyrissjóður	<a href="#">Blönduð leið</a>
Birta lífeyrissjóður	<a href="#">Innlánsleið</a>
Birta lífeyrissjóður	<a href="#">Skuldabréfaleið</a>
Birta lífeyrissjóður	<a href="#">Sparnaðarleið I</a>
Birta lífeyrissjóður	<a href="#">Sparnaðarleið II</a>
Frjálsi lífeyrissjóðurinn	<a href="#">Deild/leið I</a>
Frjálsi lífeyrissjóðurinn	<a href="#">Deild/leið II</a>
Frjálsi lífeyrissjóðurinn	<a href="#">Deild/leið III</a>
Frjálsi lífeyrissjóðurinn	<a href="#">Ævilína</a>
Frjálsi lífeyrissjóðurinn	<a href="#">Frjálsi áhætta</a>
Gildi lífeyrissjóður	<a href="#">Framtíðarsýn 1</a>
Gildi lífeyrissjóður	<a href="#">Framtíðarsýn 2</a>
Gildi lífeyrissjóður	<a href="#">Framtíðarsýn 3</a>
Íslandsbanki	<a href="#">Erlend verðbréf</a>
Íslandsbanki	<a href="#">Húsnæðisleið</a>
Íslandsbanki	<a href="#">Lífeyrisreikningur - óverðtryggður</a>
Íslandsbanki	<a href="#">Lífeyrisreikningur - verðtryggður</a>
Íslandsbanki	<a href="#">Löng ríkisskuldabréf</a>
Íslandsbanki	<a href="#">Stýring A</a>
Íslandsbanki	<a href="#">Stýring B</a>
Íslandsbanki	<a href="#">Stýring C</a>

Íslandsbanki	<a href="#">Stýring D</a>
Íslandsbanki	<a href="#">Stýring E</a>
Íslandsbanki	<a href="#">Ævileið</a>
Íslenski lífeyrissjóðurinn	<a href="#">Líf 1</a>
Íslenski lífeyrissjóðurinn	<a href="#">Líf 2</a>
Íslenski lífeyrissjóðurinn	<a href="#">Líf 3</a>
Íslenski lífeyrissjóðurinn	<a href="#">Líf 4</a>
Íslenski lífeyrissjóðurinn	<a href="#">Lífsbrautin</a>
Íslenski lífeyrissjóðurinn	<a href="#">Lífeyrisbók - verðtryggð</a>
Íslenski lífeyrissjóðurinn	<a href="#">Lífeyrisbók - óverðtryggð</a>
Íslenski lífeyrissjóðurinn	<a href="#">Lífeyrissparnaður - Erlend verðbréf</a>
Kvika bank	<a href="#">Séreignasparnaður 1</a>
Kvika bank	<a href="#">Séreignasparnaður 2</a>
Kvika bank	<a href="#">Séreignasparnaður 3</a>
Kvika bank	<a href="#">Séreignasparnaður 4</a>
Kvika bank	<a href="#">Séreignasparnaður 5</a>
Kvika bank	<a href="#">Ævileið</a>
Kvika bank	<a href="#">Innlána leið</a>
LSR	<a href="#">Leið I</a>
LSR	<a href="#">Leið II</a>
LSR	<a href="#">Leið III</a>
LSR	<a href="#">Sér-leið</a>
Lífeyrissjóður Tannlæknafélags Íslands	<a href="#">Deild I/Séreign</a>
Lífeyrissjóður verzlunarmanna	<a href="#">Ævileið 1</a>
Lífeyrissjóður verzlunarmanna	<a href="#">Ævileið 2</a>
Lífeyrissjóður verzlunarmanna	<a href="#">Ævileið 3</a>
Lífeyrissjóður verzlunarmanna	<a href="#">Ævilína</a>
Lífsvál	<a href="#">Lífsvál 1</a>
Lífsvál	<a href="#">Lífsvál 2</a>
Lífsvál	<a href="#">Lífsvál 3</a>
Lífsvál	<a href="#">Lífsvál 4</a>
Lífswerk lífeyrissjóður	<a href="#">Lífswerk I</a>
Lífswerk lífeyrissjóður	<a href="#">Lífswerk II</a>

Lífsverk lífeyrissjóður	<a href="#">Lífsverk III</a>
Lífeyrissjóður Vestmannaeyja	<a href="#">Safn I</a>
Lífeyrissjóður Vestmannaeyja	<a href="#">Safn II</a>
SL lífeyrissjóður	<a href="#">Söfnunarleið I</a>
SL lífeyrissjóður	<a href="#">Söfnunarleið II</a>
SL lífeyrissjóður	<a href="#">Söfnunarleið III</a>
Stapi lífeyrissjóður	<a href="#">Safn I Innlánasafnið</a>
Stapi lífeyrissjóður	<a href="#">Safn II Varfærna safnið</a>
Stapi lífeyrissjóður	<a href="#">Safn III Áraðna safnið</a>
Allianz	<a href="#">Allianz</a>
Bayern	<a href="#">Sparnaður</a>

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## **Appendix B**

### *Recoding of dependent variables*

The answers from these two questions were therefore converted into a binary dependent variable for pension funds with the following equation:

$$x = \frac{\textit{Current pension fund}}{\textit{"New job" pension fund}} = \begin{cases} \textit{if } x = 1 \textit{ then } y = 0 \\ \textit{if } x \neq 1 \textit{ then } y = 1 \end{cases}$$

and for the supplementary savings accounts with the following equation:

$$z = \frac{\textit{Current supplementary savings account}}{\textit{"New job" supplementary savings account}} = \begin{cases} \textit{if } z = 1 \textit{ then } w = 0 \\ \textit{if } z \neq 1 \textit{ then } w = 1 \end{cases}$$