



Network for Studies on Pensions, Aging and Retirement

# What options are desirable from the participant's perspective?

*Casper van Ewijk  
Roel Mehlkopf  
Sara van den Bleeken  
Chantal Hoet*

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## **Affiliations**

Casper van Ewijk – Universiteit van Amsterdam

Roel Mehlkopf – Tilburg University and DNB

Sara van den Bleeken – AFM

Chantal Hoet – AEGON

**Foreword**

This paper examines the desirability or undesirability of new options for participants in the Dutch pension system, with a special focus on the so-called second pillar, or occupational pensions. We start by presenting a brief overview of the developments in terms of customization and options in pensions. We then move on to discussing the various options in order of the life cycle sequence: first, the choices regarding contributions, then those related to investment decisions, and finally the choices related to retirement and payout patterns. In each case, we start with a survey of the existing options under current regulations and the degree to which these are already used. This survey of options includes an examination of the major behavioral factors influencing the choices being made. Moreover, for some of the options, we explore how much participants might take advantage of them in theory and what advantages or disadvantages that might have for their own welfare. Both the costs and benefits of the options are thus analyzed.

## 1. Introduction

Compared to other pension systems, the Dutch system is distinguished by the great influence of the government and social partners and limited availability of customization and options for participants (Lever, Ponds, Cox, & García Huitrón, 2015).

This emphasis on collective pensions has major advantages. For one thing, very little saving for old age occurs when left entirely up to the individual. Moreover, people often make wrong investment decisions and fail to insure themselves against the risk of a long life. Not only do people possess insufficient knowledge in this domain, they are also susceptible to procrastination and shortsightedness when it comes to decisions whose impact will not be felt for years to come. The strength of collective pension plans thus lies in their ability to "alleviate worry" and help people build a good pension.

The Dutch pension system ranks as one of the best in the world precisely because saving for retirement is mandatory (Willemse, 2015). Nevertheless, growing heterogeneity in the workplace and the need for more customized pension plans are assuming a significant place in the discussions surrounding reform of that pension system. Providing more choices could help address these issues, but not without complications. As Jetta Klijnsma, Dutch State Secretary for Social Affairs and Employment at the time, put it during the ESB Symposium on "Freedom of Choice and Pensions" (April 22, 2015): "There is a need for more freedom of choice in the pension system, but people have little sense of the consequences of that freedom." She emphasized the need for striking the right balance in reforming the pension system between freedom of choice on the one hand and compulsory participation on the other.

The demand for customization and options is tied to societal developments. These include the growing diversity of the working population, increasing mobility in the labor market, and a better educated Dutch populace as a whole. The time of the pension that guaranteed a form of deferred compensation is long gone. Pension participants have had to assume an ever-greater share of responsibility and risk, which is paired with a greater need for control. At the same time, the Dutch government is shifting more risks to the individual consumer during both the active phases of their life (e.g., unemployment, disability, and healthcare risks) and their retirement (e.g., long-term care risk). This places greater demands in terms of lifetime financial planning. More than in the past, individual households must possess sufficient flexibility and liquidity to accommodate setbacks. Pensions and retirement savings can play an important role in this. They cannot be relied on exclusively, however. In addition to their pension and retirement savings, people accumulate assets through home ownership and personal savings; moreover, decisions about working

more or less, either temporarily or long term, can contribute to greater flexibility. The theme of flexibility and liquidity throughout the life course has become a prominent one, such as in the work of Lapperre, Oerlemans, and Dellaert (2016).

Given the growing diversity of the workforce, providing pension participants with customization and options in their plans is increasingly important. At the same time, there is a noticeable trend toward simplicity and transparency among employers and pension providers. These two trends could be simultaneously addressed by having pension providers better calibrate their plans to participant characteristics, such as differentiating risk according to age. For many decisions, however, providers lack the requisite information about individual preferences. In such cases, the obvious choice is to leave the decision up to the individual participant, such as decisions concerning when a person wishes to retire. Greater personal control would allow people to harmonize their pension with their personal situation. Pensions would thus become a much more intrinsic part of life cycle planning, along with decisions about work, home ownership, and healthcare (Arts, Jori, & Ponds, 2016; Bart et al., 2016).

Preferences about pension plans and assuming risk can vary according to a person's individual situation. Someone accruing wealth through home ownership alongside their pension savings might have different desires with regard to retirement than someone who has rented their whole life. Another important variable is someone's employment situation. People planning to retire early can benefit from extra pension savings. Similarly, a career interruption can lead to the need for extra pension savings. Conversely, someone who finds themselves temporarily short of cash might need to reduce their contributions in a given year. The methods for offering pensions could also vary per group. Making such savings compulsory is more important for young people, for whom old age is far off in the future, than it is for older people, who are more conscious of its pending inevitability.

Our current system provides a limited number of options for the participant, such as the choice of investment profile, earlier or later retirement, and receiving a higher payout in the initial years of retirement. Broadening freedom of choice could take the form of adding new options, such as allowing participants the choice of withdrawing a portion on their pension benefits in one lump sum or perhaps other alternatives such as choosing their own pension provider. The question is whether incorporating more options is desirable from the perspective of the participant. Do participants actually take advantage of options when afforded them? And does more freedom of choice also produce the welfare gains promised? What are the risks of wrong choices?

Introducing more freedom of choice also poses a dilemma for policymakers. On the one hand, it can improve the fit with a person's individual situation and

increase personal involvement. Greater freedom of choice thus boosts people's engagement with their pension and therefore increases confidence in the pension system overall (Goudswaard Commission, 2010). On the other, as freedom of choice grows so does the risk of individual mistakes in making decisions (Van Dalen & Henkens, 2015), which in turn damages confidence in the system.

In other words, the discussion about offering more or less freedom of choice is complicated and demands a pragmatic, nuanced approach. The issue is not whether or not people should be able to make their own choices, but which should be assumed for them and which should not and how the decisions they need to make can be steered in the right direction with a dedicated choice architecture. Paradoxically, human weaknesses can prove useful in this. The tendency of people to avoid making decisions as a result of choice overload can be used in systems that incorporate automatic enrollment or opt out choices: for example, people in a new job might be automatically enrolled in a voluntary net pension scheme for the portion of their salary in excess of the statutory tax maximum, while having the option of canceling the plan. In the latter case, it would take an active decision on the part of the participant to make the change, something which is often neglected in practice. Another way to direct choice is through standard or default options: experience shows that most people easily allow themselves to be guided in this manner, especially when it comes to complex decisions of which they have little understanding.

This paper adopts the definitions for the terms "customization" and "options" ("maatwerk" and "keuze" in Dutch in the original) outlined by Bakels, Joseph, Kortleve, and Nijman (2017). Customization applies when a pension provider designs its pension plan to accommodate individual variables or preferences. It can be fully enacted by the pension provider without any freedom of choice on the part of the participant. This might take the form of a life cycle profile for investing, with younger participants offered a different risk mix than older ones. With options, the pension participant is able to make choices for themselves within the parameters offered. In many cases, it would seem obvious to offer individual participants freedom of choice for certain options, such as in their date of retirement or for the so-called high-low construction (higher benefits payments early on, followed by lower ones later). Freedom of choice can entail a combination of customization and options, such as when a pension provider establishes a standard option or when a participant's choices depend on their personal characteristics.

## **2. Options: Behavioral Aspects, Experiences, and Welfare Effects**

### **2.1. Behavioral Aspects: From Homo Economicus to "Human"**

People value their freedom to make choices, such as being able to decide the amount of investment risk to assume in an investment pension plan. That does not necessarily mean, however, they actually want to exploit that freedom or that they take advantage of the choices offered to them (Van Dalen & Henkens, 2015). When people are confronted with having to choose between options, they can suffer from something called "choice overload" and might not always make the best decisions. A concept known as "bounded rationality" comes into play (Simon, 1957; Tiemeijer, Thomas, & Prast, 2009). What does this refer to? Both classical and neoclassical economics view man as a "homo economicus," a rational being who makes decisions based on reason, thinks logically and analytically, and weighs the costs of those decisions against their benefits. He does not allow himself to be ruled by feelings or emotions in this. This economic man is accordingly highly predictable in terms of behavior and thus extremely suited to serving as a basis for the academic models of choice architecture in the context of the pensions domain. But does "homo economicus" really exist? The answer is No.

In reality, people behave differently than the economic man (Tiemeijer, Thomas, & Prast, 2009). Whereas classical economics assumes that people will behave as though information is free and can be processed rationally and analytically, this does not generally prove to be the case in practice (EIOPA, 2012; Kahneman, 2012). Looking more specifically at this idea in terms of pensions, one sees that people have limited capacities in terms of time, subject knowledge, and motivation for reading and understanding the information on their plans (Sunstein, 2011). They prefer not to have to think about their pensions or postpone having to think about them because they have to allow so much time for doing so (AFM, 2015). People employ heuristics ("rules of thumb") when making decisions and tend to also be susceptible to biases (thinking in a manner incompatible with rational thought). In addition, feelings and emotions play a major role in the process, as does the complexity involved in gaining an overview of one's income, assets, and expected expenses upon retirement in order to make choices (AFM, 2015; Nenkov, MacInnis, & Morrin, 2009). Information must therefore be presented in a way suited to how people think and make decisions, one that, moreover, also offers prospects for action.

When we look closely at how we think, it becomes evident that 90 to 95 percent of our thought processes occur in the unconscious, primarily taking the form of images and metaphors. Although feelings and emotions are consciously experienced,

they are driven by the subconscious mind. The conscious mind is at best a mediocre press agent for the unconscious mind (Zaltman, 2003). This unconscious mind is characterized by great collectivity. In the case of complex decisions (with a great deal of information), unconscious decision-making appears to produce better decisions. As the volume of information increases, the quality of conscious cognition quickly diminishes. More than 90 percent of purchasing behavior is driven by the subconscious (Zaltman, 2003). When we understand how people make decisions, it provides us with insight into the kinds of options that should or should not be offered and how best to steer decisions. In other words, it gives us tools for designing an optimal choice architecture for promoting maximum welfare (Thaler & Sunstein, 2008).

## **2.2. Actual Behavior**

As the discussion above illustrates, "homo economicus" does not exist. In other words, there are bounds to our rational thinking. Human behavior is influenced by a variety of factors when making decisions. The fact that most decisions are only partially grounded in rational considerations is evident when examining the choices people make regarding their pensions and retirement. This paper focuses specifically on the concrete choice behavior of pension participants and the various options offered within the Dutch pension system. This includes a presentation of the results from our own data analysis. These data on investment decisions are based on a review of the actual choices made by 34,877 members in a Dutch PPI (a DC plan administered by an investment pension fund). Information on decisions made regarding date of retirement and payout patterns also derives from this dataset and is based on the decisions made by participants in benefits agreements.

## **2.3. Welfare Effects**

Furthermore, this paper will provide an indication of the quantitative value of customization and options by performing a welfare analysis. This is accomplished by presenting several cases of welfare gains from differentiation, as well as welfare losses caused by mistakes on the part of individuals.<sup>1</sup> It is difficult for a pension provider to objectively determine what the "right" or indeed "wrong" decision for a participant might be. Providers have access to certain demographic information on participants, such as age and income, and they may also be able to request information on other

1 The welfare effects of options in this paper were calculated from the perspective of the individual participant. Individual choices can of course also have an impact on "social" welfare at the aggregate level, such as in the case of the societal impact of selection effects. We discuss selection effects in Chapter 6.

variables such as the value of their home. Yet, it is highly possible for participants of an identical age, income level, and home ownership position to differ sharply in terms of their financial situation, preferences, or aspirations. One example might be a participant who chooses to deduct a large lump sum from their pension upon retirement to pay for a trip around the world. At first glance, such a decision might be viewed as "wrong" under the suspicion that it was driven by a lack of discipline. However, perhaps it has always been one of the participant's biggest dreams to take a world trip and afterward they were extremely happy about having chosen to use the lump sum that way.

Under the current regime, customization by age is easily feasible, especially in the form of an age-dependent investment profile. For other dimensions, however, providers in the Netherlands currently lack sufficient information. It is therefore unhelpful to imagine we are in a position at this juncture to decide what the "optimal decision" is for every individual participant and, based on that, to determine how great the loss will be in situations where an alternative choice is made (by either the pension provider or the participant themselves). We can, however, gain valuable insight into "what could go right" and "what could go wrong" based on a few illustrative examples. We can ascertain, for instance, how large the losses are of deciding to take a lump sum distribution in the example cited above of a participant who does so due to a lack of discipline. This entails examining a hypothetical case and exploring whether there would be a loss or a gain based on that assumed situation. Based on the assumptions made, we determine how large the gains would be "if all goes right" or the losses "if all goes wrong." It is also important to estimate how great the probability is that the effects triggered in the sample situation could also occur in reality. In other words, is it reasonable to assume that the hypothetical situation is realistic and representative for a larger group of participants in real life? By following these steps, we gain important insights that can be relevant for policymakers tasked with deciding which new and existing options are attractive for participants and for providers aiming to implement choice architecture. The smaller the gains and the greater the risk of losses, the more the need for robust guidance in steering individual decisions.

The welfare effects discussed in this paper are not "monetary" gains or losses. Individual participants will not literally become richer or poorer as a result of the decisions we discuss. A participant who, for instance, fails to save sufficiently for retirement due to lack of discipline will still also have more money to spend during their working years when they were not putting much money aside. In hindsight, of course, that individual lacking discipline would have been better off if they had saved

more. That effect is the welfare effect we measure in this paper. In situations involving the welfare losses associated with wrong decisions, we establish a hypothetical amount that a participant would rationally be willing to pay in order to be protected against an erroneous choice. For the welfare gains owing to pension differentiation, we establish the amount that a participant would rationally be willing to pay to have the opportunity of achieving a better fit through customization or options.

The welfare calculations are based on the life cycle model created by Bodie, Merton, and Samuelson (1992), with the welfare effects expressed as a percentage. A technical explanation of this methodology is presented in the appendix. The percentages reported for welfare gains and losses represent the gain or loss in terms of consumption measured over the entire life cycle. A welfare gain of 3 percent thus represents a 3 percent rise in consumption over a lifetime. The interpretation of this figure in the case of a welfare gain is that a participant would be willing to pay 3 percent of his or her lifetime earnings to be able to take advantage of the associated form of pension differentiation. The interpretation in the case of a welfare loss is that a participant would be willing to give up 3 percent of their consumption to be protected against making the wrong decision.

We consistently employ the same definition for welfare effects so that the order of magnitude of the effects can be compared across the various options. It should be noted that some options only have an impact on one segment of the life course, such as the decision to deduct a lump sum, which would only have an effect during the retirement period. Because these effects are still expressed as the consumption effect over a lifetime, the effects of some choices noted, such as to take a lump sum, are relatively smaller in our paper than for results in which only the retirement period is considered. By way of comparison, a loss of income of 1 percent over a lifetime is approximately equivalent to a loss of 4.5 percent for the retirement period due to the fact that the latter only comprises a portion of the lifetime and also as a result of discounting (consumption in late stages of life has a lower present value). In addition, our output measure takes total consumption into account, including social security (AOW). Since social security constitutes approximately half of the retirement income in our calculations, our welfare effects would be almost double if social security were not included. A loss of income of 1 percent over a lifetime, with social security included, is approximately equal to a loss of  $2 \times 4.5$  percent = 9 percent in terms of the impact on the retirement period without social security.

In the following chapters, we discuss the options in the sequence in which they occur during the life course: first, in Chapters 3 and 4, those related to level of contributions and investing. Then in Chapter 5, those related to payout patterns, whereby

we examine the so-called high–low construction and lump sum option. Finally, in Chapter 6, we devote attention to the risk of calculating behavior leading to undesirable selection effects that undermine the solidarity of the pension system.

### 3. Choices Pertaining to Level of Contributions

#### 3.1. Behavioral Aspects and Actual Behavior

In the Netherlands, the amount and share of contributions paid into occupational pensions by both employers and employees is set by the social partners. From a global perspective, experience shows that when participation is mandatory, the level of contributions is generally also fixed. In cases of voluntary participation, the participant generally determines the amount they want to contribute themselves, which leads to minimum contributions (Lever, Ponds, Cox, & García Huitrón, 2015). We see in practice that participants tend to keep the level of contributions low in favor of present consumption. Behavioral economics explains this by proposing that participants place greater value on short-term rewards than on long-term ones. This so-called hyperbolic discounting is subject to a certain time inconsistency, moreover (Frederick, Loewenstein, & O'Donoghue, 2002; Read, 2004). People assign a disproportionately greater value to activities that yield immediate rewards than to those that yield rewards in the future, resulting in constant conflict between short- and long-term preferences (Laibson, Repetto, & Tobacman, 1998). Research has shown that when two forms of reward are far off in the future, people are more inclined to make a rational decision between the two than when the two rewards are more immediate. This can be illustrated by the following example:

If someone is given the option of receiving 50 euros in 200 days or 51 euros in 201 days, they will usually choose the 51 euros because the difference between 200 and 201 days is not seen to be that great. If someone is given the option of receiving 50 euros today or 51 euros tomorrow, they will choose the immediate reward, in other words, the 50 euros. This teaches us that preferences can change under the influence of time (Brüggen, Rohde, & Van den Broeke, 2013; Laibson, Repetto, & Tobacman, 1998; Wiener & Doescher, 2008).

The impulse for short-term rewards is more pronounced in people who lack self-discipline and are naive. According to that thinking, naive people might endlessly postpone taking action or making decisions (Brüggen, Rohde, & Van den Broeke, 2013). In the context of saving for a pension, this means that if contributions were entirely voluntary, they would make almost none.

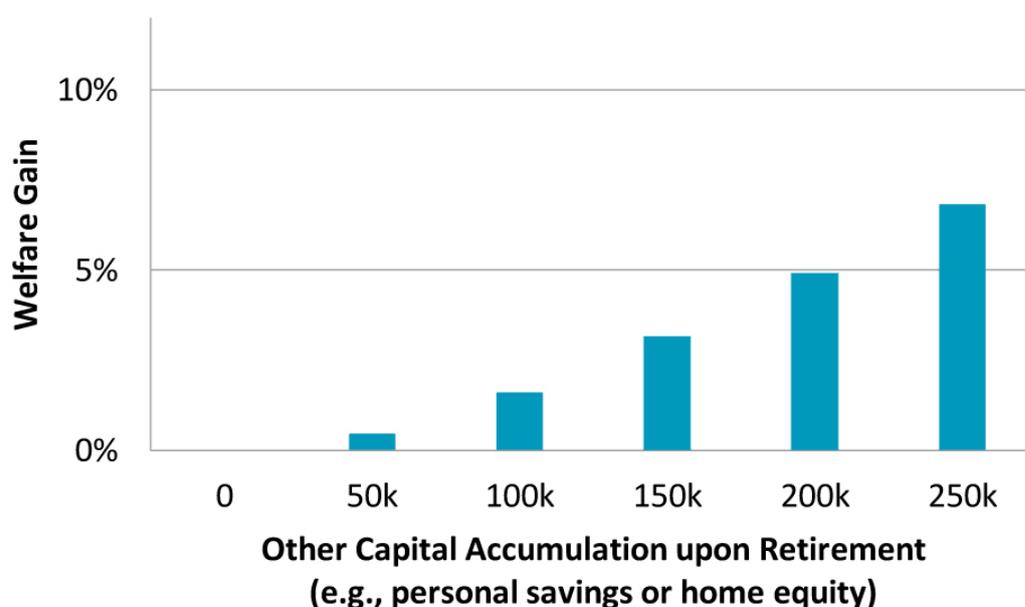
Meanwhile, research by Fernández-López, Vivel-Búa, Otero-González, and Durán-Santomil (2015) shows that European women are less inclined to save for retirement

than European men. At the same time, however, national institutional factors would appear to have a greater influence on the saving behavior of individuals than gender differences. This relatively limited impact of gender differences on the savings practices of individuals is consistent with the results of earlier research on gender differences in a controlled environment. That research showed that, in general, women are more risk-averse than men and that women also often save less for retirement (Bajtelsmit, Bersanek, & Jianakoplos, 1999). Gerrans and Clark (2013) introduce nuance to these findings by pointing out that the study in question did not take the social status or the division of roles between men and women in the household into account. A study by Schubert, Brown, Gysler, and Brachinger (1999) demonstrated that in a controlled environment, women do not make any less risky financial decisions than men. How a person makes decisions would thus appear to be largely determined by the so-called decision frame. The literature is inconclusive on the difference between men and women in making financial decisions.

### 3.2. Welfare Calculations

Figures 1 and 2 show the gains and losses, respectively, that can be associated with differentiation in the level of contributions. Figure 1 shows the gains from differentiation when the level of contributions is aligned with wealth creation through home ownership. This form of customization or options prevents home owners from saving

Figure 1: *Welfare gain from aligning level of contributions with other forms of individual savings, such as capital accumulation through home ownership*



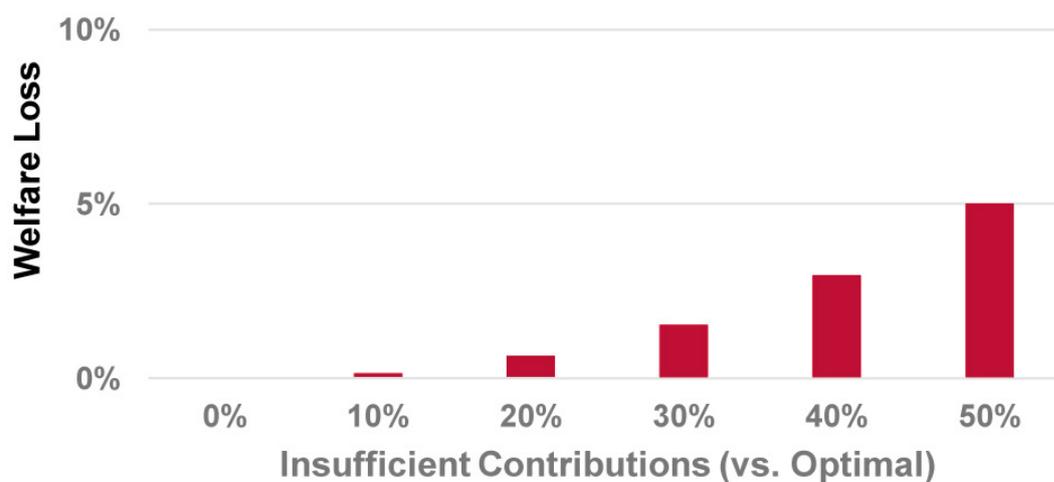
too much by virtue of the fact that they are accumulating capital in both their homes and their pensions. The welfare gains in such a situation depend on the relative importance of the wealth accumulation through the home asset. The figure shows the results for various amounts of capital (50k, 100k, 150k, 200k, and 250k) that the accumulated home value might represent upon date of retirement.<sup>2</sup> The welfare gain of a differentiation in the level of contributions is substantial, ranging from 0.5 to 6.8 percent. The underlying calculations take as their premise a situation in which a person sells their home at the date of retirement, whereby the wealth accrued in the form of home equity can be used entirely for their retirement provisions. In this situation, any greater capital accumulation through home ownership thus corresponds one-to-one to a decrease in the need for capital accumulation through a pension plan. There are obviously other conceivable situations, such as if a participant were to continue owning their home after retirement and leave it to their heirs upon their death. In that situation, as well, home ownership decreases the need for accruing wealth through a pension plan, since the participant will have lower housing costs during retirement as a result of owning their home. Home ownership therefore reduces the need for supplemental savings for retirement when all other circumstances are the same.<sup>3</sup>

An important qualifier worth noting is that high income earners, who are more likely to own their home, have lower replacement rates on average. For people who own their own homes, then, it is important that the lower fixed costs attributable to the paid off portion of the home serve as a good addition to the supplemental pension if they are to maintain their standard of living after retirement.

Figure 2 shows the welfare loss when people fail to save enough for retirement as the result of wrong decisions or a lack of discipline. Loss of welfare occurs when consumption after retirement falls sharply compared to consumption earlier in a person's lifetime. Their consumption is thus not evenly distributed across their life. The graph shows the results for levels of contribution that are 10, 20, 30, 40, and 50 percent below the optimal level for ensuring a balanced distribution of consumption across the life cycle. The welfare losses from insufficient contributions are substantial,

2 Note that this refers to the home value per participant. For a two-person household, the situation for a home value of 150k is thus equivalent to a paid-off home valued at 300k.

3 If the home is not sold during retirement, then the effect is smaller than if the home were to be sold upon the date of retirement and that housing wealth converted entirely into pension benefits, since in that event the heirs are also benefiting from said housing wealth, which they receive as an inheritance.

Figure 2: *Wealth loss when shortsightedness leads to insufficient contributions*

ranging from 0.2 to 5.0 percent. We therefore see that both the welfare gains and losses from customization and options are substantial and that the orders of magnitude for saving either too much or too little are comparable.

Figures 1 and 2 show that the welfare losses from wrong decisions increase quadratically in proportion to the magnitude of the wrong decision. This is a consequence of presuming the participant to be defined by the fact that absolute aversion to risk increases as the consumption level drops. As a result, any mistakes made become increasingly costly so that there is a “piling up” of mistakes in the larger effects.

From a policy perspective, this means that it could be beneficial to incorporate variation in the levels of contribution based on a form of customization with limited options for the participant. This needs to be done in a way that prevents greater freedom of choice from leading to insufficient contributions caused by shortsightedness, thus also producing insufficient pension results. One possibility is to limit the option to certain controllable uses, such as investing in a home. In Switzerland, for example, people are given the option of swapping out their pension capital for an investment in their own home; the arrangement then also applies when the house is sold, whereupon the earnings must be redeposited into the pension account. Another possibility is to limit the options to certain amounts, such as a one-time withdrawal of assets or allowing participants a “wild card” year off from contributions (and accrual) during their working life. Finally, the risk of wrong choices can be mitigated through good choice architecture, such as asking for an explicit motivation.

#### **4. Choices with Regard to Investments and Risk Profile**

##### **4.1. Behavioral Aspects and Actual Behavior**

Defined benefit plans in the Netherlands do not allow people any individual freedom in the asset mix. Individual defined contribution plans, on the other hand, do offer people a choice in this,<sup>4</sup> whereby participants are expected to make decisions about investment policy. This includes decisions about the types of investments to make and the degree of risk to assume (investment profile). If a participant does not actively make a choice, they are automatically placed in the default option. A shift has been taking place around the world from DB plans to individual DC plans that offer more options in terms of asset mix and risk profile. The responsibility for the trade-off between total amount and certainty in pension outcomes thus increasingly lands on participants.

A look at other countries, though, reveals that little use is made of the options being afforded there. In Australia, over 50 percent of participants choose the standard option, while in Chile, the assets of 58 percent of pension participants are invested using the default life cycle strategy. When DC pensions were introduced in Sweden, however, over 67 percent of the participants in the state pension system invested in investment funds other than the default fund (CPB Memorandum, 2015; Lever, Ponds, Cox, & García Huitrón, 2015). That means that 33 percent of participants still invested in the default fund, although that qualifies as a low percentage (CPB Memorandum, 2015). Given the tremendous number of investment funds from which participants must choose, behavioral economics theory would lead us to expect that most of them would invest in the default fund. A great deal of research has gone into finding an explanation for the relatively low percentage of participants in the default fund in Sweden. One cause put forward is the high level of publicity surrounding the options when the DC pension was introduced there. This explanation is consistent with observations made in the years following that publicity campaign to the effect that the number of pension participants making active decisions gradually dropped to fewer than 1 percent in 2013 and that very few people changed funds after their initial choice (CPB Memorandum, 2015; Lever, Ponds, Cox, & García Huitrón, 2015). This drop in the number of participants making active decisions can also be explained by the age of the new participants entering the DC pension plan several years after its

4 This refers to the investment freedom with regard to investment profiles and not the individual investment freedom by which the pension provider is responsible for the investments in administering a DC plan with investment freedom, thus acting in accordance with Section 135 (Section 52 of the Dutch Pensions Act).

introduction. Most of the them are young people; young participants are not yet very concerned about their pension and do not fully recognize the importance of making decisions about it.

As indicated earlier, behavioral economics also teaches us that people prefer the status quo (status quo bias) and will not take action until the need for doing so is abundantly clear (Wiener & Doescher, 2008). This is reflected in the pensions context in terms of the difficulty of getting people to actively make decisions. In countries that have pension systems based on voluntary plans, people have no incentives for changing that situation and encouraging participation. One response to this is to use an "opting out" principle, whereby the participant does not have to do anything to participate in the plan (they are enrolled by default) but retains the option of dropping out. When the opting-out principle is used, the rate of participation rises significantly because people are reluctant to either terminate their participation or change the existing situation. The preference for sticking with an existing situation is also evident with other voluntary options. There, too, the response frequently involves employing the aforementioned opting-out principle combined with good default options (Beshears, Choi, Laibson, & Madrian, 2008 & 2011; Choi, Laibson, & Madrian, 2004; Madrian & Shea, 2001).

The United States has a retirement savings vehicle known as a 401(k) plan.<sup>5</sup> These are voluntary DC plans that offer tax benefits to the employee. Participation in such plans increases significantly when the opt-out system is employed; people are automatically enrolled in the plan unless they expressly elect not to participate (Madrian & Shea, 2001).

Another factor that may have played a role in Sweden, in addition to the great amount of publicity, was the timing of the introduction of investment options. Market conditions were favorable at that time, which made the option of actively investing attractive to many participants (CPB Memorandum, 2015). Here too, heuristics and

5 This type of plan is defined in subsection 401(k) of the U.S. Internal Revenue Code and is comparable to the occupational plans in the Dutch second pillar. The biggest differences are that participation is not mandatory and many companies offer a true occupational pension plan (paid completely by the employer) in addition to such a retirement savings plan. The contributions an employee makes in a 401(k) plan are tax-free (Legal Information Institute, 26 U.S. Code § 401).

biases play an important role. In making investment decisions, people often place too much value on, for instance, past returns (Bernartzi, 2001; Calvet, Campbell, & Sodini, 2009; Choi, Laibson, & Madrian, 2004), while at the same time not adequately considering such variables as investment fees (Choi, Laibson, & Madrian, 2010). Moreover, people have a tendency to seek information that validates their preferences and expectations (confirmation bias) (Lambert, 2006). They therefore fail to consider all of the information equally thoroughly or to properly weigh relevant and irrelevant information and often operate more according to habit than on the basis of careful consideration of the facts (Beshears, Choi, Laibson, & Madrian, 2011; Tiemeijer, Thomas, & Prast, 2009).

A study by the Chilean regulatory agency of the investment results of various funds in the 2008–2013 period revealed that participants who invested their pension contributions according to the default strategy generally earned a better return than those who actively changed their asset mix (CPB Memorandum, 2015). Research by Kristjanpoller and Olson (2015) showed no significant difference in the percentage of men and women in Chile who chose the default strategy. Meanwhile, a study by Fuentes et al. (2013) showed that participants with a higher income were more likely to opt for an active investment policy. Young participants, men with a low education, and men with a low income more commonly invested in the default investment plan (Kristjanpoller & Olson, 2015). There was no significant difference found in risk preferences between male and female participants who actively changed their investment plan. As mentioned in the previous chapter, however, the literature is inconclusive on the difference between men and women in the financial context. The results from the Kristjanpoller and Olson (2015) study do allow us to conclude, though, that participants take fewer risks as they grow older and more risks as they have more income.

Our own analysis based on information on the pension plans at a Dutch insurer reveals that 98.7 percent of the pension participants invested using the default risk profile (in this case, a defensive investment profile). Table 1 summarizes the results. This is consistent with the international results outlined above indicating that few pension participants take advantage of the options offered. The data analysis further showed that participants with higher incomes were more likely to deviate from the default risk profile. In addition, people with a higher income had a greater tolerance for risk than those with a lower income. The risk tolerance of pension participants declined as they grew older. This coincides with previous research findings. Moreover, women were more likely to actively make decisions in a pension plan than men.

Table 1: Investment profile choices in a pension plan (N=34,877)

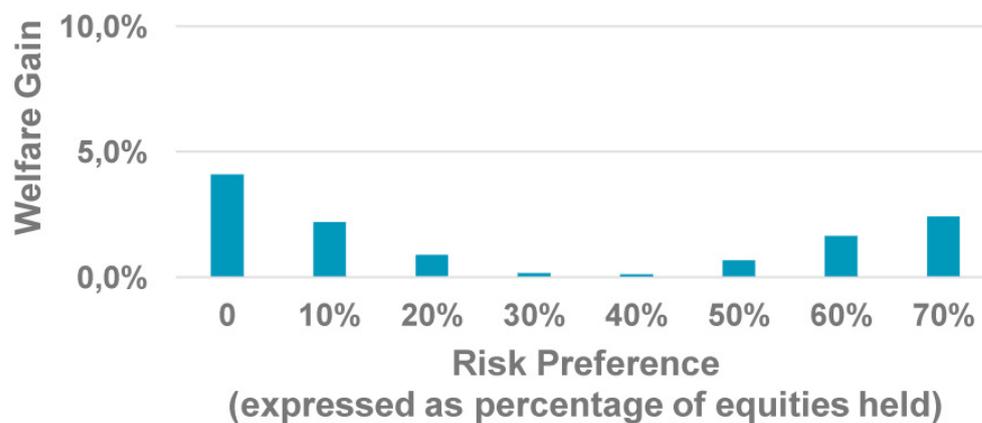
	N	%	< 40K	<40,100>	> 100K
TOTAL	34.877	100.0%	100.0%	100.0%	100.0%
DEFENSIVE	34.420	98.7%	99.1%	98.3%	96.9%
NEUTRAL	290	0.8%	0.6%	1.1%	2.1%
OFFENSIVE	167	0.5%	0.3%	0.6%	1.0%

	Woman	Man	Age < 35y	Age <35,55y>	Age > 55y
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%
DEFENSIVE	98.4%	98.9%	98.9%	98.5%	99.1%
NEUTRAL	1.0%	0.8%	0.7%	1.0%	0.6%
OFFENSIVE	0.6%	0.3%	0.4%	0.5%	0.3%

#### 4.2. Welfare Calculations

Figures 3 and 4 illustrate the potential gains and losses of offering freedom of choice in investing. Figure 3 graphs the welfare gains when having a choice of risk profiles means that those risk profiles more closely correspond to individual risk preferences.

Figure 3: Investment choices: Welfare gains when investment profiles are better aligned with individual preferences through differentiation



The figure assumes a situation in which the standard risk profile is based on the weighted average over a lifetime of an allocation of 40 percent in equities (with the remaining 60 percent in fixed income). The welfare gain of the option is 0 percent when this standard risk profile happens to coincide with the participant's individual preferences; in such a case, the asset mix in the plan is exactly what the individual would have otherwise chosen. If a participant has a higher, or indeed lower, risk preference, then the standard mix is not optimal, leading to a potential welfare gain from having options. As the graph indicates, this gain becomes greater when the participant is either highly risk averse or in fact hardly risk averse at all. For situations in which the desired percentage in equities over a lifetime is extremely low (e.g., 0 percent) or very high (70 percent), the welfare gains grow quickly to several percent. These are, however, fairly extreme preferences that rarely occur. For the more moderate risk preferences, where the desired percentage in equities (as a lifetime weighted average) ranges between 20 and 50 percent, the welfare gains from risk profile options remain relatively limited, at approximately 1 percent. It should be noted that the order of magnitude here is smaller than for the effects we saw earlier pertaining to the level of contributions. The importance of maintaining good levels of contribution is thus greater than that of a perfectly aligned risk profile.

Figure 4: *Investment choices: Welfare losses when a lack of investment knowledge leads to insufficient diversification in the investment portfolio*

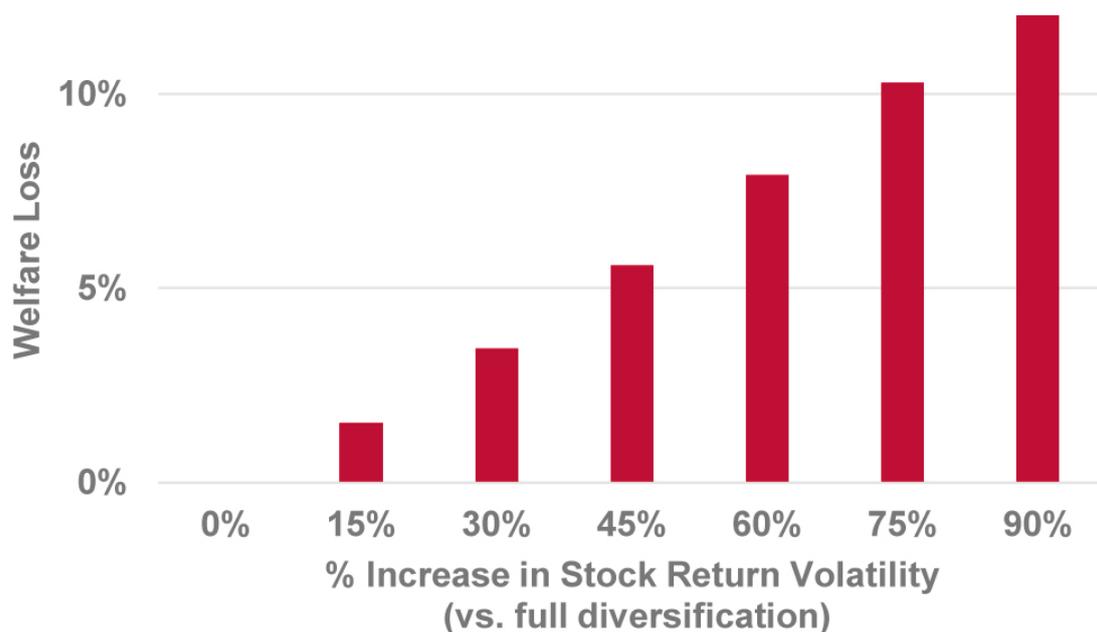


Figure 4 shows the welfare losses for a situation in which the participant is given complete freedom in terms of the choice of investments but fails to distribute those investments well due to a lack of knowledge or experience. Such poor distribution provides too little diversification and results in an unnecessarily high volatility of returns. One example might be someone who invests in only a few stocks instead of a broadly diversified investment fund. The graph shows the welfare losses for various situations in which the annual volatility in stock returns is higher than for optimal diversification. One rule of thumb<sup>6</sup> is that investing in solely two stocks leads to 90 percent higher annual volatility (thus almost double the amount) than full diversification. Figure 4 shows that the welfare loss in such a case is quite high, at 12.6 percent. If a person invests in ten different shares, that improves the situation, but they will still be exposed to 15 percent higher volatility than with full diversification: Figure 4 shows the welfare loss still amounting to approximately 1.5 percent.

The welfare losses from inadequate diversification are hefty. Should the option of introducing more freedom of choice in investing be entertained from a policy perspective, it seems reasonable therefore that it be limited to choosing between investment profiles and not consist of complete freedom in creating portfolios. There are, of course, a variety of other considerations in deciding whether to introduce an option or not, such as the costs associated with it and estimates as to how many people might avail themselves of it. Moreover, as both behavioral economics and real-life experience, in for example Chile, teach us, a free choice of investment profiles does not produce better results than the default option for a large share of participants. This can be attributed, among other things, to the fact that participants tend to make riskier investments in a bull market and become risk averse in a bear market, regardless of whether such an investment strategy aligns with their personal situation. As mentioned before, people do not consider all of the information equally thoroughly, fail to properly weigh relevant and irrelevant information, and often operate more according to habit than on the basis of careful consideration of the facts (Beshears, Choi, Laibson, & Madrian, 2011; Tiemeijer, Thomas, & Prast, 2009). Multiple factors thus play a role here. The welfare gains that can be achieved need to be weighed against the risk of wrong decisions being made and the administrative costs of offering multiple risk profiles. This is especially true in light of the fact that it appears people make little use of such options in practice.

6 See Statman, M. (1987), How Many Stocks Make a Diversified Portfolio?, *The Journal of Financial and Quantitative Analysis*, Vol. 22, No. 3, pp. 353-363.

## 5. Choices in Payout Patterns

### 5.1. Behavioral Aspects and Actual Behavior

#### *5.1.1. Choices with Regard to High–Low Benefits Payments and Swapping Out Survivors Pension*

The tax advantageous occupational plans in the second pillar of the Dutch pension system are distributed entirely in the form of an annuity. These forms of benefits contain two options for flexibility. People can choose to stagger the amount of benefits they receive over time, having them go from high to low, with a maximum variation of 100:75 (high–low construction).<sup>7</sup> In addition, they have the option of swapping out their retirement and partner pension on an accrual basis.<sup>8</sup> Having the full benefits paid out as an annuity is an exception compared to other systems in the world. This is true even compared to other countries with a social partners model (Lever, Ponds, Cox, & García Huitrón, 2015).<sup>9</sup> More generally, participants can choose to receive complete or partial distribution outright. The Melbourne Mercer Global Pension Index<sup>10</sup> ranks a pension system as superior when it offers the flexibility of withdrawing a portion of the pension savings as a lump sum. The index assigns a maximum score to systems with an option for receiving 20 to 40 percent of the benefits all at once (Lever, Ponds, Cox, & García Huitrón, 2015).

The following graph presents the results of our own data analysis. The number of participants actively choosing to take advantage of the swap option has been higher in the past five years than it was before. Use of the high–low construction has also risen sharply in recent years. This might be partly explained by the low interest rates, which makes deferring pension benefits less attractive. It could also point to greater pension awareness overall, caused in part by the financial crisis. The most recent study by the GfK (GfK, 2016) determined, however, that while the public's pension awareness might be slightly higher, it is still relatively low. Yet another possible explanation lies in the methods of communication being used. Insights from behavioral economics have established the influence that the way information is presented can have on people's choice behavior. In this study, though, we did not

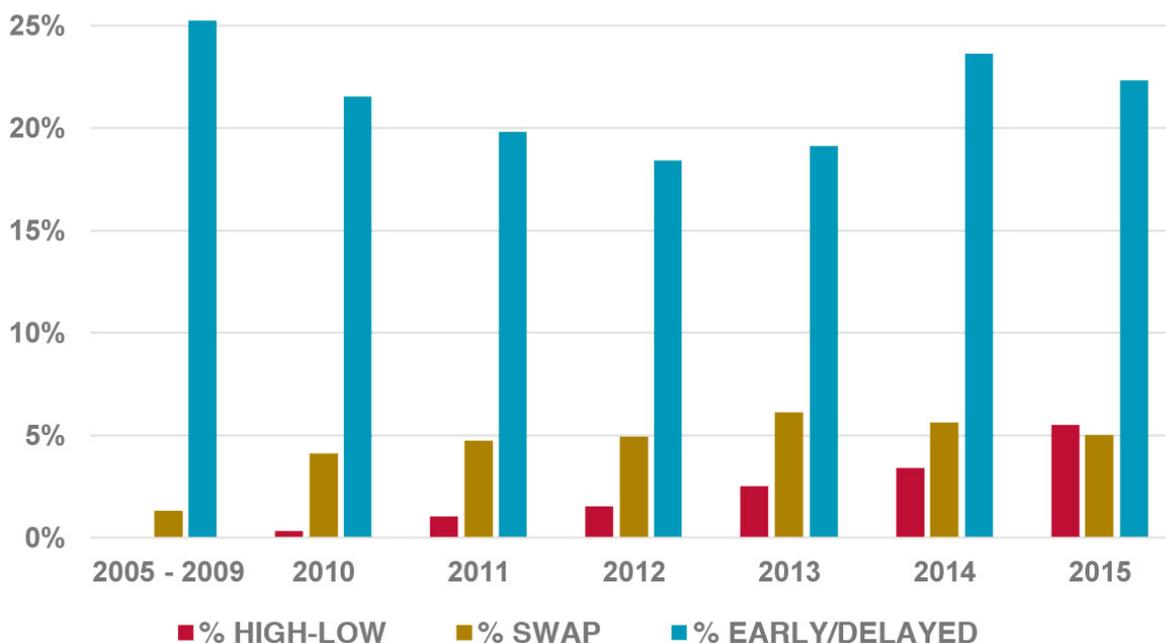
7 Section 63, subsection 1.a, of the Dutch Pensions Act.

8 Sections 60 and 61 of the Dutch Pensions Act. In this paper, we look only at the case of a swap on the date of retirement and not on the date of terminated participation due to resignation.

9 The social partners model is characterized by a combination of government regulation and self-regulation by the social partners (Lever, Ponds, Cox, & García Huitrón, 2015).

10 <http://www.globalpensionindex.com/>.

Table 2: *Options upon retirement (high–low construction, swap out of retirement and survivors pension, and early or delayed retirement) in pension plans from 2005 to 2015*



include the impact of possible changes over the years in ways of communicating with participants.

The reported use of the high–low construction of 5.5 percent might well be an underestimate. Willemsen and Kortleve (2016) reported an increase in the use of this vehicle from 10 to 35 percent from 2011 to 2015 because in recent years it has been frequently used in combination with advancing the starting date of a retirement pension to prevent a drop in income prior to the social security entitlement age.

The table below breaks down the percentages of participants who actively chose the options of high–low construction, swap out, or early/delayed retirement benefits. The results show that women are more likely than men to choose swapping out the survivors pension for a retirement pension (16.5 versus 3.5 percent). In addition, we see that people in high–income groups, categorized according to their level of benefits, are more likely to opt for the high–low construction than average earners (8.3 versus 3.4 percent). These results also contain no indication that deliberate choices are being made based on life expectancy; otherwise, one would expect higher earners to actually make less use of high payouts at the beginning. This corroborates the findings from the study by Dellaert and Ponds (2014). Alongside the economic motives, limited rational choice behavior is at work here. It is another circumstance in which people are not consciously being calculating, but are strongly inclined to follow the default

Table 3: *Choices made upon retirement (high–low construction, swap out of retirement and survivors pension, and early or delayed retirement) for pension plans in 2014*

	Total %	Income Top 50%	Income Top 10%	Income Top 1%	Woman	Man
TOTAL (N=14,949)						
High–Low	3.4%	3.7%	5.3%	8.3%	3.0%	3.5%
Swap	5.6%	3.7%	5.6%	6.4%	16.5%	3.5%
Early/Delayed	23.6%	27.0%	24.2%	30.1%	19.4%	24.4%

patterns. A lack of information and the influence of choice overload are bigger factors than shortsightedness. If shortsightedness were the dominant influence, then more people would opt for a high–low pension distribution.

#### 5.1.2. A Portion of Benefits as a Lump Sum

Many countries place limits on the allowable amounts for a partial payout of benefits all at once or benefits payments for a fixed term, mostly dependent on income levels and assets. There are also various conditions for being eligible for the related tax benefits, which vary according to country. In practice, very few participants voluntarily choose to take their full benefits as an annuity, despite the fact that this form of income is the only one that guarantees income up to the point of death. This marginal demand for annuities is referred to in the literature as the “annuity puzzle” (Bütler & Teppa, 2007). There are a variety of conceivable reasons for this, such as people suffering from a lack of liquidity or fearing that they will be shortchanged in terms of benefits if they die prematurely. Behavioral aspects also play a role in this limited demand for annuities. People tend to prefer short-term rewards (see also Chapter 3.1), which means they have a tendency to favor consumption.

The “annuity puzzle” might also be culturally determined. The majority of participants in Switzerland, for instant, opt for annuitization (70 percent of the pension assets), which could be explained by a cultural need for certainty (Lever, Ponds, Cox, & García Huitrón, 2015) and the specific benefits of the Swiss social security system (Bütler & Teppa, 2007). In Chile, approximately half of participants, a considerable segment, choose to have their pension savings paid out as lifelong benefits upon retirement. Research has shown that it is primarily participants who opt for early retirement who exhibit a strong preference for annuitizing their pension savings (CPB Memorandum, 2015). One possible explanation for the popularity of annuities

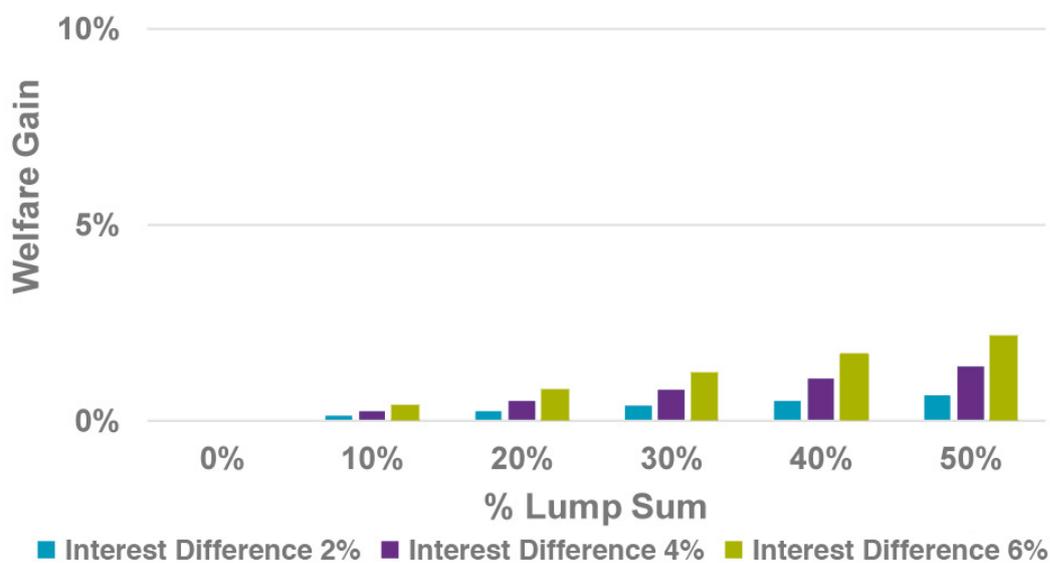
in Chile is the fact that not everyone there is entitled to guaranteed lifelong benefits through the first pillar (or social security) as is the case in so many other countries. Social security in Chile is only available to the poorest 60 percent of the population (CPB Memorandum, 2015).

Additional research on the options offered under the Swiss pension system in the payout phase showed that divorced men and widowers had a greater tendency to withdraw a portion of their benefits as a lump sum (Bütler & Teppa, 2007). In general, knowledge about a country's pension system, good health, and a higher level of education are associated with an increased chance of choosing a lifelong payout for the entire sum of pension savings (Ruiz, 2014). People's choices are also influenced by other demographic and psychological characteristics (Eberhardt, Brügggen, Post, & Hoet, 2016).

### 5.2. Welfare Calculations

Figures 5 and 6 show the gains and losses from choosing the option of withdrawing a partial lump sum upon retirement. There are a variety of reasons that the option of a lump-sum drawdown could lead to a loss in welfare. Figure 5 considers situations in which the lump sum is used for an investment (e.g., purchasing a vacation home) or repayment (e.g., pay down debt). Ponds et al. (2016) have shown that the most

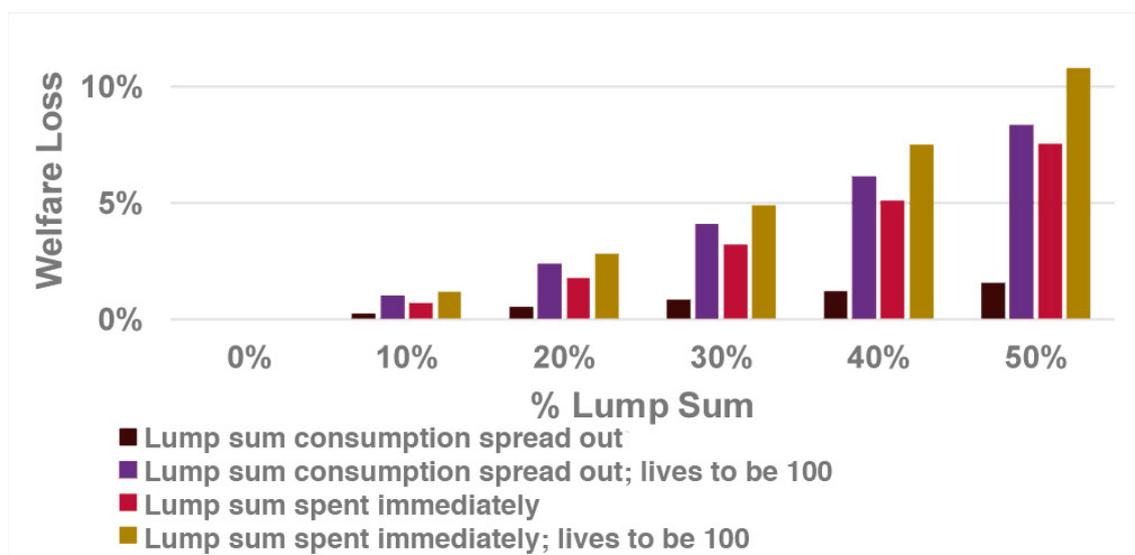
Figure 5: *Lump sum option: Welfare gains when the lump sum is used to finance the paying down of debt or an investment and helps the participant avoid having to use consumer credit at unfavorable interest rates*



frequently cited spending target for participants wanting to take advantage of the lump sum option was paying off debt (primarily mortgages). We assume a situation in which the participant would have to take on consumer credit in the absence of the lump sum payout. Consumer credit has a relatively unfavorable interest rate that is higher than the savings rate. Figure 5 presents the results for cases in which the lump sum percentage taken ranges from 10 to 50 percent<sup>11</sup> and the difference between interest rates for consumer credit and savings ranges from 2 percentage points to 6 percentage points. The welfare gains of a lump sum are relatively limited overall compared to the effects of other options, reaching a maximum of 2.2 percent.

Figure 6 shows the welfare losses when the option to withdraw a partial lump sum leads to shortsighted behavior. This produces a loss of welfare for two reasons: 1) it causes an uneven distribution of consumption if the lump sum is spent immediately; and 2) it leads to inadequate pooling of the micro-longevity risk. Figure 6 shows the welfare losses for various situations. Those attributable to the poor distribution of consumption become greater when the lump sum is consumed immediately and more limited when the participant consumes it over time. The losses stemming from an inadequate pooling of the micro-longevity risk become greater as the participant lives

Figure 6: *Figure 6: Lump sum option: Welfare losses if lump sum payout is chosen through shortsightedness and negatively impacts lifetime consumption distribution and longevity risk pooling consumer credit at unfavorable interest rates*



11 A lump sum of 10% was suggested in the recent proposal from the Federation of the Dutch Pension Funds (Van Wijk, 2015).

to be older. The figure therefore includes the situation whereby a participant reaches the age of 100. As evident from Figure 6, the welfare losses can be considerable for relatively large lump sum percentages, reaching over 10 percent for a lump sum distribution of 50 percent of the pension savings. For a lump sum payment of 10 percent, losses are limited to less than 1 percent.

From a policy perspective, therefore, the conclusion is that the 10 percent lump sum option has only limited consequences compared to the effects of the examples of greater freedom of choice presented in Chapters 3 and 4 pertaining to levels of contribution and investing options. The risks of wrong choices are relatively minor and providing such an option could satisfy the desire for a level of flexibility and liquidity. It is likely that many people would take advantage of the lump sum option if it were put into practice (Bockweg, Ponds, Steenbeek, & Vonken, 2016). This stems from a need for flexibility, and possibly also a preference for immediate income, along with an underestimation of the importance of longevity insurance, although the limited interest in the high–low pension benefits payout construction contradicts this. With regard to the latter, however, it is uncertain how aware people are that their pension plan contains such an option.

## 6. Selection Effects and Solidarity

Allowing participants free choice could potentially give rise to undesirable selection effects. Pension providers are legally prohibited from discriminating between participants with higher or lower life expectancies in terms of pension costs. Consequently, poorly educated men and well-educated women, for example, pay the same amount for their pensions even though their life expectancies differ considerably. Table 4 illustrates these differences in life expectancy as of date of retirement. It shows that the remaining lifetime after retirement for a poorly educated man is 6 years lower than that for a well-educated woman. The associated pension costs are therefore 15.7 percent "too high" for the man and 11.7 percent "too low" for the woman. In the case of a sample participant in poor health with a remaining lifetime of only 10 years after retirement, the excess cost of their pension rises to as high as 42.5 percent.

The choice of whether or not to opt for a lump sum payout could be influenced by the uniform pricing system. As we have seen, participants with a life expectancy that is below average, such as men with a low education level, are disadvantaged by uniform pricing. If they choose to take the partial lump sum distribution, they can avoid part of the attendant transference and are thus less disadvantaged. This is an example of selection effects. Table 5 shows the degree to which a participant would be withdrawing from the plan, measured as a function of the sharing of micro-longevity risk, for each of the options. As the percentages show, the effects of a 10 percent lump sum have the same order of magnitude as those of the existing high-low construction.

Table 4: *Uniform pricing results in a transference from poorly educated men to well-educated women and can affect choice behavior*

	Remaining expected lifetime upon retirement (in years)	Net subsidy or tax as a result of uniform pricing
Well-educated woman	21.5	11.7%
Average woman	20.5	7.1%
Average	19.0	0%
Average man	17.6	-6.2%
Poorly educated man	15.6	-15.7%
Someone with a short life expectancy	10.0	-42.5%

Source: *Own calculations based on the Royal Actuarial Association's tables (2014), Van Herten et al. (2002), and Bovenberg, Mackenbach, and Mehlkopf (2006)*

Table 5: *The degree to which a participant withdraws from sharing the micro-longevity risk at the date of retirement for each of the various options*

	Degree to which participant withdraws from sharing the micro-longevity risk
Straight benefits	0%
High-low construction	9.6%
Variable benefits with an initial higher payment	9.6%
Lump sum 10%	10.0%
Lump sum 25%	25.0%
Lump sum 50%	50.0%

It is not the case, however, that choosing a full or partial lump sum payout is automatically welfare-enhancing for participants with a below-average life expectancy. When someone opts for that lump sum distribution, the disadvantage is that they are then insufficiently insured against micro-longevity risk (pooling).<sup>12</sup> For participants with a below-average life expectancy, this thus constitutes a trade-off. The advantage and disadvantage of this trade-off are described in Table 6.

Table 6: *Trade-off in choosing a lump sum payout for participants with a below-average life expectancy*

Trade-off for participants with a below-average life expectancy	
<p><b>Advantage:</b> Reduces the redistribution (ex-ante disadvantageous) to participants with an above-average life expectancy</p>	<p><b>Disadvantage:</b> Reduces the benefits derived from the pooling of micro- and other forms of longevity risk (insurance against the individual risk of a long life)</p>

12 It is worth noting that these people with relatively lower life expectancy could use the lump sum to subsequently insure themselves against their longevity risk on the insurance market. Although insurers charge a premium for this, it is quite plausible that that would be more beneficial than full annuitization through the pension fund. Such might be the case when life insurers use greater differentiation than the pension funds in pricing their annuities. The welfare losses would then be smaller than the figures reported in this paper. In a hypothetical situation in which insurers do not charge any premium and fully differentiate their rates, the welfare loss would disappear entirely. The situation in real life inevitably lies somewhere between this hypothetical scenario and the figures presented in the paper.

Figures 7a and 7b show how this trade-off breaks down for a poorly educated man and a sample participant with a remaining life expectancy of 10 years after retirement, respectively. For the poorly educated man in Figure 7a, the negative effect of a sub-optimal pooling of micro-longevity risk dominates and the withdrawal from solidarity by opting for a lump sum distribution is clearly welfare-inhibiting. For the sample participant in Figure 7b, on the other hand, the advantages and disadvantages are approximately the same order of magnitude.

Figure 7a: Trade-off between welfare gain and welfare loss for a poorly educated man in enacting the lump sum option

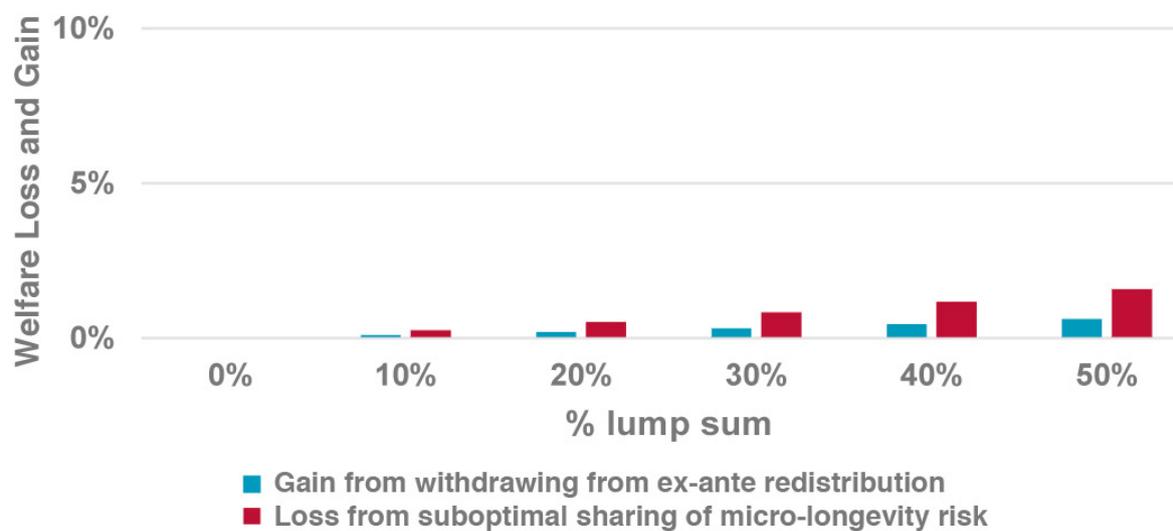
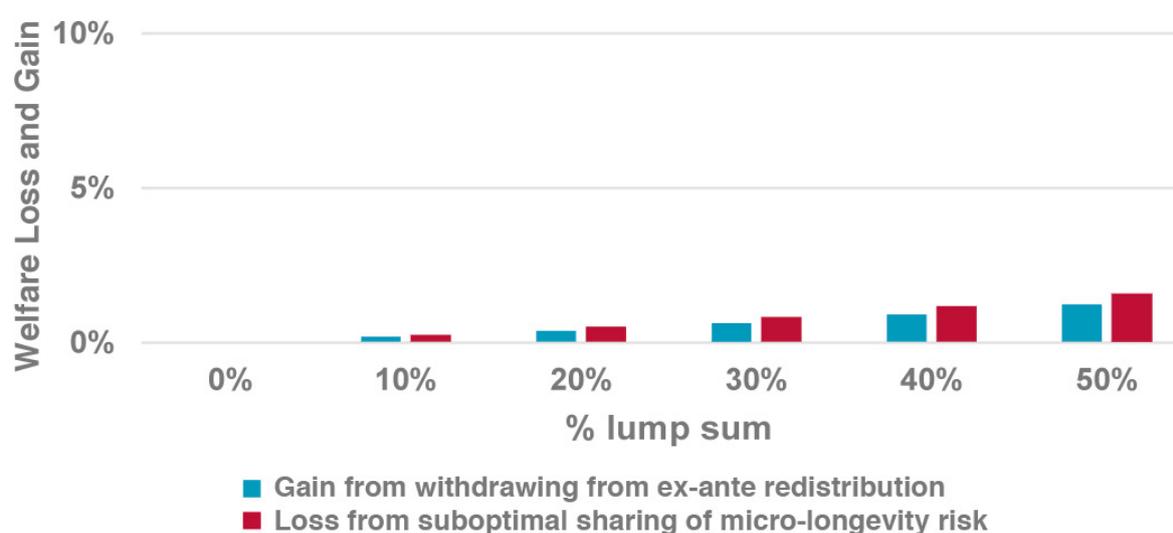


Figure 7b: Same as Figure 7a but for a model participant with a remaining life expectancy of 10 years after retirement



The conclusion from a policy perspective is that the danger of undesirable selection effects is limited by the fact that for many people the value of insuring against longevity risk outweighs the benefit of withdrawing from solidarity. This is underscored by the actual behavior of participants, with little indication of undesirable selection as a result of calculating behavior.

## 7. Conclusions

With the increasing heterogeneity of workers, demand is growing for more customized pension plans. Providing individual participants with more leeway to make their own decisions – within limits – would enable them to align their pension with their personal situation and preferences. For their part, pension providers can offer greater customization by gearing pension plans toward individual characteristics. This paper examines the advantages and disadvantages of offering more individual freedom of choice. Addressing questions regarding customization and options in pensions requires a nuanced approach. The very premise of pension arrangements is, of course, to “alleviate worry” for participants by taking over the complicated financial decisions pertaining to retirement. This requires striking the right balance between requirement and choice. The Dutch pension system stands out internationally because of its emphasis on compulsory participation and its limited scope for individual choice. The increasing heterogeneity, coupled with improvements in information technology and new insights into choice architecture, could impel a new balance between requirement and choice. It is not a question of either-or, however. The findings of behavioral science teach us that the transition from requirement – steering – to choice is gradual. When this knowledge is combined with the many dimensions of retirement planning, it produces a richly interlinked picture of decision points at which choices can be steered to greater or lesser extents.

This paper combines a number of lessons learned from the behavioral literature about the choices individuals can or cannot make with an economic analysis of the welfare effects of good and bad choices. In addition, it contains a brief analysis of actual choice behavior in the Netherlands. Welfare gains are theoretically possible with greater individual control through better alignment with the personal situation. This is counterbalanced, of course, by the fact that wrong choices can lead to welfare losses. Welfare losses can also emerge for the collective when the availability of options leads to selective behavior, for example if individuals with a shorter life expectancy withdraw from the longevity insurance pool. Eventually, it is hoped that the combination of welfare effects with insights into the actual choice behavior of individuals can form the basis for designing a system that offers room for individual choice.

A number of conclusions concerning the advantages and disadvantages of introducing new options can be drawn from the welfare calculations:

- *Levels of contribution option.* The potential gains from allowing individuals greater freedom of choice in their level of pension contributions are substantial,

but so are the potential losses from wrong decisions. Since this involves complex decisions, the consequences of which only become apparent over the long term, extreme care must be taken in introducing options for pensions during the savings stage. From a policy perspective, this means that one promising option might be to incorporate variation in the level of contributions through customization, for instance by allowing retirement goals to vary according to income level.

- *Investment option.* The potential advantages of options related to the risk profile are smaller in scope than those related to contribution levels. For policymakers, this means that ensuring a good level of contributions is more important than ensuring a perfectly aligned risk profile. In terms of individual investment choice, moreover, it is important to note that inadequate diversification can lead to a significant, and unnecessary, loss of welfare. A customized investment policy designed to accommodate the entire life cycle is an obvious policy solution. Any attendant free choice could be restricted by offering a limited number of risk profiles, as is common in other countries. Even then, though, the benefits of differentiation need to be weighed against the risks of wrong decisions. Moreover, the administrative costs need to be considered; introducing options that rarely get used is expensive from an administrative standpoint, especially for smaller plans. At the same time, the mere existence of options – whether or not people take advantage of them – can reinforce participants' sense of ownership in a plan.
- *10 percent lump sum option.* Compared to the effects of the other options discussed in this paper, the option of withdrawing a lump sum percentage totaling 10 percent has only a limited impact. The risks of wrong choices are relatively minor and such an option could satisfy the desire for a level of flexibility and liquidity. Moreover, people already have the possibility of choosing a high–low structure for their pension benefits payouts.

The welfare losses of wrong choices increase quadratically according to the magnitude of the erroneous decision-making. When choices are kept within more narrow bounds, any potential losses are relatively small. Limited flexibility in savings accumulation and benefits are a conceivable avenue. Allowing the possibility for a lump sum payout upon retirement, something that is common in other countries, also seems like a realistic option as long as it is capped, at for example no more than 10 or 20 percent of the accumulated pension capital. By restricting eligibility to the age of retirement, you limit the potential undesirable selection effects that arise when people with a short life expectancy, in particular, take advantage of the option. It is

to be expected that many people will want to take advantage of the lump sum payout upon reaching their retirement age.

Freedom of choice can also elicit strategic behavior, for example when individuals with a shorter life expectancy withdraw from the longevity risk insurance pool. The danger of such selection effects is mitigated by the fact that the insurance for longevity risk has tremendous added value – including for the poorly educated. As long as this added value offsets the “benefits” of withdrawing from the collective pool, the danger of undesirable selection remains limited, theoretically. Our calculations reveal that this is indeed the case for most participants, such as poorly educated men who have a below-average life expectancy. There are, moreover, no indications in the data on the choices made that, for instance, the high–low option for pension distribution leads to undesirable selection effects. The same applies to choices surrounding the age of retirement. Other considerations prevail in these decisions. Moreover, selection effects can be curbed by setting limits on the options. As the calculations in this paper demonstrate, offering the free choice of a lump sum distribution of 10 percent upon retirement is equivalent in terms of the selection effects to the high–low option for pensions benefits payouts.

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## Appendix: Technical Explanation of Welfare Calculations

The welfare analysis is based on the life cycle model of Bodie, Merton, and Samuelson (1992); it was also used by Bovenberg, Koijen, Nijman, and Teulings (2007) and Van Ewijk, Lever, Bonenkamp, and Mehlkopf (2014). The method of calculating welfare losses is as follows. We start by specifying the properties of the returns on financial markets and the life cycle and participant preferences. Then the welfare level of the participant is calculated for a situation in which their savings and investment decisions are optimally matched to the financial markets and preferences. After that, the welfare level is determined for a situation in which suboptimal choices are made, and the welfare loss is determined by comparing this result with the level if optimal decisions had been made. In the model, pension outcomes are stochastic on account of the uncertainty of future returns. The difference in welfare is calculated as the percentage of change in the certainty equivalent consumption level (i.e., the consumption level throughout a person's lifetime that provides the same utility level as the stochastic consumption pattern using an optimal or suboptimal decision-making strategy). This refers to consumption throughout the life cycle (the employment period plus the pension period), including the income from the first pillar ("AOW," or social security).

The following assumptions form our benchmarks:

- Life cycle with fixed retirement age and deterministic mortality rates as from the retirement date:
  - Accumulation phase starts at age 25
  - Retirement at age 67
  - Deterministic mortality probabilities as from retirement based on the prognosis of the 2015 mortality tables of the Royal Actuarial Association up through the maximum age of 100
  - The individual longevity risk is insured in the supplemental pension pillar through pooling, with perfect risk-sharing based on the law of large numbers
  - We abstract from the macro-longevity risk: mortality probabilities are deterministic
- Economy on the basis of Black-Scholes-Merton modeling with:
  - Risk-free real interest of 2 percent
  - Risk premium on high-risk investments of 4 percent per year
  - Volatility of high-risk investments of 20 percent per year

- Utility function on the basis of constant relative risk aversion (CRRA) with:
  - A parameter for relative risk aversion of 5 percent
  - A parameter for time preference of 2 percent
- Risk-free work income from employment and social security:
  - Salary is constant in real terms throughout the accumulation phase
  - Income from social security is constant in real terms throughout the decumulation phase
  - Salary is € 40,000; social security income is € 13,000
- We abstract from savings in the third pillar or other forms of individual savings or assets unless specifically stated otherwise (as in calculating customized contribution payments if a participant owns their own home).
- We abstract from fiscal aspects.

The analysis focuses on a defined contribution plan with fixed contributions throughout the employment period. The contribution rate is optimized. For our parameters, this results in a contribution of 9.2 percent of the salary, or 15.3 percent of the pension base (this is salary after subtraction of the deductible, which is assumed to be equal to the social security level). The numerical results in this paper are based on Monte Carlo simulations of the same 5,000 economic scenarios for the life cycle between ages 25 and 100 with a time stage of 1 year.

### Scenarios for the Life Cycle

Figures 8a–8c show the most important characteristics of the life cycle scenarios in which the savings and investment decisions are optimal. Figure 8a shows the simulations of the supplemental pension assets during the life cycle. The pension assets increase during the employment phase of life and reach their highest point on the retirement date. On the retirement date, the supplemental pension assets amount to EUR 400,000 in the 50 percent quantile. This amount is much smaller in unfavorable economic scenarios, falling to around EUR 200,000 in the 90 percent quantile. In favorable economic scenarios, on the other hand, it is much higher, reaching around EUR 700,000 in the 10 percent quantile. The pension assets start to decline after the date of retirement. Thanks to insurance against the individual longevity risk (through pooling in the supplemental pensions), the pension assets remain positive even if a participant reaches an advanced age. Longevity risk pooling provides a biometric return that increases with age (see also Bovenberg, Mehlkopf, and Nijman, 2014).

Figure 8a: Simulated pension assets (x EUR 1,000) during the life cycle (incl. social security as from the retirement date) in the event of optimal savings and investment decisions

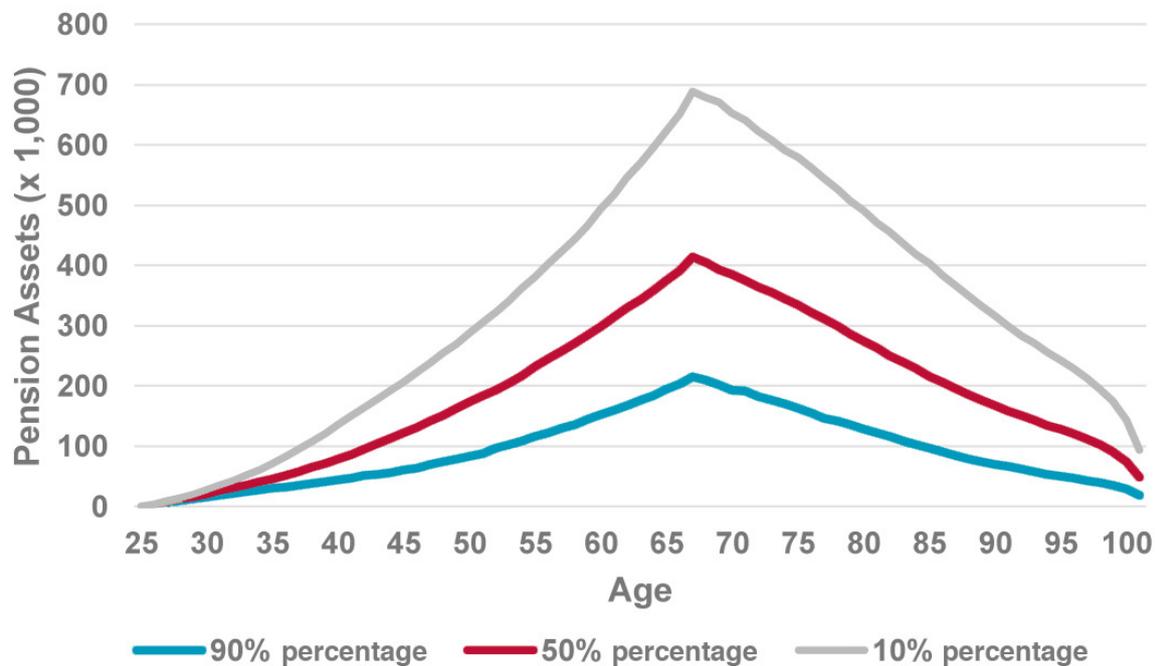


Figure 8b: Simulated consumption level (x EUR 1,000) during the life cycle (incl. social security as from the retirement date) in the event of optimal savings and investment decisions

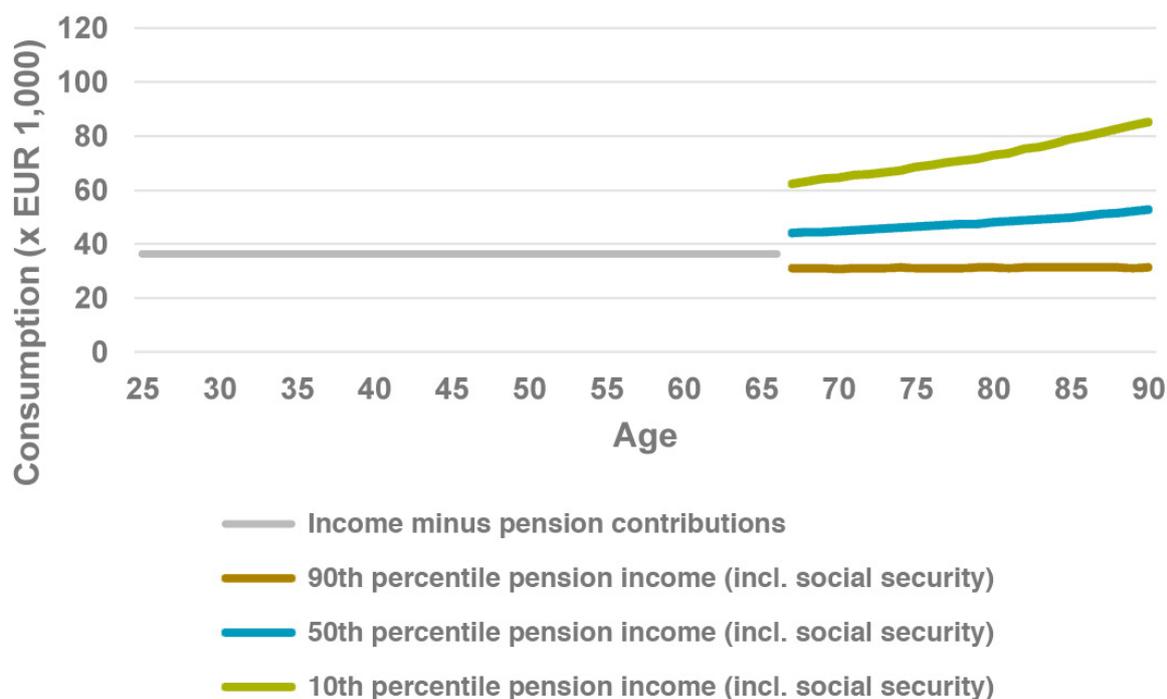
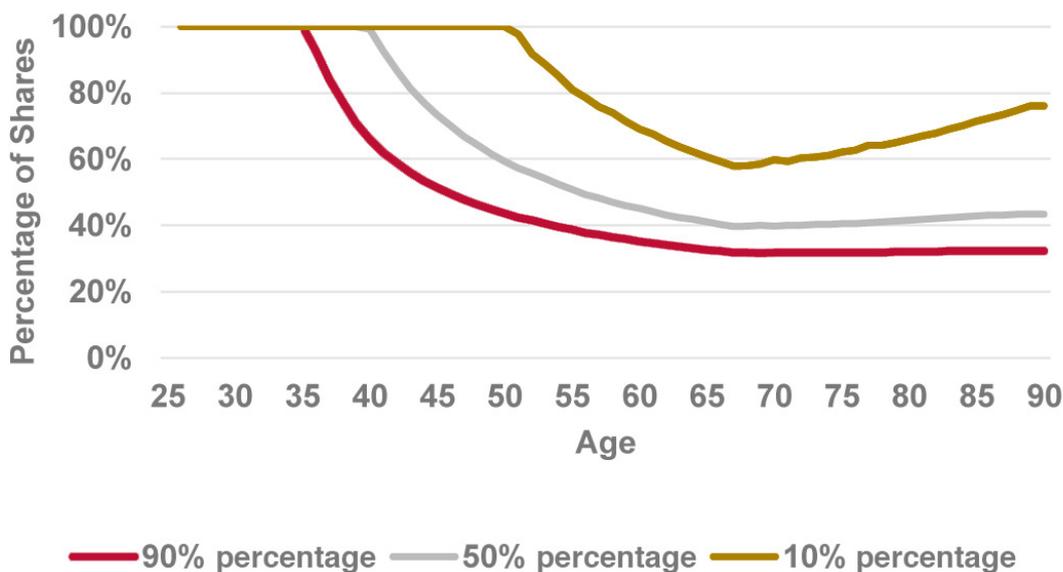


Figure 8b shows the simulations of consumption during the life cycle. During the employment phase, consumption is equal to income minus pension savings. Consumption is constant in this period because income and pension savings are constant as well. During the pension phase, consumption is stochastic as a result of the uncertainty in investment returns. The consumption level after retirement may be higher than before retirement (see the 10 percent quantile) but may also be lower (see the 90 percent quantile).

Figure 8c shows the simulation results of the investment policy during the life cycle in terms of the percentage of financial assets invested in high-risk securities. During the employment period, there is a life cycle pattern in which the percentage invested in high-risk titles decreases with age. This is because the relative importance of risk-free human capital decreases as the retirement date approaches. After the retirement date, the human capital is fully exhausted. The percentage invested in high-risk securities is then close to the median, at 40 percent. It should be noted here that this is the investment profile of supplemental pension plans. On average, half of the pension income consists of social security, which is risk-free. In terms of the overall assets (supplemental pension assets plus social security), only 20 percent is invested in high-risk titles.

Figure 8c: Simulated investment policy in terms of the % of shares during the life cycle (including social security as from the retirement date) in the event of optimal savings and investment decisions



### **Sensitivity Analysis of Welfare Calculations Based on Savings Decisions**

The welfare calculations in this paper are aimed at obtaining qualitative insights not quantitative precision. But a sensitivity analysis is also important for reliable qualitative insights. Tables 7a–7c show the extent to which the welfare calculations are vulnerable to various assumptions. It would be going too far to carry out a comprehensive sensitivity analysis for every welfare calculation in this paper. Instead, we will discuss two specific welfare calculations in greater detail: the calculation of welfare gains and welfare losses for the savings decisions in Figures 1 and 2 in Chapter 3.

Table 7a shows the sensitivity to economic parameters; we show results for alternative assumptions for risk premium and interest rate. Table 7b shows sensitivity to preference parameters; we show results for alternative assumptions for time preference and risk aversion. Table 7c shows sensitivity to income parameters; we show results for alternative assumptions for salary level and social security level. The first two columns of Table 7a show the results for the benchmark parameters in this paper, and these figures are identical to the results in Figures 1 and 2 in Chapter 3. The other columns in Tables 7a–7c show how these welfare gains and losses change when alternative assumptions are used.

The general observation is that for the alternative assumptions, as well, the magnitude of welfare gains and losses is substantial. The general qualitative conclusion is therefore robust, which says that the savings decision is important for both the gains from customization and the losses due to lack of self-discipline. Looking more closely at these figures, a number of aspects come forward. First of all, it is striking that the welfare loss due to a lack of saving discipline is much greater if there is no social security (final column of Table 7c). In the absence of social security, saving for a supplemental pension is more important because there is no basic income being provided by the state system. Second, it is striking that the loss in welfare due to a lack of self-discipline is greater for high incomes (100k instead of 40k) and smaller for low incomes (25k instead of 100k). Supplemental pensions play a relatively important role for high income groups, meaning that poor decisions have greater consequences. The loss due to lack of self-discipline is also greater when there is greater risk aversion. Finally, it is striking that the welfare gain of customization in cases of home ownership is high for people with a lower income (25k instead of 40k) and low for those with a higher income (100k instead of 40k). However, this is because home values were not adjusted in this sensitivity analysis, meaning that home ownership becomes relatively more important for low incomes and less important for higher incomes. If we had expressed the value of home ownership as a multiple of income, this effect would not have occurred.

Table 7a: *Sensitivity to economic parameters of calculated welfare gains and losses from savings decisions*

Benchmark		Interest 1% (instead of 2%)		Interest 3% (instead of 2%)		Risk Premium 3% (instead of 4%)		Risk Premium 5% (instead of 4%)	
Gain	Loss	Gain	Loss	Gain	Loss	Gain	Loss	Gain	Loss
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.5%	0.2%	0.3%	0.4%	0.3%	0.1%	0.0%	0.5%	0.9%	0.1%
1.6%	0.6%	1.8%	1.2%	1.0%	0.6%	0.8%	1.3%	2.3%	0.2%
3.1%	1.5%	3.9%	2.5%	2.1%	1.5%	2.2%	2.6%	4.1%	0.4%
4.9%	3.0%	6.4%	4.4%	3.3%	3.0%	3.8%	4.4%	5.9%	1.4%
6.8%	5.0%	9.0%	7.0%	4.7%	5.1%	5.7%	6.9%	7.9%	3.0%

Table 7b: *Sensitivity to preference parameters of calculated welfare gains and losses from savings decisions*

Time Preference 1% (instead of 2%)		Time Preference 3% (instead of 2%)		Risk Aversion = 3 (instead of 5)		Risk Aversion = 7 (instead of 5)	
Gain	Loss	Gain	Loss	Gain	Loss	Gain	Loss
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
-0.1%	0.5%	0.9%	-0.2%	0.5%	0.0%	-0.2%	0.7%
0.7%	1.4%	2.3%	0.0%	1.5%	0.2%	0.8%	2.0%
2.0%	2.8%	4.0%	0.5%	2.7%	0.5%	2.3%	3.8%
3.7%	4.7%	5.9%	1.4%	4.2%	1.2%	4.2%	6.3%
5.5%	7.4%	7.8%	2.9%	5.8%	2.3%	6.2%	9.5%

Table 7c: *Sensitivity to income parameters of calculated welfare gains and losses from savings decisions*

Salary 25k (instead of 40k)		Salary 100k (instead of 40k)		Soc. Sec. = 0 (instead of 16k)	
Gain	Loss	Gain	Loss	Gain	Loss
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.3%	0.0%	-0.1%	0.7%	-0.2%	1.5%
3.7%	0.1%	0.0%	2.4%	0.7%	4.8%
6.6%	0.2%	0.3%	5.4%	2.1%	10.5%
9.7%	0.6%	0.7%	10.2%	4.0%	19.1%
12.9%	1.1%	1.2%	16.7%	6.0%	30.5%

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Netspar  
Phone +31 13 466 2109  
E-mail [info@netspar.nl](mailto:info@netspar.nl)  
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