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Savings Adequacy Uncertainty

Driver or Obstacle to Increase Pension Contributions

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Savings Adequacy Uncertainty: Driver or Obstacle to Increase Pension Contributions?

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Abstract: Deciding how much to save for retirement is a difficult task surrounded with many uncertainties. In this paper we study the impact of uncertainty about one's savings adequacy on retirement savings contributions and information search. We combine ideas from literature in psychology and economics that have opposing predictions for the impact of uncertainty on retirement savings contributions. Accordingly, our results show that the effect of uncertainty is moderated by two factors: an individual's perceived adequacy of current savings and financial constraints. In particular, we find that uncertainty triggers retirement contributions for those who think they save adequately. At the same time it hinders retirement contributions for those who think they save inadequately. This effect of uncertainty is further moderated by the availability of financial means: a reduction in uncertainty results in more savings contributions only when financial constraints are absent. Concerning the effect of uncertainty on savings information search, we find that uncertainty not only has an indirect effect – because uncertainty affects individuals' intention to save more for which individuals need to engage in purchase-oriented information search – but that uncertainty also has a direct effect because individuals engage in ongoing information search to directly reduce uncertainty. Implications of these findings are discussed.

Keywords: uncertainty, savings adequacy, retirement, financial decision making

1. Introduction

In recent years individuals in many developed economies around the world have become increasingly responsible for their retirement savings. As a result of a shift from defined benefit to defined contribution pension plans, for example, individuals now confront a wide array of savings decisions (e.g. Lusardi & Mitchell, 2007a). By now, it is well recognized that individuals are very passive in making these decisions (Choi, Laibson, Madrian, & Metrick, 2002). Consequently, individuals often stick to their current savings levels, implicitly holding them from studying retirement savings information or contributing more to retirement savings accounts. This has at least two important consequences. First, many individuals do not start preparing and saving for their retirement till very late in life, and do not manage to save enough once they start (Mitchell & Utkus, 2004). Indeed, there is a clear need for increased saving for retirement, for example almost half the American working population is not confident they will be able to live comfortably after retirement (Helman, Copeland, & VanDerhei, 2010). Second, it creates a substantial hurdle for policy makers and for companies selling retirement savings products. In particular, individuals who do not actively think about their retirement savings cannot be effectively advised about the need for additional savings and the products that match their specific needs. Considering the importance of increased retirement savings there is a (surprising) lack of research that addresses the processes underlying individuals' tendencies to start additional savings contributions (Croy, Gerrans, & Speelman, 2010; Hershey, Jacobs-Lawson, McArdle, & Hamagami, 2007).

A *rational* individual should start saving more when current savings are inadequate to provide financial support during retirement. However, evaluating whether current savings are adequate is a daunting task. It involves a complex and ongoing process of forecasting future

needs and resources. Recent research has acknowledged the role of subjective uncertainty in explaining behavior in such complex situations (see Osman 2010 for a review). While we expect that individuals have some notion about the adequacy of their current retirement savings, the feeling of uncertainty surrounding their expectations is also likely to affect their saving behavior. From a theoretical perspective, however, there is no clear prediction about the consequences of uncertainty on saving behavior. Our main objective therefore is to investigate subjective uncertainty (towards savings adequacy) as a potentially important driver for individuals to save more and to search for retirement savings information (e.g. Lipshitz & Strauss, 1997). Following Osman (2010), we define savings adequacy uncertainty as one's subjective confidence in predicting whether current retirement savings are adequate or not.

Our first contribution is that we combine insights from psychology and economics on the behavioral responses to savings adequacy uncertainty. This is of particular interest, as research in psychology and in economics has opposing predictions regarding the impact of uncertainty on retirement savings contributions, which suggests that the impact of uncertainty operates through two different mechanisms. First, psychological literature on choice deferral predicts a negative effect because individuals respond to uncertainty by postponing decisions. Individuals tend to put off making decisions as the complexity of the decision task increases (Dhar & Nowlis 1999, Iyengar, Huberman, & Jiang, 2004; Tversky & Shafir, 1992). In contrast, economic literature on precautionary saving predicts a positive effect of uncertainty. The assumption underlying this theory is that individuals cope with uncertainty by increasing the level of wealth accumulation to buffer against unexpected future decreases in income or increases in expenses (Carroll & Kimball, 2008; Hubbard, Skinner, & Zeldes, 1995; Lusardi, 1997).

We propose that the effect of savings adequacy uncertainty is moderated by perceived savings adequacy, defined as an individuals' expectation if current retirement savings are adequate or inadequate for a comfortable retirement. In line with psychological literature we expect that savings adequacy uncertainty decreases savings contributions for those who think they save inadequately, because uncertainty results in a less compelling incentive to change behavior. At the same time it is predicted to increase savings contributions for those who think they save adequately – and hence should have no incentive to save extra – according to the precautionary saving literature.

Second, we introduce financial constraints as another potential moderator for the effect of savings adequacy uncertainty on individuals' retirement savings contributions. Financial constraints refer to an individuals' financial ability to make additional savings contributions. They may hinder individuals to make additional savings contributions simply because there are no financial means to take action. Therefore, even if an individual has less uncertainty about saving inadequately and hence knows additional savings are desired, financial constraints may hold him or her from making additional savings contributions. To examine this additional moderating effect we examine a three-way interaction effect between savings adequacy uncertainty, perceived savings adequacy and financial constraints.

Finally, we examine the effect of savings adequacy uncertainty on retirement savings information search. We distinguish between search behavior that is related and unrelated to making additional savings contributions. The goal is to better understand whether information search is only motivated by specific decision-making needs to support additional savings contributions, or that information search is also the result of a need to directly cope with uncertainty without a purchase decision in mind. Indeed, individuals not only acquire

information to enhance the quality of a specific purchase decision (e.g. Punj & Staelin, 1983), but they also engage in information search activities that are independent of specific purchase needs or decisions (e.g. Bloch, Sherrell, & Ridgway, 1986). Understanding these different search types is important as individuals may gather information from a number of different information sources depending on the type of search.

This paper's findings also have important policy implications. In particular, we provide valuable insights about individuals who are at risk of not preparing adequately for retirement. While a substantial proportion of individuals in this group would benefit from reading more retirement savings information – because it might reduce uncertainty and hence induce them to start saving more – our results suggest that just providing them with information passively might not be very effective, simply because these individuals are not very likely to look for information themselves. Hence, an active approach is needed to inform and motivate them to adequately prepare for retirement.

2. Retirement savings decisions

The main focus in the decision making literature has been on understanding how people search for and choose among several product alternatives rather than on understanding when they make a choice in a specific product group. Yet, the latter is a critical aspect in saving for retirement, as many individuals tend to postpone retirement savings decisions. Instead of investigating the choice among a specific set of products, e.g. choosing the mutual funds to invest in, this research aims at investigating whether individuals actively decide on retirement saving behavior or not.

In this section we develop a conceptual model, summarized in Figure 1, that explains an individuals' intention to make a retirement savings decision. A distinction is made between two

important stages in this process: the decision to start saving (more) for retirement and the decision to search for retirement savings information. We focus on three important drivers of retirement saving behavior: perceived savings adequacy, savings adequacy uncertainty and financial constraints. The core question of this research is the role uncertainty plays in the retirement savings decision process as there exist opposing predictions for its consequences.

<< INSERT FIGURE 1 ABOUT HERE >>

2.1 Retirement savings contributions

In this study we analyze individuals' intentions to make additional savings contributions in the next 12 months. A first step in shaping these intentions is to actively decide on one's pension savings requirements. This step is crucial as often people postpone such complex decisions (Dhar, 1997). Indeed, Choi, Laibson, Madrian, and Metrick (2002), among others, have shown that individuals are not very eager to take active responsibility to increase their retirement savings. This is reflected in the fact that individuals are heavily influenced by the proposed retirement default option, implicitly letting others decide for them. In particular, participation rates appear to be substantially higher under automatic enrollment, and once participants enroll, they make few active changes to the default savings rate and conservative investment choices set for them (Beshears, Choi, Laibson, & Madrian, 2008; Choi et al., 2002; Madrian & Shea, 2001). Despite this evidence on a passive approach to retirement preparation, the antecedent conditions of taking more active control over retirement savings remain poorly understood. Still, there is a clear need for individuals to take a more active saving approach as more than 40 percent of the American working population (36-62 years) may be at risk of not having adequate retirement resources to meet even basic retirement expenditures and uninsured health care costs (VanDerhei

& Copeland, 2010). Moreover, more than two-third of the working population is not confident that Social Security will continue to provide benefits of at least equal real value of the benefits retirees receive today (Helman et al., 2010), which gives individuals an even greater responsibility to make their own retirement savings decisions. Also in the Netherlands – which is the focus of the current study – there is an obvious need for increased retirement preparation, as many individuals are not saving adequately to meet their expected and/ or desired level of pension income (Van Rooij, Lusardi, & Alessie, 2011).

2.2 Retirement savings information search

Once individuals have recognized they need to save more for retirement, they will need to gather information to learn more about savings products and planning for retirement, as many individuals lack the necessary information to adequately support a savings decision. For example, only 46% of American workers have calculated how much they would need to save for retirement. Yet, those who did are more confident they will be able to accumulate the amount they need for retirement (Helman et al., 2010). Searching for more information is therefore an important factor to improve retirement saving behavior and an integral part of consumer decision making (e.g. Howard & Sheth, 1969).

In this study we focus on individuals' intention to acquire information about pension planning. Individuals may acquire retirement savings information for several reasons. Some individuals might search for specific product related information because they intend to adjust their current savings level. Others might look for more general information, for example to establish their desired savings level, without considering a specific change in their saving practices. Existing information acquisition research has mainly focused on the former, where

consumers search for information with a specific purchase goal at hand, i.e. they know what product they want (Beatty & Smith, 1987; see Xia & Monroe 2004 for a review). This type of search behavior has been referred to as goal directed search. In other cases, individuals acquire information when no specific purchase is considered, which is referred to as ongoing search (Bloch et al., 1986; Janiszewski, 1998; Moe, 2003). The latter search type is particularly relevant given that savings goals for retirement are often not that well defined, and the environment in which savings decisions are made is subject to continuous change. For example, in many countries the question arises whether the eligible retirement age should be raised (Business Week, 2010). As a response, individuals might engage in ongoing information search to stay informed about these potential changes, without directly considering adjusting their current retirement savings.

Until now little is known about factors that differentiate individuals who search for retirement information from those who do not, let alone the factors that affect either goal directed or ongoing retirement information search. We study the role of uncertainty in retirement savings information search, where we differentiate between its impact on goal directed search behavior that is related to the decision to save more (i.e. purchase-oriented retirement information search) and search behavior that is unrelated to additional savings (i.e. ongoing retirement information search). Hence, we examine whether uncertainty only affects information search indirectly – because uncertainty affects the decision to make extra savings contributions for which information search is required – or that uncertainty also has a direct effect on information search.

In order to make this distinction we argue that the intention to start additional savings contributions induces a need to search for purchase-oriented information. For example, to make a well-informed decision an individual needs to collect information about available financial

products that fit the individual's requirements, the relevant tax benefits, and so on. In contrast, searching for retirement information in general does not necessarily result in a higher savings intention. Individuals could simply engage in ongoing information search to increase retirement knowledge or to confirm that current savings are adequate, without a specific purchase goal in mind.

2.3 Perceived savings adequacy

The first driver of retirement saving behavior in our conceptual model is the perceived adequacy of individuals' current savings levels. The adequacy of individuals' retirement savings has received considerable attention (Engen, Gale, & Uccello, 1999; Scholz, Seshadri, & Khitatrakun, 2006; Skinner, 2007), and, although views of savings adequacy expressed in those studies are widely divergent, there is general consensus that at least some households are saving sub optimally for retirement. More surprising is the finding that individuals are in general aware that their retirement saving behavior is not optimal (Clark, d'Ambrosio, McDermed, & Sawant, 2004). For example, Choi et al. (2002) observe that two-thirds of employees at a large U.S. food corporation report that their current retirement savings rate is "too low" relative to their ideal savings rate. Of those respondents who indicated that their savings rate is too low only a small fraction actually increased their savings contribution rate in the next few months. As such, an important question is why simply being aware of inadequate retirement savings is not always sufficient to induce additional retirement savings.

2.4 Savings adequacy uncertainty

One reason why an anticipated lack of sufficient savings for retirement is not acted upon by increasing saving activities is the uncertainty surrounding the perceived savings adequacy. Following Osman (2010), we define uncertainty as individuals' subjective confidence in their prediction whether they save enough for retirement or not. Previous research has shown that many individuals are poor at estimating the balance between financial needs and financial resources across the years of retirement (e.g. Hershey, Walsh, Brougham, Carter, & Farrel, 1998). Hence, one would expect that individuals perceive substantial uncertainty when deciding how much to save for a comfortable retirement. The effect of uncertainty on retirement saving behavior, however, is not unequivocal, as uncertainty may either positively or negatively affect retirement savings decisions according to different theories in psychology and economics.

First, psychology literature shows that individuals might postpone decisions in response to uncertainty. Lipshitz and Strauss (1997) describe uncertainty in the context of action as a sense of doubt that blocks or delays action. This definition is consistent with empirical studies of choice deferral in psychology and marketing. For example, Dhar (1997), Luce (1998) and Tversky and Shafir (1992) show that individuals are more inclined to postpone their product choice in complex decisions. In an analysis of the decision processes that lead to this deferral behavior, Dhar (1997) shows that individuals who expressed a greater number of thoughts or had relatively equal numbers of favorable evaluations toward several options, and therefore presumably faced greater preference uncertainty in the choice task, were more likely to defer their decision. These findings are consistent with a systematic bias toward indecision in retirement decision making (e.g. Madrian & Shea, 2001; Choi et al., 2002).

In contrast, whereas psychology literature predicts less action under uncertainty, literature in economics suggests that uncertainty results in more action, that is additional savings. In fact,

precautionary saving, defined as the additional saving that results from the knowledge that the future is uncertain, is considered one of the most important motives to save, see Carroll and Kimball (2008) for a review. More specifically, this theory posits that individuals create a savings buffer to remain in sound financial conditions in the future even in case of unexpected negative changes in income or expenses. Most research in the precautionary saving literature has focused on the relationship between earnings uncertainty and wealth accumulation (e.g. Carroll & Samwick, 1998; Lusardi, 1997). In general, these studies find that individuals increase the accumulation of wealth as a type of self insurance against adverse income shocks. Besides income uncertainty, other risk factors such as life span uncertainty, health uncertainty, and uncertainty about medical expenses are important precautionary motives (Davies, 1981; Hubbard et al., 1995; Palumbo, 1999). Taken as a whole, what matters for precautionary saving decisions is individuals' notion that additional savings can provide financial security in the future, given that future income and future income needs are uncertain.

Because psychology and economics predict opposing effects of uncertainty, we consider the circumstances under which choice deferral is more (vs. less) influential than precautionary savings as a driver of savings intentions. First, consider individuals who think they save inadequately – and hence will have a rather concrete reason to increase savings. These individuals should (rationally) perceive a strong incentive to start saving extra. However, when uncertainty is high, the fact that an individual is at risk of saving inadequately might be not part of one's direct experience (Wakslak, Trope, Liberman, & Alony, 2006). As a consequence, for those who think they save inadequately, a higher level of uncertainty results in less clear preferences for the decision whether or not to increase savings for retirement, resulting in choice deferral and a lower intention to start extra savings. In contrast, when individuals think they save

adequately – and hence have no concrete reason to increase savings – but they feel uncertain about this, they are likely to engage in (precautionary) saving to reassure they indeed save enough for retirement. In sum, the net effect of uncertainty on savings intentions will be increasing with the level of perceived savings adequacy.

Concerning the effect of uncertainty on information search we formulate two expectations. First, we expect that a higher savings intention induces a need to search for purchase-oriented information. As one might expect, when individuals have decided to start saving more, they should search for information to make a proper choice. Hence, uncertainty has an indirect effect on information search through its impact on savings intention. Indeed, mainstream marketing literature related to consumer information search has focused on individuals searching for information to enhance the quality of a specific decision. For instance, search effort rises when uncertainty about which brand is best increases (Moorthy, Ratchford, & Talukbar, 1997) or when choice uncertainty regarding which alternative to choose increases (Urbany, Dickson, & Wilkie, 1989). As such, individuals acquire information to reduce decision uncertainty and hence to enhance decision quality (see Ratchford 2008 for a review).

Second, we expect that uncertainty has a direct effect on information search that is unrelated to the decision to save more. In particular, uncertainty has a direct effect on information search intention as individuals are likely to engage in ongoing information search to directly reduce uncertainty. A primary motive for such ongoing search behavior is to gain and update product and marketplace information (Bloch et al., 1986; Moe, 2003). Thus, even when individuals do not consider any adjustments in retirement savings, they may still use ongoing information search to directly cope with uncertainty regarding, for example, how much to save for retirement (i.e. “to what extent has an individual a savings problem”) as well as to update this

prediction to reduce uncertainty resulting from a continuously changing retirement decision environment. Indeed, behavioral decision theories show that information search can be a very relevant strategy to directly reduce uncertainty (e.g. Lipshitz & Strauss, 1997).

2.5 Financial Constraints

The relationship between savings adequacy uncertainty and retirement savings decisions will be further affected by an individuals' financial ability to increase contributions. In particular, a lack of available financial resources can act as a constraint when planning for retirement (e.g. Bernheim & Scholz, 1993; Lusardi & Mitchell, 2007b). It has been shown, for example, that individuals with the lowest income are at the highest risk of running short of money in retirement (VanDerhei & Copeland, 2010). In our study we do not focus on income per se, but rather on an individuals' financial ability to change one's savings level, which is based on projected expenditures and income for the next year. Although some individuals might perceive their current pension savings as inadequate and hence feel an urge to better prepare for retirement, they might simply not be able to make additional savings contributions. Therefore, we expect that the interaction effect of uncertainty and perceived savings adequacy is conditional on individuals' financial ability. In particular, for those who think they save inadequately, a reduction in uncertainty should result in a greater intention for additional retirement savings only when financial constraints are absent. To test this expectation we examine a three-way interaction effect between savings adequacy uncertainty, perceived savings adequacy and financial constraints.

2.6 Control variables

Retirement saving tendencies are heterogeneous among individuals. Previous evidence shows that variance in retirement planning and savings decisions can be partly explained by socio-demographic and psychological characteristics (e.g. Hershey, Jacobs-Lawson, McArdle, & Hamagami, 2007). Following extant research we include financial literacy, retirement goal clarity, and retirement income knowledge as control variables.

Financial literacy – Lusardi and Mitchell (2007b) suggest that simply planning for retirement has a significant effect on savings. Planning can actually jump-start the consideration of retirement savings decisions as it may induce a need to save more for retirement. Insufficient economic and financial knowledge is one important reason why many people may not plan and save adequately for retirement. In fact, Lusardi and Mitchell (2007b) show that financial literacy influences planning tendencies and that planning, in turn, increases wealth accumulation.

Goal clarity – Several studies show that having clear goals for retirement is a significant predictor for retirement planning activities and saving tendencies (e.g. Hershey, Henkens, & Van Dalen, 2007; Hershey, Jacobs-Lawson, McArdle, & Hamagami, 2007). Long term goals serve to specify a behavioral plan that will ultimately lead to goal fulfillment (e.g. Beach & Mitchell, 1987). Hence, visualizing how life in retirement will be gives individuals a goal against which they can measure their progress. The more concrete an individuals' concept of retirement is, the easier it will be to save.

Retirement income knowledge – Empirical evidence is growing that individuals' knowledge of future retirement benefits affects retirement decision making. Gustman and Steinmeier (2005) report, among others, that many individuals are poorly informed about their own pensions. This lack of pension knowledge has important consequences for retirement savings decisions. Recent

work by Chan and Stevens (2008), for example, shows that individuals who are well informed about their pensions are far more responsive to pension incentives than the average individual.

Other controls – Because it is well-documented that an individuals' saving behavior is also influenced by socio-demographic characteristics we include control variables for age, gender, education, household income, number of children, partner, main wage earner of the household, financial administrator of the household, availability of a pension fund, and primary occupation. We furthermore control for risk aversion and past information search activities and savings, as past behavior is often an important predictor of behavioral intentions (e.g. Bagozzi & Dabholkar, 1994).

3. Data and methodology

Our model of retirement savings decisions is empirically tested using data collected through a representative Dutch household panel of CentERdata. CentERdata collects a vast array of detailed information about an individuals' financial, psychological and socio-demographic situation. Next to this general data collection, supplementary questionnaires can be tailored to collect specific variables of interest. Respondents were selected from the panel on the basis of the criterion that they were in between age 25-65, because these respondents are most likely to be responsible for making retirement savings decisions. In total 1,078 household members completed the survey. Either because respondents already retired (N = 91), were still attending college (N = 3), or did not answer questions of interest that were collected in the general 2009 data wave (N = 219[1]), we exclude those respondents from further analyses. Our final sample

[1] 69 out of the 219 missing values in the general 2009 wave result from missing items for the variable risk aversion, because these items are only answered by respondents that explicitly indicate to have a yearly net household income of 10,000 euro or above. This means that for this variable the missing values consist of respondents that answered

consists of 765 respondents, with an average age of 48. Table A.2 (appendix A) provides a complete description of the socio demographic sample characteristics.

3.1 Measurement

3.1.1 Additional savings and information search intention

For the two dependent variables we measure individuals' intention to make additional savings contributions and individuals' intention to search for retirement savings information in the next 12 months. Intended additional savings was measured on a seven point scale ranging from "certainly not" to "certainly" to answer the question: "In the next 12 months, do you expect to make extra contributions in order to supplement your income after retirement". Intended information search was measured on a five point scale ranging from "disagree" to "agree" to answer the two questions: "In the next 12 months I expect to calculate how much money I need to save to retire comfortably", and "In the next 12 months I expect to collect information about financial planning and pensions", based on the retirement planning scale of Hershey, Henkens, and Van Dalen (2007). The measurement proves to be reliable (Cronbach Alpha = 0.91), and we use the average score to form the composite information search intention scale.

We measure intentions because in mainstream psychological models the likelihood an individual performs a particular behavior is an increasing function of the strength of his intention to engage in that behavior (e.g. Ajzen, 1991). A host of previous research, in contrast, has focused on past retirement saving behavior (e.g. total accumulated wealth). However, we cannot use measures on past saving behavior in this research, as our objective is to uncover how perceived uncertainty and savings adequacy affect savings decisions. Hence, observing only past

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"don't know" OR "lower than 10.000 euro". 150 out of the 219 missing values in the general 2009 wave result from missing items for the variable financial constraints.

behavior, such as accumulated retirement wealth or an individuals' savings rate in a pension plan, would not reveal these effects, because *current* levels of perceived uncertainty and savings adequacy are the result and not the cause of *past* saving behavior.

3.1.2 Perceived savings inadequacy

To measure individuals' perceived savings adequacy we use a measure to gauge whether individuals perceive their current retirement savings to be adequate in order to retire comfortably. Based on Hershey, Henkens, and Van Dalen (2007) we measure perceived savings adequacy with a five point scale ranging from "totally inadequate" to "totally adequate" on: "Based on how you expect to live in retirement and given that you do not adjust your current saving behavior, do you expect to have adequate financial resources to retire comfortably?". We divide the respondents in two groups based on whether they perceive their current saving behavior as adequate (0) or inadequate (1).

Much other research on savings adequacy used objective measures of savings adequacy (e.g. total wealth accumulation, replacement rates, retirement plan contributions). There are at least two important reasons in favor of using a subjective measure for savings adequacy in our study. First, there is no standard retirement adequacy measure against which to measure the observed saving behavior of individuals or households (Scholz et al., 2006: 608). As a consequence, views of savings adequacy for retirement are widely diverging (Skinner, 2007). Hanna and Chen (2008), for example, indicate that the weakest part of retirement savings adequacy studies results from shortcomings in the estimation of individuals' spending needs during retirement. Financial needs across the years of retirement may be very heterogeneous. For some households it might be rational to save more for retirement when expenses are expected to

increase after retirement (e.g. expensive holidays), while for other households it might be rational to save less because they plan to use their housing value to finance their retirement expenses. As such, savings adequacy is hard to establish objectively.

Second, previous research has indicated that subjective variables can have strong effects on financial decision making (e.g. Donkers & van Soest, 1999). These subjective variables might make up individuals' perceptions of financial opportunities and constraints (Kemp, Rosenthal, & Denton, 2005), thereby affecting financial expectations and planning for retirement (Chan & Stevens, 2008).

3.1.3 Savings adequacy uncertainty

Savings adequacy uncertainty was measured (after reverse coding) with a seven point scale ranging from "very certain" to "very uncertain" in answer to the following question: "You indicate that you expect to have (inadequate/ adequate) financial resources to live comfortably during retirement. How certain are you that your expectation turns out to be true?"

3.1.4 Financial constraints

To account for an individuals' financial ability to change one's savings level we use a question which is answered by panel respondents every year. On a five point scale ranging from "expenditures will be much higher than income" to "expenditures will be much lower than income" respondents answer the question: "When you think of the NEXT 12 MONTHS, do you think the expenditures of your household will be higher than the income of the household, about the same as the income of the household, or lower than the income of the household?". Details on the control variables can be found in appendix A.

3.2 Descriptive statistics

In our sample 22 percent of the respondents perceive their current saving behavior as inadequate. Respondents report a mean score of 3.6 for the level of uncertainty (measured on a 7- point scale) when predicting whether they save adequately or not. Among our respondents 12 percent expects that in the next 12 months expenditures will be higher than income, 51 percent expects that these will be about the same, and 37 percent expects that expenditures will be lower than income. In line with low behavioral intentions reported in other studies (e.g. Choi et al., 2002), the intentions of our sample are also low with mean values of 2.5 (scale 1 – 7) and 1.9 (scale 1 – 5) for additional savings intention and information search intention, respectively.

3.3 Model

To uncover the relationship between perceived savings adequacy, savings adequacy uncertainty, financial constraints and intended retirement saving behavior we use the ordered logit model, as additional savings intention and information search intention are both measured as ordinal variables with seven and nine categories, respectively (Greene, 2003: 736). The ordered logit model for a variable with J ordered categories reads as follows:

$$(1) \qquad \text{Intention}^* = X'\beta + \varepsilon$$

with

$$\text{Intention} = 1 \quad \text{if intention}^* \leq \alpha_1$$

$$\text{Intention} = j \quad \text{if } \alpha_{j-1} < \text{intention}^* \leq \alpha_j \qquad \text{for } j = 2,\ldots, J - 1$$

$$\text{Intention} = J \quad \text{if } \alpha_{J-1} < \text{intention}^*$$

Here *intention** represents a latent variable, and α_1 to α_{J-1} are unobserved thresholds that satisfy $\alpha_1 \leq \alpha_2 \leq \ldots \leq \alpha_{J-1}$. *X* contains all explanatory variables, and ε is the error. We mean center our measures of savings adequacy uncertainty and financial constraints to enhance interpretation of the results, given the presence of interactions. This means that the signs of the coefficients for these explanatory variables can be interpreted in relation to the population mean for these variables.

4 Results

4.1 Intention to make retirement savings contributions

Table 1 presents the estimation results for additional savings intention. The socio-demographic and psychological variables are included as control variables. We also control for individuals' extra retirement savings and information search activities in the past few years.

In order to test our expectations we estimate a three-way interaction effect model where we include our three independent variables of interest. First, we find a positive main effect for the dummy inadequate savings (β = .434; p = .019), indicating that those who think they save inadequately have a higher intention to make additional savings contributions. Second, we find a positive main effect of uncertainty on additional savings intention (β = .234; p = .001). This indicates that individuals indeed respond to uncertainty by making additional savings contributions, which is in line with precautionary saving. For those who think they save inadequately, however, the positive role of uncertainty vanishes because of the negative interaction effect with inadequate savings (β = -.206; p = .080). Moreover, in line with our expectations, the effect of uncertainty even reverses if individuals are not financially constrained,

which is indicated by a significant three-way interaction effect between the variables dummy inadequate savings, savings adequacy uncertainty and financially unconstrained (β = -.491; p = .000). This result shows that – for those who think they save inadequately – uncertainty has a negative effect on savings intention, yet only if they are financially able to change their saving behavior. In other words, making individuals more certain that they save inadequately seems beneficial only for those who have the financial means to change their current savings levels.

<< INSERT TABLE 1 AND FIGURE 2 ABOUT HERE >>

To enhance interpretation, the three-way interaction effect is visually presented in figure 2. This figure shows how our three variables of interest influence the intention to make additional savings contributions in the next 12 months. We create eight new dummy variables based upon the dummy inadequate savings, and a median split for the variables savings adequacy uncertainty and financial constraints. Next, we run the same ordinal regression analysis including the eight dummy variables – and including all previous control variables – and plot the values of the dummy variables in the figure. On the horizontal axis we divide our respondents in four groups according to adequate versus inadequate savings and financially constrained versus financially unconstrained. The solid line shows respondents who are uncertain about their savings adequacy prediction, and the dotted line those who are certain about this prediction.

Two findings in this figure are particularly interesting and improve our understanding of the reported three-way interaction effect. First, for those who think they save adequately, uncertainty has a positive effect on additional savings intention, whereas a lack of financial ability shows a minor (and insignificant) negative effect on additional savings intention only

when people are uncertain whether they save adequately. Thus, for this "adequate-savings" group, individuals facing greater uncertainty regarding their savings adequacy intend to make more retirement contributions in the next year, which is in line with the economic precautionary saving motive. Second, for those who think they save inadequately, financial ability and the extent of savings adequacy uncertainty are both important factors in explaining additional savings intentions. Individuals, who are certain that they are saving inadequately, and who are not financially constrained, have the highest intention to make additional savings contributions in the next 12 months. For this "inadequate-savings" group with sufficient financial resources, uncertainty leads to a lower intention to make additional savings contributions. Overall, these results support our expectation of opposing roles for uncertainty, where its impact depends on perceived savings adequacy. Specifically, for those who think they save adequately, uncertainty increases the intention for additional savings. In contrast, for those who think they save inadequately, uncertainty decreases the intention for additional savings, though only when financial constraints are absent.

As is clear from our results the interactions in our model play an important role. A test on the joint significance of all interactions also supports this ($\chi^2 = 11.97$, d.f. = 4, $p = .018$).

4.2 Intention to search for retirement savings information

In table 2 we present the results of two ordered logit models for individuals' intention to search for retirement savings information. In both models we use the composite information search intention scale as dependent variable. The difference between the two models is that we control for additional savings intention in our second model to show the effects of our variables on search behavior that is not driven by the intention to directly increase retirement savings.

Therefore, in model 1 the coefficients can be interpreted as overall effects on retirement search behavior, which can be either related or unrelated to intended additional savings contributions. In model 2 the coefficients can be interpreted as the consequences for search behavior that is unrelated to intended additional savings contributions, i.e. ongoing retirement information search. Again, we include controls for a host of socio-demographic variables and for individuals' extra retirement savings and information search activities in the past few years.

The first column in table 2 shows the results of overall retirement search behavior, which may be either related or unrelated to individuals' additional savings intentions. We find results that are very similar to the results that were obtained for additional savings intention. First, we find a significant positive coefficient for the dummy inadequate savings ($\beta = .437$; $p = .023$), as well as for uncertainty ($\beta = .319$; $p = .000$), which again disappears in case individuals expect to save too little ($\beta = -.323$; $p = .009$). Second, as for additional savings intention, we find a significant three-way interaction effect for our three variables of interest ($\beta = -.387$; $p = .008$). This means that though uncertainty has a positive main effect on information search intention, it negatively affects information search intention for individuals who think they save inadequately and are not financially constrained.

<< INSERT TABLE 2 AND FIGURES 3 AND 4 ABOUT HERE >>

The fact that the findings for information search intention are similar to additional savings intention is also evident from figure 3, where we graphically represent the three-way interaction effect. For this representation we use the same procedure as described for additional savings intention. Again, the figure shows that in the "adequate-savings" group, individuals who face

greater savings adequacy uncertainty report a higher intention to search for information. In contrast, in the "inadequate-savings" group, individuals who face more savings adequacy uncertainty report a lower intention to search for information, but only if they are not financially constrained. Thus, for this "inadequate savings" group, uncertainty may hold individuals – given they have sufficient financial ability – from considering extra information search. Overall, observing the same pattern of uncertainty's impact on information search intention and additional savings intention supports our notion that individuals engage in (purchase-oriented) information search to support additional savings decisions.

In the second column in table 2 we control for additional savings intention to see whether individuals also use information search to lower uncertainty when additional savings are not directly considered. By controlling for additional savings intention, the coefficients can now be interpreted as their effects on ongoing information search behavior. As expected, we find a strong significant effect of additional savings intention ($\beta = 1.061$; $p = .000$). The main effect of uncertainty ($\beta = .202$; $p = .010$) shows that individuals who think they save adequately use information search to lower uncertainty. For individuals who think they do not save enough, however, this effect is fully cancelled by the interaction between inadequate savings and uncertainty ($\beta = -.268$; $p = .044$), so uncertainty does not drive information search for them. Further, we see that the three-way interaction effect becomes insignificant ($\beta = -.215$; $p = .163$), indicating that financial constraints no longer have a significant effect.

In figure 4 we graphically represent this ongoing information search model, for which we use the same procedure as before. When we compare this figure with overall search in figure 3 we see that especially the group characterized by "inadequate savings, uncertainty, and no financial constraints" shows a low intention to search for information after controlling for

additional savings intention. Two alternative explanations may underlie this finding. First, individuals in this group may be relatively low involved in the retirement decision process, and hence focus on information search only when needed to support an additional savings decision. Individuals in other groups, in contrast, may have a higher level of enduring involvement and hence focus relatively more on ongoing information search to stay informed about changes in the retirement decision environment (e.g. Bloch et al., 1986). Second, searching for more information might elicit negative emotions because it confronts these individuals with their savings problem. The desire to minimize such negative emotions might therefore be another reason why they do not think about their retirement savings and thus do not search for information (Luce, 1998). According to this argument, ongoing information search might then, in contrast, evoke more positive emotions for those seeking reassurance they indeed save enough.

4.3 Use of information sources

In the previous section we examined how uncertainty affects an individual's decision to search for retirement savings information. The distinction that we make between overall search and ongoing search behavior is particularly relevant because search typically involves gathering information from a number of different sources. In particular, a person searching for information to support a decision for additional savings contributions may use different sources than a person searching for information to lower uncertainty. In this section we explore how individuals search for information, dependent on whether they search for information with or without the intention for additional savings.

For this purpose, we asked respondents which information sources they would use when searching for information about life after retirement and which information sources they would

use when searching for information about retirement income. For each, we show respondents the same pre-specified list of sources and ask them to indicate which sources they would use. Factor analysis (see appendix B), including information sources for both life after retirement and retirement income, reveals 4 general groups of sources that respondents consider to use: company/ pension fund ("the company you work(ed) for"; "your pension fund"), social environment ("family, friends, or acquaintances"; "people who already have retired"; "colleagues"), financial self-assistance ("financial magazines, guides and/ or books"; "financial information on the internet"; "financial calculators on the computer or internet"), and a professional financial advisor. To obtain an average score of information source consideration we calculate the number of sources in a particular factor that the respondent considers to use and divide it by the total number of sources in that particular factor. For example, the factor "financial self assistance" consists of 6 information items. If an individual indicates to consider 4 of these information items, this individual gets a score of 0.67 for this information source[2].

<< INSERT FIGURE 5 ABOUT HERE >>

In figure 5 we present the information sources that individuals consider to use. Groups are created based upon a median split of individuals' intentions to search for information and to make additional savings contributions. As the figure shows, individuals that report a low intention for both information search and additional savings (i.e. group "none") are less likely to consider each of these information sources. Following from our analyses it is especially interesting to compare individuals that report a high intention for both information search and

[2] Note that we obtain similar results if we do this analysis for information sources about life and income after retirement separately.

additional savings (i.e. purchase-oriented search) with those that only report a high intention for information search without a high additional savings intention (i.e. ongoing search). The most notable and single significant difference is that individuals who conduct a purchase-oriented search are more likely to use a professional financial advisor, compared to either the ongoing search group or the no intention group. Advice from a financial advisor may be a valuable information source for reducing the many kinds of uncertainty inherent in making a choice within the wide range of available pension products. Firms can therefore use this channel particularly well to get in touch with consumers that are seriously planning on making additional pension contributions. Further, though the social environment and pension fund seem especially important for those who conduct ongoing information search, the differences are not significantly different from the purchase-oriented search group.

4.4 Further analyses: Determinants of uncertainty

Understanding the factors that determine the level of perceived uncertainty is important for those who are responsible for providing individuals with information to lower that uncertainty. Therefore, we estimate another ordinal regression analysis with savings adequacy uncertainty as the dependent variable. Table 3 shows the results. We control for the same socio-demographic and individual variables as in the previous analyses. We find that retirement income knowledge, retirement goal clarity, and financial literacy have a significant negative impact on perceived savings adequacy uncertainty. The insignificant influence of past information search behavior might be somewhat surprising. However, once we exclude retirement goal clarity and, in particular, income knowledge, the influence of past information search becomes significantly negative. This suggests that the impact of past information search is mediated by goal clarity

and, most importantly, income knowledge. Excluding the same set of variables does not result in a significant effect of past action, suggesting that these variables do not mediate the impact of past action.

<< INSERT TABLE 3 ABOUT HERE >>

5. Conclusion and discussion

5.1 Conclusions

This study increases our understanding of individuals' intentions to actively decide on retirement saving behavior. In particular, we investigate the role perceived uncertainty plays in saving for retirement and searching for retirement savings information. Theories in psychology and in economics have opposing predictions for the impact of savings adequacy uncertainty on one's intentions to start saving (more). We develop a conceptual model to describe these multiple roles of uncertainty and use a unique representative dataset to empirically test our model.

Taken as a whole, the results of this study support our notion that uncertainty either increases or decreases an individuals' intention to make additional savings contributions depending on the specific circumstances. Specifically, we show that the effect of uncertainty depends on two important factors: an individuals' perceived savings adequacy and financial constraints. In line with the economic precautionary saving literature, we find that uncertainty results in a higher intention to make additional savings contributions for those who think they save adequately. In contrast, congruent with choice deferral literature in psychology, we find that uncertainty leads to a lower savings intention for those who think they save inadequately. This detrimental effect of uncertainty is conditional on an individuals' financial ability: a reduction in

uncertainty results in more savings only when an individual has sufficient financial resources to actually adjust saving behavior. We also examine the effect of uncertainty on information search in more detail. We find that, on the one hand, uncertainty has an indirect effect on information search, as uncertainty affects an individual's intention for additional savings, which induces a need to search for purchase-oriented information. On the other hand, uncertainty also has a direct effect on information search because individuals, in particular those who think they save adequately, engage in ongoing information search to directly cope with uncertainty. We show that differentiating between these different types of search behavior is relevant, because individuals who search for purchase-oriented information are relatively more likely to use information from a professional advisor.

5.2 Discussion

The theoretical implications of our research are fourfold. First, we find support for the idea that we can transfer well addressed findings about the role of uncertainty in the evaluation and choice of (product) alternatives to one's intentions to make savings decisions or not. Specifically, we find evidence for choice deferral in the context of the decision to make extra retirement savings contributions.

Second, our research extends the insights from studies that have reported that even though many individuals anticipate they are saving inadequately for their retirement, only few have the intention to actually increase savings (e.g. Choi et al., 2002). Our results provide an explanation for these findings as we show that uncertainty and financial constraints are two significant factors – for those who are saving inadequately – that affect the intention to contribute more.

Third, by considering psychological and economic theories of coping with uncertainty as complementary, we show that both theories are needed to explain the impact of uncertainty on retirement savings decisions. For those who save adequately, precautionary motives explain the positive effect of uncertainty, as individuals start saving more to secure themselves against uncertainty. At the same time, for those who save inadequately, literature on choice deferral explains the negative effect of uncertainty, as uncertainty makes the benefits of adjusting current savings less salient. This psychological effect of uncertainty complements and highlights the value of recent studies that seek to find non-economic explanations for retirement saving tendencies (e.g. Hershey, Jacobs-Lawson, McArdle, & Hamagami, 2007; Lusardi & Mitchell, 2007b). These studies recognize that individuals are not always the rational well-informed agents that underpin economic models of saving.

Fourth, our results complement findings in the precautionary saving literature, in which it has been well addressed that individuals start saving more as a response to uncertainty. Note, however, that in the precautionary saving literature information search plays a far less prominent role, as individuals are often assumed to have access to all relevant information. Only with the passing of time, new information will be revealed to the individual, for example about job opportunities or stock market performance. In contrast, our results show a strong impact of uncertainty on information search. Hence, studying savings as the only consequence of uncertainty might overlook information search as another important behavioral response to uncertainty.

From a managerial perspective, our results show valuable insights for policy makers and practitioners who have recently started to introduce new initiatives to make the savings decision task more transparent. For example, the U.S. Social Security Administration is required to send a

yearly Social Security Statement, providing eligible individuals with their estimated retirement benefits. Further, many websites start offering their visitors online retirement calculators to assess how much they should be saving for retirement, as well as online testimonials in which pre-retirees and retired persons share their retirement planning experiences. For example, The Wall Street Journal provides online calculators and expert advice on retirement planning. These financial decision aids may help individuals to overcome the many kinds of uncertainty when deciding how much to save for retirement and, hence, they may have a strong impact on savings decisions. Policy makers should also carefully consider whether such aids make individuals feel more or less uncertain about their savings adequacy expectations. Decision aids that help to reduce uncertainty might be especially beneficial for those with inadequate retirement savings and no financial constraints, because a decrease in uncertainty gives these individuals a strong incentive to start saving more. Although this seems a promising avenue to increase retirement savings for these individuals, our results also show that especially this group of individuals is unlikely to actively search for information. Hence, just making such tools available online will be ineffective as they will not be used by them.

So far, the focus of most available financial decision aids has been on providing individuals with information about their retirement income like the Social Security Statement. Our results show that retirement income knowledge is an important factor to decrease uncertainty. Policy makers should note, however, that simply providing information about expected benefits via the Social Security Statement is only a first step, as our results show that the level of uncertainty is affected by more than just retirement income knowledge. Supplementing retirement income information with, for example, information about life after retirement could improve an individual's understanding of current savings adequacy. Financial literacy seems another

important factor to decrease uncertainty. Recent research, however, has not yet found unequivocal results on how to best support individuals in improving their financial knowledge (e.g. Lusardi & Mitchell, 2007a).

5.3 Limitations and directions for further research

Our study poses several interesting avenues for future research. First, a limitation of this study is that we only focus on individuals' intentions to make retirement savings decisions. Though the likelihood that someone will actually make extra savings contributions will be an increasing function of one's intentions, it will also be affected by procrastination. Studying the relative importance of both factors on actual savings remains an interesting area for further research. Moreover, it would be interesting to know whether procrastination is also related to uncertainty.

Second, being limited by the available data, we could only find four factors that explain the level of savings adequacy uncertainty. More research is needed to investigate other determinants: Is uncertainty mainly affected by individual psychological dispositions or by the unpredictable (external) decision environment? And, to what extent can individual feelings of uncertainty be reduced? It is important to better understand why individuals perceive uncertainty in determining an adequate level of retirement savings, because these reasons will inform the discussion of how to best support individuals in saving for retirement.

Third, we used data from a Dutch household panel to test our model. As indicated by for example Hershey, Henkens, and Van Dalen (2007), planning and saving tendencies are heterogeneous across countries, in large part due to differences in pension systems. Workers in the U.S., for example, face much more financial responsibility and uncertainty surrounding

future pension payouts compared to Dutch workers. Therefore, it would be interesting to see if the same results are obtained in other institutional settings.

Finally, our results give rise to additional research that focuses on supporting individuals in their construction of retirement preferences (e.g. Slovic, 1995). In particular, *information acceleration* has been proposed as a valuable tool to assist individuals in understanding new and unfamiliar consumption situations (Urban et al., 1997). In a typical information acceleration process, individuals are invited to explore a rich virtual (online) environment that consists of many different types of information and information formats in order to learn more about a future situation. While information acceleration has thus far mainly be used as a tool to support new product development and marketing testing, it seems a promising approach to also support individuals in understanding future pension needs and preferences. In this view, information acceleration may help individuals to decrease uncertainty regarding the adequate savings level and, hence, trigger them to adequately prepare for retirement.

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Appendix A: Description of variables

Table A.1: Multi-item measures

Construct	Source	Scale	Item description	Construct α	Mean
Goal clarity	Adapted from Hershey, Henkens, & Van Dalen, 2007	1-5	I have a clear vision of how life will be in retirement. I know what I want to do after retirement. I think a great deal about (quality of) life in retirement.	.771	2.76
Income knowledge	Not previously published	1-5	I feel comfortable when I have to estimate how much income I will receive after retirement. I am very knowledgeable about the amount of my monthly income after age 65. I have insight into the structure of my retirement income.	.895	2.67
Financial literacy	Adapted from Hershey, Henkens, & Van Dalen, 2007	1-5	I am very knowledgeable about financial issues. When I have a need for financial services, I know exactly where to obtain information on what to do. I am confident in my own ability when I have to make financial decisions.	.800	3.19
Risk aversion	Adapted from Donkers & Soest, 1999	1-7	I think it is more important to have safe investments and guaranteed returns, than to take a risk to have a chance to get the highest possible returns. I would never consider investments in shares because I find this too risky. I want to be certain that my investments are safe.	.666	5.02

Table A.2: Socio demographic control variables

Variable	Measurement	Mean
Age	Age of respondent in years	48.39
Gender	Sex of respondent (0 = man; 1 = woman)	.48
Education (in years)	Highest level of education in categories of Statistics Netherlands (in years)	13.32
Household income	Monthly total net income of all respondents in a household (in euro)	2776
Children	Number of children in the household	.93
Partner	Is there a partner present in the household? (0 = no; 1 = yes)	.77
Main wage earner of the household	Are you the main wage earner of the household (i.e. highest income)? (0 = no; 1 = yes)	.63
Financial administrator of the household	Are you the person who is most involved with the financial administration of the household? (0 = no; 1 = yes)	.67
Pension fund	Does your current/ last job (before your retirement) entitle you to a retirement pension (apart from old-aged pension law/ AOW)? (0 = no; 1 = yes)	.74
Dummy pension fund missing	Missing values for “pension fund” (0 = not missing; 1 = missing)	.12
Primary occupation (dummy coded)	Primary occupation of the respondent	
	1 employed on a contractual basis	.71
	2 works in own business	.01
	3 free profession, freelance, self-employed	.05
	4 looking for work after having lost job	.02
	5 looking for first-time work	.00
	6 works in own household	.12
	7 (partly) disabled	.07
	8 unpaid work, keeping benefit payments	.01
	9 works as a volunteer	.01
	10 other occupation	.01
Past information search (mean score)	Calculations have been made to estimate how much money I need to save to retire comfortably (disagree 1-5 agree)	2.31
	The last few years I collected information about financial planning and pensions (disagree 1-5 agree)	
Past action	The past few years I made extra contributions in order to supplement my income after retirement (disagree 1-7 agree)	3.48

Appendix B: Factor analysis information sources

	Financial self assistance	Social Environment	Company/ pension fund	Advisor
Life after retirement				
family, friends, or acquaintances		.753		
colleagues		.553		
people who already have retired		.665		
the company you work(ed) for			.740	
your pension fund			.670	
professional financial advisor				.852
financial magazines, guides and/ or books	.565			
financial information on the internet	.598			
financial calculators on the computer or internet	.500			
Retirement income				
family, friends, or acquaintances		.498		
colleagues		.413		
people who already have retired		.440		
the company you work(ed) for			.595	
your pension fund			.523	
professional financial advisor				.768
financial magazines, guides and/ or books	.613			
financial information on the internet	.719			
financial calculators on the computer or internet	.558			

Notes: factor loadings below .4 excluded. Principal Component Analysis, Varimax rotation with Kaiser Normalization.

Figure 1: Conceptual Model of Individuals' Intention to Make Retirement Savings Decisions

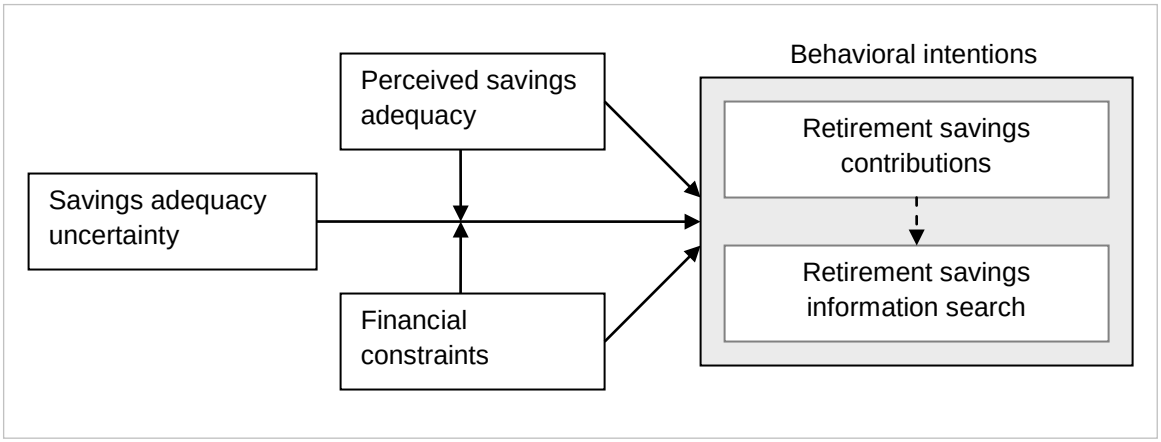


Figure 2: Three-way interaction effect for additional savings intention

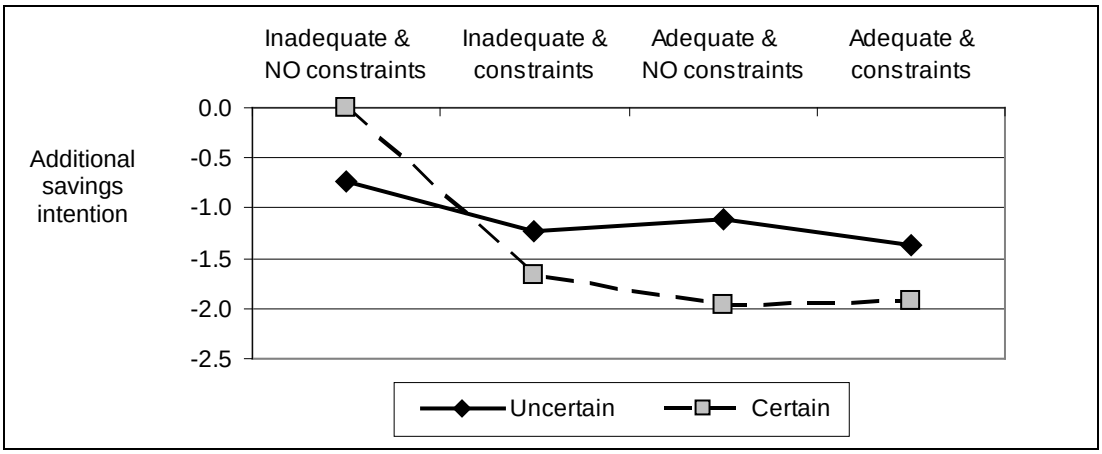


Figure 3: Three-way interaction effect for information search intention

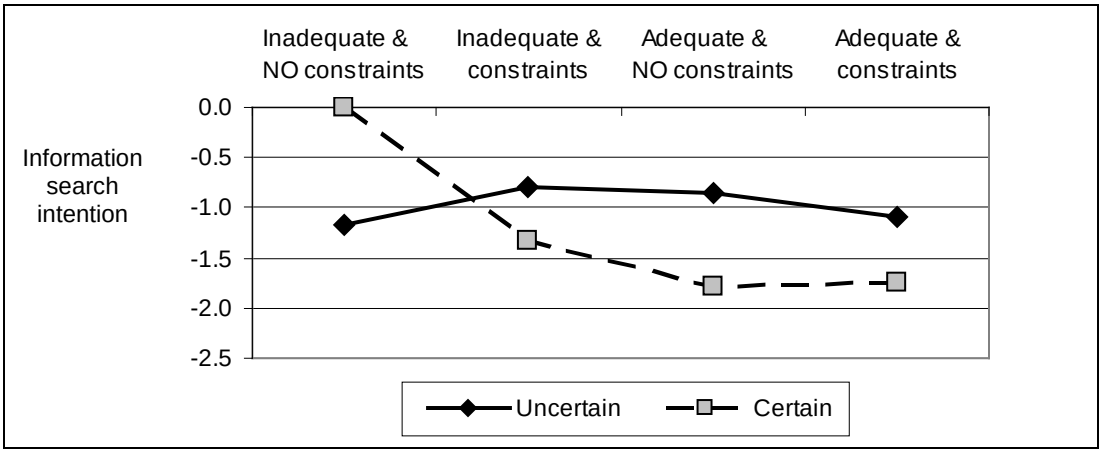


Figure 4: Three-way interaction effect for information search intention separating out additional savings intention

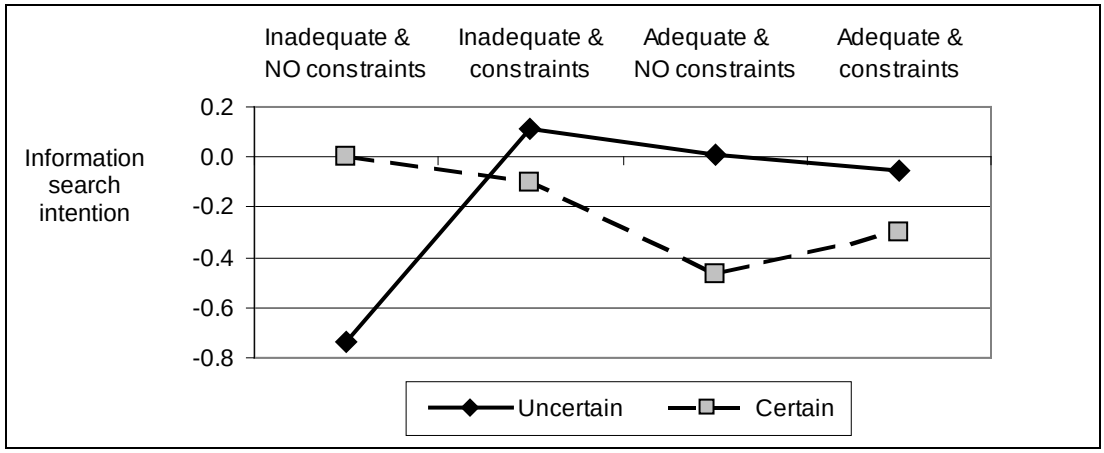
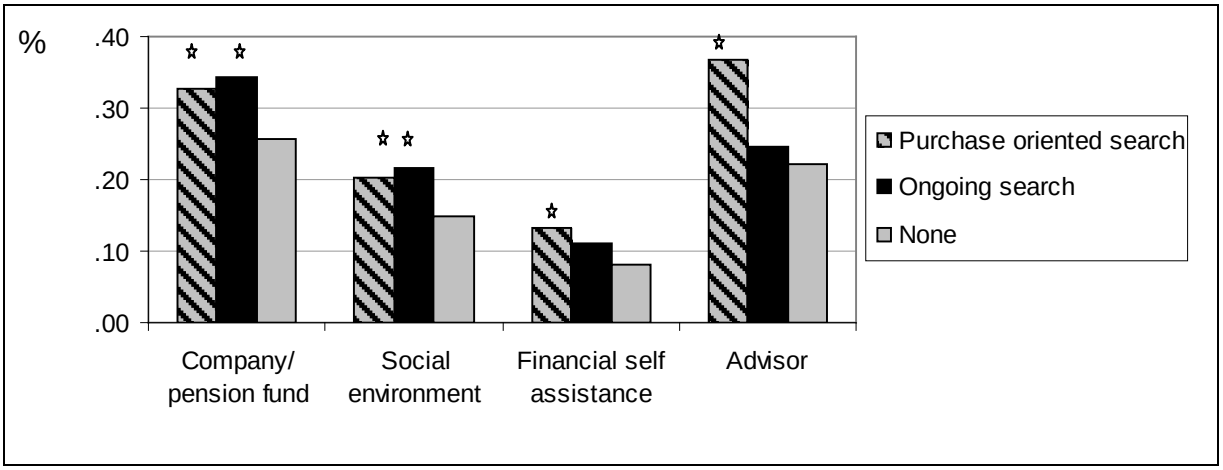


Figure 5: Information source usage for different intention groups



Notes:

a. None = reference group; * indicates significantly different from reference group at 5% (ANOVA).

b. N (purchase oriented search) = 240; N (ongoing search) = 159; N (none) = 310; Individuals who only score high on additional savings intention are not included.

Table 1: Estimation results of additional savings intention

	Savings intention		
	B		St. error
Inadequate savings	.434	*	.186
Financially unconstrained	.010		.105
Uncertainty	.234	**	.069
Inadequate*uncertainty	-.206		.118
Inadequate*financially unconstrained	.194		.220
Financially unconstrained*uncertainty	.192	*	.078
Three-way interaction	-.491	**	.140
Income knowledge	.035		.099
Goal clarity	.172		.100
Financial literacy	-.174		.107
Past info	.296	**	.072
Past action	.237	**	.040
Nr. of observations	765		
Pseudo R-square	.177		

* $p < 0.05$, ** $p < 0.01$.

Table 2: Estimation results of information search intention

	Overall search intention			Search intention separating out additional savings intention		
	B		St. error	B		St. error
Inadequate savings	.437	*	.193	.095		.203
Financially unconstrained	-.035		.111	-.127		.117
Uncertainty	.319	**	.073	.202	**	.078
Inadequate*uncertainty	-.323	**	.124	-.268	*	.133
Inadequate*financially unconstrained	-.049		.228	-.162		.240
Financially unconstrained*uncertainty	.133		.081	.079		.088
Three-way interaction	-.387	**	.145	-.215		.154
Income knowledge	.184		.104	.215		.111
Goal clarity	.309	**	.105	.256	*	.112
Financial literacy	-.168		.113	-.132		.119
Past info	.664	**	.077	.564	**	.081
Past action	.053		.041	-.092	*	.045
Additional savings intention				1.061	**	.065
Nr. of observations	765			765		
Pseudo R-square	.224			.483		

* $p < 0.05$, ** $p < 0.01$.

Table 3: Determinants of savings adequacy uncertainty

	B		St. error
Inadequate savings	-.231		.169
Financially unconstrained	-.055		.092
Income knowledge	-.813	**	.096
Goal clarity	-.377	**	.099
Financial literacy	-.335	**	.104
Past info	.016		.071
Past action	.013		.038
Nr. of observations	765		
Pseudo R-square	.325		

* $p < 0.05$, ** $p < 0.01$.