Let's Talk Money: Activating Pension Plan Participants -
The Retirement Belief Model

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Keywords: Financial well-being, Retirement saving, Consumer financial decision making

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Abstract

Pension reforms result in more individual choice and responsibility. Being informed about expected pension benefits becomes more important. However, many participants in pension plans do not look up information and may not discover whether they save too little for retirement.

We develop the Retirement Belief Model to study which beliefs and emotions drive information search intention. Based on a survey among pension plan participants, we identify three distinct segments: the overconfident, emotional and alpha males. For these segments, it differs which beliefs and emotions are most important in determining their motivation to inform themselves.

1. Introduction

Insufficient pension benefits form one of the biggest challenges of aging societies in the 21st century. According to a recent UN report, "the proportion of persons aged 60 and over is expected to double between 2007 and 2050, and their actual number will more than triple, reaching 2 billion by 2050" (UN, 2016). This unprecedented change, together with the aftermath of the financial crisis and low interest rates, puts pension systems around the world under pressure. As a result governments and employers increasingly shift risks and responsibility for individual retirement planning towards pension plan members (Bodie, Marcus, & Merton, 1988; EIOPA, 2013; Knoef, Goudswaard, Been, & Caminada, 2014; Van Rooij, Kool, & Prast, 2007).

These developments imply that it is getting more and more imperative that pension plan participants become active and inform themselves about whether they are on target to meet their retirement income goals. However, recent studies and industry reports suggest that many pension plan participants know very little about pensions, do not read information provided by pension funds, do not consult a financial advisor and consider pension information too difficult (Brüggen et al. 2013b; EIOPA 2013; Gustman et al. 2012; Lusardi and Mitchell 2011). In sum, participants do not sufficiently inform themselves about their retirement situation. Given the pressure on pension systems around the world, participants who are not sufficiently informed may encounter significant pension gaps, which will have detrimental welfare effects at retirement (Post et al. 2014).

This pressing problem has stimulated research on how to improve retirement savings intentions (e.g., Hershfield et al., 2011), asset allocation (e.g., Sunden & Surette, 1998), or increase planned retirement age (e.g., Gustman, Steinmeier, & Tabatabai, 2012). However, several key issues remain unaddressed. First, research on the very first step, becoming active and acquiring the necessary information about their personal pension situation is scarce. This is striking given that without proper information about their current and future situation, participants cannot make sound choices concerning retirement, may it be about saving, delaying retirement age or changing asset allocation. Second, possible participant heterogeneity is ignored in most studies, which is surprising given that there is some evidence that participants differ significantly in their approach towards retirement planning. One possible reason may be that it is difficult to tailor retirement information to different participant segments. For instance, some participants may suffer from retirement anxiety, i.e. "concerns about one's income and health,

emotional and mental well-being" (Hayslip et al., 1997), whereas others do not. The emotional tone in communications with those participants should be such that it does not add to the anxiety, whereas for others, it may be effective to stress the urgency of the situation. However, it is usually unknown whether participants have such retirement anxiety or not. Therefore, a wide-spread strategy is to provide uniformly the same communication to all customers. Such a strategy may be wasteful in terms of its impact on the retirement awareness of pension plan participants.

The purpose of this article is therefore twofold: We will first identify factors that determine whether participants inform themselves about their pension situation. Second, we will investigate relevant dimensions of heterogeneity, determine whether segmentation of pension plan participants is worthwhile, and show how to deliver targeted pension communication to appropriate segments.

To this end, we develop the Retirement Belief Model (RBM), which is based on the idea that pension plan participations will only become active and inform themselves if they (1) believe that the consequences of (not) engaging in a behavior are severe (*severity*), (2) that they are at risk of experiencing an undesirable outcome (*susceptibility*), (3) think that benefits of taking action weigh heavier than the costs (*benefits vs. barriers*), and finally (4) feel that they are able to change something about their situation (*self-efficacy*). To identify heterogeneity among participants, we measure socio-economic characteristics (e.g. age, gender, income), financial preferences (e.g. risk-taking, propensity to plan), financial literacy, and emotions (e.g. retirement anxiety) of pension plan participants. We employ a PLS structural equation model and FIMIX-PLS to analyze the survey data from 583 pension plan participants and find that the impact of the distinct beliefs on motivation to inform oneself about ones pension differs in sign and magnitude for three segments and help to predict whether people inform themselves.

We organize the rest of the article as follows. First, we outline our contribution to the extend literature and derive the retirement belief model. We then describe our field survey and data collection, discuss our analyses techniques, and present the results. Finally, we draw conclusions, explain our theoretical contributions as well as managerial implications, and note some limitations and opportunities for further research.

2. The Retirement Belief Model

As mentioned in the introduction, pension systems around the world under pressure due to increasing life expectancies and decreasing birth rates, which results in more risks and responsibilities for pension plan participants. However, recent studies and industry reports show that participants around the world are not sufficiently informed about their retirement situation (Brüggen et al. 2013b; EIOPA 2013; Gustman et al. 2012; Lusardi and Mitchell 2011). A 2008 US study shows that pension plan participants typically do not know the details of their plan and are misinformed about their range of choices (Chan & Stevens, 2008), Irish participants are reported to lack knowledge about and interest in their pension schemes (Barrett, Mosca, & Whelan, 2013) and in the Netherlands, participants declare themselves as not being open for pension information, with women and young individuals being the least interested (Visser, Oosterveld, & Kloosterboer, 2012). Given the risk that large groups of people will face a pension gap at retirement and potential welfare losses on individual and national levels, it is therefore extremely important to find ways to change this situation. While existing research looks at retirement savings intentions, asset allocation, or increase planned retirement age (e.g., Hershfield et al., 2011; Gustman, Steinmeier, & Tabatabai, 2012; Sunden & Surette, 1998), the focus of this study is on participants' information search behavior. We believe that acquiring information about one's own pension situation is the basis for making sound choices for saving, delaying retirement age or changing asset allocations.

To identify what distinguishes participants that do and do not inform themselves, we developed the Retirement Belief Model (see Figure 1). The RBM is inspired by research on preventive health behaviors, where the health-belief model was developed to explain what motivates people to participate in cancer screenings or health check-ups (Rosenstock, 1966). The retirement belief model (RBM) includes beliefs and dimensions of heterogeneity that influence whether participants' inform themselves about their retirement situation. We will now describe the components of the RBM in more detail.

Figure 1: Retirement Belief Model
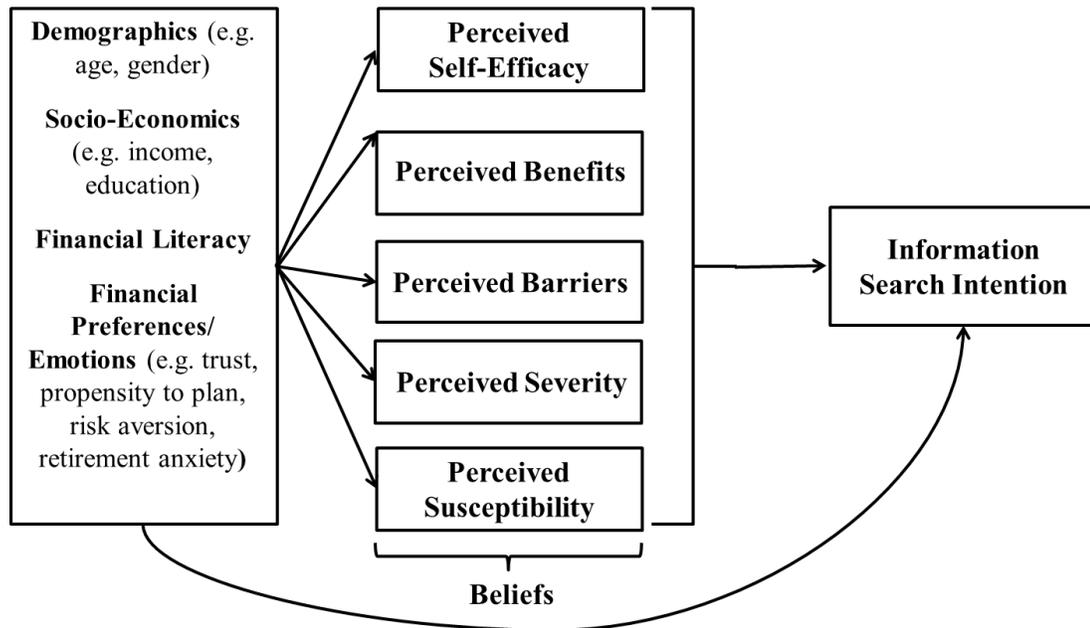
2.1 Core Constructs: Beliefs

The central part of the RBM are beliefs which determine the behavior of individuals. Beliefs can be defined as the "subjective probability that the object has a certain attribute" (Ajzen & Fishbein, 2000). Individuals can, for example, believe that there are no benefits in informing oneself about ones expected retirement income. Individuals can form different beliefs about a behavior, but only the strongest, accessible beliefs then determine the attitude.

According to the RBM, individuals only engage in a certain behavior, if they (1) believe that the consequences of (not) engaging in a behavior are severe (*severity*), and (2) that they are at risk of experiencing an undesirable outcome (*susceptibility*), (3) think that benefits of taking action weigh heavier than the costs (*benefits vs. barriers*), and finally (4) feel that they are able to change something about their situation (*self-efficacy*) (Glanz, Rimer, & Viswanath, 2008; Janz & Becker, 1984). We formulate five hypotheses concerning the central part, the core constructs of our RBM: the influence of beliefs on behavioral intention to inform oneself about one's pension income situation.

Perceived self-efficacy is defined as the certainty than one can accomplish a behavior to produce a desired outcome (Bandura, 1994), specifically the degree to which individuals feel that

they are capable of informing themselves, for example where to look for information, and whether one would be able to understand the acquired information. Especially the latter is important, since previous research found that when facing retirement related information, participants feel powerless (Visser et al., 2012) and do not know how to act upon the information (Lusardi, Keller, & Keller, 2009). When individuals feel confident about their own skills to look for financial information, they show more positive retirement-related behavior such as saving for an emergency fund, and figuring out how much money they need for retirement (Fernandes et al., 2014). Furthermore, efficacy and achievability of goals have been shown to positively influence savings behavior of participants (Cheema & Bagchi, 2011). We therefore expect that:

> **H1**: Participants are relatively more likely to inform themselves about their pension, if their perceived self-efficacy is high.

Perceived benefits are the advantages that participants perceive if they inform themselves. Participants want relevant and insightful information on their current situation and potential future actions. Benefits could include peace of mind because of a sense of security about one's pension situation and the determination of future needed actions to have a comfortable retirement. However, these benefits are often drowned out by negative feelings or ideas concerning the pension system, such as expectations that the system will collapse in the future anyways, or that financial institutions cannot be trusted.

> **H2**: Participants are relatively more likely to inform themselves about their pension, if their perceived benefits of informing oneself are high.

Perceived barriers are the obstacles that may prevent participants from informing themselves. In contrast to benefits of information behavior, barriers are specific: time, effort, and money it costs to inform oneself. Additionally, individuals are even more focused on the present and what happens today when making choices that require effort, than when making choices that cost money (Augenblick, Niederle, & Sprenger, 2013). Individuals conduct a cost-benefit analysis when deciding whether to engage in a certain behavior, in this case whether to inform themselves about pensions or not. If barriers (such as time, effort, money it costs to inform oneself) are higher than perceived benefits (such as sense of security about one's pension situation), individuals will not inform themselves.

> **H3**: Participants are relatively less likely to inform themselves about their pension, if their perceived barriers of informing oneself are high.

Perceived severity describes an individual's personal perception of the seriousness of a condition, in our retirement context defined as severity of not saving enough for retirement. Many individuals have false confidence in their retirement preparations, assume that they do not need much money later or never computed how much they would need to save (Ellen et al., 2012). If individuals do not save enough for retirement, financial and social consequences can be severe. However, only if participants anticipate the full range of resulting difficulties, they will also act upon them. There is also evidence of an optimism bias among participants, since more than 80% expect that they will receive 70% of their final salary as retirement income (GfK, 2014). While most participants in Dutch pension schemes consider themselves as saving enough, approximately 49% of households will probably not reach a gross replacement rate of 70% when taking into account first and second pillar savings (Knoef et al., 2015).

H4: Participants are relatively more likely to inform themselves about their pension, if their perceived severity is high.

Perceived susceptibility is the degree to which individuals see themselves at risk of having a pension gap, i.e. as not accumulating enough money for retirement. Since in most countries pension benefits to current retirees are comparably generous (e.g. in the US, Gustman & Steimmeier, 1999), participants often only know the relatively rich retirees of today and have troubles imagining themselves as poor retirees. However, by media news items on recent pension system reforms and ageing society, some individuals can get a sense of urgency to act. In order for participants to inform themselves, they need to consider themselves as vulnerable for a pension gap. Some participants fall prey to an optimism bias, such that they are reluctant to admit vulnerability to a pension gap because the threat of harm would worry them too much (Kirscht, Haefner, Kegeles, & Rosenstock, 1966). Thus, we hypothesize:

H5: Participants are more likely to inform themselves about their pension, if their perceived susceptibility is high.

2.2 Emotions, financial preferences and literacy

Next to beliefs, we include additional factors that either directly or indirectly influence information search intention.

Retirement anxiety is defined as "preretirement expectations of the consequences of retirement" (van Solinge & Henkens, 2008). A significant share of participants does not associate the retirement phase with good times, but rather with unpleasant health and disability problems.

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Okumura and Usui (2014) find that individuals experiencing anxiety about the public pension program increase their private saving efforts to compensate the expected gap. Additionally, the further individuals are away from retiring, the less information they have on aging or retirement, and the more anxious they are (Hayslip et al., 1997). We would therefore expect a high level of retirement anxiety to be positively related with a willingness to inform oneself, such that participants that are scared of retirement feel a stronger urge to inform themselves. Yet, fear can also have the opposite effect: individuals get scared and shy away from taking action at all (Ellen et al., 2012). Whether retirement anxiety therefore has a positive or negative effect on information search intention is therefore difficult to predict, and so it is one of the goals of our research to find out. Besides that we expect participants with a high level of retirement anxiety to also perceive a high level of severity and see themselves as more susceptible for a pension gap.

Propensity to plan reflects differences between participants in their frequency of forming planning goals and a personal preference to plan (Lynch et al., 2010). Individuals differ in their preference for planning horizons. If participants have a preference to plan, they will experience comfort after an information process (Lynch et al., 2010). Planners understand the benefits of acquiring information, and anticipating these will be more likely to inform them.

Risk-taking is the willingness of individuals to take risks (Dohmen et al., 2011). We assess participants' level of financial risk-taking, and expect that risk-taking to be a preference that is positively correlated with self-efficacy. Risk-averse individuals experience more fear and want to minimize the risk of the unknown (Loewenstein, Weber, Hsee, & Welch, 2001) while risk-taking individuals have more confidence in themselves. If individuals are confident enough to take financial risks, they may have already informed themselves about their retirement situation which assures them of their ability to do so again.

Financial literacy is the degree to which individuals understand financial concepts, and possess the ability and confidence to manage their finances, both on the short and on the long term (Remund, 2010). If participants are financially literate they understand that it is wise to acquire information concerning one's retirement and are more willing to do so than less financially literate individuals (Lusardi & Mitchell, 2011). We measure financial literacy by using the three basic financial knowledge questions by Lusardi and Mitchell (2010), and expect that financially literate participants have higher self-efficacy while perceiving lower barriers.

Trust towards one's service provider (Hansen, 2012) – in this case participants' pension provider - is another component of the RBM. If participants expect that the service provider can be relied on to deliver on its promises (Hansen, 2012), that is their trust in their pension provider is high, they will consider their provider as first contact point for retirement information, and therefore be more willing to search for information. Besides that, trusting participants will also perceive higher benefits, since they have a better relationship with their service provider than non-trusting participants.

2.3 Socio-demographic Dimensions

In our framework, beliefs and psychographic characteristics of participants can be influenced by their demographic and socio-economic characteristics. Different individuals form different beliefs, and the degree to which these beliefs influence attitude (that is, the degree to which they are accessible), also differs among individuals. The beliefs that individuals form can be influenced by their demographics, socio-economics, knowledge, and personality.

First, age is positively related with the tendency to save for retirement (Grable & Lytton, 1997): older people spend more time thinking about and planning or preparing for retirement (Adams & Rau, 2011; Feldman & Beehr, 2011). Younger people may think about retirement from time to time, but not take action steps because they either cannot do so because of financial restrictions, or because they do not see the need to act now already since retirement is still so far away (Kemp, Rosenthal & Denton, 2005).

Then, concerning gender, we know that since many women in the past joined the workforce only on a part-time basis or stopped working at all or for short periods of time for their children, women have been relatively less engaged in retirement planning (Hershey, Jacobs-Lawson, & Neukam, 2002) and are saving less for retirement (Adams & Rau, 2011). Furthermore, women are also more risk averse than men (Booij & van Praag, 2009; Clark et al, 2012; Clark et al, 2007; Bajtelsmit, Bernasek, & Jianakoplos, 1999, Papke, 1998) meaning that many of them also invest less risk-taking in when investing for retirement, which can result in non-sufficient income during retirement. Moreover, women are often less financially literate and less secure about their capabilities to make financial decisions (Bucher-Koenen & Lusardi, 2011).

Third, concerning the influence of education and income, college graduates are often better informed about (retirement) savings, and are more likely to have a higher income (Ricketts,

Rezek, & Campbell, 2013). A high income facilitates individuals to save for retirement, and households with higher income have shown to be more willing to save and to be better prepared for their last phase of life (Hayhoe et al., 2012; Ricketts et al., 2013; Poterba, 1996; Stawski, Hershey & Jacobs-Lawson, 2012). Income is also positively related with financial interest (Donkers & van Soest, 1999), while the direction of the relationship can be in both ways: either individuals are generally interested in financial matters and therefore study and take a job where they are able to earn more, or they come to have a job where they earn higher wages which requires them to learn about investing this money or managing their finances. Furthermore, richer and higher educated individuals are also more prone to take risks (Donkers & van Soest, 1999), because they can afford to take more risk or because of their higher level of financial understanding of the risk and return relationship.

Specifically, we include age, gender, marital status, number of children, current living situation (living with partner, and living in rented or own space), education, monthly net household income, and the participant's percentage of contribution to this household income in our model. Related to our literature review, we for example expect older, wealthier, higher educated and male participants to be relatively more positive in their beliefs about retirement than their counterparts, since they often have more positive prospects concerning their retirement.

We refrain from formulating separate hypotheses for relationships between additional constructs and core constructs and/or behavioral intention. Yet, we include them according to the above-mentioned expectations in our conceptual model. By incorporating dimensions of heterogeneity from health promotion and financial research into one single framework, we hope to discover underlying differences between participants that determine information search behavior, which can help in segmenting participants.

3. Empirical Application

Data collection

We design an online survey to test the RBM with Dutch pension plan participants of a large international insurance company and occupational pension provider. Together with a newsletter, the survey was sent out via e-mail to 7,122 participants in September 2014, the complete active DC participant base of the provider. Focusing on DC plan participants makes the results of the study more generalizable to other countries where this form of pension plan is used predominantly. Furthermore, the share of DC pension plans as compared to DB plans is increasing steadily, which makes it even more relevant to generate insights in this area. Also, DC participants are facing higher risks, and have more choices in their pension plan. In this research context, participants can choose between life cycle and free investing. Therefore, it is especially important to raise awareness and stimulate action in this group.

The participants in this DC base are all building up their second pillar pension in this scheme via their employer. Participants who have been in the DC scheme before, but are not actively building up retirement benefits anymore (so-called "sleepers") are not included in the sample. Most of the participants (> 90%) stayed in the default investment portfolio with low risk exposure. For their participation in the survey respondents could win one of five 50 Euro gift vouchers. Participants had twenty days to respond, with a reminder being sent after one week. 885 participants opened the survey link, and 638 participants filled out the complete questionnaire. We match survey and anonymized administrative data of the pension provider. Our final sample includes only the participants for which this matching was successful: 583 participants, a final response rate of 8%. The descriptive statistics of the sample are given in Appendix A.

Concerning gender, our sample of 583 participants is fairly representative for the total base of 7,122 participants: 34% of the total DC base is female, compared to 32% in our sample. The total base and sample differ significantly in age, income and marital status. Mean age is 42 for the total base, with a mean age of 45 the sample is slightly older. The majority of respondents is married (60%), while half of all DC participants are married, and yearly pensionable salary is somewhat higher for respondents as compared to the total base (see Appendix A, panel D).

Survey development

We started the questionnaire with asking about participants behavioral intention to inform oneself abut one's pension, and added a question on whether participants are already informed about their pension. After that, we continued with the beliefs dimensions perceived self-efficacy, benefits, barriers, severity, susceptibility (adapted from Grispen et al., 2011) and response-efficacy (adapted from Witte, Cameron, McKeon, & Berkowitz, 1996). For retirement anxiety (Hayslip et al., 1997), propensity to plan (Lynch et al., 2010), risk-taking (Dohmen et al., 2011), financial literacy (Lusardi & Mitchell, 2011), trust towards the financial service industry and the pension provider (Hansen, 2012), we use established scales by the authors mentioned. Except for risk-taking (10 point scale) and financial literacy, all scales are 7-point Likert agreement scales. At the end of the questionnaire, we asked respondents to indicate their gender, age, whether they live together with a partner, marital status, children, monthly net household income, the percentage of the household income they contribute, education, the sector they work in, and whether they own or rent a house (the latter with or without governmental support). The complete questionnaire is given in Appendix B.

The survey was translated to Dutch, and pre-tested with administrative university staff and professors (N=21) to ensure that wording and structure of the questionnaire are straightforward. Any inconsistencies or unclarities were resolved.

Data Analysis

We estimate the RBM by building a structural equation model, which allows us to test a network of relationships between different latent variables (measured by several indicators) simultaneously. We apply the partial least squares (PLS) approach to the structural equation model, which includes an iterative algorithm to first evaluate the measurement model and second to estimate the path coefficients in the structural model. In contrast to ordinary least squares regression procedures, the estimation procedure in PLS is named partial because it alternates a series of single and multiple regressions step by step (Esposito Vinzi, Trinchera, & Amato, 2010).

For analyzing the data, we use PLS structural equation modeling instead of covariance-based structural equation modeling, because the purpose of our research is exploratory, our data is partly non-normally distributed and some constructs are composed of less than three items

(Hair, Ringle, & Sarstedt, 2011). All analyses are carried out using SmartPLS 3 (Ringle, Wende, & Becker, 2015).

We start by estimating the influence of demographics on behavioral intention, and use the observable characteristics of participants to predict information search intention. The result is shown in figure 2. The variables gender, high income, and married are all coded to 0 or 1: 1 if gender is female, if monthly net household income is equal to or higher than 2800-3800 Euro (based on median split), and if the participant is married. We only see an significant effect for age and high income, so the older and wealthier participants are, the higher is their intention to inform themselves. However, this model does not explain intention very well (adjusted R^2 of 0.019), which shows that we cannot only rely on demographics but need a more sophisticated model to predict information search intention.

Figure 2: Demographics on Intention

Age — 0.135** → Behavioral Intention to inform oneself

Gender — 0.023 → Behavioral Intention to inform oneself

High Income — 0.080* → Behavioral Intention to inform oneself

Married — 0.006 → Behavioral Intention to inform oneself
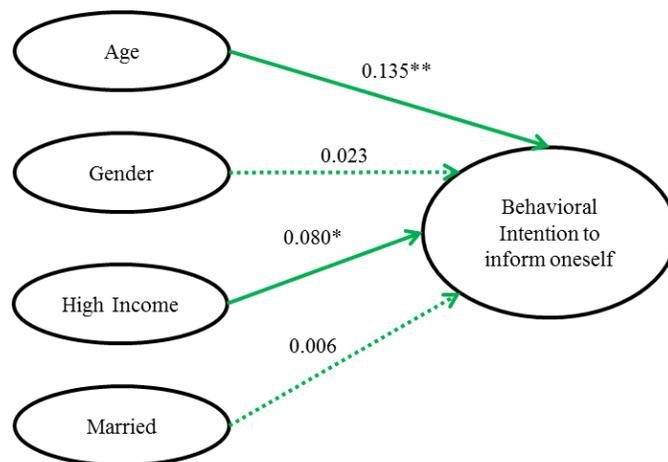
Note: This figure displays the path coefficients for demographics on behavioral intention to inform oneself. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level (estimated with PLS). Dotted lines show insignificant relationships, solid lines significant relationships.

Therefore, the next step of our analysis is to estimate the RBM. First, we estimate the RBM for the whole sample. The second step then includes estimating a finite mixture (FIMIX) segmentation model, because we expect the impact of the different beliefs, personality, financial literacy and socio-demographic factors to be different for different segments of participants.

Measurement Model

The measurement model is completely of a reflective nature, since the indicators are consequences rather than antecedents to the constructs, indicators for the different constructs are

expected to be correlated, and we expect measurement error at indicator level (Churchill, 1979; Jarvis, Mackenzie & Podsakoff, 2003). We first run a traditional PLS to test reliability of our multi-item measures, the prerequisite for validity. Concerning construct reliability, all Cronbach's α values are close to or above 0.8 (see Appendix C). Cronbach's α underestimates reliability because it assumes a tau-equivalent measurement model (i.e. all indicators are equally important), while we deviate deliberately from this assumption with PLS (Esposito Vinzi, Trinchera, & Amato, 2010, p. 51). We therefore also look at the composite reliability values, and find satisfying values between 0.8 and 0.9.

Second, we investigate validity and find acceptable average variance extracted (AVE) values (>0.5) for convergent validity. To check discriminant validity , we look at the cross-loadings and all indicators load higher on its assigned latent variable than on the other latent variables. The given Fornell-Larcker criterion value (calculated with consistent PLS) is also highest for the corresponding latent variables (see Appendix D, Fornell & Larcker, 1981). Since the Fornell-Larcker criterion requires consistent PLS, while we estimate our model using traditional PLS, we also take a look at the Heterotrait-monotrait Ratio of Correlations (HTMT, Henseler, Ringle, & Sarstedt, 2015). All values are lower than threshold values $HTMT_{.85}$, (see Appendix E) which is we can conclude that we can assume discriminant validity. However, when investigating the outer loadings, we see that indicators 4, 5, 6 and 7 for construct perceived barriers have loadings lower than 0.4. We analyze the impact of indicator deletion (see Appendix F) on the Fornell-Larcker criterion and composite reliability (Hair, Hult, Ringle, & Sarstedt, 2013). Only after deleting all indicators 4, 5, 6 and 7, the Fornell-Larcker criterion improves, but composite reliability does not which is why we decide to retain all indicators.

Structural Model

The correlations of latent constructs are shown in Appendix G. We first look at differences in the latent constructs between men and women, and between income groups. The results are given in Appendix H. We already see interesting differences between participants. Women are significantly less risk-taking (in general, and in a financial context), score higher on retirement anxiety, have more trust in their own pension provider, and plan more for the future. Concerning the RBM core constructs, women feel that it's more severe to have a pension gap, see more barriers to inform themselves and are less self-confident that they know how to search for

pension information and what to do with it. Interestingly, if we look at the income groups, the mean scores for perceived susceptibility do not differ substantially. This underlines the perceived invulnerability to not saving enough of many participants, indicated earlier as one of the main challenges for pension communication.

We then estimate the RBM using the traditional PLS algorithm. The results are displayed in table 1. In model 1, we only look at the influence of the core constructs, the beliefs, on behavioral intention to inform oneself. Concerning the hypotheses, we find no support for H1: for self-efficacy, the path on behavioral intention is significant, but with an unexpected negative sign, contrary to findings of Fernandes et al. (2014). If we follow their explanation we would expect that participants that are confident in their ability are more likely to inform themselves. We investigate the influence of beliefs on the construct of already being informed in a separate analysis, and see that self-efficacy has a significant positive influence. Individuals who have a high self-efficacy are more likely to already be informed, and therefore have no intention to do so (again) in the near future. H2 is supported, since we find a positive and significant path between benefits and behavioral intention. For H3, we find partial support: in model 1, barriers have a negative, but non-significant influence on information search intention.

However, after having estimated the role of beliefs in the RBM, we are interested in what dimensions of heterogeneity influence beliefs (and behavioral intention), and how socio-demographic factors influence the different dimensions and beliefs. We therefore estimate a broader RBM to explore these relationships, model 2. Interestingly, barriers now significantly negatively influence behavioral intention. Since we added a path between financial literacy and barriers this could indicate mediation. We test for it by conducting a separate analysis in which we add a path from financial literacy on behavioral intention, and see that financial literacy has a positive, significant influence on barriers, but not on intention. Therefore, barriers fully mediate the impact of financial literacy on intention to inform oneself. This means financially illiterate participants experience higher barriers to informing themselves, and via that channel display a lower intention to inform themselves.

We find support for H4 (severity has a positive, significant influence), but no support for H5 (susceptibility). There is also no significant correlation between susceptibility and behavioral intention (see Appendix G).

In addition, we find the following concerning the influence of socio-demographic characteristics on the additional dimensions of heterogeneity: the higher educated participants are, the higher their financial literacy, financial risk-taking and the lower their retirement anxiety. Age increases self-efficacy, since older participants are also more experienced with the pension information process. Women are significantly less financially literate and risk-taking, but have higher trust in their own pension provider. Concerning beliefs, women feel that it's more severe to have a pension gap, see more barriers to inform themselves and are less self-confident that they know how to search for pension information and what to do with it. Interestingly, participants with a higher income do not perceive significantly lower barriers, but a lower susceptibility to a pension gap.

Table 1. PLS Results

	Model 1				Model 2			
	Path Coefficient	SE	t-statistics	p-values	Path Coefficient	SE	t-statistics	p-values
Beliefs on Behavioral Intention (BI)								
Barriers → BI	- 0.188	0.158	1.186	0.236	-0.141	0.059	2.399	0.017
Benefits → BI	0.282	0.043	6.621	0.000	0.24	0.049	4.923	0.000
Self-Efficacy → BI	- 0.156	0.054	2.910	0.004	-0.098	0.05	1.954	0.051
Severity → BI	0.152	0.045	3.367	0.001	0.13	0.043	3.046	0.002
Susceptibility → BI	0.028	0.05	0.558	0.577	0.02	0.043	0.458	0.647
Psychographic on BI								
Propensity to Plan → BI					0.063	0.043	1.461	0.145
Retirement Anxiety → BI					0.163	0.044	3.686	0.000
Trust Own Provider → BI					0.109	0.042	2.558	0.011
Demographic on Psychographic								
Education → Financial Literacy					0.357	0.034	10.526	0.000
Education → Financial Risk-Taking					0.234	0.038	6.133	0.000
Education → Retirement Anxiety					-0.142	0.041	3.468	0.001
Gender → Financial Literacy					-0.232	0.038	6.121	0.000
Gender → Financial Risk-Taking					-0.213	0.036	5.925	0.000
Gender → Trust Own Provider					0.087	0.039	2.233	0.026
Gender → Propensity to Plan					0.082	0.043	1.907	0.057
Demographic on Beliefs								
Age → Barriers					-0.087	0.058	1.496	0.135
Age → Self-Efficacy					0.139	0.045	3.065	0.002
Education → Barriers					-0.123	0.049	2.498	0.013
Education → Benefits					0.119	0.041	2.886	0.004
Education → Self-Efficacy					0.038	0.046	0.825	0.41
Gender → Barriers					0.099	0.041	2.434	0.015
Gender → Self-Efficacy					-0.083	0.043	1.914	0.056
Income → Barriers					-0.048	0.043	1.102	0.271
Income → Severity					-0.059	0.042	1.380	0.168
Income → Susceptibility					-0.074	0.036	2.050	0.041
Psychographic on Beliefs								
Financial Literacy → Barriers					-0.177	0.05	3.525	0.000
Financial Literacy → Self-Efficacy					0.034	0.048	0.71	0.478
Financial Risk-Taking → Self-Efficacy					0.186	0.046	4.003	0.000
Trust Own Provider → Benefits					0.296	0.044	6.790	0.000
Propensity to Plan → Benefits					0.224	0.039	5.696	0.000
Retirement Anxiety → Severity					0.338	0.037	9.154	0.000
Retirement Anxiety → Susceptibility					0.35	0.036	9.676	0.000
Adjusted R² for BI					0.19*			
Confidence Intervals (Lower, Upper)					(0.14, 0.27)			

Next to positive beliefs, retirement anxiety and trust towards one's own pension provider increase participants' intention to inform themselves.

The extended model 2 has an adjusted R^2 of 0.19 for explaining information search behavior. Compared to the low adjusted R^2 of 0.019 when using only demographic factors, this model explains information search behavior much better. Yet, it could be that participants differ on so many dimensions, that the model does not perfectly fit for every participant. Hence, we try to better explain behavior of different participants and estimate a model that allows for difference

in impact of the factors on behavioral intention (e.g. for one segment, self-efficacy may have a less strong, positive or negative influence than for another segment). Therefore, and to identify the potential of the model to predict meaningful segments, we estimate a finite mixture (FIMIX) segmentation model, because we expect the impact of the different beliefs, psychographic and socio-demographic dimensions to be different for different segments of participants.

Segmentation

Using the FIMIX-PLS procedure, we can estimate the parameters and at the same time investigate heterogeneity in our sample. We follow the FIMIX-PLS steps as Ringle, Sarstedt, and Mooi (2010) suggest. The scores of the PLS model we estimated before are now used as input for the finite mixture model. We estimate the mixture model with increasing number of latent classes, starting with two classes. Using the evaluation criteria suggested by Hahn et al. (2002), we aim for a number of classes with as low as possible values for log-likeliohood (*lnL*), Akaike information criterion (AIC), Bayesian information criterion (BIC), consistent Akaike information criterion (CAIC). Furthermore, a high entropy statistic (EN) indicates an unambiguous separation of classes (Ringle, Wende, & Will, 2010). Evaluating the criteria (displayed in table 2), three classes is the optimal choice for the dataset at hand (since with six or more classes, the segments get too small for estimation).

Table 2. Evaluation of FIMIX-PLS results

Number of latent classes	*lnL*	*AIC*	*BIC*	*CAIC*	*EN*
K = 2	- 8636.872	17447.744	17827.777	17914.777	0.672
K = 3	**- 441.274**	**1144.548**	**1716.780**	**1847.780**	**0.883**
K = 4	- 406.304	1162.607	1927.040	2102.040	0.882
K = 5	- 282.362	1002.723	1959.356	2178.356	0.921
K = 6	22.488	481.024	1629.857	1892.857	0.931

After this step, we conduct a multi-group analysis to see whether paths are significantly different between the segments. We compute the t-statistics for differences between the segments manually, using the formula provided by Chin (2000). Results are shown in table 3.

Table 3. FIMIX-PLS disaggregate results for three latent classes

	Global	K = 1	K = 2	K = 3	t [mgp K1 and K2]	t [mgp K1 and K3]	t [mgp K2 and K3]
Relative segment size (%)		10.3	45.3	44.4			
N	583	60	264	259			
Adj. R² (for Behavioral Intention)	0.191	0.242	0.200	0.327			
Panel A. Paths							
Susceptibility → BI	0.018	0.221	- 0.054	0.020	1.861*	1.213	0.770
	(0.40)	(1.56)	(0.85)	(0.27)			
Severity → BI	0.129	- 0.065	0.087	0.198	1.038	1.659*	1.219
	(2.92)**	(0.43)	(1.44)	(2.89)***			
Self-Efficacy → BI	- 0.094	- 0.542	0.071	- 0.147	3.898***	2.261**	2.204**
	(1.84)*	(3.24)***	(1.11)	(1.96)**			
Benefits → BI	0.240	0.254	0.301	0.183	0.322	0.483	1.256
	(5.10)***	(1.79)*	(4.83)***	(2.58)**			
Barriers → BI	- 0.133	- 0.306	- 0.153	- 0.128	0.460	0.769	0.135
	(2.35)**	(1.64)	(0.99)	(1.24)			
Retirement Anxiety → BI	0.162	- 0.194	0.253	0.154	2.653**	2.212**	1.016
	(3.45)***	(1.11)	(3.60)***	(2.27)**			
Propensity to Plan → BI	0.064	0.263	0.036	0.012	1.566	1.864*	0.281
	(1.55)	(2.07)**	(0.57)	(0.21)			
Trust → BI	0.108	0.084	- 0.020	0.232	0.674	1.069	2.824**
	(2.54)**	(0.61)	(0.30)	(3.93)***			
Panel B. Descriptives							
Age		47.55	43.60	46.19			
Male		55%	61%	100%			
Living Together		75%	72.7%	83.4%			
Married		60%	53.8%	66.8%			
Own House		71.7 %	79.5%	89.6%			
Financial Literacy (all 3 correct)		21.7%	24.2%	100%			

Note: t[mgp] = t-value for multi-group comparison test. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level (two-tailed test).

We label the segments based on their characteristics: the overconfident, the emotional and alpha males.

The first segment (N=60, 55% male), the overconfident, is the oldest group with the least education, income and financial literacy, but highest divorce rate. Self-efficacy and propensity to plan are the most influential variables on information search intention. We call this segment the overconfident, since they have a relatively high self-efficacy, but low financial literacy – so they think they can inform themselves, but they may actually not be able to do so. Self-efficacy has a negative influence on information intention for this segment, while most of them are not informed yet about their pensions.

The second segment (N=264, 61% male), the emotional, is the youngest, has the highest rate of not having any children (37%), is similar to segment 1 concerning financial literacy, but

generally higher educated and has a higher household income. For this group, emotions play a large role: their level of retirement anxiety is high, they are scared of retirement. Security is important to them, and these emotions stimulate them to take action: retirement anxiety and perceived benefits (which are mainly emotional, such as getting a feeling of certainty) significantly influence intention to inform in a positive way.

Segment 3, the alpha males, then is exclusively male, perfectly financially literate and has the highest income, education, and rate of owning a house (90%). Especially trust to their own pension provider is important in triggering this group to inform itself, they understand a lot about finances and want a partner for their retirement planning that takes them seriously. Furthermore for this group, self-efficacy has a negative influence, but this effect is significantly less strong than the negative effect for the overconfident. Yet, this segment is also the most informed segment, meaning that they not only think they can do it, but they already did. Interestingly, while segment 3, for example, perceives lower barriers than the other two groups, there are no significant differences between the segments in how susceptible to a pension gap they perceive themselves to be.

In addition, the adjusted R^2 values for each segment are now higher (0.24, 0.20, and 0.33 respectively) than the adjusted R^2 value for the whole sample (0.19). This shows that we have large differences between the segments that need to be taken into account. The path coefficients differ significantly in their size (and sign in some cases) between the different segments (Eberhardt, Brüggen, & Post, 2015). Descriptive statistics for the three segments are given in Appendix I, and comparisons between mean scores on RBM constructs of the three segments are given in Appendix J.

5. Conclusion

Ensuring sufficient retirement income is one of the most important challenges for (aging) societies. Changes towards DC schemes put individuals in the role of investors or decision-makers, a role for which many are not ready. Pension communication should trigger participants to inform themselves about their pension income situation. Merton (2014) emphasizes that communication influences participants' decision-making and underlines how important it therefore is to guide and not mislead savers. We develop the Retirement Belief Model and show how information search intention depends on different beliefs, emotions, financial literacy, and

financial preferences, and provide pension communication providers with segmentation guidelines.

We contribute to academic literature by developing a new conceptual model to research heterogeneity between pension plan participants influencing their motivation to inform themselves about retirement, the RBM. Second, we recognize the impact of emotions on retirement decision-making. Previously, researchers (e.g. Ellen et al., 2012; Lusardi, Keller, & Keller, 2009) focused on the cognitive perspective on retirement saving decisions, implying that by processing certain information (e.g. planning aid with how-to steps), individuals would act upon that information. Samwick (2006) argues that the most important dimensions of heterogeneity that keep individuals from saving for retirement are budget constraints, life-cycle motives, and their discount rate. We argue that by doing so, one misses important key aspects of the decisions being made and therefore include beliefs and discrete emotions (Barrett, 1998) such as retirement anxiety. Third, while previous research focused on average individuals (e.g. Hershfield et al., 2011), we consider differences between individuals to tease out differential effects of pension communication on awareness and action.

Within this paper we show which dimensions of heterogeneity influence whether participants inform themselves. Our findings display that the "usual suspects", the older, higher educated, wealthier and male participants are more likely to be informed. Yet, beliefs and psychographic dimensions play a very important role, and are essential in forming segments of pension plan participants. We show that using only socio-demographic information is not sufficient for segmentation of pension plan participants and that for different segments, it differs which beliefs determine the intention to become active. For the overconfident, self-efficacy has a significant negative impact, these participants feel that they can inform themselves, while they actually do not do so in the end. The emotional experience high levels of retirement anxiety, which together with their perceived benefits of informing themselves stimulates them to take action. Our last segment, the alpha males, needs trust towards their pension provider for them to inform themselves. For this segment, the belief that the consequences of not informing oneself are very severe, is also a main trigger to act.

Our findings support our expectation that heterogeneity of participants matters, and underlines the need to approach these individuals differently with adapted communication. For example, for the overconfident it would be important to create a sense of urgency, since they are

the most vulnerable for a pension gap, but do not act while they feel they could do so. For the emotional segment, communication can focus on feelings, emphasize the peace of mind state that participants can gain by informing themselves. In communicating with the alpha males, trust and severity should be stressed.

Based on our findings, we expect that personalized messages increase message relevance, awareness, and stimulate corresponding actions. Personalizing the information made available to participants could help getting participants more involved with their own retirement planning. However, developing personalized messages is only possible if relevant dimensions of heterogeneity are known and we lack knowledge about how different target groups react on different types of framing information. Based on the insights from this research, we can make a step forward into the direction of tailoring communication to the different segments of participants.

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Appendix

A. Descriptives

Descriptive Statistics (N=583)

Panel A. Education

Highest Educational Degree	%	Financial Literacy (# questions correctly answered)	%
High school	23.0	0	3.9
Intermediate vocational (Dutch: MBO)	22.1	1	7.0
College (bachelor degree)	35.4	2	31.4
University (master degree)	14.9	3	57.6
PhD	2.9		
Other	1.7		

Panel B. Income

Net Monthly Household Income	%	Contribution to Household Income	%
Less than 1200	0.3	0-20	3.9
1200-1800	7.2	20-40	7.2
1800-2800	24.2	40-60	21.4
2800-3800	26.6	60-80	21.6
3800-5000	15.4	80-100	30.5
More than 5000	9.4	No answer	15.3
No answer	16.8		

Panel C. Marital Status & Children

Marital Status	%	Children	%
Married	60.2	None	31.2
Separated	0.2	1 child	14.8
Divorced	8.7	2 children	38.8
Widowed	1.4	3 or more	15.3
Never married	29.5		

Panel D. Non-response analysis

	All DC participants	Respondents	t-statistic on mean difference
N	7,122	583	
Proportion of men (%)	66%	68%	-0.74
Mean Age (SD)	42 (10.55)	45 (10.85)	9.18***
Age Range	20 - 66	21 - 64	
Mean Yearly Pensionable Salary (SD)	48,189 (26,024.37)	50,758 (24,944.67)	2.4**
Married (%)	49%	60%	5.2***

Note: This table presents the distribution of education, financial literacy, net monthly household income, respondent's contribution to household income, marital status, and number of children. Panel D shows a comparison between the sample of participants that received the survey link via e-mail and the respondents, and the results of an independent samples t-test. Standard deviations are given in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level.

B. Measures Used

Overview Constructs

Construct	# Indicators	# items Likert Scale	Coding	Reference	Indicators
Behavioral Intention	2	7	Reflective	Self-developed	(1) How big is the chance that you will look at your pension situation in the upcoming months?
					(2) I am planning to look up information about my pension in the upcoming months.
Perceived Barriers	7	7	Reflective	Grispen et al. (BMC PH, 2011)	(1) The financial costs of informing myself about my pension are a barrier to me.
					(2) The time it costs to inform myself about my pension are a barrier to me.
					(3) The efforts it costs to inform myself about my pension are a barrier to me.
					(4) Informing myself would make me too concerned with my financial situation during retirement.
					(5) Being (too) much concerned with my financial situation during retirement scares me.
					(6) Just thinking about informing myself about my pension scares me.
					(7) Just thinking about informing myself about my pension scares me.
Perceived Benefits	6	7	Reflective		(1) According to me, informing yourself about your pension is important.
					(2) Informing yourself about your pension means taking responsibility for your own financial situation.
					(3) Informing yourself about your pension gives a feeling of certainty about your own financial situation.
					(4) By informing myself about my pension, I can reassure myself.
					(5) By informing myself about my pension, I can take care of my own financial situation.
					(6) It feels good to take responsibility for my own financial situation.
Perceived Self-Efficacy	3	7	Reflective		(1) Informing myself over my pension is difficult.
					(2) When informing myself about my pension I would miss professional assistance.
					(3) If I would like to do something with the received information about my pension I would miss professional assistance.
Perceived Severity	1	7	Reflective		(1) According to you, how severe is it to not save enough for your retirement?
Perceived Susceptibility	2	7	Reflective		(1) According to you, what are the chances that you discover that you are not saving enough for retirement?
					(2) According to you, what are the chances that you discover that you are not saving enough for retirement, compared to others of your age and gender?
Perceived Response-Efficacy	3	7	Reflective	Witte et al. (JHC, 1996)	(1) Informing myself about my pension income works in preventing a potential retirement savings gap.
					(2) Looking up information about my pension is an effective way to prevent not saving enough for my retirement.
					(3) If I inform myself about my pension, I will not discover too late that I have not saved enough for retirement.
General Risk-Taking	1	10	Reflective	Dohmen et al. (JEEA, 2011)	(1) Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?
Financial Risk-Taking	1	10	Reflective		(1) Are you in financial matters a person who is fully prepared to take risks or do you try to avoid taking risks?
Trust Financial Industry	1	7	Reflective	Hansen (JSR, 2012)	(1) In general, I believe that financial companies are trustworthy
Trust Financial Service Provider	1	7	Reflective		(1) I believe that my [name pension provider] is trustworthy

Propensity to Plan	6	7	Reflective	Lynch et al. (JCR, 2010)	(1) I set financial goals for the next 1–2 months for what I want to achieve with my money.
					(2) I decide beforehand how my money will be used in the next 1–2 months.
					(3) I actively consider the steps I need to take to stick to my budget in the next 1–2 months.
					(4) I consult my budget to see how much money I have left for the next 1–2 months.
					(5) I like to look to my budget for the next 1–2 months in order to get a better view of my spending in the future.
					(6) It makes me feel better to have to have my finances planned out in the next 1–2 months.
Retirement Anxiety	5	7	Reflective	Hayslip et al. (IJAHD, 1997)	(1) I am concerned about my health after retiring.
					(2) I am concerned about my income after retiring.
					(3) I am concerned about where I will live after retiring.
					(4) I am concerned about feeling alone after retiring.
					(5) I am concerned about being able to care for myself after retiring.
Financial Literacy	3		Reflective	Lusardi et al. (JPEF, 2011)	(1) Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? (1 = More than $102, 2 = Exactly $102, 3 = Less than $102, 4 = Do not know, 5 = Refuse to answer)
					(2) Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? (1 = More than today, 2 = Exactly the same, 3 = Less than today, 4 = Do not know, 5 = Refuse to answer)
					(3) Please tell me whether this statement is true or false. 'Buying a single company's stock usually provides a safer return than a stock mutual fund'. (1 = True, 2 = False, 3 = Do not know, 4 = Refuse to answer)

Overview Demographics

Variable	Value	Coding
Gender	0	Male
	1	Female
Age	21-64	n.a.
Living Together with Partner	1	No
	2	Yes
Marital Status	1	Married
	2	Separated
	3	Divorced
	4	Widow(er)
	5	Never married
Children	1	None
	2	1 child
	3	2 children
	4	3 children
	5	More than 3 children
Monthly net household income	1	Less than € 1200
	2	€ 1200 - € 1800
	3	€ 1800 - € 2800
	4	€ 2800 – 3800
	5	€ 3800 - € 5000
	6	More than € 5000
	7	Rather not answer
% contribution to household income	1	0 - 20%
	2	20 – 40 %
	3	40 – 60 %
	4	60 – 80 %
	5	80 – 100 %
	6	Rather not answer
Living Situation	1	Rent with government support
	2	Rent without government support
	3	Own house
Education	1	None
	2	Basisonderwijs, lagere school
	3	Lager beroepsonderwijs
	4	MAVO, VMBO-Theorie , IVO, MULO, en ten hoogste 3 jaar HAVO, HBS, VWO of VHMO
	5	HAVO, VWO, Atheneum, Gymnasium, HBS, MMS
	6	Middelbaar beroepsonderwijs
	7	Hoger beroepsonderwijs: HBO-bachelor, HBO oude stijl
	8	Universitaire opleiding: WO-bachelor, Kandidaatsexamen
	9	Hoger beroepsonderwijs: HBO-master
	10	Universitaire opleiding: WO-master, WO oude stijl, Officiersopleiding aan het KIM, de KMA of de Defensie Academie
	11	Universitaire opleiding: gepromoveerd, post-doctorale beroepsopleiding

Sector		
	1	Automatisering\ICT
	2	Auto, reparatie, garagebedrijf
	3	Bank- en verzekeringswezen, financiële instellingen
	4	Bouw
	5	Culturele sector
	6	Detailhandel food
	7	Detailhandel non-food
	8	Gezondheidszorg en welzijnszorg
	9	Groothandel
	10	Horeca
	11	Industrie, delfstofwinning, energie-\waterleidingbedrijven
	12	Landbouw, bosbouw, visserij
	13	Onderwijs
	14	Overheid, openbaar bestuur, sociale verzekeringen
	15	Overige (semi-)overheidsinstellingen en non-profit instellingen werkzaam in het algemeen belang
	16	Recreatie, toerisme en sport
	17	Transport, opslag, communicatie
	18	Werkgevers-, werknemers- en beroepsorganisaties, levensbeschouwelijke en politieke organisaties, overige ideële organisaties en charitatieve instellingen
	19	Zakelijke dienstverlening en verhuur

C. Measurement Model

Table X. Assessment of Measurement Model

Construct	# Indicators	# items Likert Scale	Reliability		Validity		Reference
			Cronbachs Alpha	Composite Reliability	AVE	Fornell-Larcker	
Behavioral Intention	2	7	0.845	0.928	0.866	0.931	Self-developed
Propensity to Plan	6	7	0.928	0.943	0.735	0.858	Lynch et al. (JCR, 2010)
Retirement Anxiety	5	7	0.848	0.886	0.611	0.782	Hayslip et al. (IJAHD, 1997)
Perceived Barriers	7	7	0.876	0.904	0.579	0.761	Grispen et al. (BMC PH, 2011)
Perceived Benefits	6	7	0.861	0.897	0.596	0.772	Grispen et al. (BMC PH, 2011)
Perceived Self-Efficacy	3	7	0.834	0.901	0.754	0.868	Grispen et al. (BMC PH, 2011)
Perceived Response-Efficacy	3	7	0.784	0.873	0.696	0.835	Witte et al. (JHC, 1996)
Perceived Susceptibility	2	7	0.781	0.901	0.820	0.906	Grispen et al. (BMC PH, 2011)
Perceived Severity	1	7					
General Risk-Taking	1	10					Dohmen et al. (JEEA, 2011)
Financial Risk-Taking	1	10					Dohmen et al. (JEEA, 2011)
Trust Financial Industry	1	7					Hansen (JSR, 2012)
Trust Financial Service Provider	1	7					Hansen (JSR, 2012)

D. Fornell-Lacker Criterion for Multi-Item Constructs

Table X. Fornell-Larcker Criterion

Construct	1.	2.	3.	4.	5.	6.	7.	8.
1. Behavioral Intention	**0.931**							
2. Propensity to Plan	0.170	**0.858**						
3. Retirement Anxiety	0.188	0.141	**0.782**					
4. Perceived Barriers	- 0.172	- 0.093	0.028	**0.761**				
5. Perceived Benefits	0.354	0.240	- 0.002	- 0.124	**0.772**			
6. Perceived Self-Efficacy	- 0.195	- 0,114	- 0.339	- 0.286	- 0.122	**0.868**		
7. Perceived Response-Efficacy	0.261	0.117	0.027	- 0.037	0.606	- 0.229	**0.835**	
8. Perceived Susceptibility	0.070	0.086	0.333	0.063	- 0.093	- 0.284	- 0.072	**0.906**

Note: Square root of AVE reported on the diagonal, numbers below the diagonal represent construct correlations.

E. HTMT Criterion

Table X. HTMT (traditional PLS)

Construct	1.	2.	3.	4.	5.	6.	7.	8.
1. Behavioral Intention								
2. Propensity to Plan	0.188							
3. Retirement Anxiety	0.199	0.150						
4. Perceived Barriers	- 0.039	0.072	0.541					
5. Perceived Benefits	0.413	0.260	- 0.024	- 0.269				
6. Perceived Self-Efficacy	- 0.196	- 0.118	- 0.380	- 0.607	- 0.071			
7. Perceived Response-Efficacy	0.315	0.127	0.023	- 0.070	0.739	- 0.234		
8. Perceived Susceptibility	0.057	0.068	0.391	0.423	- 0.168	- 0.358	- 0.133	

Note: Square root of AVE reported on the diagonal, numbers below the diagonal represent construct correlations.

F. Barriers

Table X. Assessment of Barriers Indicators

Construct	Reliability		Validity	
	Cronbachs Alpha	Composite Reliability	AVE	Fornell-Larcker
All 7	**0.876**	**0.904**	0.579	0.761
Without Barrier 4	0.849	0.568	0.283	0.532
Without Barrier 5	0.854	0.785	0.417	0.645
Without Barrier 6	0.847	0.637	0.310	0.557
Without Barrier 7	0.843	0.656	0.321	0.567
Without Barrier 4 and 5	0.821	0.778	0.454	0.674
Without Barrier 4,5, and 6	0.785	0.810	0.546	0.739
Without Barrier 4,5,6 and 7	0.775	0.857	**0.680**	**0.824**

G. Correlations

Table X. Correlations of latent constructs

	1. Behavioral Intention	2. Propensity to Plan	3. Retirement Anxiety	4. Perceived Barriers	5. Perceived Benefits	6. Perceived Self-Efficacy	7. Perceived Response-Efficacy	8. Perceived Susceptibility	9. Perceived Severity	10. General Risk-Taking	11. Financial Risk-Taking	12. Trust Financial Industry	13. Trust Financial Service Provider
1. Behavioral Intention	1	.165**	.169**	-,041	.351**	-.162**	.255**	,044	.268**	,019	,014	.142**	.209**
2. Propensity to Plan	.165**	1	.134**	,062	.232**	-.103*	.108**	,055	.116**	-,080	-,065	.100*	,080
3. Retirement Anxiety	.169**	.134**	1	.456**	-,012	-.319**	,021	.318**	.304**	-.187**	-.161**	,013	,002
4. Perceived Barriers	-,041	,062	.456**	1	-.222**	-.524**	-,056	.347**	.193**	-.172**	-.198**	-,025	-,005
5. Perceived Benefits	.351**	.232**	-,012	-.222**	1	-,066	.610**	-.140**	.219**	,005	,042	.308**	.307**
6. Perceived Self-Efficacy	-.162**	-.103*	-.319**	-.524**	-,066	1	-.187**	-.289**	-.323**	.157**	.211**	-,033	-.115**
7. Perceived Response-Efficacy	.255**	.108**	,021	-,056	.610**	-.187**	1	-.105*	.220**	-,044	-,005	.281**	.310**
8. Perceived Susceptibility	,044	,055	.318**	.347**	-.140**	-.289**	-.105*	1	.242**	-,081	-.088*	-.150**	-.114**
9. Perceived Severity	.268**	.116**	.304**	.193**	.219**	-.323**	.220**	.242**	1	-.111**	-.180**	,039	.111**
10. General Risk-Taking	,019	-,080	-.187**	-.172**	,005	.157**	-,044	-,081	-.111**	1	.772**	-,006	-,069
11. Financial Risk-Taking	,014	-,065	-.161**	-.198**	,042	.211**	-,005	-.088*	-.180**	.772**	1	,048	-,053
12. Trust Financial Industry	.142**	.100*	,013	-,025	.308**	-,033	.281**	-.150**	,039	-,006	,048	1	.663**
13. Trust Financial Service Provider	.209**	,080	,002	-,005	.307**	-.115**	.310**	-.114**	.111**	-,069	-,053	.663**	1

Note: **. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

H. Differences in RBM constructs based on gender and income

Table 2. Differences in RBM constructs based on gender and income

	(1)			(2)							
	Gender			**Income**							
	Overall (N=583)	Male (N=395)	Female (N=188)	< 1200 € (N=2)	1200 -1800 € (N=42)	1800 - 2800 € (N=141)	2800 - 3800 € (N=155)	3800 - 5000 € (N=90)	> 5000 € (N=55)	Not answer (N=98)	
Variable	**Mean (SD)**	**Mean (SD)**									**F df (6,576)**
Behavioral intention to inform oneself (1-7)	3.83 (1.58)	3.83 (1.64)	3.81 (1.44)	1.75 (1.06)	3.75 (1.45)	3.79 (1.48)	3.88 (1.58)	3.93 (1.75)	4.19 (1.68)	3.57 (1.49)	1.63
Already Informed	4.51 (1.66)	4.55 (1.67)	4.42 (1.62)	1.00 (0.00)	3.76 (1.65)	4.35 (1.64)	4.57 (1.59)	4.40 (1.81)	5.15 (1.57)	4.77 (1.49)	5.19***
Perceived response-efficacy	4.78 (1.17)	4.80 (1.23)	4.75 (1.03)	5.33 (0.47)	4.91 (1.04)	4.60 (1.27)	4.73 (1.19)	4.84 (1.06)	5.24 (1.12)	4.76 (1.14)	2.23**
Perceived self-efficacy	3.50 (1.42)	3.65 (1.42)	3.20 (1.33)***	1.00 (0.00)	3.25 (1.26)	3.51 (1.40)	3.44 (1.48)	3.48 (1.37)	3.68 (1.37)	3.67 (1.40)	1.75
Perceived barriers	3.31 (1.23)	3.18 (1.23)	3.60 (1.11)***	6.00 (1.41)	3.66 (1.46)	3.41 (1.08)	3.29 (1.16)	3.13 (1.26)	2.94 (1.21)	3.39 (1.17)	3.77**
Perceived benefits	5.24 (1.00)	5.21 (1.06)	5.31 (0.85)	3.66 (2.36)	5.21 (1.15)	5.16 (1.97)	5.23 (0.95)	5.22 (1.06)	5.77 (0.64)	5.16 (0.88)	3.82**
Perceived susceptibility	3.64 (1.42)	3.61 (1.42)	3.70 (1.30)	5.25 (1.77)	3.73 (1.26)	3.92 (1.46)	3.63 (1.35)	3.37 (1.33)	3.34 (1.54)	3.61 (1.24)	2.54**
Perceived severity	4.58 (1.47)	4.50 (1.46)	4.75 (1.43)*	6.50 (0.71)	4.60 (1.55)	4.64 (1.50)	4.66 (1.35)	4.66 (1.43)	4.69 (1.29)	4.21 (1.57)	1.84*
Retirement anxiety	3.42 (1.34)	3.32 (1.33)	3.60 (1.30)**	6.20 (0.56)	3.80 (1.35)	3.58 (1.28)	3.19 (1.27)	3.31 (1.40)	3.30 (1.15)	3.46 (1.36)	3.53**
Propensity to plan	4.77 (1.48)	4.67 (1.51)	4.93 (1.40)**	3.75 (2.24)	5.01 (1.50)	4.83 (1.42)	5.00 (1.29)	4.55 (1.57)	4.50 (1.73)	4.51 (1.57)	2.14**
Trust own pension provider	4.51 (1.42)	4.42 (1.50)	4.69 (1.19)**	4.50 (0.71)	5.10 (1.12)	4.45 (1.33)	4.52 (1.47)	4.33 (1.58)	4.84 (1.26)	4.30 (1.42)	2.36**
Trust financial institutions	3.66 (1.56)	3.55 (1.61)	3.77 (1.37)	2.00 (1.41)	4.10 (1.51)	3.48 (1.52)	3.57 (1.50)	3.34 (1.57)	4.09 (1.52)	3.74 (1.53)	2.77**
Financial risk-taking (1-10)	4.03 (2.26)	4.36 (2.30)	3.33 (2.00)***	2.00 (1.41)	3.50 (2.11)	3.5 (1.99)	4.17 (2.22)	4.62 (2.33)	5.02 (2.26)	3.74 (2.40)	5.31***
General risk-taking	4.74 (2.22)	5.05 (2.21)	4.07 (2.12)***	2.50 (2.12)	3.93 (2.22)	4.48 (2.07)	4.76 (2.18)	5.32 (2.05)	5.65 (2.39)	4.40 (2.30)	4.73***

Note: Part 1 of this table shows the results of an independent samples t-test. Mean differences between males and females are indicated with * in the "female" column. Part 2 presents the results of an ANOVA. Standard errors are given in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level.

I. Descriptive statistics segments

Descriptive Statistics Segments (N=583)

	All	Segment 1 (N=60)	Segment 2 (N=264)	Segment 3 (N=259)		All	Segment 1 (N=60)	Segment 2 (N=264)	Segment 3 (N=259)
Panel A. Education									
Highest Educational Degree		**%**			**Financial Literacy** (# questions correctly answered)		**%**		
High school	23.0	45.0	28.0	13.1	0	3.9	11.7	6.1	0.0
Intermediate vocational (Dutch: MBO)	22.1	15.0	23.1	22.8	1	7.0	13.3	12.5	0.0
College (bachelor degree)	35.4	31.7	30.4	41.3	2	31.4	53.3	57.2	0.0
University (master degree)	14.9	5.0	12.9	15.4	3	57.6	21.7	24.2	100.0
PhD	2.9	1.7	2.7	3.5					
Other	1.7	1.7	3.1	0.4					
Panel B. Income									
Net Monthly Household Income		**%**			**Contribution to Household Income**		**%**		
Less than 1200	0.3	3.3	0.0	0.0	0-20	3.9	5.0	5.3	2.3
1200-1800	7.2	13.3	10.2	2.7	20-40	7.2	13.3	10.6	2.3
1800-2800	24.2	28.3	27.3	20.1	40-60	21.4	26.7	24.2	17.4
2800-3800	26.6	21.7	23.5	30.9	60-80	21.6	10.0	11.7	34.4
3800-5000	15.4	13.3	10.6	20.8	80-100	30.5	26.7	27.3	34.7
More than 5000	9.4	1.7	8.0	12.7	Not answer	15.3	18.3	20.8	8.9
Not answer	16.8	18.3	20.5	12.7					
Panel C. Marital Status & Children									
Marital Status		**%**			**Children**		**%**		
Married	60.2	60.0	53.8	66.8	None	31.2	26.7	37.1	26.3
Separated	0.2	0.0	0.4	0.0	1 child	14.8	16.7	16.3	12.7
Divorced	8.7	15.0	9.1	6.9	2 children	38.8	36.7	34.5	43.6
Widowed	1.4	3.3	1.1	1.2	3 or more	15.3	20.0	12.1	13.1
Never married	29.5	21.7	35.6	25.1					

J. Differences in RBM constructs between segments

Table X. Differences in RBM constructs based on latent class

Variable	Overall (N=583) Mean (SD)	1 (N=60)	2 (N=264) Mean (SD)	3 (N=259)	F df (2, 580)
Behavioral intention to inform oneself (1-7)	3.83 (1.58)	3.45 (1.97)	3.85 (1.36)	3.88 (1.67)	1.94
Already Informed	4.51 (1.66)	4.23 (2.15)	4.27 (1.52)	4.82 (1.62)	8.40***
Perceived response-efficacy	4.78 (1.17)	4.51 (1.81)	4.82 (0.93)	4.80 (1.21)	1.82
Perceived self-efficacy	3.50 (1.42)	3.78 (2.12)	3.13 (1.06)	3.81 (1.42)	17.67***
Perceived barriers	3.31 (1.23)	3.36 (1.80)	3.65 (0.95)	2.96 (1.17)	23.50***
Perceived benefits	5.24 (1.00)	4.80 (1.69)	5.26 (0.76)	5.33 (1.00)	7.24***
Perceived susceptibility	3.64 (1.42)	3.44 (2.00)	3.74 (1.11)	3.58 (1.44)	1.65
Perceived severity	4.58 (1.47)	4.40 (2.25)	4.69 (1.21)	4.52 (1.44)	1.45
Retirement anxiety	3.42 (1.32)	3.49 (1.88)	3.58 (1.21)	3.22 (1.25)	5.13**
Propensity to plan	4.76 (1.48)	4.53 (1.94)	4.91 (1.31)	4.65 (1.51)	2.83*
Trust own pension provider	4.51 (1.42)	4.13 (1.89)	4.77 (1.10)	4.33 (1.53)	8.92***
Trust financial institutions	3.62 (1.54)	3.28 (1.80)	3.87 (1.34)	3.45 (1.63)	6.70***
Financial risk-taking (1-10)	4.03 (2.26)	3.27 (2.63)	3.59 (1.98)	4.65 (2.28)	19.35***
General risk-taking	4.74 (2.22)	4.02 (2.61)	4.40 (2.07)	5.24 (2.17)	13.42***

Note: Part 1 of this table shows the results of an independent samples t-test. Mean differences between males and females are indicated with * in the "female" column. Part 2 presents the results of an ANOVA. Standard errors are given in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level.