

# Saving Preferences after Retirement

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## **Abstract**

We investigate the importance of alternative motives for choosing a saving and consumption trajectory after retirement. Using an online experimental survey, we elicit the impact on advised spending patterns and underlying saving motives of alternative retirement drawdown designs, comprising different combinations of annuity income and wealth, and of major life events such as becoming frail or losing a spouse. We find that individuals' saving motives are revised in anticipation of major life events. They are less responsive to variation in 'experimental' retirement drawdown arrangements, remaining aligned to prevailing institutional arrangements. Our results suggest that the main explanations for the widespread behaviour of retirees to hold onto their wealth are the desire to hold precautionary savings for health and other unforeseen expenses, facilitating an intra-household bequest, and making it possible to enjoy life now as well as later.

# 1 Background and motivation

The life-cycle model predicts that individuals and their households accumulate wealth during their productive careers and draw down their assets after retirement. Still, in spite of large differences in pension systems across countries and substantial pension reforms, recent empirical studies for different countries show that many retirees hold on to their assets or even keep on saving well into old age; see Dynan et al. (2004) and Love et al. (2009) for the United States, Van Ooijen et al. (2015) for The Netherlands, and Asher et al. (2017) for Australia. Several explanations for this stylised fact have been suggested, including motives informed by economic theory such as precautionary saving or the utility of leaving a bequest, and more abstract motives such as the fear of losing autonomy or the desire to feel secure.

In this paper, we contribute to the literature on consumption expenditures, saving, and wealth accumulation or decumulation after retirement by investigating why people hold on to or even increase their wealth after retirement. We analyse the influence of institutional factors such as the flexibility of retirement drawdowns compared to lifelong income streams on the observed differences in preferences. We examine the importance of saving motives founded on economic theory, as well as more abstract motives informed from economic psychology and assess the influence of (expecting) major life events, such as a health shock or losing a spouse.

In experimental surveys we implement in the Netherlands and Australia, we use vignettes that present short descriptions of hypothetical retiree households with given patterns of wealth and income and expected future health conditions, including death of a spouse. We then ask the survey participants to advise the retiree household a spending pattern and to rank the importance of a set of saving motives justifying this advice. The wealth and income patterns vary to reflect different pension systems - from full annuitisation (characterised as low wealth and high income and indicative of the Dutch system) to complete flexibility (characterised as high wealth and low income as in the Australian system), allowing us to analyse how the importance of saving motives varies with pension system design. We present a broad menu of saving motives for this behaviour, drawing on economic theory and psychology. We focus on the role of the institutional background which is very different in the two countries, and on the role of expected health shocks and other major life events.

Government policy typically plays an important role in individual decisions on retirement saving (the accumulation phase) and drawdown (the decumulation phase). The government can restrict individual choice by mandating (for example, setting compulsory participation and minimum contribution levels), or can direct choice through tax policy (such as providing tax concessions for contributions, fund earnings and/or benefits) or nudges (including setting participation, contributions and asset allocation defaults). The aim of the government policy should be to efficiently allocate welfare spending in retirement and to improve overall social welfare by preventing or discouraging suboptimal individual choices which substantially reduce expected lifetime utility (Beshears et al., 2009). The stylised fact that individuals do not decumulate their wealth after retirement may point to suboptimal decision-making over the life-cycle. Therefore, a better understanding of the motives for continued accumulation of assets or slower than expected decumulation is important to analyse the efficiency of retirement saving

and decumulation policy design.

The Netherlands and Australia are ideal settings for our experimental survey. The pension systems in both countries are consistently ranked among the top three in the world (Mercer, 2017) and have a similar structure which includes a large funded income replacement pillar. Other relevant institutional characteristics also coincide, including comprehensive health insurance and high home ownership rates amongst retirees. On the other hand, the two countries have very different pension arrangements when it comes to accumulating and, in particular, decumulating pension wealth, allowing us to investigate how culture and norms from an institutional setting affect saving motives. In the Netherlands, pension wealth drawdown is income driven through mandatory annuitisation, usually with a defined benefit (DB) plan. Australia on the other hand follows a wealth driven approach with flexible drawdowns from defined contribution (DC) plans. Combining this difference with an experimental design mimicking the own as well as the other country's pension system allows us to test the impact of the institutional settings.

Australia's mandatory DC income replacement pillar - known as the "superannuation guarantee" - was introduced in 1992 to supplement long standing voluntary arrangements. The superannuation guarantee is a mandatory universal workplace pension system in which every employee over 18 with income of more than 450 dollars per month accumulates at least 9.5% of their salary in a pension account. Retirees can choose to take benefits as a lump sum, a phased withdrawal product, or a term or life annuity. Most people purchase non-annuitised phased withdrawal products, known as account-based pensions, at retirement (APRA, 2017). This income replacement (second) pillar is accompanied by a first pillar means-tested public Age Pension, and by third pillar voluntary saving. Under current policy settings a person on average weekly earnings working for 40 years could expect a replacement rate of 65-70% from an annuitised superannuation accumulation and a part Age Pension.

In the Dutch pension system, the first pillar is a pay-as-you-go state pension, providing a minimum standard of living for everyone above the statutory retirement age who has continuously been a resident of the Netherlands from age 15. Mandatory occupational pensions supplementing the state pension (either DB or DC) cover more than 90% of employees. There is no required minimum retirement contribution and legislation mandates a maximum annual tax favored accrual of pension rights. Benefits are paid as lifetime annuities. Most pension plans aim for a gross replacement rate of 70% of average career salary (including the state pension) for an individual with 40 years of (full-time) employment (Knoef et al., 2016). The difference between the two systems in the decumulation phase is large: Australian retirees typically have a more flexible and liquid phased withdrawal retirement savings account, while Dutch retirees are required to transfer their mandatory occupational pension savings into a lifetime annuity.

We find that motives to spend and save in retirement are not sensitive to (experimental) changes in the institutional pension settings, with persistence in importance rankings as participants move from full annuitisation to full flexibility. On the other hand, individuals do modify the ordering of saving motives in the event of an expected deterioration in their own or their partner's health, in which case the precautionary health saving motive becomes more important. Our findings also suggest that awareness of the potential risks faced in the actual institutional setting (Dutch or Australian) is more important

for the ranking of saving motives than the experimental setting, suggesting that retirees only slowly adjust their saving and spending patterns after an actual policy shift. Overall, the predicted probabilities suggest that the most important reasons for conservative spending after retirement are precautionary health, intra-household bequest and self-gratification for the Dutch, and precautionary health, self-gratification and security for Australians. Life-span risk is not an important saving motive in either country.

The remainder of this paper is structured as follows. Section 2 provides a brief review of explanations informed by the economic and psychology literature for why individuals hold on to their wealth in retirement. Section 3 presents the experimental design and the structure of the experimental survey, while Section 4 describes the data. Section 5 describes the estimation models and presents results and Section 6 concludes.

## 2 Saving motives of the elderly

There has been considerable attention in the academic literature to identify, describe, and categorise saving motives for different types of households (Browning and Lusardi, 1996; Canova et al., 2005). In an economics context, saving is generally treated as residual unspent income (Lunt and Livingstone, 1991). Economic psychology, however, suggests that ordinary people think of saving as “to actively put money in bank accounts” as, for example, “a protection against future insecurities” (Katona, 1975). From an economics point of view, the difference between active or passive (residual) saving is not important. From a psychological point of view this is certainly not the case, since the framing of the decision matters.

In the experiment analysed in this paper, we restrict ourselves to ten possible saving motives, avoiding the cognitive demands to the survey participants imposed by extensive lists of saving motives.<sup>1</sup> To select the ten saving motives, we used a pre-test described in detail in Appendix A. In the remainder of this section we focus on the literature on the ten selected saving motives in the context of the elderly, see Table 1, distinguishing between those founded on economic theory and more abstract motives informed by economic psychology. The different motives are not necessarily mutually exclusive, although recent research by Beshears et al. (2011) suggests that some individuals do view them as though they are.

### Economic saving motives

The economic motives we consider are related to precautionary savings (subdivided into precautions for health expenditures and general expenditures), bequests (intra household and intergenerational), lifespan risk, and liquidity. The work surveyed in De Nardi et al. (2016) suggests that the economic saving motives of the elderly essentially break down into two categories: precautionary savings, mainly for the risks implied by lifespan uncertainty (the lifespan risk motive) and uncertain medical - out of pocket - expenditures (the precautionary (health) motive), and bequest motives (the (intra-household) bequest motive). The literature related to savings for lifespan risk has a long history,

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<sup>1</sup>Alternatively, selecting for each participant only a small subset from an extensive list would reduce the statistical power of our analysis.

Table 1: Saving motives used in the vignettes

Name	Text in vignette (The household ...)
<i>Economic</i>	
precautionary	wants to ensure that they will be able to finance any unforeseen expenditures other than health and aged care expenditures
precautionary health	wants to ensure that they will be able to finance unforeseen health and aged care expenditures
life-span risk	wants to ensure that they will not outlive their wealth
intended bequest	wants to ensure that they will be able to leave a bequest to their dependents or estate
liquidity	wants to ensure that they have enough cash on hand at any time
intra-household bequest	wants to ensure that if they die, their partner is able to maintain his/her standard of living
<i>Psychological</i>	
autonomy	wants to ensure that they remain financially independent
security	wants to ensure that they have enough money to have peace of mind
self-gratification	wants to ensure that they are able to enjoy life now as well as later
political risk	wants to ensure that they are protected against a change in the superannuation / pension rules

dating back to Yaari’s seminal paper (Yaari, 1965). Davies (1981), using actual income and survival data from Statistics Canada, shows a negative impact of uncertain lifetimes on dissaving by the elderly. De Nardi et al. (2009), using US data on people aged 75 and older, show that individuals deplete their net worth by the end of their certain lifetime whereas individuals facing an uncertain lifespan still have significant asset holdings towards the end of their lives, even when facing the most pessimistic survival prospects. The importance of precautionary savings for the elderly is empirically confirmed for the US by Kennickell and Lusardi (2004), using a direct question about precautionary wealth from the 1995 and 1998 waves of the Survey of Consumer Finances. Finkelstein et al. (2013) argue that the marginal utility of consumption varies with health, implying that health also affects the optimal level of life-cycle savings, which is something that many other studies do not take into account. The role of health expenditures for savings, however, is undisputed, and emphasised by e.g. Kotlikoff (1989), Levin (1995) and De Nardi et al. (2016).

The role of intergenerational transfers, both inter-vivos and in the form of bequests, has gained considerable attention in the economics literature (Masson and Pestieau, 1997; Alessie and Kapteyn, 2001). Still, as pointed out by Poterba (2001) and others, there is a lack of consensus on why people leave a bequest. Some argue that bequests are mainly accidental (Hurd, 1989) as the elderly keep a buffer as a result of life-span risk. Lockwood (2018) argues that accumulated wealth during retirement serves the double purpose of building a bequest and financing costly health care expenditures. Others find that bequests are intentional (Alessie et al., 1995; Laferrère and Wolff, 2006) and motivated by either inter-generational altruism (Hochguertel and Ohlsson, 2009) or the joy of giving (Hurd, 1989).

Finally, the elderly may hold on to their wealth during retirement due to liquidity constraints and investments in illiquid assets such as their own house. The standard models consider retirees’ aggregate assets in the household portfolio (including housing) and implicitly assume that households can easily liquidate their housing wealth by selling and moving to a smaller and cheaper house or by, for example, acquiring a second or reverse mortgage. There is a general consensus, however, that the elderly are

usually not willing to give up their houses (Fisher et al., 2007; Banks et al., 2012; Caro et al., 2012), except in the case of specific events like divorce, widowhood, or children leaving home (Sabia, 2008; Suari-Andreu et al., 2018). Since most household wealth is invested in home ownership and reverse mortgages are generally non-standard, costly or unavailable, the willingness to stay put may be a reason for the elderly to save during retirement (Venti and Wise, 2004).

## Psychological saving motives

An increasing number of studies in the economics literature emphasise the importance of abstract explanations for savings (Shefrin and Thaler, 1988; Canova et al., 2005; Beshears et al., 2011). The psychology literature suggests that individuals find more abstract saving goals more important than concrete motivations (Canova et al., 2005), or save as a buffer against social risks (Engelberg and Sjöberg, 2007). Canova et al. (2005) identified fifteen salient abstract motives for saving. These include autonomy, self-gratification and security, which are among the ten most important saving motives according to our pre-test. An explanation for why they are perceived as important is that these saving motives are likely to be the target of other saving motives (including ‘economic’ explanations) and linked to other goals. This aligns with the early work of Yamauchi and Templer (1982) who identify, using an experimental setting, three dimensions to explain the attitude towards money. The first is “power and prestige” – purchasing items or accumulating wealth to impress others and increase your self-esteem; the second and third are “time-retention” and “security”, which can be interpreted as placing value on preparing for future goals or security. Moreover, the psychology literature suggests that there is a tendency to view saving as a protection against the kind of vulnerability that is inherent to social involvement (Yamauchi and Templer, 1982; Furnham, 1984; Engelberg and Sjöberg, 2007), explaining the importance of the motives autonomy and security. Risks could include the loss of trust and confidence in others, or loss of autonomy and, as a consequence, dependence on other people.

Finally, political risk can be a motivation to save, as an example of building up a buffer against a social risk. In particular, individuals may save to protect themselves against a change in pension rules that may reduce their benefits (Liebman and Luttmer, 2015). Diamond (1999) notes that the effect of reforms of the pension system can be twofold: first, they can provide a solution to existing social risk, or they can generate such risks. Since political risks are an inherent part of any pension scheme (Barr and Diamond, 2006), individuals may experience discomfort with them. Using a regular survey with a representative sample of the Dutch population, Van Dalen and Henkens (2018) find that the Dutch have reduced their trust in pension funds, banks and insurance companies after the global financial crisis, possibly affecting saving attitudes and actual saving behaviour.

### 3 The experimental survey

Individuals from representative samples in the Netherlands and Australia were invited to participate in an online experimental survey on consumption (spending) patterns and saving motives in retirement. The experimental task was designed with two main objectives: First, to investigate the effect of liquidity of wealth (that is, lifetime income versus liquid wealth) and second, to assess the effect of (expected) health problems on preferred consumption patterns and saving motives.<sup>2</sup> The Dutch survey was fielded in December 2016 and the Australian survey in late March 2017.<sup>3</sup> In addition to the experimental tasks, we also collected information on demographics and personal and household characteristics, personality traits, and financial competence.

To elicit the respondents' saving and expenditure preferences and saving motives, we designed and implemented stated-choice experiments using vignettes.<sup>4</sup> Vignettes have long been used in social sciences including economics to analyze preferences (Van Beek et al., 1997). Our vignettes comprise short descriptions of scenarios of income, wealth and health status for hypothetical retiree households. We present hypothetical households so that participants in different countries (who have experience with or knowledge of different retirement income systems) can evaluate the same choice set with minimal influence of country specific factors. Another advantage of the vignette methodology is that participants whose actual situations differ from the scenarios presented can still complete the tasks. Stated choice methods allow us to collect participant's motives for their decisions, as well as information on preferences, competencies and personal characteristics generally not available in revealed preference data.

Participants in the Netherlands were recruited from two well-established and ongoing panels - the LISS panel and CentERpanel, which together include over 5,000 households. Invited panel members are a representative sample of Dutch households, selected by Statistics Netherlands. Participants agree to respond to surveys on a regular basis (bi-weekly for CentERpanel, monthly for LISS).<sup>5</sup> For our experimental survey, we selected individuals aged 50 - 64, working for pay or with a partner working for pay. The Dutch sample comprised 1,798 eligible individuals. LISS panel members were paid €5 for completing the survey; CentERpanel members only receive a small compensation for internet use.<sup>6</sup> Participants in Australia were recruited from the commercial web panel provider 'TEG rewards' which includes over 1,000,000 panel members and were paid A\$4 on completion of the survey. The Australian sample comprised 1,004 people aged 50-64 and not yet retired. The median time for completion of the survey was 31 and 30 minutes for the Dutch and Australian samples, respectively.

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<sup>2</sup>A third objective to analyse the role of government prescribed drawdown patterns (that is, implied endorsement) on preferred consumption patterns and saving motives is analysed in a companion paper (Alonso-García et al., 2018).

<sup>3</sup>Static copies of the questionnaires are available in the supplementary materials as 'Dutch version of the survey.pdf' and 'English version of the survey.pdf'. A 'live' version of the Australian survey is available at <http://survey.us.confirmat.com/wix/6/p3081554696.aspx>.

<sup>4</sup>See Louviere et al. (2000) for advantages and drawbacks of stated preference methods.

<sup>5</sup>One member in the household provides the household data and updates this information at regular time intervals.

<sup>6</sup>We have not provided additional in-survey incentives besides the after-survey compensation as this is not common in the LISS panel and CentERpanel.



### 3.1 Survey overview

The survey consists of some preliminary questions and four sections. The preliminary questions cover marital status, age of the participant and partner (if applicable), employment status of the participant and partner and household income. This information is used to select the sample and to allocate the participant to one of four household income groups.<sup>7</sup>

Section 1 of the survey is the experimental task, explained in detail in Subsections 3.2 and 3.3 below. Section 2 is a set of questions on retirement planning and personality traits. To test whether an individual's knowledge of retirement planning and future orientation influence retirement saving behaviour we include questions on planning and future time perspective from Jacobs-Lawson and Hershey (2005), time preference and planning horizon from Fisher and Montalto (2011), and questions on risk attitudes from Dohmen et al. (2011). We also include questions to elicit subjective life expectancy, which should influence retirement planning as theory predicts that people who underestimate their life expectancy are more likely to retire early, save too little, and do not purchase longevity protection (Van Solinge and Henkens, 2009; Bateman et al., 2018). Moreover, participants are asked to estimate the life expectancy of their partner (if relevant). Following the recent practice to add psychological personality tests such as the Big Five to general socio-economic surveys (e.g. Borghans et al., 2008; Agnew et al., 2018), we asked the ten-item personality inventory (TIPI).<sup>8</sup>

Section 3 is a set of questions on superannuation, pension arrangements and financial competence. It includes a question on self-reported financial literacy, the big three financial literacy questions (Lusardi and Mitchell, 2011), questions on superannuation/pension knowledge (Agnew et al., 2013) and questions on numeracy (Lipkus et al., 2001), since financial competence has been found to influence retirement decisions (Lusardi and Mitchell, 2014) and financial returns on savings (Deuffhard et al., 2018). We also asked a set of questions on the actual pension arrangements of the participants.

Section 4 concludes the survey with questions on demographics and personal characteristics. To analyse whether other socio-economic and cultural differences can explain different preferences, we asked questions about place of birth (of the participant and their parents), religion (Weber, 2013), number of children in household, education, health, financial and housing wealth, and the extent of financial support provided to others.

### 3.2 The experimental task - vignette characteristics

In Section 1 of the experimental survey, each participant is shown eight different vignettes ('Choice sets'). The base vignette describes a hypothetical couple at retirement and the eight vignettes differ through variation in expected health status (four alternatives), the institutional retirement income arrangement ("liquidity" - the combination of annuity income and freely available wealth; three alternatives), and implied endorse-

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<sup>7</sup>These questions were not included in the Dutch survey, as the relevant information was already available.

<sup>8</sup>We used this instead of the much lengthier original version of Gosling et al. (2003) to address possible cognitive exhaustion and personality is not the primary topic of interest.

ment (two alternatives). For each vignette the participant is asked (A) to advise a preferred consumption stream (spending pattern), and (B) in two rounds of best / worst choice sets, to rank the importance of five saving motives for the given advice. The income and wealth shown to the participant are based on the median wealth for the income group to which the participant is allocated at the beginning of the survey. We determine the wealth and income groups to align with gross household income in the Dutch LISS panel and CentERpanel and convert these to Australian dollars with the Purchasing Power Parity (PPP) index (OECD, 2015b). The liquidity of retirement saving in each vignette is discussed in detail in Section 3.3; the net present value of the total wealth at retirement is always the same for a participant. The text of the base vignette is displayed in Table 2. Appendix B explains in detail how the amounts in the vignettes (wealth and income, consumption expenditures) are determined.

Table 2: Text of the base vignette

<p>The household consists of two individuals currently 65 years old who have just retired. [INSERT FUTURE HEALTH EXPECTATIONS].</p> <p>The household has a net of tax lifetime income of [INSERT INCOME] and their wealth at retirement is [INSERT WEALTH]. The household owns the house they live in, without a mortgage. They don't want to move or sell their house. If one member of the household dies, the survivor will receive less income but also spend less. The reduction in income is roughly equivalent to the reduction in spending.</p> <p>At retirement the household has to plan how much they expect to save and spend, based on their income and current wealth. The following table shows five different spending plans together with income and wealth at different ages (if they survive). If their wealth is exhausted then the household has to adapt their spending to their income. [INSERT IMPLIED ENDORSEMENT or not]</p> <p>Finally, you can assume that prices do not change over time.</p> <p><b>Part A:</b>  What spending plan do you advise the household to choose, based on your preferences? &lt;&lt; Show five different SPENDING PLANS, accompanied by a reminder of annual and fortnightly/monthly income, and information about remaining wealth at ages 65, 75, 85, 95 &gt;&gt;</p> <p><b>Part B:</b>  Below you see five possible reasons to choose a specific spending plan.</p> <p>Please indicate which reason is the most important for this household, based on your own preferences, and which saving motive is the least important. Then indicate which saving motive is the 2nd most important and the 2nd least important. &lt;&lt; Show five different SAVING MOTIVES in each choice set, randomly selected from 10 (subject to category restrictions)&gt;&gt;</p>
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## A: advising a spending pattern

For each vignette, the participant is asked to advise one spending pattern out of five alternatives for the hypothetical household.<sup>9</sup> For a given participant the same five spending patterns are presented in all eight vignettes. However, the spending patterns differ between participants since they are aligned to the participant’s household income group.<sup>10</sup> To help the participant understand the consequences of each spending pattern, we include information on remaining wealth at ages 65, 75, 85, and 95.<sup>11</sup> We also remind the participant of their lifetime income (presented earlier in the vignette). Figure 1 shows an example screen shot of the set of spending patterns presented.

Figure 1: Spending patterns for a household in the lowest income group with middle income and middle wealth (as defined in Section 3.3)

Lifetime income		Spending		Wealth			
Annual	Fortnightly	Annual	Fortnightly	At age 65	At age 75	At age 85	At age 95
\$36,050	\$1,387						
<input type="radio"/> Spending Plan 1	\$42,700	\$1,642	\$152,775	\$86,275	\$19,775	\$0	
<input type="radio"/> Spending Plan 2	\$40,650	\$1,563	\$152,775	\$106,775	\$60,775	\$14,775	
<input type="radio"/> Spending Plan 3	\$36,050	\$1,387	\$152,775	\$152,775	\$152,775	\$152,775	
<input type="radio"/> Spending Plan 4	\$31,450	\$1,210	\$152,775	\$198,775	\$244,775	\$290,775	
<input type="radio"/> Spending Plan 5	\$29,900	\$1,150	\$152,775	\$214,275	\$275,775	\$337,275	

## B: saving motives used to advise a spending pattern

Informed by the economics and psychology literature, we identified 19 possible saving motives for retirees. To prevent cognitive exhaustion while maintaining econometric power, we designed a pre-test to reduce the list to ten saving motives to be included in the experimental task. In the pre-test best/worst scaling was used to select the highest ranked subset of ten (see Appendix A). Table 1 lists these ten, with the explanation given to participants in the experimental task.

To further address cognitive exhaustion, we present a subset of five of the ten saving motives in each choice set. Three economic motives and two motives informed by the psychology literature are randomly selected for each set. The order in which these five are presented is randomised. To further minimise experimental complexity, the subset of five saving motives are the same across the first four vignettes, which differ by institutional arrangement, and across the last four vignettes, which differ by expected health state.

<sup>9</sup>In order to reduce complexity, consumption remains constant over time and the choice set comprises just five consumption patterns (Iyengar and Kamenica, 2010). It would be of interest to analyse the effect of decreasing or increasing spending patterns but this is left for future work.

<sup>10</sup>Dutch participants for whom information on gross household income was missing were allocated to an income category at random.

<sup>11</sup>In line with actual practice, income is expressed annual and fortnightly (monthly) for the Australian (Dutch) participants.

### 3.3 Variation of key characteristics across vignettes

As illustrated in Table 2, three features of the characteristics of the hypothetical household vary across the vignettes. In the first three vignettes the extent to which retirement savings are liquid (that is, require full, partial or no annuitisation) differ.<sup>12</sup> In the last four vignettes the future health expectations of the hypothetical household vary, but for a given participant, the liquidity of retirement savings is fixed.

#### Liquidity of retirement savings (vignettes 1-3)

In the first three vignettes, the hypothetical household consists of two recently retired individuals aged 65. They are in good health and expect to remain in good health until at least age 70. They own the house they live in (without a mortgage) and do not intend to move or sell the house. If one of them dies, the widow(er) would receive less pension income, but the reduction corresponds to the expected decrease in expenditure needs.<sup>13</sup> Based on their household income group (Table B.1), participants are allocated a given level of total resources (liquid wealth plus net present value of lifetime income) which excludes housing wealth. Vignettes 1-3 differ in the extent to which retirement savings are liquid - that is, in the proportion of liquid wealth and the remaining proportion transferred into a lifetime annuity. There are three (liquid wealth and (annuity) income combinations which we refer to as liquidity treatments:<sup>14</sup> treatment 1: [high wealth, low income], treatment 2: [middle wealth, middle income], and treatment 3 [low wealth, high income]. The order in which the first three vignettes are presented to the participant is random without replacement.<sup>15</sup>

An important characteristic of this experimental design is how the three wealth and lifetime income combinations relate to the country specific pension systems. In the Netherlands, second pillar pension contributions are always converted into a lifetime income stream (full annuitisation), whereas Australian retirees can and often do choose to take non-annuitised benefits (lump sums or phased withdrawals) from their superannuation accumulation.<sup>16</sup> Treatment 1 thus mimics the financial situation of a household in the Australian institutional framework (high pension wealth and low lifetime income), while treatment 3 corresponds to the Dutch institutional framework (low wealth and high income). In our experimental setting we explicitly mention that the hypothetical households have a certain lifelong income and wealth at the start of retirement, providing a level of guaranteed pension and liquid wealth. We point out that if their wealth is exhausted, the household has to adapt their spending to their income, so there are no additional resources of income or wealth.

The intermediate arrangement (treatment 2) corresponds to a potential future direction for both retirement systems. Discussions on pension system reform in the Netherlands indicate that the new pension contract could allow for more flexibility while maintaining

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<sup>12</sup>In the fourth vignette we introduce implied endorsement which we address in a companion paper.

<sup>13</sup>We do not include the number of children in the description of the hypothetical household to reduce the complexity of the experimental setting. However, in our econometric model we control for the number of children reported by the participant.

<sup>14</sup>See Appendix B for the exact amounts.

<sup>15</sup>The ordering of the vignettes is less important as we treat the spending patterns obtained from this stage as explanatory variables for our main research questions. Ordering effects would therefore enter the model as second order effects.

<sup>16</sup>For a thorough investigation of the similarities and differences between the Dutch and Australian pension systems, see e.g. Bateman et al. (2016).

some intragenerational risk-sharing features (Bovenberg and Nijman, 2018). Similarly, reform proposals for retirement income in Australia indicate that more prescription may be introduced by encouraging income stream products which offer longevity protection (Murray et al., 2014; Treasury, 2016). This suggests that in the future pension systems could (slowly) converge towards each other. Alternatively, treatment 2 could also be interpreted as a system in transition, where individuals have had some years of pension accrual in a DB setting and some years in a DC setting (which is, for example, representative of the United States and the United Kingdom). Participants in both Australia and the Netherlands are presented with vignettes with all three liquidity treatments.

### **Future health expectation (vignettes 5-8)**

Vignettes 5-8 are the same as vignettes 1-3 except for the inclusion of four expected future health state scenarios for the hypothetical household.<sup>17</sup> The institutional arrangement for health and long-term care expenses are similar in the Netherlands and Australia (Bakx et al., 2016; Hall, 2015). In the Netherlands, health care is mainly financed through a standardized basic health insurance offered by insurers which cost (on average) €1,378 per adult in 2018 (Vektis, 2018). In Australia, Medicare is financed through a 2% levy on taxable income.<sup>18</sup> In addition to the basic health insurance, more than three quarters of the Dutch and half of the Australians purchase supplementary health insurance (Vektis, 2018; APRA, 2018). Long-term care, on the other hand, is (partially) means-tested in both the Netherlands and Australia (Maarse and Jeurissen, 2016; myAgedCare, 2018).

In vignettes 1-3, both household members expect to remain in good health until at least age 70. In vignette 5, both household members expect to remain healthy until at least age 75. The household in vignette 6 expects that one of them will have some difficulties with activities of daily living (ADL) within ten years. The household in vignette 7 expects that one of them will pass away within 10 years, and that the surviving spouse will remain healthy at least until age 75. Finally, the household in vignette 8 expects that one member of the household will pass away within 10 years, and that the survivor will develop some ADL limitations. For vignettes 5-8, each participant is randomly assigned to liquidity treatment 1 [high wealth, low income] or 3 [low wealth, high income].<sup>19</sup> In our analysis we refer to the future health expectation vignettes as treatments 5, 6, 7 and 8 where they are assigned the low liquidity [low wealth, high income] alternative, and as 5H, 6H, 7H and 8H where they are assigned the high liquidity alternative [high wealth, low income].

## **4 Data and descriptive analysis**

From the initial samples of 1,798 Dutch and 1,004 Australian survey participants, we dropped 38 Dutch participants who started but did not complete the survey and 138 Dutch participants who did not report gross household income and were (randomly) matched to a very different income category than appeared to be reasonable from

<sup>17</sup>Vignette 4 is the implied endorsement vignette, which is not analysed in this paper.

<sup>18</sup>Individuals and households earning over \$90,000 and \$180,000 pay an additional medical levy surcharge between 1% and 1.5% depending on their income.

<sup>19</sup>We do not include treatment 2 to avoid lack of explanatory power due to too many between subject treatments.

other income information. In addition we dropped 185 Dutch participants and 21 Australian participants who afterwards turned out not to be eligible (e.g. retirees), or who had missing information on relevant covariates (see Table 3). This reduced the initial samples to an analysis sample of 1,437 Dutch and 983 Australian participants.

Table 3: Description of the covariates

Covariate	Explanation
<i>Demographics</i>	
gender = male	1 if male, 0 if female
marital status = partner	1 if lives together with partner, 0 otherwise
children living at home	1 if participant has at least one child living at home, 0 otherwise
household income (Q3 and Q4)	1 if participant is in (current) income category 3 or 4, 0 otherwise
homeowner	1 if participant owns (potentially with a mortgage) the house (s)he lives in, 0 otherwise
religious / member of a church community	1 if participant considers (him)herself as a member of a certain religion or church community, 0 otherwise
born in the country they are currently living in	1 if participant is born in the country (s)he lives in, 0 otherwise
subjective life expectancy: high	1 if participant expects to live as least as long as predicted according to the Australian Bureau of Statistics / Statistics Netherlands, 0 otherwise
<i>Financial competence</i>	
retirement plan	1 if participant answered ‘Yes’ to the question: “Have you ever tried to work out how much you need to save for retirement?”, 0 otherwise
pension capability: objectively measured	1 if participant had less mistakes than the median number of mistakes in the analysis sample for both the financial literacy questions (Lusardi and Mitchell, 2011), the numeracy questions (Lipkus et al., 2001), and pension literacy questions (Bateman et al., 2018), 0 otherwise.
pension capability: self-assessed	standardised measure comprised of the following questions: “I am knowledgeable about how the state pension works” and “I am knowledgeable about how superannuation / pension works.”
<i>Personality traits and preferences</i>	
willingness to take risk	standardised measure comprised of the following question: “How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?” (Dohmen et al., 2011)
impulsive financial behaviour	standardised measure comprised of four questions related to self-controlled behaviour in the domain of finances of the participant (Duckworth and Weir, 2011)
future orientation	standardised measure comprised of twelve questions related to patience / future orientation of the participant (Strathman et al., 1994)
personality: TIPI conscientiousness	standardised measure for the personality trait conscientiousness, comprising two conscientiousness related questions from the ten-item personality inventory (TIPI) (Gosling et al., 2003)
<i>Country of residence</i>	
Australia	1 if participant is in the Australian sample, 0 otherwise

*Notes:* Standardised measures are standardised (mean 0 and standard deviation of 1) using the full analysis sample.

Table 4 shows that in the final sample, Australian participants are more likely than the Dutch to have at least one child living at home, have a higher home ownership rate, and have higher subjective life expectancy. The Dutch are more likely to be born in the country they currently live in, and more often consider themselves a member of a church or religion. Australians have much more often tried to work out how much they need to save for retirement. They also perform much better in the pension

capability measure, which combines financial literacy, numeracy and pension knowledge questions. In particular, Australians outperform the Dutch in the financial literacy questions (around 85% had at most one mistake, compared to 72% of the Dutch). On the other hand, Australians are less confident about the operation of the first and second pension pillars. This may be due to the fact that Australia’s comprehensively means-tested first pillar is more complex than the Dutch universal first pillar. According to the personality measures, Australians are more conscientious and more future oriented (patient), but also more impulsive in financial matters, and slightly more risk seeking than the Dutch.

In our experimental design participants were asked to advise one from five spending patterns for the hypothetical household. Table 5 presents the distribution of advised spending patterns by treatment and country of residence. Note that spending patterns are ordered from high spending (pattern  $s = 1$ ) to low spending (pattern  $s = 5$ ; cf. Figure 1). Irrespective of the liquidity/health state treatment, spending patterns  $s = 2$  and  $s = 3$  are the most popular. There is a salient difference between the two countries: the Australians tend to choose a more conservative spending pattern than the Dutch, irrespective of the treatment.<sup>20</sup> This corresponds to the real world context in the two countries. In the Netherlands, most individuals have a high replacement rate and a 70% replacement rate of final pre-retirement earnings is still the social norm (Knoef et al., 2016), which in the experiment most often corresponds to spending pattern 2. In Australia, replacement rates are lower (OECD, 2015a), and pension adequacy is generally communicated in terms of absolute expenditure levels rather than a relative standard of living (ASFA, 2017), which for many retirees are lower than 70% of final earnings in our experimental setting.

Table 6 shows how participants change their advised spending pattern if the retirement income policy design (i.e., liquidity of retirement wealth) changes or if future health status changes. Overall, expecting a deterioration in health status often leads to a lower preferred spending pattern. Between 50 and 75% of the participants advise the same spending pattern as in the base treatment, with somewhat higher persistence among the Dutch than among the Australians. For columns 1 and 2, such persistence was expected, as the treatments by design give the same total lifetime wealth. For the vignettes concerning future health status, we see an interesting asymmetry for the Dutch participants if pension wealth is more liquid (compare e.g. column 4, ( $t = 5 - t = 3$ ) with 8, ( $t = 5H - t = 1$ ) and 5 with 9, etc.). They more often advise a higher spending pattern (row: “spend more”) when confronted with varying health status in the high liquidity vignettes. One explanation could be that the need for precautionary savings is higher with less liquid wealth. For the Australian participants, the asymmetry is much weaker.

Table 7 shows the importance attached to the ten saving motives by treatment and country of residence. A motive is defined as important if it is ranked first or second of the five motives presented in a given choice set. The importance of a particular motive is fairly consistent across treatments. Irrespective of the country of residence, the motives *autonomy* and *self-gratification* are ranked highly. The importance of some economic saving motives, however, differ substantially and significantly between countries.

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<sup>20</sup>This country difference is significant for the treatments that present varying retirement income policy design. However, this difference is not significant for participants advising high spending in the health status treatments.

*Life-span risk* and *security* are considered more important by Australian participants, while *intra-household bequest* and *liquidity* are more important for the Dutch participants. Other saving motives are less important in both countries, specifically *intended bequest*, although *intra-household bequest* is moderately important for both Australian and Dutch participants. The liquidity of retirement wealth (that is, whether retirement income policy is high wealth / low income or low wealth / high income) only affects the ranking of the saving motives in the case of an expected deterioration in future health ( $t = 6, 6H$  and  $t = 8, 8H$ ). Expecting future health problems increases the importance of the precautionary health motive, as one would expect. In the next section we will further explore the explanation for these treatment effects.

Table 4: Descriptive statistics

	Analysis Sample			The Netherlands		Australia	
	Mean	Min	Max	Mean	Sd	Mean	Sd
<i>Country of residence</i>							
Australia	0.41						
<i>Demographics</i>							
gender = male	0.50			0.50		0.50	
marital status = partner	0.72			0.71		0.74	
children living at home <sup>a</sup>	0.40			0.36		0.45	
household income (Q3 and Q4)	0.32			0.31		0.34	
homeowner	0.78			0.74		0.83	
religious / member of a church community	0.32			0.33		0.30	
born in the country they are currently living in	0.85			0.92		0.74	
subjective life expectancy: high	0.49			0.40		0.62	
<i>Financial competence</i>							
retirement plan	0.42			0.33		0.56	
pension capability: objectively measured	0.35			0.26		0.47	
pension capability: self-assessed		-1.88	1.87	0.04	1.05	-0.06	0.92
<i>Personality traits and preferences</i>							
willingness to take risk		-1.97	2.40	-0.04	1.01	0.06	0.98
impulsive financial behaviour		-1.94	5.08	-0.23	0.93	0.34	1.01
future orientation		-4.18	2.80	-0.16	0.99	0.24	0.97
personality: TIPI conscientiousness		-4.11	1.52	-0.12	1.02	0.17	0.94
Individuals		2,420		1,437		983	

*Notes:* <sup>a</sup>Recall that ‘children’ equals one if the participant has at least one child living at home, and zero otherwise (cf. Table 3). Hence, 40% of the participants in our analysis sample have at least one child living at home. Standardized measures have a mean of zero and unit variance for the analysis sample, therefore we only report the minimum and maximum.

## 5 Modelling the Importance of Each Saving Motive

We model that importance attached to each saving motive underlying the advised spending patterns in vignettes  $t = 1, 2, 3, 5, \dots, 8, 5H, \dots, 8H$  as described in Section 3, focusing on the effect of the participant’s country of residence, liquidity of wealth (i.e., experimental retirement income policy design), and future health expectations, while controlling for a rich set of covariates.



Table 5: Advised spending pattern by treatment (percent): The Netherlands and Australia

Spending pattern ( <i>s</i> )	Treatment ( <i>t</i> )											
	varying retirement income policy design			varying health status & low liquidity of wealth			varying health status & high liquidity of wealth			varying health status & high liquidity of wealth		
	<i>t</i> = 1	<i>t</i> = 2	<i>t</i> = 3	<i>t</i> = 5	<i>t</i> = 6	<i>t</i> = 7	<i>t</i> = 8	<i>t</i> = 5H	<i>t</i> = 6H	<i>t</i> = 7H	<i>t</i> = 8H	
<i>The Netherlands</i>												
<i>s</i> = 1	17.1	15.7	7.9	5.4	5.2	7.2	5.0	15.0	13.0	18.5	17.4	
<i>s</i> = 2	42.2	46.2	56.9	58.7	49.7	57.4	50.5	45.7	40.4	42.5	38.2	
<i>s</i> = 3	26.4	30.1	28.3	29.9	38.1	26.7	33.5	24.9	31.8	26.0	28.7	
<i>s</i> = 4	8.8	5.4	3.6	2.9	4.2	4.5	6.0	9.9	10.9	9.6	11.1	
<i>s</i> = 5	5.5	2.7	3.3	3.1	2.9	4.2	5.0	4.5	4.0	3.3	4.6	
<i>Australia</i>												
<i>s</i> = 1	12.7***	12.3**	5.6**	5.2	4.4	5.4	4.8	12.1	10.5	13.8**	13.6*	
<i>s</i> = 2	29.4***	28.4***	34.3***	35.8***	32.5***	39.2***	34.1***	33.3***	32.0***	32.9***	28.7***	
<i>s</i> = 3	29.8*	36.6***	39.6***	41.4***	41.8	37.8***	40.8***	28.5	29.1	27.0	32.0	
<i>s</i> = 4	13.5***	13.3***	11.8***	11.5***	14.7***	12.3***	14.5***	12.8	14.9**	14.0**	11.1	
<i>s</i> = 5	14.6***	9.4***	8.8***	6.1***	6.7***	5.4	5.9	13.4***	13.6***	12.3***	14.6***	

*Notes:* \*\*\* $p < 0.01$ , \*\* $p < 0.01$  and \* $p < 0.10$ . Significance level for the two-sample test of proportions of the difference between the Dutch and Australian sample. Per country, columns add up to 100. Varying retirement income policy design means varying 'liquidity of wealth'. Treatments  $t = 1, \dots, 3, 5, \dots, 8, 5H, \dots, 8H$ , relate to the vignettes as discussed in Section 3, with  $t = 1$  referring to high liquidity [high wealth, low income],  $t = 2$  to moderate liquidity [middle wealth, middle income],  $t = 3$  to low liquidity [low wealth, high income],  $t = 5H, \dots, 8H$  referring to high liquidity varying health status vignettes and  $t = 5, \dots, 8$  referring to low liquidity varying health status vignettes 5 to 8.

Table 6: Changes in advised spending pattern between treatments (percent): The Netherlands and Australia

	$\Delta$ Treatment					
	varying retirement income policy design $\frac{(t=2 - t=1)}{(t=3 - t=1)}$	varying health status & low liquidity of wealth $\frac{(t=5 - t=3)}{(t=6 - t=3)}$	varying health status & high liquidity of wealth $\frac{(t=7 - t=3)}{(t=8 - t=3)}$	varying health status & high liquidity of wealth $\frac{(t=5H - t=1)}{(t=6H - t=1)}$	varying health status & high liquidity of wealth $\frac{(t=7H - t=1)}{(t=8H - t=1)}$	varying health status & high liquidity of wealth $\frac{(t=7H - t=1)}{(t=8H - t=1)}$
<i>The Netherlands</i>						
spend more	20.46	11.54	9.74	15.72	11.54	15.46
spend the same	67.29	74.69	68.98	66.76	64.12	71.03
spend less	12.25	13.77	21.28	17.52	24.34	13.51
<i>Australia</i>						
spend more	22.99	18.61***	17.43***	23.37***	21.39***	18.20
spend the same	62.46**	69.31**	63.76*	61.78*	59.41*	68.41
spend less	14.55	12.08	18.81	14.85	19.21**	13.39

*Notes:* \*\*\* $p < 0.01$ , \*\* $p < 0.01$  and \* $p < 0.10$ . Significance level for the two-sample test of proportions of the difference between the Dutch and Australian sample. " $(t = 2 - t = 1)$ " is shorthand notation for the advised spending pattern in treatment 2 minus the advised spending pattern in treatment 1. "spend more": individual advised a higher spending pattern. "spend the same": individual advised the same spending pattern. "spend less": individual advised a lower spending pattern, thus a more conservative spending pattern. Per country, columns add up to 100. We refer to Table 5 for the definitions of the treatments.

Table 7: Importance of saving motives by treatment and country

Saving motive ( $m$ )	Treatment ( $t$ )										
	varying retirement income policy design			varying health status & low liquidity of wealth			varying health status & high liquidity of wealth				
	$t = 1$	$t = 2$	$t = 3$	$t = 5$	$t = 6$	$t = 7$	$t = 8$	$t = 5H$	$t = 6H$	$t = 7H$	$t = 8H$
<i>The Netherlands</i>											
<i>Economic</i>											
$m = 1$	46.5	48.3	48.5	43.5	47.1	44.6	45.1	46.5	51.5	49.6	48.7
$m = 2$	53.8	54.2	54.9	50.4	59.9	54.3	60.2	52.8	64.1	53.1	64.6
$m = 3$	7.9	5.6	5.6	7.2	8.1	7.8	7.5	6.5	8.3	7.1	9.8
$m = 4$	6.1	6.6	6.9	8.2	7.1	6.8	6.2	4.8	3.7	4.8	5.3
$m = 5$	59.7	58.2	58.3	58.9	62.9	61.5	63.7	57.3	59.5	61.0	56.4
$m = 6$	52.9	53.9	54.2	51.7	50.4	60.4	59.1	54.9	51.0	60.2	58.8
<i>Psychological</i>											
$m = 7$	58.9	57.9	58.1	59.9	54.5	54.5	52.6	57.8	53.3	53.5	54.4
$m = 8$	26.8	27.7	27.4	25.9	22.5	23.6	22.2	26.9	25.1	23.7	22.8
$m = 9$	64.0	63.8	63.0	63.5	58.1	60.3	56.2	66.3	62.4	64.4	58.6
$m = 10$	25.9	26.4	25.6	24.8	24.5	20.1	21.5	26.1	20.9	22.7	20.4
<i>Australia</i>											
<i>Economic</i>											
$m = 1$	45.5	47.9	48.4	42.2	49.0	44.6	49.8	45.7	48.2	41.7*	43.7
$m = 2$	51.9	51.5	51.3	47.3	49.0***	46.1*	51.0**	52.6	63.8	51.7	59.9
$m = 3$	33.0***	33.3***	31.8***	34.2***	35.0***	30.8***	31.3***	28.5***	26.4***	24.8***	26.4***
$m = 4$	8.3	7.5	8.5	6.1	10.6	8.3	7.6	10.1**	12.3***	11.5***	12.3***
$m = 5$	32.1***	35.5***	33.1***	34.2***	31.5***	31.9***	33.1***	25.6***	30.8***	31.6***	31.2***
$m = 6$	41.4***	40.6***	42.5***	50.6	49.4	60.7	61.1	46.8**	45.6	58.1	51.2*
<i>Psychological</i>											
$m = 7$	56.5	54.9	58.7	58.7	57.6	57.6	50.4	53.5	50.2	53.9	49.8
$m = 8$	54.9***	54.5***	53.2***	44.1***	41.8***	44.8***	43.7***	55.5***	52.4***	55.0***	53.3***
$m = 9$	63.5	64.7	61.9	62.0	58.0	62.0	56.4	62.3	55.9	56.4**	58.1
$m = 10$	14.6***	11.4***	12.2***	20.0	17.4**	11.5***	14.9**	19.4*	14.9*	15.3**	14.5**

Notes: \*\*\* $p < 0.01$ , \*\* $p < 0.01$  and \* $p < 0.10$ . Significance level for the two-sample test of proportions of the difference between the Dutch and Australian sample. A respondent assesses the importance of five saving motives per treatment. The 'most important' motives are those that are ranked first or second in each choice set using best / worst scaling. These two motives are assigned value 1, while the other three motives are assigned value 0. The share of ones out of the total number of times a motive is assessed, by saving motive and treatment is reported in the table. By country, columns average is around 40. We refer to Table 5 for the definitions of the treatments. See Table 1 for the full-text for the saving motives.

The importance of a given motive in a given vignette can be seen as a latent (unobserved) variable; all we observe is its rank amongst five motives (a random subset of the ten motives in Table 2). We explain the rank of each motive separately using an ordered response model. To be precise, the importance  $U_{i,t}^{m,*}$  of saving motive  $m$  ( $m = 1, \dots, 10$ ) for individual  $i$  ( $i = 1, \dots, N$ ) in vignette  $t$  is determined by individual characteristics  $X_i$  (the covariates in Table 3), a set of five dummies indicating the advised spending pattern ( $S_{i,t}^j = 1$  if spending pattern  $j$  is advised),  $j = 1, \dots, 5$ , a set of ten dummies  $A_{i,t}$  indicating which five saving motives the respondent is ranking ( $A_{i,t}^j = 1$  if motive  $j$  is included in the set of five,  $j = 1, \dots, 10$ ), and an individual specific term  $\mu_i^m$  capturing unobserved individual characteristics that make motive  $m$  less or more important for each vignette:

$$U_{i,t}^{m,*} = U_{i,t}^{m,*}(X_i, S_{i,t}, A_{i,t}, \mu_i^m).$$

The effect of  $S_{i,t}$  is allowed to vary across vignettes and motives.<sup>21</sup> Using a linear specification, the equation for  $U_{i,t}^{m,*}$  can be written as follows:

$$U_{i,t}^{m,*} = \beta_1^m X_i + \beta_2^{m,t} S_{i,t} + \beta_3^m A_{i,t} + \mu_i^m + \epsilon_{i,t}^m$$

Here  $\beta_1^m$  measures the effects of individual characteristics. The influence of the chosen spending pattern is captured by  $\beta_2^{m,t}$ . The  $\beta_3^m$  are the nuisance parameters related to which (other) saving motives are ranked. The random effects  $\mu_i^m$  are assumed to be normally distributed with mean 0 and variance  $\sigma_{\mu^m}^2$ , independent of all  $X_i, S_{i,t}$  and  $A_{i,t}$ . The error terms  $\epsilon_{i,t}^m$  ( $t = 1, \dots, 8H$ ) are assumed to be normal with mean 0 and variance  $\sigma_{\epsilon^m}^2$ , independent of each other and of all  $\mu_i^m, X_i, S_{i,t}$  and  $A_{i,t}$ .

The observed ranking of saving motive  $m$  in vignette  $t$ ,  $R_{i,t}^m$ , coded as 1 (least important), 2, 3, 4 or 5 (most important), is given by

$$R_{i,t}^m = k \text{ if } \nu_{k-1}^m < U_{i,t}^{m,*} \leq \nu_k^m,$$

with threshold parameters  $-\infty = \nu_0^m < \nu_1^m < \dots < \nu_4^m < \nu_5^m = \infty$  for each  $m$  (assumed to be the same for all participants). Identification is achieved by restricting the constant term to zero and  $\sigma_{\epsilon^m}^2$  to 1. This gives, for each motive  $m$ , the specification of a random effects ordered probit (REOP) model which can be estimated using maximum likelihood and standard software.

We present two broad sets of results. First, we report the estimation results for the influence of demographics, financial competence, personality traits and random effects and preferences on the importance of each of the ten saving motives (Section 5.1).<sup>22</sup> Second, we present the predicted probabilities for a reference person to choose a saving motive as highly important (i.e., ranked first or second), first by retirement income policy design treatment (Section 5.2) and second by expected health status treatment (Section 5.3). This allows us to identify which motives are important for those who

<sup>21</sup>Our results appear to be qualitatively very similar in a specification where these effects (treated as nuisance parameters) are restricted to be the same for all vignettes.

<sup>22</sup>The estimates of the parameters of interest are presented in Table 8. The estimates of the other parameters (which are required for the predicted probabilities discussed below) are reported in the Appendix (Table C.1).

advise the conservative spending patterns which are prevalent in real world settings. In our analysis we cluster standard errors on a household level, accounting for the nature of the data.<sup>23</sup>

## 5.1 The influence of participant characteristics

Table 8 reports the estimation results for the influence of demographics, financial competence, personality traits and preferences on the importance of the ten selected saving motives.

### *Demographics*

We collect information on gender, marital status, children, income, home ownership, religion and subjective life expectancy. The importance of these demographic characteristics differ by saving motive, and some motives are not influenced at all by demographics. In particular, the demographics we collect have no significant effects on the *precautionary*, *autonomy* or *security* motives. More surprisingly perhaps is the absence of statistically significant demographics for the motive *life-span risk*. A priori, one might expect that (private) information on subjective life expectancy, current income, and partner would matter for the importance of *life-span risk*, but these three variables are jointly insignificant (and re-estimating the model with only one of the three does not lead to any significant estimate). However, this may be due to the vignette design: household composition, income, and health of the hypothetical household are given, and in the experimental task these should matter more than the respondent’s own household composition.

Males attach lower importance than females to the *precautionary health* motive but higher importance to the *intra-household bequest* motive. Since males are generally the first of a couple to pass away (as they, on average, live shorter and are generally older), they are also providers of the *intra-household bequest* and typically receive informal care from their partner (Kaye et al., 2010). In addition, males spend less time in bad health (Majer et al., 2013). As expected, a stronger *intended bequest* motive is found for individuals with children.

Receiving a high income and being a homeowner are indicators of wealth, explaining their positive coefficient estimates for the importance of the *self-gratification* and *political risk* motives. Wealthier individuals are less constrained by their current income, making it possible for them to “enjoy life now, as well as later”. In addition, wealthier individuals generally have alternative sources of wealth, thereby providing an opportunity to hedge themselves against *political risk*. Individuals who consider themselves a member of a certain church or religion,<sup>24</sup> on the contrary, are less likely to value material wealth strongly, are more trusting, and have longer planning horizons (Renneboog and Spaenjers, 2012). This explains the positive coefficient estimates for the effect of the religion dummy on the motives *precautionary health* and *liquidity*, and the negative effect for *self-gratification*. In addition, our estimation results suggest that immigrants

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<sup>23</sup>The LISS panel and CentERpanel are household panels, that is, all adult members of the household are invited to participate in the experiment. To correctly account for this when estimating our standard errors, we cluster on a household level as opposed to an individual level.

<sup>24</sup>Of those who consider themselves a member of a certain church or religion, 50% identify as Roman Catholic and over 25% as Protestant.

attach less weight to *self-gratification* and *intra-household bequest*.

### ***Financial competence, personality traits and preferences***

Similar to the demographic variables, the explanatory power of personality traits, financial competence and preferences differs by saving motive. All personality traits influence the importance of at least one saving motive, although the *security* motive is unaffected by any of the personality traits. Individuals who have tried to work out how much they need to save for retirement are more likely to have a plan to meet their financial needs (Agnew et al., 2013), reducing the uncertainty about wealth needed upon retirement. This aligns with the negative estimate for the *liquidity* motive and the *precautionary* motive. Moreover, as these individuals plan for retirement, they typically place relatively more importance on a good standard of living in retirement. Similar to retirement planners, those who objectively have better pension capabilities attach lower importance to the *bequest* motive and are less concerned about *political risk*. In contrast to being retirement planner, having better pension capabilities raises the importance of *precautionary* and *precautionary health* motives, possibly because this group is more aware of the (health) cost of ageing. Having better self-assessed pension knowledge implies greater awareness that the income benefits are jointly provided, thus leaving the widow(er) with similar levels of income. This may explain the negative estimate of this variable for the *intra-household bequest* motive.

The personality trait conscientiousness is associated with a tendency to set out plans and stick to them. Therefore, conscientious individuals are more likely to be aware of uncertain expenditures and place importance on *precautionary* saving and are more likely to account for *life-span risk*. Since the hypothetical households own the house they live in without a mortgage, the negative estimate for *intended bequest* could be explained by the intention to leave the house as a bequest. As conscientious individuals tend to follow their plans, it is more natural for them to ensure that “they will enjoy life now, as well as later” (*self-gratification*).

Having less self-control in financial matters (captured by higher *impulsive financial behaviour*) decreases the ability to save during retirement, or to reduce spending if an unexpected event occurs (such as unanticipated health expenditures or a change in the pension system). This reduces the importance of the *precautionary health* and the *political risk* motives. Also, having more self-control suggests that an individual is more willing to control their own consumption hence the positive estimate for the *intra-household bequest* motive. Being more patient (or future oriented) makes individuals more aware of future consumption levels, leading to a positive coefficient for the *precautionary* and *precautionary health* motives. The same line of reasoning leads to negative estimates for the *liquidity* motive and *self-gratification*.

Finally, more risk seeking individuals are more willing to not have money for unexpected events, making *precautionary* and *precautionary health* motives less important. Instead, they want to ensure that they are financially independent (the *autonomy* motive).

### ***Random effects***

Our modelling approach allows us to estimate the fraction of unexplained variation captured by the individual effects. Here  $\hat{\rho}$  denotes the estimate of this fraction. Formally, we have  $\rho = \frac{\sigma_{\mu}^2}{\sigma_{\mu}^2 + \sigma_{\epsilon}^2} = \frac{\sigma_{\mu}^2}{\sigma_{\mu}^2 + 1}$  where  $\sigma_{\epsilon}^2 = 1$  by definition. Our estimation results suggest that unobserved heterogeneity is important, as per motive at least half of the

fraction of the unexplained variation is captured by the individual effects.

## 5.2 Predicted probabilities for saving motive importance - the role of pension policy design

Table 9 presents model predictions<sup>25</sup> of the probability that a saving motive is among the two most important motives for a reference person in liquidity (of pension wealth) treatment 1 [high wealth, low income] and treatment 3 [low wealth, high income]. Spending pattern “Aggregate” refers to the distribution of the advised spending patterns per country and per treatment, see Table 5.

### *Overall importance of each saving motive*

Irrespective of country of residence or treatment, the psychology informed saving motive *self-gratification* (“wants to be able to enjoy life now and later”) is most often in the top two. As expected, *self-gratification* is particularly important for participants who advise one of the higher spending patterns ( $s = 2$  in Table 9). *Autonomy* (“wants to remain financially independent”) is the second important psychology motive for participants in the Netherlands and Australia. Its importance does not vary systematically with spending pattern or liquidity of pension wealth treatment. Among the economic saving motives, *precautionary* and *precautionary health* savings, *liquidity* and *intra-household bequest* are ranked as important. Surprisingly, the economic saving motives *life-span risk* and *intended bequest* are less often considered to be important. These results suggest that people are saving for unexpected expenses and to leave their partner in a good state financially should they pass away in the near future. They are less concerned about the distant future: that is, whether one of the household members lives longer than expected or what happens with the savings after both household members have passed away. This aligns with the findings of Beshears et al. (2014), who ask participants, among other things, to motivate the importance of potential reasons for cash-out<sup>26</sup>. They find that the desire to give money to children (*bequest*) and worries about dying early (*life-span risk*) have little importance to the survey participants. Flexibility in the timing of their spending, and having enough income later in life, however, are considered to be important.

### *Treatment effects*

The importance of the saving motives is largely consistent between the liquidity of pension wealth treatments. The main difference relates to the importance of the *precautionary* and *precautionary health* motives. These tend to be more important when the liquidity of retirement savings is low, particularly among those who advise spending less and saving more (high  $s$ ), in line with the notion that precautionary motives reduce consumption and increase savings. In the high liquidity treatment this is less important, since pension wealth can be used as a buffer. The saving motive *security* becomes less important in the low liquidity treatment, since a fixed annuity income is seen as providing more security than a phased withdrawal product with (probably)

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<sup>25</sup>Tables 9 and 10 present the predicted probability together with the standard error that indicates the uncertainty related to our reference person for finding a certain saving motive important.

<sup>26</sup>In our analysis we want to assess whether the saving motives chosen could be explained, among other things, by the institutional setting. We find that it has a little effect. On the other hand, Beshears et al. (2014) analyzes the reasons that drive the choice of (partial) annuitization.

Table 8: Random Effects Ordered Probit estimates of participants characteristics on saving motive importance

Saving motive ( $m$ )	$m = 1$	$m = 2$	$m = 3$	$m = 4$	$m = 5$	$m = 6$	$m = 7$	$m = 8$	$m = 9$	$m = 10$
<i>Demographics</i>										
gender = male	-0.0717 (-1.17)	-0.306*** (-4.25)	0.00764 (0.10)	0.304*** (3.26)	0.0176 (0.26)	0.153** (2.13)	-0.0745 (-0.97)	-0.000738 (-0.01)	0.0559 (0.72)	-0.0342 (-0.47)
marital status = partner	-0.0449 (-0.61)	-0.158* (-1.88)	0.0108 (0.13)	0.135 (1.24)	-0.0820 (-1.08)	0.553*** (6.56)	0.0129 (0.15)	-0.0805 (-0.89)	-0.0743 (-0.84)	-0.0373 (-0.46)
children living at home	0.0338 (0.54)	0.0332 (0.46)	-0.0489 (-0.66)	0.366*** (3.85)	0.0220 (0.34)	-0.0955 (-1.31)	-0.0353 (-0.47)	-0.0812 (-1.01)	-0.0688 (-0.87)	0.0295 (0.40)
household income (Q3 and Q4)	-0.0464 (-0.67)	0.0755 (0.93)	0.0505 (0.61)	-0.0587 (-0.56)	-0.0179 (-0.23)	-0.0858 (-1.04)	0.121 (1.42)	-0.0160 (-0.18)	0.268*** (2.99)	-0.276*** (-3.48)
homeowner	-0.00952 (-0.12)	-0.00492 (-0.05)	-0.0336 (-0.37)	-0.125 (-1.07)	0.00672 (0.08)	0.0316 (0.34)	-0.0235 (-0.25)	0.0225 (0.23)	0.224** (2.48)	-0.172** (-2.05)
religious / member of a church community	-0.0785 (-1.22)	0.142* (1.90)	0.0728 (0.97)	0.0405 (0.42)	0.155** (2.31)	-0.0895 (-1.19)	-0.00697 (-0.09)	0.00735 (0.09)	-0.284*** (-3.60)	0.0211 (0.30)
born in the country they are currently living in	-0.0843 (-0.93)	0.0198 (0.20)	-0.138 (-1.23)	-0.0472 (-0.37)	0.0504 (0.57)	0.184* (1.83)	0.0474 (0.45)	-0.171* (-1.65)	0.182* (1.73)	-0.117 (-1.14)
subjective life expectancy: high	-0.0297 (-0.48)	-0.0603 (-0.84)	0.0781 (1.07)	-0.0980 (-1.08)	-0.0877 (-1.33)	0.0261 (0.37)	0.0407 (0.55)	0.0188 (0.25)	0.122 (1.58)	-0.0178 (-0.26)
<i>Financial competence</i>										
retirement plan	-0.198*** (-2.88)	-0.0109 (-0.13)	-0.0191 (-0.23)	-0.235** (-2.22)	-0.148** (-2.00)	0.116 (1.51)	0.103 (1.22)	0.0443 (0.51)	0.0495 (0.60)	0.0918 (1.13)
pension capability: objectively measured	0.173** (2.56)	0.253*** (3.17)	0.0985 (1.24)	-0.404*** (-3.98)	0.0853 (1.23)	-0.0813 (-1.07)	0.0354 (0.42)	0.0795 (0.89)	0.128 (1.50)	-0.380*** (-5.04)
pension capability: self-assessed	0.0104 (0.33)	0.0317 (0.81)	-0.0147 (-0.37)	-0.0493 (-1.00)	0.0556 (1.52)	-0.0886** (-2.20)	0.00397 (0.10)	-0.0178 (-0.42)	0.00595 (0.15)	-0.0155 (-0.42)
<i>Personality traits and preferences</i>										
willingness to take risk	-0.0740** (-2.47)	-0.0645* (-1.76)	0.00869 (0.25)	0.0333 (0.72)	-0.0423 (-1.35)	-0.0267 (-0.76)	0.0884** (2.41)	0.0416 (1.10)	0.0547 (1.42)	0.0456 (1.34)
impulsive financial behaviour	-0.00186 (-0.06)	-0.0578 (-1.60)	-0.0175 (-0.47)	-0.00230 (-0.05)	0.0165 (0.45)	0.0685* (1.81)	-0.0320 (-0.82)	0.00746 (0.19)	0.0328 (0.81)	-0.102*** (-2.79)
future orientation	0.0868*** (2.73)	0.0910** (2.20)	-0.0319 (-0.79)	-0.0222 (-0.45)	-0.0669* (-1.95)	-0.00736 (-0.19)	-0.0357 (-0.93)	0.00852 (0.21)	-0.0758* (-1.75)	0.0136 (0.37)
personality: TIPI conscientiousness	0.0649** (2.12)	0.0442 (1.23)	-0.0941** (-2.52)	-0.123*** (-2.59)	0.0427 (1.24)	0.0486 (1.31)	0.0433 (1.15)	-0.0493 (-1.26)	0.0803** (2.05)	-0.0577 (-1.59)
Additional control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nuisance parameters'	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Random effect</b>										
$\hat{\sigma}_\mu^2$	1.211*** (15.77)	1.691*** (16.64)	1.691*** (15.05)	2.593*** (14.15)	1.427*** (16.52)	1.740*** (16.55)	1.949*** (16.70)	2.010*** (16.74)	1.953*** (16.99)	1.607*** (15.31)
$\hat{\rho}$	54.8%	62.8%	62.8%	72.2%	58.8%	63.5%	66.1%	66.8%	66.1%	61.6%
Individuals	1796	1770	1778	1848	1847	1831	1836	1785	1813	1788
Observations	8386	8279	8315	8645	8545	8650	8568	8390	8541	8381
Log-likelihood	-11517.9	-10727.9	-9692.3	-7026.0	-11141.9	-11105.3	-10966.1	-10704.6	-10576.8	-10469.7

Notes: \*, \*\*, and \*\*\* denote significance at 90%, 95%, and 99% respectively.  $t$ -statistics clustered by household in parentheses. See Table 1 for the full-text saving motives. Additional control variables are: dummies related to: Liquidity of retirement savings, dummies related to: Future health expectations, and interaction “treatment” and “country of residence”. Estimates for these controls, nuisance parameters, threshold parameters and random effect can be found in Table C.1 in Appendix C.  $\hat{\rho}$  is the estimated fraction of the unexplained variation captured by the individual effects. Formally,  $\rho = \frac{\sigma_\mu^2}{\sigma_\mu^2 + \sigma_\epsilon^2} = \frac{\sigma_\mu}{\sigma_\mu + 1}$ .



stochastic investment returns.

Overall, the prevalence of the saving motive *autonomy* does not differ substantially between the liquidity of pension wealth treatments, but the relationship with the advised spending pattern varies. For the low liquidity treatment, it is a more prevalent saving motive when the advised spending pattern is low (high  $s$ ). This reflects participants who want to have some cash on hand to feel they have financial autonomy. On the other hand, in the high liquidity treatment *autonomy* is a more prevalent saving motive among participants who advise a high spending pattern, indicating that their financial autonomy is related to their short run ability to spend more.

Similarly, the prevalence of the saving motive *liquidity* does not differ substantially between the liquidity of pension wealth treatments, but varies with the advised spending pattern. For the high liquidity of pension wealth treatment the saving motive *liquidity* is more prevalent as an important motive when the participant advises a high spending pattern (low  $s$ ) indicating that there is enough liquid pension wealth to have high consumption in the near future and not worry about the liquidity of wealth in the distant future. In the low liquidity of pension wealth treatment, the participants' focus on the short run makes the *liquidity* saving motive more prevalent where participants advise the hypothetical household to spend less ( $s = 4$ ).

*Life-span risk* is important in Australia but not in the Netherlands. Surprisingly, its importance for Australians is independent of the liquidity of pension wealth treatment. As for the low liquidity of wealth treatment respondents are insured against outliving their wealth, we would have expected that life-span risk would become less important. This finding could be explained by Brown et al. (2017), who argue that individuals are cognitively constrained in valuing life-annuities.

### ***Country of residence (norms and awareness of risks) effects***

There are no saving motives that are very important for participants in one country but not in the other, but there are several substantial differences by country of residence, which are larger than the between treatment differences.<sup>27</sup> Given that the liquidity of pension wealth treatments represent different pension systems, this suggests that individuals do not respond quickly to a change of the pension system, and it would take time before people adjust their saving motives. This might occur because people are more influenced by societal norms and awareness of potential risks within the current system, rather than by the experimental institutional setting. This implies that policy evaluation is difficult, as it may take a long time before people adjust to a change of retirement income arrangements.

The *intra-household bequest* motive is considered more important by Dutch participants than Australian participants. This is consistent with current arrangements in the two countries, where it is standard to consider pension provision in the context of the household in the Netherlands, compared with Australia where pensions have an individual focus. The norm in the Netherlands is that state and occupational pensions are household income and that a surviving spouse is able to maintain their standard of living after one of the couple passes away. Occupational pension arrangements in the Netherlands typically have a 70% partner pension feature<sup>28</sup> and the state pension per

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<sup>27</sup>For country-specific differences we refer the reader to the point estimates as reported in Table C.1.

<sup>28</sup>The partner pension feature works as follows. If the insured passes away the widow(er) receives for

person is higher for single than couples, paying 72% of the couple (household) rate. On the other hand, the state pension for singles in Australia is paid at a rate of 67% of the couple (household rate). However, Australia's income replacement DC system does not require annuitisation, so if the surviving spouse lives long enough, there is a chance she will run out of money.

In the Netherlands the pension system requires retirees to take up an income stream without the possibility of even a partial lump sum. Under the Australian arrangements, a liquid phased withdrawal account or lump sum is the standard option for decumulation of retirement savings – there is no mandatory annuitisation requirement and little take-up of voluntary annuities. As a result, the Dutch participants are likely to be more aware than the Australians that a (non-reversible) income stream might lead to too low (liquid) wealth when they need cash on hand for immediate expenditures. We see this particularly for the saving motive *liquidity* and to a lesser extent for the *precautionary* and *precautionary health* saving motives. This difference between countries in awareness of the risk effect is even larger than the liquidity treatment effect.

*Political risk* is much more prevalent as an important motive for the Dutch participants than the Australian participants. This might be due to a lack of transparency in the Dutch pension system rather than political risk itself. The transparency in the Dutch retirement income system characterized by soft rights is an issue due to the allocation of realised risks to different cohorts. In the past decade many pension funds did not fully index pension income to inflation due to low funding ratios, and had to warn their members of the possibility of nominal pension cuts in the future should their funding ratio remain low. Political intervention in the Netherlands has led to small changes in prudential regulation, requiring pension funds to hold higher reserves. Moreover, for a few years now, there has been an ongoing debate about whether to introduce a new type of pension contract. By comparison, in the recent past the politically driven changes in the Australian retirement income arrangements have been much more extensive - with many changes to both state pensions and the taxation and tax concessions in the DC system. On the one hand Australia's retirement income has become more generous: in 2007 pension withdrawals became tax exempt and in 2009 the ratio of the single to married rate of the state pension increased. On the other hand, the arrangements have become less generous as means testing of the state pension has become tighter, while changes to the taxation of pensions has increased uncertainty despite their narrow impact. A plausible explanation for the larger importance of perceived political risk in the Netherlands is that in the Netherlands the debate is still continuing and there is a serious chance of drastic changes in the near future, whereas in Australia, substantial reforms have already taken place.

In Australia the lack of mandatory annuitisation implies that people might know peers or elderly family members who have run out of money in retirement and are left with the state pension<sup>29</sup>. In the Netherlands, this would rarely arise, since occupational pensions are fully annuitised. As a consequence, the saving motives *life-span risk*<sup>30</sup> and

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the rest of their life 70% of the income the insured received while alive. If the partner of the insured passes away, the income of the insured is not reduced.

<sup>29</sup>Peers effects have been found to affect saving decisions (see e.g. Duflo and Saez (2002)).

<sup>30</sup>Table 9 shows four cases where the “aggregate” result is higher or lower than the results for the spending patterns  $s = 2, 3$  and  $4$ , three of which correspond to the life-span risk saving motive and one to the precautionary motive ( $m = 1$ ) for low liquidity of wealth in the Netherlands. This is driven by

*security* are much more prevalent for Australians than for the Dutch. This difference is much larger than the treatment effect, indicating that people need to be aware of the risk before they adjust their saving motives.

### 5.3 Predicted probabilities for saving motive importance - the effect of expected future health status

Table 10 presents model predictions of the probability that a saving motive is among the two most important motives for a reference person in varying health treatments for the high and low liquidity of wealth scenarios.

The dummy variables for expected future health status<sup>31</sup> allow us to control for the (experimental) institutional setting and to assess the effect of expected future health status.<sup>32</sup> Similar to the liquidity of retirement wealth dummy variables, most estimates are not statistically significantly different from the reference category (low wealth / high income - treatment 3 - and spending pattern 2),  $S_{3,2}$ . An interesting exception is the negative estimate of  $S_{5,2}$  for the *precautionary health* motive, suggesting that reducing uncertainty about the future health state is associated with a decrease in the importance of that motive in the low wealth / high income setting.

Interestingly, the saving motive *liquidity* is affected by the expected health status of the household in the high liquidity of pension wealth treatment, but there is almost no effect for the low liquidity treatment. It seems that the participant wants to ensure an adequate standard of living for the healthy surviving spouse if the household has high pension wealth but low retirement income. This implies that the *liquidity* saving motive is more prevalent for  $t = 6H$  and  $t = 7H$ , where the household will expect some out of pocket health expenditures because either spouse will die within ten years ( $t = 7H$ ) or acquires a limitation in the activities of daily living (ADL) ( $t = 6H$ ). If the household has high income but low wealth,  $t = 6$  or  $t = 7$ , the surviving healthy spouse will not be in poverty, as the income would be sufficient to maintain an adequate standard of living.

Table 10 reports the predicted probabilities for a reference person to choose a saving motive as highly important (i.e. ranked first or second) by expected health status treatment. As expected, results show that a change in the expected health status of the household has the largest effect on the importance of the *precautionary health* saving motive. Expecting a limitation in ADLs ( $t = 6$  or  $t = 8$ ) makes the *precautionary* saving motive more important. Whereas for Dutch participants the liquidity of the pension wealth (comparing  $t = 5, \dots, 8$  and  $t = 5H, \dots, 8H$ ) only has a minor influence on

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the estimates associated with spending pattern  $s = 1$  and  $s = 5$  shown in Table C.1. For instance, the higher “aggregate” predicted probabilities for the high liquidity of wealth treatment can be explained by looking at column  $m = 7$  in Table C.1 and comparing  $S_{1,1}$  and  $S_{1,5}$  with the other three estimates associated with treatment 1 and concluding that  $S_{1,1}$  and  $S_{1,5}$  are roughly four times as large. For the other saving motives, the differences between  $S_{1,1}$  and  $S_{1,5}$  and the other point estimates for treatment 1 are much smaller.

<sup>31</sup>The dummy variables are included in the full model - see Table C.1.

<sup>32</sup>The estimates for spending pattern  $s = 5$  (available from the authors on request) in the second stage variables are, for some motives, driven by at most 50 observations. Therefore, these estimates might behave somewhat surprisingly. We note that combining these with spending pattern  $s = 4$  is not desirable because of the interpretation, as spending pattern  $s = 5$  is constructed to indicate an increase in wealth for the high wealth / low income type of vignettes.

Table 9: Predicted probabilities for saving motive importance - the role of pension policy design

Saving motive ( $m$ )		Country of residence							
		<i>The Netherlands</i>							
		Treatment ( $t$ )							
		high liquidity of wealth				low liquidity of wealth			
		$t = 1$				$t = 3$			
		Spending pattern ( $s$ )				Spending pattern ( $s$ )			
		$s = 2$	$s = 3$	$s = 4$	“Aggregate”	$s = 2$	$s = 3$	$s = 4$	“Aggregate”
<i>Rational</i>									
$m = 1$	precautionary	45.2 (12.0)	48.4 (12.4)	62.6 (12.3)	47.6 (11.9)	52.0 (11.8)	51.1 (12.3)	53.2 (13.3)	50.8 (11.9)
$m = 2$	precautionary health	57.6 (13.2)	68.5 (12.2)	64.5 (13.3)	61.5 (12.8)	60.1 (12.8)	74.1 (11.1)	79.7 (10.4)	65.5 (12.3)
$m = 3$	life-span risk	1.3 (1.2)	1.4 (1.3)	1.5 (1.4)	1.6 (1.4)	1.2 (1.1)	1.1 (1.0)	1.1 (1.2)	1.1 (1.0)
$m = 4$	intended bequest	0.2 (0.3)	0.4 (0.6)	0.1 (0.2)	0.2 (0.3)	0.1 (0.2)	0.4 (0.6)	0.5 (0.6)	0.2 (0.3)
$m = 5$	liquidity	71.0 (10.6)	63.3 (11.9)	60.4 (12.7)	66.7 (11.1)	66.2 (11.0)	63.6 (11.8)	69.4 (11.8)	65.0 (11.2)
$m = 6$	intra-household bequest	64.5 (12.3)	65.9 (12.3)	62.2 (13.4)	65.0 (12.1)	66.1 (11.8)	66.6 (12.1)	72.1 (12.1)	67.1 (11.7)
<i>Psychological</i>									
$m = 7$	autonomy	64.8 (13.7)	59.5 (14.5)	72.4 (13.1)	64.5 (13.6)	63.1 (13.7)	62.6 (14.2)	57.4 (15.8)	62.2 (13.8)
$m = 8$	security	11.9 (7.4)	11.7 (7.4)	13.3 (8.3)	12.2 (7.4)	11.9 (7.3)	12.1 (7.6)	11.0 (7.8)	11.7 (7.2)
$m = 9$	self-gratification	87.3 (7.8)	82.0 (9.9)	77.3 (11.7)	84.0 (9.0)	86.3 (8.0)	76.5 (11.7)	68.9 (14.2)	83.7 (9.0)
$m = 10$	political risk	7.3 (4.8)	7.3 (4.9)	13.2 (7.9)	7.9 (5.0)	7.8 (4.9)	8.4 (5.4)	10.0 (6.8)	7.9 (5.0)
Saving motive ( $m$ )		Country of residence							
		<i>Australia</i>							
		Treatment ( $t$ )							
		high liquidity of wealth				low liquidity of wealth			
		$t = 1$				$t = 3$			
		Spending pattern ( $s$ )				Spending pattern ( $s$ )			
		$s = 2$	$s = 3$	$s = 4$	“Aggregate”	$s = 2$	$s = 3$	$s = 4$	“Aggregate”
<i>Rational</i>									
$m = 1$	precautionary	42.2 (12.5)	45.4 (12.9)	59.7 (13.1)	45.7 (12.6)	47.9 (12.5)	47.0 (12.9)	49.1 (13.9)	47.5 (12.6)
$m = 2$	precautionary health	49.7 (14.2)	61.1 (13.9)	56.8 (14.7)	55.5 (13.9)	45.4 (13.9)	60.9 (13.9)	67.8 (13.8)	55.4 (13.9)
$m = 3$	life-span risk	15.3 (8.8)	15.9 (9.2)	16.5 (9.8)	17.2 (9.3)	20.8 (10.4)	19.8 (10.4)	20.3 (11.5)	19.6 (10.1)
$m = 4$	intended bequest	0.3 (0.4)	0.6 (0.8)	0.2 (0.3)	0.3 (0.4)	0.1 (0.2)	0.5 (0.7)	0.6 (0.8)	0.4 (0.5)
$m = 5$	liquidity	36.6 (12.3)	28.9 (11.4)	26.3 (11.3)	31.3 (11.5)	33.9 (11.7)	31.3 (11.7)	37.2 (13.3)	32.4 (11.6)
$m = 6$	intra-household bequest	45.0 (13.8)	46.6 (14.0)	42.6 (14.4)	45.0 (13.6)	46.9 (13.5)	47.5 (13.9)	53.8 (15.0)	48.4 (13.7)
<i>Psychological</i>									
$m = 7$	autonomy	62.6 (14.7)	57.1 (15.4)	70.4 (14.1)	62.8 (14.5)	65.6 (14.0)	65.1 (14.5)	60.0 (16.2)	64.5 (14.3)
$m = 8$	security	51.5 (15.6)	51.2 (15.7)	54.1 (16.0)	52.3 (15.4)	47.9 (15.3)	48.3 (15.8)	45.9 (17.2)	47.1 (15.4)
$m = 9$	self-gratification	88.4 (7.6)	83.4 (9.9)	79.0 (11.7)	83.8 (9.5)	85.2 (8.9)	75.0 (12.7)	67.2 (15.2)	79.1 (11.2)
$m = 10$	political risk	2.0 (1.7)	2.0 (1.8)	4.2 (3.5)	2.3 (1.9)	1.7 (1.5)	1.9 (1.7)	2.4 (2.3)	1.9 (1.7)

*Notes:* Predicted probabilities (%) and corresponding standard error (\*100) in brackets of a reference person for the saving motive to be amongst the top two (that is, most important in first or second round best / worse). Reference person vary by country of residence, liquidity of wealth, and advised spending pattern. Our reference person has the following characteristics: ‘gender = male’ = 1, ‘marital status = partner’ = 1, ‘children living at home’ = 1, ‘household income (Q3 and Q4)’ = 1, ‘homeowner’ = 1, ‘religious / member of a church community’ = 0, ‘born in the country they are currently living in’ = 1, ‘subjective life expectancy: high’ = 0, ‘retirement plan’ = 1, ‘pension capability: objectively measured’ = 1, other (standardised) variables equal zero. Nuisance parameters have value 0.5 and we abstain from the random effects (formally, we use the mean random effects which equals zero). Per country, columns average is around 40. We refer to Table 5 for the definitions of the treatments. Spending pattern “Aggregate” refers to the distribution of the advised spending patterns per country and per treatment, see Table 5. See Table 1 for the full-text for the saving motives.

Table 10: Predicted probabilities for saving motive importance - the effect of expected future health status

		Country of residence							
		<i>The Netherlands</i>				<i>Australia</i>			
		Treatment ( <i>t</i> )				Treatment ( <i>t</i> )			
		varying health status & low liquidity of wealth				varying health status & low liquidity of wealth			
		<i>t</i> = 5	<i>t</i> = 6	<i>t</i> = 7	<i>t</i> = 8	<i>t</i> = 5	<i>t</i> = 6	<i>t</i> = 7	<i>t</i> = 8
		Spending pattern ( <i>s</i> ): "Aggregate"				Spending pattern ( <i>s</i> ): "Aggregate"			
Saving motive ( <i>m</i> )									
<i>Rational</i>									
<i>m</i> = 1	precautionary	44.3 (12.2)	51.3 (12.2)	47.9 (12.2)	49.0 (12.2)	41.5 (13.2)	48.2 (13.4)	39.9 (13.0)	51.6 (13.5)
<i>m</i> = 2	precautionary health	58.0 (13.3)	72.0 (11.5)	64.7 (12.7)	72.9 (11.3)	54.4 (14.9)	58.7 (14.7)	53.2 (14.9)	57.4 (14.8)
<i>m</i> = 3	life-span risk	1.0 (0.9)	1.5 (1.3)	1.9 (1.6)	1.7 (1.5)	20.0 (10.8)	18.4 (10.3)	15.5 (9.2)	15.7 (9.3)
<i>m</i> = 4	intended bequest	0.4 (0.5)	0.2 (0.3)	0.1 (0.2)	0.1 (0.2)	0.2 (0.3)	0.3 (0.5)	0.3 (0.5)	0.3 (0.4)
<i>m</i> = 5	liquidity	66.0 (11.4)	68.4 (11.1)	68.1 (11.1)	68.0 (11.1)	32.1 (12.2)	29.7 (11.8)	30.9 (11.9)	31.8 (12.2)
<i>m</i> = 6	intra-household bequest	67.4 (12.0)	66.6 (12.1)	79.8 (9.4)	77.2 (10.0)	56.2 (14.2)	54.6 (14.3)	66.9 (13.3)	63.9 (13.8)
<i>Psychological</i>									
<i>m</i> = 7	autonomy	64.6 (13.9)	57.2 (14.6)	56.9 (14.6)	56.7 (14.6)	66.1 (14.9)	63.3 (15.3)	67.2 (14.5)	57.1 (15.8)
<i>m</i> = 8	security	8.8 (6.0)	7.6 (5.3)	6.5 (4.7)	6.3 (4.6)	37.7 (15.4)	38.0 (15.4)	42.3 (15.9)	39.7 (15.7)
<i>m</i> = 9	self-gratification	83.3 (9.3)	78.8 (10.9)	80.5 (10.3)	77.6 (11.2)	76.5 (12.4)	74.5 (13.0)	78.9 (11.8)	74.1 (13.1)
<i>m</i> = 10	political risk	6.9 (4.6)	5.7 (4.0)	4.5 (3.3)	4.6 (3.4)	2.1 (1.9)	1.5 (1.5)	0.7 (0.8)	1.1 (1.1)
		Treatment ( <i>t</i> )				Treatment ( <i>t</i> )			
		varying health status & high liquidity of wealth				varying health status & high liquidity of wealth			
		<i>t</i> = 5H	<i>t</i> = 6H	<i>t</i> = 7H	<i>t</i> = 8H	<i>t</i> = 5H	<i>t</i> = 6H	<i>t</i> = 7H	<i>t</i> = 8H
		Spending pattern ( <i>s</i> ): "Aggregate"				Spending pattern ( <i>s</i> ): "Aggregate"			
Saving motive ( <i>m</i> )									
<i>Rational</i>									
<i>m</i> = 1	precautionary	51.5 (12.9)	57.4 (12.6)	53.4 (12.8)	52.2 (12.8)	35.2 (15.0)	43.0 (15.7)	34.9 (14.9)	38.8 (15.5)
<i>m</i> = 2	precautionary health	57.1 (14.0)	75.0 (11.4)	63.2 (13.4)	76.2 (11.0)	56.1 (17.5)	75.8 (14.0)	56.8 (17.4)	71.3 (15.3)
<i>m</i> = 3	life-span risk	1.7 (1.6)	1.7 (1.6)	1.8 (1.7)	2.6 (2.2)	14.8 (10.5)	13.5 (9.9)	12.9 (9.7)	11.6 (9.0)
<i>m</i> = 4	intended bequest	0.1 (0.2)	0.1 (0.2)	0.1 (0.2)	0.1 (0.1)	0.6 (0.9)	0.7 (1.1)	0.8 (1.2)	0.9 (1.3)
<i>m</i> = 5	liquidity	62.4 (12.4)	68.2 (11.6)	66.0 (12.0)	64.1 (12.2)	23.8 (12.6)	28.9 (13.9)	27.6 (13.4)	25.4 (13.1)
<i>m</i> = 6	intra-household bequest	70.3 (12.0)	60.5 (13.3)	75.3 (11.0)	73.3 (11.5)	50.8 (16.8)	47.6 (16.7)	65.6 (16.1)	59.5 (16.9)
<i>Psychological</i>									
<i>m</i> = 7	autonomy	54.3 (15.3)	52.2 (15.4)	51.0 (15.3)	49.0 (15.3)	58.6 (18.5)	52.0 (18.9)	54.4 (18.6)	48.6 (18.7)
<i>m</i> = 8	security	11.1 (7.3)	9.2 (6.3)	8.6 (6.1)	9.4 (6.5)	45.2 (18.7)	41.6 (18.3)	45.0 (18.7)	41.5 (18.5)
<i>m</i> = 9	self-gratification	85.8 (8.7)	81.9 (10.2)	84.8 (9.1)	76.7 (11.9)	81.1 (12.8)	74.0 (15.3)	78.4 (14.0)	78.0 (14.0)
<i>m</i> = 10	political risk	5.6 (4.1)	3.7 (3.0)	3.9 (3.0)	3.8 (3.0)	2.0 (2.1)	0.9 (1.1)	1.0 (1.2)	0.7 (0.9)

*Notes:* Predicted probabilities (%) and corresponding standard error (\*100) in brackets of a reference person for the saving motive to be amongst the top two (that is, most important in first or second round best / worse). Reference person vary by country of residence, health status for the low wealth and high income treatment, high wealth an low income treatment, and advised spending pattern. Our reference person has the following characteristics: 'gender = male' = 1, 'marital status = partner' = 1, 'children living at home' = 1, 'household income (Q3 and Q4)' = 1, 'homeowner' = 1, 'religious / member of a church community' = 0, 'born in the country they are currently living in' = 1, 'subjective life expectancy: high' = 0, 'retirement plan' = 1, 'pension capability: objectively measured' = 1, other (standardised) variables equal zero. Nuisance parameters have value 0.5 and we abstain from the random effects (formally, we use the mean random effects which equals zero). Per country, columns average is around 40. We refer to Table 5 for the definitions of the treatments. Spending pattern "Aggregate" refers to the distribution of the advised spending patterns per country and per treatment, see Table 5. See Table 1 for the full-text for the saving motives.

the importance of the *precautionary health* saving motive, the effect is much larger for the Australian participants. The same effect is also much larger for the high liquidity than for the low liquidity of pension wealth setting. In the case of high income but low liquid wealth, the Australian participants might not be aware that they can save some of their income to pay for the expenditures related to having poor health, as outside the experiment they might only be familiar with using their liquid retirement savings for health-related expenditures.

As expected, for Australian participants the *life-span risk* saving motive becomes less prevalent if one of the household members is expected to pass away within ten years ( $t = 7, 7H, 8, 8H$ ). For Dutch participants the prevalence of this saving motive as highly ranked is too low to observe an effect. Finally, the following observations about the prevalence of the saving motives as important are consistent for the country of residence of the participant as well as for the liquidity of the retirement wealth, and are as expected. The *intra-household* saving motive is more prevalent where one spouse is expected to pass away with the next ten years ( $t = 7, 8, 7H, 8H$ ). The saving motive *self-gratification* is more prevalent where at least one of the household is expected to remain healthy for at least ten years ( $t = 5, 7, 5H, 7H$ ), and the saving motive *autonomy* is more prevalent where both the household members are expected to remain healthy for at least ten years ( $t = 5, 5H$ ).

## 6 Conclusion

Recent empirical studies in the United States, the Netherlands and Australia have shown that retirees do not draw down their wealth during retirement, contradicting the theoretical predictions of the standard life cycle model. We have investigated whether and if so, why individuals close to retirement intend to hold on to their wealth after retirement. In an experimental survey, we asked individuals to advise a spending pattern to hypothetical recently retired households (“vignettes”) and to rank the importance of saving motives that justify their advice. We administered the same survey questions in the Netherlands, a country with an income driven pension system, and Australia, with a wealth-driven system. In this paper, we have examined the relative importance of saving motives based on economic, and psychological explanations. The experimental setting allows us to analyse how the survey participants in each country change the importance of saving motives if their pension system was replaced by, e.g., that of the other country - that is, where pension wealth became less or more liquid. We also assess the influence of major life events, such as a health shock or losing a spouse, on the importance of each saving motive.

The experimental data reveal substantial differences between advised spending patterns and relative importance (ranking) of saving motives between the Dutch and Australian participants. The Dutch tend to advise higher spending patterns, in line with the higher replacement rates in the Netherlands and the emphasis on an adequate pension income, typically corresponding to a lower replacement rate, in Australia. Similarly, differences in the perceived importance of saving motives reflect institutional differences in pension arrangements. Liquidity is of less importance to Australians who are used to highly liquid superannuation pension wealth than to the Dutch with their fully annuitised non-liquid occupational pensions. Concerns about surviving spouses play a larger role

in the Netherlands where pensions are typically seen as a provision for the couple, than in Australia where pensions are almost fully individual. Political risk is considered more important in the Netherlands where major changes can still be expected and the debate on pension reform is lingering on, while major Australian reforms have already been implemented and expected further changes will be incidental.

The vignette methodology allows participants to make choices in different situations, including counterfactual settings that do not reflect the institutions of their own country. It appears that changing liquidity (the income and wealth combination) affects the advised consumption pattern in both countries. Dutch participants become less conservative (i.e., more often advise a high spending pattern) if their pension wealth is more liquid than in the actual Dutch pension system. Accordingly, Australian participants would become more conservative in a setting with lower availability of wealth and higher annuity income than in their actual institutional setting. On the other hand, our results suggest that the importance of most saving motives is not substantially affected by the pension wealth liquidity treatment. In the absence of expected major health shocks or mortality of the partner, advising a low consumption pattern is associated with a greater importance of the precautionary, precautionary health and intended bequest motives. On the other hand, a high spending advice is often justified by the self-gratification motive.

Our results show that expected major health or mortality events have an impact on the advised spending pattern and saving motives. Not surprisingly, expecting a health shock in the near future is associated with an increasing importance of the precautionary health motive, particularly for the high liquidity of wealth vignette. Similarly, an expectation that one of the household members dies within 10 years after retirement significantly affects the importance of the intra-household bequest and the security motive, irrespective of the liquidity setting. Overall, the results suggest that the experimental treatment of liquidity of pension wealth, as a proxy for the institutional setting, does not seem to contribute substantively to the importance of saving motives at the start of retirement. Indeed, existing and significant country-differences persist even when participants are presented an unfamiliar institutional (liquidity of wealth) setting.

Predicted probabilities for reference persons that behave in line with the empirical results of Van Ooijen et al. (2015) for the Netherlands and Asher et al. (2017) for Australia, indicate that the most important reasons to hold on to wealth are precautionary health, intra-household bequest, and self-gratification for the Dutch and precautionary health, self-gratification, and security for Australians. In contrast to the results for the US, for example in, De Nardi et al. (2016), our results suggest that intended bequest and life-span risk are less important, irrespective of the country of residence, advised spending pattern, or the institutional setting.

Our estimation results suggest that unobserved heterogeneity is important, as per motive at least half of the fraction of the unexplained variation is captured by the individual effects. Furthermore, we observe that there still appear to be differences between Dutch and Australian participants: while we control for a rich set of covariates capturing individual characteristics and institutional factors, there are still important country-specific drivers for saving during retirement that remain unexplained.

From a policy perspective, our results suggest that the availability of liquid pension wealth, our proxy for the institutional setting, has a limited influence on advised spend-

ing patterns or the ranking of the saving motives. Higher liquidity of wealth implies higher spending and less emphasis on the precautionary saving motive, but the effect is too small to explain the difference between the Netherlands and Australia. This may mean that, at least in the short run, individuals do not respond as expected to changes in the liquidity of wealth at the start of retirement. Furthermore, the large differences explained by differences in individual characteristics suggest that a medium to high annuitisation rate with limited choice might be desirable from a policy perspective in order to accommodate for the observed heterogeneity and to protect individuals from suboptimal decisions.

Based on the findings presented in this paper, at least three important directions for future research can be identified. First, lifetime consumption and saving decisions are complex choices for individuals. One option is to use choice architecture to set drawdown decisions for a substantial proportion of individuals (Benartzi and Thaler, 2007).<sup>33</sup> Second, in our experimental setup we ask participants to choose between different constant spending patterns before indicating their preferred saving motives. An interesting extension would be to analyse preferences for saving motives for variable spending patterns, such as higher consumption at the start of retirement, followed by less spending later, which is a policy design under consideration in the Netherlands. A further extension could be to incorporate housing assets to generate income or be considered as a bequest.

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<sup>33</sup>This is investigated in Alonso-García et al. (2018).



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# Appendix A Pre-test to identify a short list of saving motives

## A.1 Background and methodology

A review of the economics, psychology and behavioural literature on motives for the spending and saving behaviour of individuals in retirement (see Section 2) identified 19 possible motives. These motives, categorised as economic, behavioural or psychological are listed in Table A.1. We used a pre-test based on best-worst scaling to reduce the 19 potential saving motives to a subset of ten to be included in the experimental task. We did so to minimise cognitive exhaustion while maintaining econometric power. The pre-test was fielded to samples of 100 people aged 50 and over in Australia and the Netherlands in September/October 2016. The commercial web panel provider Pure-profile was used in Australia and the commercial web panel provider Survey Sampling International (SSI) in the Netherlands.

We used a Balanced Incomplete Block Design (BIBD) (Louviere et al., 2015) to make 19 multiple comparison sets comprising ten of the 19 initial saving motives. In order to minimise cognitive load in the pre-test we split these into one set of nine and one set of ten saving motives. In an online survey, participants were randomly assigned to nine or ten sets of ten saving motives and in two rounds of best/worst they were asked to nominate the ‘most’ and ‘least’ important motives for saving during retirement. Figure A.1 shows an example.<sup>34</sup>

Figure A.1: Example comparison set to elicit best/worst saving motives

### Set 1 of 9

MOST important reason to save	2nd MOST important reason to save	Reasons to save	2nd LEAST important reason to save	LEAST important reason to save
<input type="radio"/>	<input type="radio"/>	You want to <b>ensure</b> that you have enough money at hand to help your children finance their house (or other unforeseen events).	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	You want to <b>ensure</b> that you will have sufficient savings to cover unforeseen expenditures and intend to leave any unused savings as a bequest to your dependents or estate.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	You want to <b>ensure</b> that you will be able to leave a bequest to your dependents or estate.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	You want to <b>ensure</b> that you remain financially independent.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	You want to <b>stick</b> to what you are used to because you tend to delay making decisions.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	You want to <b>ensure</b> that if you die, your partner is able to maintain his/her standard of living.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	You want to <b>ensure</b> that your spending level remains constant over time.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	You want to <b>ensure</b> that you have enough cash on hand at any time	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	You want to <b>ensure</b> that you will be able to finance unforeseen health and aged care expenditures.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	You want to <b>ensure</b> that you are protected against a change in the superannuation/pension rules.	<input type="radio"/>	<input type="radio"/>

<sup>34</sup>A ‘live’ version of the Australian survey is available at <http://survey.us.confirmit.com/wix/8/p3080388548.aspx>.

## A.2 Results

The ranking of the saving motives from the best-worst scaling task is summarised in Table A.1.<sup>35</sup> The precautionary, precautionary health, liquidity, intra-household bequest, mental account II, autonomy, security, self-gratification and political risk are among the top 10 in both countries. Life-span risk is in the top 10 in Australia only, whereas the top 10 in the Netherlands is completed by the mental account I motive.

These results indicate that in general, motives we categorise as economic and psychological are more important than other motives for both Australian and Dutch participants. As expected, life-span risk scores higher in Australia (top 8) than in the Netherlands, where it is the least important saving motive. This aligns with the fact that few retired households in Australia purchase longevity products, exposing themselves to the risk of outliving their wealth. On the other hand, political risk scores much higher in the Netherlands (top 4) than in Australia (top 10). This can be explained by the lack of indexation and even nominal cuts to Dutch second pillar pensions in recent years, and by the debate on further reforms expected to reduce pension generosity. Interestingly, intended bequest (for others than the partner) does not score among the top 10 reasons to save in retirement in either Australia or the Netherlands.

The ten motives we include in our experimental task are highlighted in bold italics in Table A.1. This list deviates from the list of top 10 motives identified in our pre-test for two reasons. First, the pre-test was fielded before we finalised the experimental design. Consequently, the hybrid mental accounts motives turned out to be unworkable in our final design. Second, it was important to include a lesser ranked motive, such as the intended bequest motive, in the experimental set-up to enable comparison with the academic literature.

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<sup>35</sup>The ranking of the saving motives follows from the “Sum of All Possible Pairs” (i.e., knowing most important reason to save, 2nd most important reason to save, least important reason to save and 2nd least important reason to save, we compute how many of the all possible ten options it would surpass). See Louviere et al. (2015) for more information.



Table A.1: Ranking of 19 possible saving motives

Reasons to save	Australia	The Netherlands
<b>Economic</b>		
<i>You want to ensure that you will be able to finance any unforeseen expenditures other than health and aged care expenditures. [precautionary]</i>	5	6
<i>You want to ensure that you will be able to finance unforeseen health and aged care expenditures. [precautionary health]</i>	6	1
<i>You want to ensure that you will not outlive your wealth. [life-span risk]</i>	8	19
<i>You want to ensure that you will be able to leave a bequest to your dependents or estate. [intended bequest]</i>	18	18
<i>You want to ensure that you have enough cash on hand at any time. [Liquidity]</i>	4	2
<i>You want to ensure that if you die, your partner is able to maintain his/her standard of living. [intra-household bequest]</i>	7	7
You want to ensure that you have enough money at hand to help your children finance their house (or other unforeseen events). [inter-vivos]	17	14
<b>Behavioral</b>		
You want to ensure that the amount of your total wealth remains constant over time. [habit formation (1)]	13	12
You want to ensure that the level of your monthly savings remains constant over time. [habit formation (2)]	11	16
You want to ensure that your spending level remains constant over time. [habit formation (3)]	12	11
You want to stick to what you are used to because you tend to delay making decisions. [procrastination]	16	13
<b>Behavioral - mental accounts</b>		
You want to ensure that you will have savings in one account to leave a bequest to your dependents or estate and savings in another account for unforeseen expenditures. [mental account I]	15	10
You want to ensure that you will have sufficient savings to cover unforeseen expenditures and intend to leave any unused savings as a bequest to your dependents or estate. [mental account II]	9	9
<b>Psychological</b>		
<i>You want to ensure that you remain financially independent. [autonomy]</i>	2	3
You want to ensure that your wealth continues to increase. [speculation]	14	17
<i>You want to ensure that you have enough money to have peace of mind. [security]</i>	1	8
You want to ensure that you have enough money so that you feel that you have been successful in life. [self-esteem]	19	15
<i>You want to ensure that you are able to enjoy life now as well as later. [self-gratification]</i>	3	5
<i>You want to ensure that you are protected against a change in the superannuation/pension rules. [political risk]</i>	10	4

Notes: the saving motives selected for the experimental survey are highlighted in bold italics.

## Appendix B Design of vignette choice sets

### B.1 Derivation of the household wealth

In the preliminary part of the experimental survey, participants are asked to nominate an income range (category) out of four, for their gross household income - see Table B.1. These four categories are then used to construct four versions of household income and wealth for the vignettes. For participants in a particular household income category, all hypothetical households in all eight vignettes (choice sets) have the same net present value (NPV) of retirement savings, but the liquidity of retirement savings differs (see Section 3.3). We implemented income categorisation to avoid alienation of participants from the hypothetical wealth and income combinations presented in the experiment.<sup>36</sup> The cut-off points in Table B.1 are set so that they align with the quartiles of gross household income in the Dutch LISS panel and CentERpanel. Using Purchasing Power Parity (PPP),<sup>37</sup> the cut-off points are converted to Australian dollars.

Table B.1: Categorisation of gross household income into income groups for the Netherlands (Australia)

		Participant's income		Vignette household wealth		
				NPV of pension wealth	saving wealth	
1	less than	€41,250 (\$70,000)	€168,000 (\$291,000)	€8,400 (\$14,550)		
2	€41,250 (\$70,000) ≤	€60,000 (\$105,000)	€543,000 (\$940,500)	€27,150 (\$47,050)		
3	€60,000 (\$105,000) ≤	€81,750 (\$140,000)	€880,500 (\$1,524,000)	€46,275 (\$76,200)		
4	more than	€81,750 (\$140,000)	€1,420,500 (\$2,458,500)	€71,050 (\$122,950)		

The value of the vignette household pension wealth (saving for retirement) and savings wealth (other savings) are set using the available information on the net (median) household income of couples for each of the groups in the Dutch dataset. The pension wealth at retirement is calculated in two steps. First, we calculate the “additional lifetime income”. That is, the difference between the current net median household income<sup>38</sup> for the income group and the state Age Pension for couples.<sup>39</sup> Second, we calculate the current value for this annuity product and use this as the pension wealth at retirement using a joint survivor annuity factor of 30. Furthermore, their savings wealth is the maximum of five percent of their pension wealth, or three months worth of their monthly net household income. The corresponding wealth and income combinations in Australian dollars are set by converting euros to Australian dollars using PPP (OECD, 2015b).

Using a participant's pension and savings wealth (see Table B.1), the wealth and income combinations for the vignettes are constructed as follows: Vignette 1 [high wealth, low income]: the lifetime income consists of the state pension plus annuitised savings wealth.

<sup>36</sup>For example, if a participant with a yearly income of 20,000 euros has to evaluate a hypothetical household with a yearly income of 60,000 euros, it is unlikely that we can capture the participant's preferences for the vignettes presented.

<sup>37</sup>Using Purchasing Power Parity allows us to “... equalise the purchasing power of different currencies by eliminating the differences in price levels between countries.” (OECD, 2015b).

<sup>38</sup>We assume that the replacement rate (pension entitlement divided by the pre-retirement earnings) is equal to 1, based on the net replacement rate in the Netherlands (OECD, 2015a).

<sup>39</sup>As we do not restrict our sample to couples only, we implicitly assume that participants without a partner are capable of assessing the (financial) preferences of a hypothetical household consisting of two persons.

Wealth solely consists of pension wealth: Vignette 2 [middle wealth, middle income]: the lifetime income consists of the state pension plus half of annuitised pension and savings wealth. Wealth consists of the other half of pension and savings wealth: Vignette 3 [low wealth, high income]: lifetime income consists of the state pension plus annuitised pension wealth. Wealth consists solely of savings wealth.

## **B.2 Derivation of consumption pattern given household wealth**

The consumption patterns are based on, and include, the yearly income streams derived in Section 3.3. The highest consumption pattern that the participant can choose is 105% of the high income stream. The other options are ranked from highest consumption to low(est) consumption as follows, consumption equal to high income, a consumption pattern equal to middle income, the consumption stream equal to low income, and yearly consumption equal to 95% of the low income stream. Note that if the household in the vignette receives a low income and the participant states a preferred consumption stream equal to middle income, the wealth of the household decreases each year. If the household runs out of wealth, they have to adjust their consumption level to their (low) income.

# Appendix C Estimation results: Auxiliary parameters

Table C.1 presents the remaining estimation results of the model described in Section 5. Together with the parameters of the main variables of interest in Table 8 discussed in Section 5.1, these (auxiliary) parameter estimates are used to compute the predicted probabilities in Section 5.2 and 5.3.

Table C.1: Main estimation results. Random Effects Ordered Probit estimates per saving motive

	<i>m</i> = 1	<i>m</i> = 2	<i>m</i> = 3	<i>m</i> = 4	<i>m</i> = 5	<i>m</i> = 6	<i>m</i> = 7	<i>m</i> = 8	<i>m</i> = 9	<i>m</i> = 10
<b>Demographics, financial competence, personality traits and preferences</b>										
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Dummies related to: Liquidity of pension wealth</b>										
<i>S</i> <sub>1,1</sub>	-0.189* (-1.70)	-0.0976 (-0.89)	0.326** (2.56)	-0.194 (-1.22)	-0.0732 (-0.62)	0.0486 (0.50)	0.0594 (0.54)	0.0458 (0.40)	-0.109 (-0.83)	-0.00708 (-0.07)
<i>S</i> <sub>1,2</sub>	-0.170** (-2.54)	-0.0628 (-0.94)	0.0430 (0.55)	0.145 (1.49)	0.135* (1.90)	-0.0434 (-0.61)	0.0463 (0.62)	-0.00136 (-0.02)	0.0466 (0.59)	-0.0322 (-0.46)
<i>S</i> <sub>1,3</sub>	-0.0891 (-0.95)	0.228** (2.48)	0.0677 (0.64)	0.408*** (3.42)	-0.0795 (-0.84)	-0.00388 (-0.04)	-0.0949 (-0.97)	-0.0105 (-0.12)	-0.180* (-1.82)	-0.0298 (-0.31)
<i>S</i> <sub>1,4</sub>	0.272** (2.08)	0.116 (0.90)	0.0922 (0.61)	0.0256 (0.13)	-0.156 (-1.16)	-0.103 (-0.74)	0.262* (1.74)	0.0633 (0.51)	-0.346*** (-2.68)	0.306** (2.17)
<i>S</i> <sub>1,5</sub>	-0.125 (-0.78)	0.215 (1.43)	0.211 (1.27)	0.250 (1.36)	0.0377 (0.22)	-0.156 (-1.00)	0.161 (0.91)	0.0547 (0.35)	-0.452*** (-3.08)	0.0383 (0.23)
<i>S</i> <sub>2,1</sub>	-0.235** (-2.13)	0.0651 (0.54)	0.0340 (0.26)	-0.187 (-1.08)	-0.240** (-2.05)	0.266** (2.37)	0.0662 (0.54)	0.00163 (0.01)	0.0699 (0.52)	-0.00895 (-0.07)
<i>S</i> <sub>2,2</sub>	-0.0741 (-1.13)	0.00908 (0.14)	-0.0425 (-0.56)	0.0526 (0.56)	0.00734 (0.10)	0.0793 (1.24)	-0.0113 (-0.15)	-0.0771 (-1.16)	0.0631 (0.82)	0.0169 (0.26)
<i>S</i> <sub>2,3</sub>	-0.00344 (-0.04)	0.267*** (2.82)	-0.0130 (-0.13)	0.450*** (3.59)	-0.142 (-1.56)	-0.0151 (-0.17)	0.0134 (0.14)	0.159* (1.65)	-0.304*** (-3.10)	-0.118 (-1.25)
<i>S</i> <sub>2,4</sub>	0.0538 (0.34)	0.608*** (4.21)	-0.160 (-0.95)	0.457*** (2.68)	-0.148 (-1.02)	-0.0305 (-0.19)	0.193 (1.18)	0.212 (1.39)	-0.312** (-2.12)	-0.0998 (-0.55)
<i>S</i> <sub>2,5</sub>	0.0601 (0.33)	0.401** (2.17)	-0.301 (-1.27)	0.873*** (3.61)	-0.0519 (-0.23)	0.0637 (0.31)	0.000423 (0.00)	-0.334 (-1.48)	-0.527*** (-2.91)	0.183 (0.90)
<i>S</i> <sub>3,1</sub>	-0.390** (-2.55)	0.0295 (0.17)	0.103 (0.61)	0.128 (0.62)	-0.148 (-0.86)	0.260 (1.61)	-0.214 (-1.04)	-0.110 (-0.55)	0.337* (1.91)	-0.225 (-1.31)
<i>S</i> <sub>3,2</sub>	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
<i>S</i> <sub>3,3</sub>	-0.0206 (-0.24)	0.391*** (4.42)	-0.0340 (-0.34)	0.418*** (3.59)	-0.0723 (-0.82)	0.0147 (0.18)	-0.0130 (-0.14)	0.00944 (0.10)	-0.373*** (-3.69)	0.0445 (0.51)
<i>S</i> <sub>3,4</sub>	0.0307 (0.20)	0.577*** (3.59)	-0.0171 (-0.09)	0.440** (2.23)	0.0889 (0.60)	0.172 (1.04)	-0.148 (-0.85)	-0.0506 (-0.25)	-0.602*** (-3.58)	0.138 (0.76)
<i>S</i> <sub>3,5</sub>	0.191 (1.04)	0.310* (1.68)	-0.355* (-1.69)	0.583** (2.32)	-0.173 (-0.88)	-0.0497 (-0.25)	0.0519 (0.23)	-0.146 (-0.69)	-0.410** (-2.12)	0.206 (1.01)
<b>Dummies related to: Future health expectations</b>										
<i>S</i> <sub>5,1</sub>	-0.199 (-0.65)	-0.430 (-1.58)	0.350 (1.19)	0.358 (0.98)	0.278 (1.22)	-0.281 (-1.13)	-0.118 (-0.49)	0.0582 (0.22)	-0.459 (-1.45)	0.134 (0.41)
<i>S</i> <sub>5,2</sub>	-0.214* (-1.82)	-0.226** (-2.04)	-0.107 (-0.89)	0.197 (1.26)	0.0607 (0.53)	0.0830 (0.77)	0.0894 (0.71)	-0.0765 (-0.66)	0.0716 (0.63)	-0.0766 (-0.69)
<i>S</i> <sub>5,3</sub>	-0.142 (-1.01)	0.217 (1.46)	-0.106 (-0.73)	0.716*** (3.98)	-0.123 (-0.94)	0.0200 (0.15)	0.0293 (0.20)	-0.393*** (-2.88)	-0.337** (-2.57)	-0.0576 (-0.40)
<i>S</i> <sub>5,4</sub>	-0.265 (-1.04)	0.598** (2.16)	0.254 (0.87)	0.808** (2.14)	-0.289 (-1.36)	0.0714 (0.30)	-0.0873 (-0.35)	-0.237 (-0.93)	-0.964*** (-3.97)	-0.473* (-1.93)
<i>S</i> <sub>5,5</sub>	-0.164 (-0.57)	0.675* (1.95)	0.252 (0.83)	0.813* (1.91)	-0.356 (-0.97)	-0.182 (-0.64)	-0.407 (-1.11)	-0.280 (-0.99)	-0.516 (-1.36)	0.165 (0.58)
<i>S</i> <sub>5H,1</sub>	0.218 (0.64)	-0.0338 (-0.11)	-0.0219 (-0.06)	-0.364 (-0.90)	-0.328 (-1.23)	0.230 (0.78)	0.0298 (0.10)	-0.207 (-0.68)	0.652* (1.81)	-0.273 (-0.75)
<i>S</i> <sub>5H,2</sub>	0.204 (1.41)	0.0762 (0.52)	0.146 (0.97)	-0.293 (-1.62)	-0.143 (-0.94)	0.178 (1.24)	-0.314** (-2.01)	0.119 (0.79)	-0.0472 (-0.31)	0.0128 (0.09)
<i>S</i> <sub>5H,3</sub>	0.127 (0.73)	-0.0427 (-0.23)	0.125 (0.67)	-0.530** (-2.26)	-0.120 (-0.68)	-0.0168 (-0.10)	-0.348* (-1.77)	0.331* (1.75)	0.383** (2.25)	-0.267 (-1.48)
<i>S</i> <sub>5H,4</sub>	0.161 (0.52)	-0.483 (-1.46)	0.518 (1.51)	-1.029** (-2.46)	0.319 (1.17)	-0.164 (-0.52)	-0.102 (-0.34)	-0.0445 (-0.14)	0.446 (1.50)	0.282 (0.95)

	$m = 1$	$m = 2$	$m = 3$	$m = 4$	$m = 5$	$m = 6$	$m = 7$	$m = 8$	$m = 9$	$m = 10$
$S_{5H,5}$	0.289 (0.79)	-0.524 (-1.23)	-0.290 (-0.79)	-0.653 (-1.32)	0.348 (0.79)	0.492 (1.22)	0.141 (0.33)	0.397 (1.03)	0.000320 (0.00)	-0.673* (-1.80)
$S_{6,1}$	-0.144 (-0.55)	-0.463* (-1.77)	0.973*** (3.20)	0.115 (0.37)	0.401* (1.84)	-0.134 (-0.50)	-0.631** (-2.17)	-0.414 (-1.51)	-0.147 (-0.51)	-0.244 (-0.65)
$S_{6,2}$	-0.0621 (-0.52)	0.00696 (0.06)	0.0814 (0.74)	0.0889 (0.53)	0.112 (0.97)	0.0541 (0.48)	-0.102 (-0.80)	-0.212* (-1.75)	-0.0204 (-0.16)	-0.165 (-1.33)
$S_{6,3}$	0.0234 (0.18)	0.835*** (5.48)	-0.0482 (-0.36)	0.203 (1.11)	-0.0408 (-0.33)	0.00133 (0.01)	-0.125 (-0.88)	-0.286** (-2.24)	-0.571*** (-4.40)	-0.174 (-1.35)
$S_{6,4}$	-0.0134 (-0.06)	0.322 (1.22)	0.218 (0.86)	0.337 (1.19)	-0.0113 (-0.06)	0.152 (0.71)	-0.189 (-0.85)	-0.508** (-2.16)	-0.832*** (-3.32)	-0.0948 (-0.38)
$S_{6,5}$	0.463* (1.67)	0.575* (1.88)	0.236 (0.80)	0.00278 (0.01)	-0.0346 (-0.10)	-0.398 (-1.47)	-0.456 (-1.36)	0.0456 (0.17)	-0.878** (-2.57)	0.192 (0.61)
$S_{6H,1}$	0.420 (1.35)	0.412 (1.27)	-1.002*** (-2.68)	-0.165 (-0.45)	-0.204 (-0.75)	-0.227 (-0.75)	0.449 (1.33)	0.202 (0.64)	0.401 (1.15)	0.0259 (0.06)
$S_{6H,2}$	0.131 (0.87)	0.263* (1.68)	0.0435 (0.29)	-0.278 (-1.43)	0.0388 (0.25)	-0.0895 (-0.60)	-0.138 (-0.85)	0.0763 (0.52)	0.0153 (0.09)	-0.114 (-0.73)
$S_{6H,3}$	0.0976 (0.65)	-0.0879 (-0.47)	0.173 (1.02)	-0.0714 (-0.32)	-0.0575 (-0.36)	-0.143 (-0.91)	-0.190 (-1.11)	0.123 (0.72)	0.176 (1.07)	-0.407** (-2.44)
$S_{6H,4}$	0.340 (1.24)	0.177 (0.54)	0.169 (0.51)	-0.355 (-1.07)	0.0293 (0.12)	-0.557** (-2.07)	-0.254 (-0.89)	0.305 (1.04)	0.276 (0.98)	-0.145 (-0.47)
$S_{6H,5}$	-0.506 (-1.47)	0.0577 (0.14)	0.265 (0.76)	-0.106 (-0.21)	-0.0433 (-0.11)	0.451 (1.27)	0.190 (0.47)	0.0197 (0.05)	0.183 (0.46)	-0.583 (-1.46)
$S_{7,1}$	-0.258 (-1.08)	-0.261 (-1.07)	0.651** (2.24)	0.0986 (0.35)	0.238 (0.99)	0.137 (0.58)	-0.385* (-1.76)	-0.184 (-0.79)	-0.395* (-1.85)	-0.352 (-1.39)
$S_{7,2}$	-0.177 (-1.51)	0.00178 (0.02)	0.150 (1.37)	-0.153 (-0.91)	0.166 (1.49)	0.478*** (4.16)	-0.193 (-1.58)	-0.329*** (-2.96)	0.00138 (0.01)	-0.254** (-2.30)
$S_{7,3}$	-0.0452 (-0.33)	0.410*** (2.74)	0.206 (1.48)	0.133 (0.70)	-0.127 (-1.02)	0.423*** (2.99)	0.0411 (0.29)	-0.429*** (-3.08)	-0.594*** (-4.49)	-0.292** (-2.11)
$S_{7,4}$	0.218 (0.95)	0.519* (1.74)	-0.0972 (-0.41)	0.227 (0.72)	-0.104 (-0.47)	0.594** (2.36)	-0.628*** (-2.91)	-0.234 (-0.88)	-0.800*** (-3.16)	-0.240 (-1.12)
$S_{7,5}$	0.490 (1.50)	0.194 (0.65)	0.0620 (0.15)	0.579* (1.78)	-0.528** (-1.98)	-0.0880 (-0.27)	-0.117 (-0.43)	-0.156 (-0.52)	-0.321 (-0.84)	-0.324 (-0.96)
$S_{7H,1}$	0.506* (1.82)	0.211 (0.75)	-0.583* (-1.74)	-0.0169 (-0.05)	-0.297 (-1.02)	0.0665 (0.23)	-0.187 (-0.67)	-0.0377 (-0.14)	0.717*** (2.62)	0.0119 (0.04)
$S_{7H,2}$	0.113 (0.79)	0.0272 (0.19)	0.0956 (0.66)	0.0736 (0.38)	-0.112 (-0.74)	-0.105 (-0.67)	-0.0347 (-0.23)	0.121 (0.78)	0.0600 (0.36)	-0.0853 (-0.60)
$S_{7H,3}$	0.0977 (0.58)	-0.237 (-1.26)	-0.334* (-1.86)	-0.0189 (-0.08)	0.0476 (0.28)	-0.230 (-1.21)	-0.262 (-1.43)	0.316* (1.67)	0.248 (1.39)	-0.0929 (-0.53)
$S_{7H,4}$	-0.223 (-0.78)	-0.436 (-1.22)	0.861*** (2.74)	-0.407 (-1.08)	0.163 (0.61)	-0.367 (-1.12)	0.136 (0.50)	0.0797 (0.24)	0.316 (1.02)	-0.0335 (-0.12)
$S_{7H,5}$	-0.344 (-0.90)	0.644 (1.59)	0.386 (0.81)	-0.918** (-2.26)	0.415 (1.21)	0.0914 (0.21)	0.0354 (0.09)	-0.286 (-0.76)	-0.138 (-0.31)	-0.0369 (-0.09)
$S_{8,1}$	-0.423 (-1.61)	-0.133 (-0.50)	0.439 (1.49)	-0.115 (-0.24)	0.274 (1.19)	0.0632 (0.23)	-0.417* (-1.87)	0.424* (1.88)	-0.420 (-1.43)	-0.693** (-2.15)
$S_{8,2}$	-0.163 (-1.37)	0.161 (1.38)	0.104 (0.86)	-0.0601 (-0.35)	0.137 (1.14)	0.362*** (3.07)	-0.0754 (-0.59)	-0.322*** (-2.75)	-0.156 (-1.27)	-0.225* (-1.87)
$S_{8,3}$	0.00613 (0.05)	0.671*** (4.45)	0.127 (0.95)	0.00117 (0.01)	0.00180 (0.01)	0.373*** (2.67)	-0.210 (-1.51)	-0.546*** (-4.11)	-0.497*** (-3.91)	-0.279** (-2.07)
$S_{8,4}$	0.0510 (0.23)	0.572*** (2.61)	-0.286 (-1.24)	0.445** (1.98)	-0.238 (-1.14)	0.218 (1.00)	-0.262 (-1.28)	-0.101 (-0.39)	-0.555*** (-2.62)	-0.184 (-0.72)
$S_{8,5}$	0.491* (1.82)	0.444 (1.43)	0.783** (2.53)	0.0501 (0.16)	-0.404 (-1.26)	0.162 (0.59)	-0.416 (-1.37)	-0.440 (-1.34)	-0.723*** (-2.90)	-0.289 (-0.95)
$S_{8H,1}$	0.450 (1.50)	0.374 (1.22)	-0.229 (-0.67)	0.506 (0.98)	-0.383 (-1.34)	-0.0455 (-0.14)	-0.0140 (-0.05)	-0.478* (-1.78)	0.425 (1.22)	0.0886 (0.25)
$S_{8H,2}$	0.110 (0.71)	0.251 (1.61)	0.207 (1.36)	-0.258 (-1.24)	-0.127 (-0.79)	-0.0684 (-0.44)	-0.294* (-1.79)	0.210 (1.34)	-0.0658 (-0.39)	-0.0430 (-0.29)
$S_{8H,3}$	0.0936 (0.57)	-0.0570 (-0.30)	-0.0598 (-0.37)	-0.178 (-0.79)	-0.160 (-0.95)	-0.0770 (-0.43)	-0.0437 (-0.25)	0.417** (2.27)	-0.0892 (-0.53)	-0.169 (-1.02)
$S_{8H,4}$	-0.176 (-0.62)	-0.176 (-0.62)	1.323*** (4.08)	-0.793** (-2.44)	0.227 (0.89)	-0.106 (-0.34)	-0.186 (-0.65)	-0.105 (-0.33)	-0.153 (-0.58)	0.0765 (0.24)
$S_{8H,5}$	-0.332 (-0.98)	0.425 (1.06)	-0.164 (-0.45)	-0.170 (-0.43)	0.494 (1.34)	-0.256 (-0.72)	-0.0296 (-0.08)	-0.176 (-0.45)	-0.0202 (-0.06)	0.130 (0.34)
<b>Interaction between "treatment" and "country of residence"</b>										
"t = 1" * AU	-0.0752 (-0.76)	-0.200* (-1.78)	1.195*** (9.65)	0.115 (0.79)	-0.897*** (-8.41)	-0.497*** (-4.63)	-0.0608 (-0.53)	1.217*** (10.18)	0.0559 (0.46)	-0.608*** (-5.52)

	$m = 1$	$m = 2$	$m = 3$	$m = 4$	$m = 5$	$m = 6$	$m = 7$	$m = 8$	$m = 9$	$m = 10$
" $t = 2$ "*AU	-0.0824 (-0.79)	-0.322*** (-2.91)	1.408*** (11.61)	0.0383 (0.26)	-0.764*** (-6.98)	-0.537*** (-4.92)	-0.0852 (-0.74)	1.159*** (9.51)	-0.0270 (-0.22)	-0.630*** (-5.61)
" $t = 3$ "*AU	-0.103 (-1.02)	-0.370*** (-3.28)	1.446*** (11.94)	0.0695 (0.47)	-0.834*** (-7.89)	-0.492*** (-4.67)	0.0670 (0.56)	1.125*** (9.20)	-0.0482 (-0.39)	-0.698*** (-6.13)
" $t = 5$ "*AU	-0.0763 (-0.55)	-0.241 (-1.54)	1.439*** (8.94)	-0.400** (-2.07)	-0.814*** (-5.90)	-0.280** (-1.97)	0.0768 (0.47)	1.097*** (6.90)	-0.0928 (-0.60)	-0.531*** (-3.38)
" $t = 6$ "*AU	-0.107 (-0.78)	-0.451*** (-2.82)	1.264*** (7.77)	0.131 (0.66)	-0.986*** (-6.98)	-0.306** (-2.10)	0.178 (1.08)	1.149*** (7.27)	-0.00281 (-0.02)	-0.599*** (-3.81)
" $t = 7$ "*AU	-0.257* (-1.83)	-0.391** (-2.51)	1.079*** (6.68)	0.256 (1.34)	-0.907*** (-6.66)	-0.402** (-2.57)	0.275* (1.77)	1.322*** (8.39)	0.0674 (0.42)	-0.752*** (-4.79)
" $t = 8$ "*AU	0.0283 (0.20)	-0.499*** (-3.13)	1.142*** (7.00)	0.239 (1.24)	-0.895*** (-6.40)	-0.379** (-2.42)	0.0372 (0.24)	1.271*** (7.93)	-0.0486 (-0.32)	-0.600*** (-3.83)
" $t = 5H$ "*AU	-0.350* (-1.78)	0.160 (0.76)	-0.377* (-1.76)	0.899*** (3.60)	-0.218 (-1.12)	-0.225 (-1.19)	0.0432 (0.20)	0.00188 (0.01)	-0.0306 (-0.14)	0.116 (0.56)
" $t = 6H$ "*AU	-0.247 (-1.27)	0.436** (2.02)	-0.304 (-1.39)	0.480* (1.90)	-0.0220 (-0.11)	-0.0256 (-0.14)	-0.172 (-0.78)	-0.0492 (-0.23)	-0.183 (-0.84)	0.0150 (0.07)
" $t = 7H$ "*AU	-0.225 (-1.15)	0.143 (0.68)	-0.169 (-0.77)	0.423* (1.70)	-0.0887 (-0.47)	0.153 (0.73)	-0.206 (-0.94)	-0.0651 (-0.30)	-0.225 (-1.01)	0.198 (0.92)
" $t = 8H$ "*AU	-0.392* (-1.95)	0.287 (1.33)	-0.421* (-1.90)	0.575** (2.22)	-0.136 (-0.69)	0.0249 (0.12)	-0.0453 (-0.21)	-0.114 (-0.52)	0.163 (0.74)	-0.0740 (-0.35)
<b>Nuisance parameters</b>										
$A_1$	0 (.)	0.111 (1.43)	-0.134 (-1.54)	0.0812 (0.86)	0.111 (1.55)	-0.145* (-1.89)	-0.00659 (-0.07)	0.167** (2.10)	0.132 (1.50)	0.154** (2.02)
$A_2$	-0.200** (-2.54)	0 (.)	-0.130 (-1.54)	-0.00596 (-0.06)	0.0546 (0.70)	-0.136* (-1.85)	-0.0676 (-0.73)	-0.0346 (-0.43)	0.0930 (0.98)	0.0998 (1.31)
$A_3$	0.432*** (5.31)	0.203** (2.41)	0 (.)	0.395*** (3.77)	0.377*** (4.91)	0.249*** (3.24)	0.254*** (2.94)	0.430*** (5.06)	0.346*** (3.83)	0.525*** (6.57)
$A_4$	0.474*** (6.09)	0.371*** (4.73)	0.711*** (8.89)	0 (.)	0.672*** (9.01)	0.308*** (4.17)	0.501*** (5.61)	0.626*** (7.45)	0.378*** (4.47)	0.802*** (10.03)
$A_5$	0.0227 (0.29)	-0.0327 (-0.39)	-0.126 (-1.54)	-0.0561 (-0.57)	0 (.)	0 (.)	-0.0223 (-0.24)	0.0822 (0.96)	0.0419 (0.52)	0.166** (2.27)
$A_6$	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
$A_7$	-0.290*** (-3.86)	-0.218*** (-2.70)	-0.222*** (-2.88)	-0.382*** (-4.03)	-0.513*** (-7.11)	-0.179** (-2.38)	0 (.)	-0.411*** (-4.99)	-0.222*** (-2.59)	0.00770 (0.10)
$A_8$	0.0705 (0.94)	-0.0991 (-1.36)	-0.131 (-1.58)	-0.163* (-1.71)	-0.412*** (-6.29)	-0.0252 (-0.33)	-0.227*** (-2.65)	0 (.)	-0.153* (-1.81)	0.243*** (3.11)
$A_9$	-0.230*** (-3.19)	-0.337*** (-4.49)	-0.195** (-2.49)	-0.181** (-2.07)	-0.548*** (-7.73)	-0.218*** (-3.03)	-0.591*** (-7.07)	-0.513*** (-6.35)	0 (.)	0 (.)
$A_{10}$	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
<b>Threshold parameters</b>										
$\hat{\nu}_1$	-2.172*** (-11.08)	-2.393*** (-11.23)	-0.169 (-0.81)	0.799*** (3.07)	-2.889*** (-14.69)	-1.794*** (-8.89)	-2.327*** (-9.76)	-1.290*** (-5.50)	-1.896*** (-7.87)	-1.047*** (-4.60)
$\hat{\nu}_2$	-1.143*** (-5.94)	-1.435*** (-6.83)	1.193*** (5.67)	1.898*** (7.21)	-1.696*** (-8.79)	-0.882*** (-4.41)	-1.204*** (-5.05)	0.156 (0.66)	-0.865*** (-3.58)	0.390* (1.73)
$\hat{\nu}_3$	-0.158 (-0.83)	-0.354* (-1.69)	2.074*** (9.69)	2.818*** (10.41)	-0.614*** (-3.21)	0.286 (1.44)	-0.228 (-0.96)	1.103*** (4.64)	-0.0225 (-0.09)	1.525*** (6.69)
$\hat{\nu}_4$	1.018*** (5.29)	0.856*** (4.10)	2.773*** (12.69)	3.616*** (12.83)	0.628*** (3.27)	1.667*** (8.31)	0.943*** (3.93)	2.143*** (8.89)	0.997*** (4.07)	2.576*** (11.15)
<b>Random effect</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individuals	1796	1770	1778	1848	1847	1831	1836	1785	1813	1788
Observations	8386	8279	8315	8645	8545	8650	8568	8390	8541	8381
Log-likelihood	-11517.9	-10727.9	-9692.3	-7026.0	-11141.9	-11105.3	-10966.1	-10704.6	-10576.8	-10469.7

Notes: \*, \*\* and \*\*\* denote significance at 90%, 95%, and 99% respectively.  $t$ -statistics clustered by household in parentheses. Recall that  $m = 1$  denotes the precautionary motive,  $m = 2$  the precautionary health motive,  $m = 3$  the life-span risk motive,  $m = 4$  the intended bequest motive,  $m = 5$  the liquidity motive,  $m = 6$  the intra-household bequest motive,  $m = 7$  the autonomy motive,  $m = 8$  the security motive,  $m = 9$  the self-gratification motive, and  $m = 10$  the political risk motive. See Table 1 for the full-text for the saving motives and see Table 8 in Section 5.1 for the estimates of the main variables of interest.