



Article

Indulgence, Self-Control, and Annuity Preferences: Annuity Choices by Members of the Slovak-Funded Private Pension Pillar

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Abstract: This paper employs data from an original survey to analyse the annuity preferences of members of the Slovak-funded private pension pillar. The focus is on the impact of socioeconomic variables as well as various behavioural attitudes upon annuitisation decisions. The research first considers some well-known behavioural factors (framing, mental accounting) and then turns to some underresearched traits (indulgence, self-control) and behaviours (compulsive shopping, saving habits) and links them to annuity choices. Moreover, the research studies alternative allocations of a lump sum and relates them to annuitisation decisions. Indulgence emerged as a significant negative predictor of annuitisation. This result likely refers to preferences towards hedonic lifestyles in early retirement. Interestingly, low self-discipline was also significant but positively related to an intention towards annuity purchases. People who are aware of their low financial discipline may introduce internal self-protection mechanisms and resort to tried and tested financial products to avoid anticipated feelings of regret and desperation. Annuitisation, in this case, is a regret avoidance behaviour.

Keywords: annuities; lump sum; indulgence; self-control



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1. Introduction

1.1. Annuity Research Goes Behavioural

Major financial risks faced by retirees in the accumulation phase include longevity risk, health care costs and investment risks (Ramsay and Oguledo 2018, p. 624). The longevity risk (i.e., the risk of outliving one's savings) has important implications for financial wellbeing in retirement. Standard neoclassical economics suggests that a risk-averse agent should prefer the consumption of a smooth income stream over a risky investment to a lump sum (Benartzi et al. 2011, p. 151). A risk-averse agent should consider exchanging pre-retirement savings for an annuity contract to insure his/her income against longevity risk. Yet, retirees usually convert only a fraction of their pre-retirement wealth to annuities. A lump sum payment is preferred to a guaranteed lifetime income stream. The 'annuity puzzle' is—why do people not purchase income annuities to the extent predicted by economic theory? (Brown et al. 2008b).

While there are some rational and semi-rational motives behind the rejection of annuity contracts (e.g., adverse selection, concerns about fair annuity pricing, liquidity constraints and/or existence of bequest motives, Ramsay and Oguledo 2018, p. 627), the majority of the recent literature has recognised the importance of behavioural factors for annuitisation decisions (Brown et al. 2017; Bockweg et al. 2018; Alexandrova and Gatzert 2019). So far, attention has been drawn to a relatively small number of behaviours, such as risk aversion, loss aversion, framing, and mental accounting (Ramsay and Oguledo 2018, p. 631).

This paper employs data from an author's survey to analyse the annuitisation preferences of members of the Slovak-funded private pension pillar. The Slovak Government pursued its wider neoliberal agenda (Fisher et al. 2007, p. 983) and introduced a fully funded, voluntary, defined-contribution private pension pillar (Pillar 2) in 2005. The pillar

attracted a substantial portion of the total workforce. It covered some 65% of total employment by the end of 2022 (MLSAF 2023). Members of Pillar 2 could choose between an annuity purchase or programmed withdrawals upon retirement. The research on retirement choices is informed by the current debate surrounding annuitisation decisions and considers the impact of socioeconomic variables as well as various behavioural attitudes upon annuity purchases.

The remainder of this paper is organised as follows. The next part of this section provides a literature review on socioeconomic correlates and behavioural determinants of annuitisation decisions. The research gap is identified, and hypotheses are formulated. Section 2 presents the results of the original survey on a sample of the Slovak working population (N = 627). Preferences towards full annuitisation versus a lump sum are analysed via logistic regression in Section 3. The concluding part of the paper discusses major findings, notes some important limitations, and suggests directions for further research.

This paper provides some original contributions. First, it analyses some under-researched traits (self-control, indulgence, determination, and temptation) and related behaviours (compulsive shopping and saving habits) and links them to annuity choices. Furthermore, it studies alternative allocations of a lump sum (retirement saving versus lifestyle choices) and relates them to the decision to buy an annuity or opt for a cash-out.

1.2. Literature Review

The substantial majority of previous studies have focused on developed countries with well-operating annuity markets. The literature review suggested that gender, age, family status, household size and composition, and education are key observable variables for annuitisation decisions.

As for gender, females account for a combination of longer life expectancies but lower wages and pension entitlements in comparison to males. Females, in theory, should prefer annuities more than men. In fact, few studies supported this assumption (see, for example, Guillemette et al. 2016, p. 17). More studies found a lower demand for annuities by females than by males (Hurd and Panis 2006, p. 2222; Büttler and Teppa 2007, p. 1961; Teppa 2011, p. 13). The contradiction may be explained via the availability of alternative sources of retirement income, such as widow pensions and pooling intrafamily risk insurance (Kotlikoff and Spivak 1981, p. 380).

The impact of age on annuity uptake is subject to debate. Most studies found no or a negative effect of age. An age-related preference towards a lump sum over an annuity may result from subjective survival probabilities (Hurd and Panis 2006, p. 2217). Such probabilities may refer to an individual's health status (Guillemette et al. 2016, p. 5). Brown et al. (2008a), however, argue that older people account for higher rates of annuitisation because they appreciate the importance of longevity insurance. The effects of age upon annuitisation decisions may be sensitive to sample composition, pension rules, and various behavioural factors.

Marriage: Most studies under review found no effect of marriage on the purchase of annuities. Brown (2001, p. 59) established that married couples accounted for a lower propensity to annuitise, presumably due to their ability to pool mortality risk. Some studies established a higher propensity by the married to annuitise. Hurd and Panis (2006, p. 2222) noted that divorced, separated, or widowed people have low levels of assets and, therefore, a higher cash-out rate in comparison to married people. Bateman et al. (2017, p. 48) explained a higher interest in annuities by married people via low public pensions in Australia, which encourage private annuity purchases.

Household size and structure may have a significant impact on annuity demand. Large households with many children tend to face liquidity constraints and prefer lump sums over annuities. What is more, such households are able to pool their resources and obtain longevity insurance within the family rather than in standard annuity markets (Kotlikoff and Spivak 1981, p. 380). Leaving a bequest to descendants is another motive for

heads of large households to prefer a cash-out to an annuity (Bockweg et al. 2018, p. 401; Schreiber and Weber 2016, p. 46).

Educated people tend to earn higher incomes and accumulate higher wealth. Moreover, they exhibit higher financial literacy in comparison to those with lower education (Inkman et al. 2011, p. 279). Consequently, educated people may have a higher propensity to annuitise (Brown et al. 2008a) in comparison to those with lower levels of education and income (Hurd and Panis 2006, p. 2222; Cappelletti et al. 2013, p. 799). The actual propensity, however, may be moderated by the availability of alternative sources of old-age income (Inkman et al. 2011, p. 279; Banks et al. 2015, p. 413).

Individual studies, as well as some systematic reviews (Alexandrova and Gatzert 2019; Lambregts and Schut 2020), established that observable variables explain a very low fraction of the total variance in annuitisation decisions. Consequently, behavioural factors have become popular alternatives for explaining annuity decisions in the last decade (Ramsay and Oguledo 2018, p. 631). We first examine some of the most popular behavioural factors (framing, mental accounting, loss aversion, subjective survival probabilities) and then turn to some less researched ones (indulgence, self-control, regret aversion).

1.2.1. Framing, Loss Aversion, and Endowment Effect

Studies on framing often couple framing with risk and loss aversion. Annuity products offer lifelong insurance of income. Many retirement choices relate to decisions regarding buying an annuity versus taking a lump sum (Bockweg et al. 2018). The choice is then framed in terms of wealth accumulation rather than lifelong insurance (Brown et al. 2017, p. 453). In real life, people often concentrate on intermediate characteristics of pension investments (such as risk and return) instead of the ultimate goal of pension savings—retirement spending (Brown et al. 2008b). Prospect theory (Tversky and Kahneman 1992) suggests that agents may frame their decisions in terms of not only risks but also losses (Hu and Scott 2007). A prospective buyer may frame an annuity purchase as a cost (i.e., loss) or an “investment” (Benartzi et al. 2011, p. 157). Pain from losses looms in agents’ minds about twice as much as pleasure from equivalent gains (Tversky and Kahneman 1992, p. 311). The purchase of an annuity is irreversible. Therefore, exchanging accumulated pension wealth for an annuity may be considered a risky gamble with uncertain results. A loss-averse agent may consider a lump sum to be a ‘sure thing’.

1.2.2. Mental Accounting

People assign their money to separate financial but also mental accounts. The hierarchy of accounts reflects the degree of temptation to spend money (Thaler 1999, p. 196). Money in checking accounts is the easiest to access and spend. A mental account of ‘current wealth’ includes saving vehicles (such as saving accounts, stocks, or bonds) and is accessed only out of necessity. At the far end of accessibility are retirement savings (‘future income’), with the lowest marginal propensity to spend. Mental accounting significantly impacts budgeting, saving, investing, and spending behaviours. Once an investment frame is introduced, people wish for control and flexibility over the investment, and the demand for annuities decreases. A mental account of ‘retirement savings’ makes a transfer of accumulated assets to an annuity unattractive. The annuity is no longer considered to be a strategy for reducing longevity risk. Rather, it is considered to be a risky gamble with an uncertain payoff (Hu and Scott 2007, p. 73; Benartzi et al. 2011, p. 161).

1.2.3. Survival Estimates and Mortality Salience

The utility value of an annuity depends on some assumptions, among which one’s estimated life expectancy is the key parameter. The value of an annuity can be considered from the viewpoint of lifetime income or the perspective of potentially early death. People expecting a longer life should consider the purchase of an annuity to insure against longevity risk (Teppa 2011; Schreiber and Weber 2016, p. 46). The possibility of early death significantly reduces the value of an annuity (Gazzale and Walker 2009, p. 25).

Annuities are uncertain assets that pay off only when optimistic assumptions about one's long life are met (André et al. 2022, p. 45). Estimated probabilities of survival tend to correspond to actuarial life tables (Payne et al. 2013, p. 28). Still, some people tend to display 'survival pessimism' and underestimate their survival probabilities (O'Dea and Sturrock 2023). Furthermore, evidence on the impact of estimated life expectancies upon an annuity valuation is blurred by an individual's health status (Hagen 2015, p. 575), as well as motivational biases and random errors (Payne et al. 2013, p. 46; Boyer et al. 2020). Mis-calibrated estimates of one's life expectancy make it difficult to price annuities correctly (Shu et al. 2016). Many people face cognitive constraints when valuing annuities. Such mispricing, on average, manifests in an undervaluation of buying and an overvaluation of selling prices of annuities (in exchange for a lump sum) (Brown et al. 2017, p. 458).

Terror management theory (TMT; Greenberg et al. 1997) suggests that thoughts about one's death firstly induce anxiety and, secondly, trigger defensive responses that diminish distress. Salisbury and Nenkov (2016, p. 418) argue that suppressing and pushing thoughts about dying out of one's mind is a natural proximal defence against mortality salience. Avoidance of annuity products is a way to escape thinking about one's mortality. There is some evidence that prompts to consider life expectancy significantly reduces the preference for annuities (Robinson and Comerford 2020, p. 760).

1.2.4. Indulgence and Self-Control

Economic research has concentrated on ways in which preferences are elicited and suggested several explanations for issues of self-control (Duckworth et al. 2018). The dynamically time-inconsistent model of delay discounting (Laibson 1997) assumes hyperbolic discounting of utilities. An economic agent will overweigh the current utility (instant gratification) and sharply discount one in the near future. The discount rate will then decline in the more distant future. The 'dual-self' class of models (Fudenberg and Levine 2006) assumes that an individual may have two coexisting selves. The two selves account for different valuation systems (present- versus future-oriented ones). An agent, for example, could consider a burger or salad for lunch (Berkman et al. 2017, p. 422). The burger satisfies instant hedonic urges, while the salad promotes long-term health benefits. The patient long-run self and a sequence of short-run selves compete for attention when a decision is made. Value-based choice models (Berkman et al. 2017, p. 423) propose that self-control is simply a form of value-based decision-making. Economic agents integrate various gains (money, social approval) and costs (including efforts) when calculating the value of each decision alternative. An agent may pay different attention to specific alternatives at any one moment.

Psychological research focuses on some major ingredients of self-control (Baumeister 2002, p. 671; Tangney et al. 2004, p. 281): goal setting (as opposed to indulgence), monitoring, and the capacity to change (commitment to preset goals). Most studies on self-control targeted the evils of myopic pleasure-seeking and the benefits of long-term goal pursuits. Strong self-control is associated with sound financial planning and financial behaviour, higher household wealth (Ameriks et al. 2007, p. 972), and higher saving for retirement (Strömbäck et al. 2017, p. 37). Self-control failure, on the other hand, is related to financial distress. Individuals with low self-control are more likely to engage in compulsive buying, accumulate debts (Achtziger et al. 2015, p. 147), suffer income shocks, and face unforeseen expenses on durables (Gathergood 2012, p. 590).

1.2.5. Regret Aversion

Myopic indulgences are generally considered suboptimal in comparison to the pursuit of long-term goals. Indulgences are often followed by negative emotions such as regret, guilt, or remorse (Tangney et al. 2004, p. 281). Pain from negative emotions may motivate some avoidance behaviours, such as regret aversion. Regret aversion refers to an affective evaluation of future outcomes of decisions made in the present. In hedonistic choices, people overweigh the current utility in comparison to a future one. With regret, the

situation is different: people overweigh future outcomes in comparison to current ones. Regret aversion is fuelled by a desire to avoid the emotional pain of regret stemming from incorrect decisions. Prospect theory (Tversky and Kahneman 1992) assumes that negative outcomes (losses) loom larger than positive ones (gains). As regret is so painful, it is also very functional—it can help people to learn from past blunders and prevent such errors in the future (Zeelenberg 2018, p. 278). Research on the impact of regret aversion upon annuitisation decisions is rather scarce and inconclusive. Goedde-Menke et al. (2014, p. 86) found no strong association between annuity possession and regret aversion. Olsen (2007), on the other hand, established that annuities appeal to investors who wish to reduce problems with low self-control and feelings of regret.

1.3. Research Gap

Extant literature on behavioural determinants of annuity choices concentrates on framing, risk aversion, loss aversion, probability weighting, and annuity pricing, i.e., biases suggested by economic theories (expected utility and cumulative prospect theories). There is limited research on some psychological determinants of annuity decisions, such as lifestyle choices (but see, for example, Hagen 2022), indulgence, self-control, and long-term planning. The well-tested Tangney et al. (2004, p. 281) scale enables exploring the effects of indulgence, low self-control, focus and determination, and temptation resistance upon annuity choices. We hypothesise that people with high focus and determination, and temptation resistance will prefer annuities over lump sums, while those with high indulgence and low self-control will value lump sums more than annuities. Some people, however, may acknowledge their problems with low self-control, fear anticipated regret, and consider an annuity to be a commitment device. We, therefore, formulate two alternative hypotheses on self-control.

1.4. Research Hypotheses

The literature review suggested the following hypotheses:

Hypothesis 1. *An intention towards an annuity purchase is positively associated with an insurance frame.*

Hypothesis 2. *Estimated life expectancy and mortality salience are associated with an annuity purchase.*

Hypothesis 3. *Stated saving preferences are positively related to intentions towards an annuity purchase.*

Hypothesis 4. *Actual saving behaviours are positively related to intentions towards an annuity purchase.*

Hypothesis 5. *A financial planning horizon is positively related to intentions towards an annuity purchase.*

Hypothesis 6. *Unsound spending behaviours are negatively related to intentions towards an annuity purchase.*

Hypothesis 7. *People with high indulgence are less likely to opt for annuitisation.*

Hypothesis 8. *People with high focus and determination and resisting temptation are more likely to opt for annuitisation.*

Hypothesis 9a. *People with low self-control are more likely to prefer a lump sum payment to an annuity purchase.*

Hypothesis 9b. *People with low self-control may anticipate regret from a wrong decision and commit themselves to an annuity purchase.*

Hypothesis 10. *Annuity literacy is positively associated with an intention towards an annuity purchase.*

2. Materials and Methods

The author's survey on choices regarding private pensions is a key source of data for this research. The survey was implemented by a professional polling agency on a sample of 627 individuals. All survey participants saved via the funded Pillar 2. Table 1 provides descriptive statistics on sample size and structure.

Table 1. Descriptive statistics.

<i>Sociodemographic Variables</i>			
<i>Age</i>	<i>Frequency</i>	<i>Valid percentage</i>	
40–45	265	42.26	
46–50	163	26.00	
51–62	199	31.74	
Total	627	100.00	
<i>Gender</i>	<i>Frequency</i>	<i>Valid percentage</i>	
Male	313	49.92	
Female	314	50.08	
Total	627	100.00	
<i>Family status</i>	<i>Frequency</i>	<i>Valid percentage</i>	
Single/divorced/widow(er)	129	20.57	
Married/with partner	498	79.43	
Total	627	100.00	
<i>Education</i>	<i>Frequency</i>	<i>Valid percentage</i>	
Basic and lower middle	173	27.59	
Higher middle	287	45.77	
Tertiary	167	26.63	
Total	627	100.00	
<i>Town size</i>	<i>Frequency</i>	<i>Valid percentage</i>	
Up to 5000	252	40.2	
5001–20,000	116	18.5	
20,001–50,000	119	19.0	
50,001–100,000	61	9.7	
100,001+ (Bratislava and Košice cities)	79	12.6	
Total	627	100.0	
<i>Monthly income per family member</i>	<i>Frequency</i>	<i>Valid percentage</i>	
Up to €200	53	8.75	
€201–€300	124	20.46	
€301–€400	225	37.13	
€401–€500	61	10.07	
€501–€600	85	14.03	
Over €601	58	9.57	
Total	606	100.00	
<i>Retirement variables</i>			
	<i>Mean</i>	<i>Median</i>	<i>Std. deviation</i>
Estimated years in retirement	15.96	15.00	6.80
Difference between estimated years and life expectancy	−0.73	−0.69	7.48
Monthly savings for retirement (% of net income)	8.30	7.50	8.43

Table 1. Cont.

<i>Sociodemographic Variables</i>			
<i>Lump sum allocation (%)</i>			
Savings for retirement	34.24	30.00	27.25
Current expenses and debts	15.35	10.00	15.67
Family and children	20.62	20.00	20.22
Housing and durables	16.99	15.00	15.36
Hobbies and holidays	12.80	10.00	12.10
<i>Life insurance policy allocations (%)</i>			
Savings for retirement	32.81	30.00	23.38
Current expenses and debts	13.74	10.00	13.38
Family and children	23.13	20.00	18.85
Housing and durables	17.40	15.00	14.05
Hobbies and holidays	12.92	10.00	10.97

Notes: N = 627. Average age: 47.8 years, median age: 47.0 years, std. deviation: 5.77 years.

The survey design reflected the findings from current literature on annuitisation decisions and issues identified in the research gap. The questionnaire (Appendix A) contained items on framing, mental accounting, compulsive buying, saving and planning habits, indulgence and self-control. Descriptive statistics, factor analysis and binary logistic regression were used to analyse the results of the survey. Data from the survey were processed using SPSS Statistics 21.0 software.

2.1. Descriptive Statistics

The dependent variable reflected provisions of the Slovak Old Age Pension Saving Law. Members of Pillar 2 could opt for a lifetime annuity or a cash-out via programmed withdrawals. The second option was allowed for members who met certain income security thresholds in Pillar 1 (Social Security). The following wording was used for the dependent variable:

Imagine that you are a pensioner. You have saved for a private pension and your final savings with Pillar 2 are €3000/5500/8200/11,000¹. You can cash out all savings now but have to pay income tax, or buy a lifetime annuity and pay no tax. What option would you choose? (0): I would cash out and pay the tax; (1): I would buy a tax-free lifetime annuity. The former option was indicated by 34.3% of participants, while the latter was indicated by 65.6%.

We further report distribution of choices for each independent variable.

Independent Variables

Some post-communist countries (Hungary and Poland) have nationalised their funded private pillars. Some Slovak governments have considered privatisation as well. Private pension management companies advocated a constitutional law to guarantee pension savings and products (annuities) from nationalisation. The law proposal essentially presented pension products in *two frames: investment and insurance*. The same frames were presented to the survey participants:

There is a proposal for a constitutional law on the funded Pillar 2. The law would guarantee that (a) neither the Government nor the Parliament could nationalise members' savings, as to decrease the government debt; and (b) some product standards are maintained, such as an annuity-only exit to retirement. Please tell how much you agree with these guarantees on a scale: 1: certainly disagree; 2: disagree; 3: neither agree nor disagree; 4: agree; 5: certainly agree.

- Guarantee of savings: (1–3): 9.2%; (4–5): 90.8%;
- Guarantee of products: (1–3): 52.2%; (4–5): 47.8%.

The distribution of answers indicated strong support for the guarantee of savings (investment frame) and medium support for the guarantee of products (annuities).

Two items analysed *saving habits*. The first question on stated preferences asked about the distribution of hypothetical money from a lump sum:

Imagine that you are going to retire. Your Social Security monthly pension is €200/307/436/550. You have also saved for a private pension and your final savings are €3000/5500/8200/11,000. Imagine that there is a default option to cash out all of your savings via a lump sum. What percentage of the lump sum would you set apart for retirement savings and what for family & children, housing & durables, current expenses & paying debts, and hobbies & holidays? I would set apart . . . per cent of the lump sum.

The item tested the strength of the *mental accounting rule* ‘do not spend from principal’ (Hu and Scott 2007, p. 78). The rule assigns money to two different mental accounts—capital and income—and implies that it is okay to spend interest or income but not capital. Savings received the highest median share (30.0%) among the five options (Table 1). Other important allocations included paying current expenses and debts, as well as donations to family and children (bequest motive). The same question was asked again but for a potential income from a life insurance policy. Again, the distribution of allocations was almost identical (Table 1). Participants considered life insurance and savings for a private pension to be identical if the investment frame was presented. This finding confirms Benartzi et al.’s (2011, p. 161) assumption that annuities fall into the same category as life insurance.

The structure of lump sum allocations differed for participants considering an annuity purchase and those wishing for a cash-out. Those considering an annuity would allocate 37.1% to retirement savings, 13.7% to current expenses and debts, and 19.1% to family and children. For those considering a lump sum, the respective shares were 23.7%, 18.8% and 28.3%. It seems that these choices were guided by liquidity constraints, economic rather than behavioural factors.

The next question investigated *current saving habits*: *How much of your current net income do you set apart for retirement (please do not consider your contribution to Pillar 2)? I set apart . . . per cent of my net monthly income.*

The median monthly savings for retirement accounted for 7% of net income but with a substantial standard deviation (Table 1).

One item explored *life expectancies* and *mortality salience*: *Once you retired, you would collect your pension until you died. How many years do you think you would spend in retirement? I would spend . . . years in retirement.*

The item elicited subjective survival probabilities and reminded participants about their mortality (Robinson and Comerford 2020)². Participants expecting a longer-than-average life in retirement should, in theory, pay more attention to the consumption frame of an annuity in comparison to an investment one. Survey participants displayed quite realistic subjective survival probabilities. The median subjective survival probability (15.00 years, Table 1) was close to the value from life expectancy tables (15.69 years). These results confirm findings from previous research on the high correlation between subjective probabilities and actuarial life tables (Payne et al. 2013, p. 28).

Four items observed in *financial planning* and *spending behaviours*:

For how long do you usually plan your family incomes, expenses and savings? (0): we never plan (6.2%); (1): from one or two months to one year (37.2%); (2): from one to two years (39.6%); (3): more than two years (17.0%);

Does it sometimes happen that you buy unnecessary things and are out of money then? (0): never (30.0%); (1): only once (16.3%); (2): more than once (53.7%);

Have you ever borrowed money from a non-bank private lender as to cover extraordinary expenses? (0): never (84.7%); (1): one or more times (15.3%);

Imagine that you and your colleague have worked and saved for a private pension for 40 years with the same company. Upon retirement you have converted savings to a lifetime annuity, while your colleague has cashed out and spent all of his/her savings within a short time period. S/he is in material deprivation now. Where should s/he look for assistance? (0): the state should always help

people in material deprivation (18.0%); (1): self-help and/or family (44.8%); (2): charities (13.9%); (3): no cash-outs should be allowed (23.3%).

Some 43.4% of participants indicated no or a very short-term planning horizon (up to two months). Compulsive shopping (myopic pleasure-seeking; Fudenberg and Levine 2006) was not uncommon. Over half of the participants admitted to repeated purchases of unnecessary things. Most participants were cautious about consumer debt, but some 15.3% acknowledged income shocks (Achtziger et al. 2015) and a need to pay unforeseen expenses (Gathergood 2012) via taking out high-interest loans from non-bank lenders. We hypothesised that income shocks were related to household size, but the non-parametric test found no significant association (Cramer's V: 0.054; $p = 0.763$). It seems that unsound financial behaviour, rather than liquidity constraints, was behind the income shocks.

While two-thirds of participants preferred annuitisation to a lump sum payment, overall, the support for the prohibition of cash-outs was low (23.3%). This result points to the importance of an investment frame in pension decisions.

One item explored *annuity literacy*:

You would collect the Social Security pension once you retired. You saved for retirement with the funded Pillar 2 and asked for a private pension. How high do you think the private pension would be compared to the Social Security one after 10 years of saving? Please choose one answer: (1): about the same (21.4%); (2): higher (14.2%); (3): lower (52.3%); (4): I do not know (12.1%).

If someone paid full contributions to Social Security for 30 years and divided his/her contributions between Social Security and the funded Pillar 2 in the following 10 years, his/her private pension obviously would be much lower than that provided by Social Security³. Some 52.3% of participants indicated the correct answer.

Finally, Tangney et al.'s (2004, pp. 323–24) 13-item Brief Self-Control Scale was used to elicit the relation between annuitisation decisions on the one hand and *indulgence, focus and determination, low self-control, and resisting temptation* on the other hand.

3. Results

3.1. Factor Analysis

The factor analysis was used to analyse results from Tangney et al.'s (2004, pp. 323–24) 13-item Brief Self-Control Scale. The high value of Cronbach's alpha (0.790) indicated good reliability of the scale. To alleviate potential problems with multicollinearity, the scale items were used as inputs for the factor analysis to reduce the high number of independent variables to fewer factors.

The Varimax rotation method with Kaiser normalisation reduced the 13 items to four factors, which explained 55.51% of the total variance in the 13 variables. Bartlett's test of sphericity ($p < 0.0005$) and the Kaiser–Meyer–Olkin measure of sampling adequacy (0.840) indicated a good fit and reliability of the model. Four factors emerged that broadly correspond to Baumeister's (2002) constituents of self-control:

- Factor 1: 'indulgence' explained 20.84% of the total variance and loaded on hedonistic pursuits, inappropriate behaviour, and laziness.
- Factor 2: 'focus and determination' loaded on the pursuance of long-term goals and high self-discipline and explained 13.16% of the total variance.
- Factor 3: 'low self-control' combined three items on problems with concentration, the persistence of bad habits, and limited self-discipline, and explained 11.48% of the total variance.
- Factor 4: 'temptation resistance' consisted of two items on the management of self-harming behaviours and self-discipline and explained 10.02% of the total variance.

These factor scores were inputs in the binary logistic regression.

3.2. Binary Logistic Regression: Observable Variables

We first ran a regression on observable sociodemographic and socioeconomic correlates and checked for multicollinearity issues. Variables on income, occupation and town size correlated with education and were excluded from further analysis. Table 2 reports the

values and significance levels for the unstandardised (*B*) regression coefficients, odds and Wald scores.

Table 2. Logistic regression.

	<i>B</i>	<i>Wald</i>	<i>Sig.</i>	<i>Exp(B)</i>
Age (years)	−0.019	1.013	0.314	0.981
Gender (1) male	−0.076	0.123	0.726	0.927
Education		3.925	0.140	
Education (1) higher middle	0.470	3.692	0.055	1.600
Education (2) tertiary	0.434	2.183	0.140	1.543
Household size	−0.438	15.255	0.000	0.646
Family status (1) married/with partner	0.986	10.514	0.001	2.680
Lump sum allocation, retirement savings (%)	0.010	5.718	0.017	1.010
Lump sum allocation, current expenses and debts (%)	−0.010	1.938	0.164	0.990
Estimated years spent in retirement	0.007	0.235	0.628	1.007
Constitutional law on savings (1) agree	0.141	0.150	0.698	1.152
Constitutional law on insurance (1) agree	0.487	4.958	0.026	1.627
Purchased useless thing		10.255	0.006	
(1) once	1.049	9.224	0.002	2.854
(2) more than once	0.140	0.322	0.570	1.150
Financial planning horizon (1) over two months	0.245	1.208	0.272	1.277
Actual savings for retirement (% of net income)	0.010	0.546	0.460	1.010
Non-bank loan for extraordinary expenses (1) yes	−0.718	6.321	0.012	0.487
Assistance for reckless savers		9.383	0.025	
(1) self-help and/or family	−0.078	0.079	0.778	0.925
(2) charity	0.047	0.018	0.893	1.049
(3) no cash-outs allowed	0.762	5.299	0.021	2.143
Annuity literacy (1) correct	−0.198	0.900	0.343	0.821
Factor 1: indulgence	−0.197	3.518	0.061	0.822
Factor 2: focus and determination	−0.010	0.008	0.929	0.990
Factor 3: low self-control	0.175	2.815	0.093	1.191
Factor 4: resisting temptation	0.037	0.125	0.724	1.037
Constant	0.904	0.584	0.445	2.468

Notes: significance levels over 0.05 in bold. Nagelkerke $R^2 = 0.226$.

Age and gender variables proved to be insignificant in the regression, but three other sociodemographic variables were significant for the intention to buy a tax-free annuity. Participants with higher middle education (but not those with tertiary education) indicated a stronger preference for an annuity in comparison to those with basic and lower middle education. These differences may refer to diverse sources of alternative income and tax optimisation strategies by specific socioeconomic groups. Slovak tertiary-educated workers enjoyed a significant gross wage premium in comparison to those with higher middle education (52.4%) and lower middle education (74.3%) (SOSR 2022). Membership in the funded Pillar 2 was contingent on membership in the solidarity-based Pillar 1 (Social Security). High-income workers were motivated to work, earn, and save outside the solidarity-based Pillar 1. No dividend income tax, for example, was imposed in the period 2004–2017 in Slovakia. Workers with basic and lower middle education (and lower income), on the other hand, benefitted from solidarity transfers within Pillar 1 and were not motivated to save in the funded Pillar 2. It follows that paying contributions to Pillar 1 and saving for an annuity in Pillar 2 was best suited for workers with higher middle education (and income) if tax optimisation motives were considered.

Household size was negatively associated with the intention to buy an annuity. There are two potential (and complementary) explanations. The first explanation points to liquidity constraints in large households with dependent members. Large households may prioritise short-term liquidity-related decisions over long-term pension-related ones. An irreversible purchase of an annuity product may solve problems regarding a long-term stream of income but makes it impossible to withdraw funds in the case of unforeseen

higher expenses (Hu and Scott 2007, p. 78). The second explanation refers to intrafamily risk sharing (Kotlikoff and Spivak 1981). Parents in large families may reasonably hope for support from their grown-up children. In our sample, married/with partner participants were more likely to indicate an interest in an annuity than were single, divorced, or widowed ones. Households with married/partner couples are less likely to suffer from liquidity constraints than single-person households (Hurd and Panis 2006). What is more, married participants may have considered the benefits of survivor annuities.

Studies on annuities tend to find that observable variables explain a low fraction of the total variation in annuitisation decisions (Cappelletti et al. 2013; Schreiber and Weber 2016; Bockweg et al. 2018; Boyer et al. 2020). This research arrived at similar conclusions. Five observable variables (age, gender, education, household size, family status) generated Nagelkerke pseudo- $R^2 = 0.048$.

3.3. Binary Logistic Regression: Behavioural Variables

The inclusion of variables on behavioural controls significantly improved the explanatory power of the model (Nagelkerke pseudo- $R^2 = 0.226$). The Hosmer–Lemeshow test (chi-square 4.021; $p = 0.855$) suggested a good model fit. Moreover, we ran an OLS regression to check for multicollinearity. The variance inflation factors were in the range of 1.055–1.624 and indicated a low risk of multicollinearity. The ‘area under the ROC curve’ statistics (0.743. $p < 0.0005$) implied good overall accuracy of the regression model.

The variable on estimated years spent in retirement (proxy to mortality salience) had the expected sign but was insignificant for annuitisation decisions (Hypothesis 2 rejected). More than half of the participants passed the test on annuity literacy. Such literacy was positively associated with an intention to buy an annuity but proved to be statistically insignificant (Hypothesis 10 rejected).

3.3.1. Saving Preferences: Framing and Mental Accounting

The proposal for a constitutional law presented Pillar 2 in two frames. The first frame is related to savings and investment, while the second is related to insurance (annuity products). The savings/investment frame proved to be insignificant, but the insurance frame was significant and positively associated with the intention to buy a tax-free annuity (Hypothesis 1 confirmed). The insurance frame is an intuitive explanation for preferring an annuity over a lump sum.

As for the stated saving preferences, people preferring a tax-free annuity over a lump sum declared stronger intentions to save and plan their finances. The mental account of ‘retirement savings’ was much stronger for people interested in annuities than those wishing for cash-outs. If the cash-out were the default option, people preferring annuitisation would assign a higher percentage of a lump sum to retirement savings in comparison to those preferring a taxed lump sum (Hypothesis 3 confirmed). Using money from a lump sum to cover current expenses and/or repay debts was negatively related to an intended purchase of an annuity. The association had the expected sign but was insignificant. The prudent ‘annuity lovers’ expressed distinctive opinions on the reckless beneficiaries of lump sums. They strongly advocated for cancelling lump sum options. This option was statistically significant in comparison to other options (e.g., help via charity or the state).

Actual saving rates and the ability to plan household finance had the expected signs and were positively related to the stated preference for annuity products but were statistically insignificant (Hypotheses 4 and 5 rejected). Household financial planning and budgeting, as well as actual saving rates, could be impacted by a number of external factors, such as liquidity constraints and financial literacy (Gathergood 2012, p. 600).

3.3.2. Spending Behaviours

Compulsive buying may deplete household financial reserves and cause financial distress (Achtziger et al. 2015, p. 142). Financial distress, in turn, exacerbates liquidity constraints and increases the demand for cash. Unfortunate spending habits had strong

and negative impacts on the intention to buy an annuity (Hypothesis 6 confirmed). Survey participants who had to apply for an expensive non-bank loan to cover extraordinary expenses were much more likely to prefer a cash-out over an annuity. The association was highly significant. People who never had or had once bought a useless thing were more likely to indicate the purchase of a tax-free annuity than were those who had bought multiple unnecessary things. At the same time, people admitting to one-time compulsive shopping were more likely to consider an annuity purchase than those with no stated history of compulsive shopping. We speculate that 'one-time compulsive shoppers' were aware of their self-control problems and considered an annuity to be a commitment device (Laibson 1997, p. 469).

3.3.3. Indulgence and Self-Control

Indulgence (factor 1) was statistically significant and negatively associated with the intended purchase of an annuity (Hypothesis 7 confirmed). This result likely refers to preferences towards hedonic lifestyles in early retirement (Hagen 2022). Interestingly, low self-discipline (factor 3) was also significant but positively related to an intention towards an annuity purchase (Hypothesis 9b confirmed, Hypothesis 9a rejected). One explanation is concerned with rational hedging against old-age poverty. An alternative explanation points to an effective evaluation of investment decisions. Some may fear anticipated regret related to low financial discipline (Zeelenberg 2018, p. 278). They may resort to tried and tested financial products to avoid feelings of regret and desperation. Annuitisation, in this case, is a regret avoidance behaviour (Olsen 2007). If someone is aware of his/her self-control problems, s/he may introduce some internal self-protection mechanisms (commitment devices; Laibson 1997, p. 469) to mitigate anticipated consequences of unsound behaviour (Duckworth et al. 2018, p. 107). The irreversible lifetime annuity contract is an excellent hedge against reckless spending behaviour.

What models are the best in describing annuitisation decisions under indulgence and anticipated regret? Models on the dual self (Fudenberg and Levine 2006) and sequential choices may account for limited explanatory power. Sequential choices happen in specific settings and involve instant gratification. The outcomes of many sequential choices are reversible. The purchase of an annuity or a cash-out is a one-time decision with an irreversible result. The outcomes need not involve instant gratification. If someone opts for a lump sum, s/he may spread gratification over several years of early retirement. Stated focus and determination (factor 2), as well as the ability to resist temptation (factor 4), proved to be insignificant in the regression (Hypothesis 8 rejected). Positive outcomes of focus, determination, and the ability to resist temptation deliver gains in the distant future. The value of such gains is discounted (Laibson 1997). Indulgence-related behaviours, on the other hand, deliver instant gratification, and their values tend to be overweighed. As for anticipated regret, potential emotional pain results in a disproportionate overweighing of future (negative) outcomes. Diverse valuation mechanisms may explain why indulgence and anticipated regret loom in people's minds more strongly (and emerged as significant in the regression) than focus and determination, and/or the ability to resist temptation.

4. Discussion, Conclusions, Limitations, and Direction for Further Research

This research provides several insights into annuity choices. Firstly, it confirmed some existing findings on the determinants of annuitisation decisions. Most studies, including this one, found gender and age to be insignificant for annuitisation decisions. Education proved to be significant, albeit only for people with higher middle education. We argue that the impact of education (and income) upon annuitisation decisions must consider alternative sources of old-age income (e.g., Social Security pensions) as well as tax optimisation motives. Household size was found to be negatively associated with an intention to buy an annuity. The likely explanation points to liquidity constraints but also pooling resources and obtaining longevity insurance within the family rather than in annuity markets (Kotlikoff and Spivak 1981). Our research indeed confirmed

that observable variables matter for annuity choices but explain only a low fraction of the total variance in annuitisation decisions. Behavioural factors seemed to have a much higher impact on annuitisation preferences than did observable variables. Loss aversion related to an investment frame certainly is one of these factors. Our research confirmed the importance of framing and mental accounting for retirement saving.

Other behavioural factors included unfortunate spending habits related to myopic indulgences. Income shocks emerged as unrelated to household size (and potential liquidity constraints) and seemed to correlate with unsound financial behaviour (e.g., compulsive shopping and myopic pleasure seeking). This result supports the finding by [Achtziger et al. \(2015, p. 147\)](#) that income shocks and indebtedness are more of a problem of low self-control than financial factors. This research found support for hypotheses on the insurance frame (H1), stated saving preferences (H3), actual spending habits (H6), as well as those on indulgence (H7) and low self-control (H9b). Items on mortality salience (H2), actual saving rates (H4), the ability to plan household finance (H5), and annuity literacy (H10) had expected signs but showed insignificantly.

Statistically significant versus insignificant variables fell into two distinctive groups. Actual saving rates, ability to plan household finance and annuity literacy are moderated by cognitive abilities, experience with financial products and overall financial literacy. Knowledge of demographic trends is important for the estimation of (subjective) life expectancies. Indulgence and (low) self-control, saving preferences and actual spending behaviours, on the other hand, were driven by diverse valuation mechanisms. The dynamically time-inconsistent model of delay discounting ([Laibson 1997](#)) suggests that people high on indulgence and low on self-control would overweigh current utility and discount the future one.

Not all hedonic behaviours, however, relate to low self-control and involve instant gratification. For many people, enjoying a hedonic lifestyle is important for overall well-being ([Bernecker and Becker 2021](#)). A utility maximiser may prefer a lump sum to an annuity to enjoy an active and enjoyable lifestyle in early retirement when s/he is still healthy ([Hagen 2022, p. 392](#)).

The annuity size may have impacted decisions on annuitisation. The Social Security pensions (Pillar 1) provided relatively decent replacement rates and were key sources of old-age income in Slovakia. Slovak net replacement ratio was 69.4% for mean and 64.3% for double average earnings in 2022. Private pensions replaced as little as some 2% of the pre-retirement income in the same year.

This paper has some important limitations. The research was based on survey data and covered the usual observable variables (age, gender, education, family status, and household size), but data on some important variables were unavailable. Previous research, for example, has suggested the importance of wealth and alternative sources of income for annuitisation decisions ([Banks et al. 2015](#); [Alexandrova and Gatzert 2019](#); [Lambregts and Schut 2020](#)). Last but not least, the research was limited in scope. We did not consider some important personality traits such as risk aversion, optimism, or (over)confidence ([Strömbäck et al. 2017](#)). The survey was implemented on a sample of the Slovak working population and involved people with diverse cognitive skills. The questionnaire considered mental costs related to the completion of tasks and did not include gambling and lotteries. Participants' heterogeneous preferences are not controlled, which may affect the annuity choices.

The limitations suggest directions for further research. The most interesting findings from this research suggest that annuity purchases can stem from regret avoidance and operate as a commitment device. Further research may employ a regret scale to test this assumption directly.

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Appendix A. Questionnaire

Imagine that you are a pensioner. You have saved for a private pension and your final savings with Pillar 2 are €3000/5500/8200/11,000⁴. You can cash out all savings now but have to pay income tax, or buy a lifetime annuity and pay no tax. What option would you choose?

- I would cash out and pay the tax;
- I would buy a tax-free lifetime annuity.

There is a proposal for a constitutional law on the funded Pillar 2. The law would guarantee that (a) neither the Government nor the Parliament could nationalise members' savings, as to decrease the government debt; and (b) some product standards are maintained, such as an annuity-only exit to retirement. Please tell how much you agree with these guarantees on a scale: 1: certainly disagree; 2: disagree; 3: neither agree nor disagree; 4: agree; 5: certainly agree.

Imagine that you are going to retire. Your Social Security monthly pension is €200/307/436/550. You have also saved for a private pension and your final savings are €3000/5500/8200/11,000. Imagine that there is a default option to cash out all of your savings via a lump sum. What percentage of the lump sum would you set apart for retirement savings and what for family & children, housing & durables, current expenses & paying debts, and hobbies & holidays?⁵

- I would set apart . . . per cent of the lump sum for savings.
- I would set apart . . . per cent of the lump sum for family & children.
- I would set apart . . . per cent of the lump sum for housing & durables.
- I would set apart . . . per cent of the lump sum for current expenses & paying debts.
- I would set apart . . . per cent of the lump sum for hobbies & holidays.

How much of your current net income do you set apart for retirement (please do not consider your contribution to Pillar 2)?

- I set apart . . . per cent of my net monthly income.

Once you retired, you would collect your pension until you died. How many years do you think you would spend in retirement?

- I would spend . . . years in retirement.

For how long do you usually plan your family incomes, expenses and savings? (0): we never plan;

- from one or two months to one year;
- from one to two years;
- more than two years.

Does it sometimes happen that you buy unnecessary things and are out of money then?

- never;
- only once;
- more than once.

Have you ever borrowed money from a non-bank private lender as to cover extraordinary expenses?

- never;
- one or more times.

Imagine that you and your colleague have worked and saved for a private pension for 40 years with the same company. Upon retirement you have converted savings to a lifetime annuity, while your colleague has cashed out and spent all of his/her savings within a short time period. S/he is in material deprivation now. Where should s/he look for assistance?

- the state should always help people in material deprivation;
- self-help and/or family;
- charities;
- no cash-outs should be allowed.

You would collect the Social Security pension once you retired. You saved for retirement with the funded Pillar 2 and asked for a private pension. How high do you think the private pension would be compared to the Social Security one after 10 years of saving? Please choose one answer:

- about the same;
- higher;
- lower;
- I do not know.

Please indicate how much each of the following statements reflects how you typically are (1 not at all . . . 5 very much) (Tangney et al. 2004)

1. I am good at resisting temptation.
2. I have a hard time breaking bad habits.
3. I am lazy.
4. I say inappropriate things.
5. I do certain things that are bad for me, if they are fun.
6. I refuse things that are bad for me.
7. I wish I had more self-discipline.
8. People would say that I have iron self-discipline.
9. Pleasure and fun sometimes keep me from getting work done.
10. I have trouble concentrating.
11. I am able to work effectively toward long-term goals.
12. Sometimes I can't stop myself from doing something, even if I know it is wrong.
13. I often act without thinking through all the alternatives.

Notes

- ¹ Note: specific values of pensions and lump sums reflected income levels stated by individual participants.
- ² We computed the difference between estimated individual and actual average life expectations for each participant and examined the effects of potential mis-calibration upon annuitisation decisions. The variable proved to be collinear with estimated life expectancy and was omitted from the regression.
- ³ The total contribution rate for the old-age pension was 18% of the gross wage in Slovakia. Members of Pillar 2 divided their contribution between Social Security (9%) and private pension funds (9%) in the period 2005–2012. The Slovak Government considered the fiscal burden and changed the ratio to 14% versus 4% in 2012–2016. The overall percentage of pension contributions (18%) remained unchanged, but the ratio between Social Security and private pension contributions changed from 13.75% vs. 4.25% in 2017 to 12.50% vs. 5.50% in 2022.
- ⁴ See note 1 above.
- ⁵ The same question was asked again for a potential income from a life insurance policy.

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