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# Household Economics, Information Sources and Annuity Choices: Annuitisation Preferences of Members of the Slovak Private Pension Pillar

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**Abstract:** This research uses representative survey data to elicit the annuitisation preferences of members of the Slovak-funded private pension pillar. The research explores the impact of socioeconomic and sociodemographic variables, as well as some exogenous factors on annuity choices. The following choices are analysed: (i) taking an annuity upon retirement; (ii) delaying the uptake of an annuity and accumulating savings beyond the official age of retirement; and (iii) leaving accumulated wealth to heirs (bequest motive). The paper provides some original contributions. Firstly, it relates annuity choices to intrafamily risk sharing. Attention is paid to household structure, income levels, and the presence of dependent children. Secondly, the importance of diverse information resources on the formation of annuity preferences is examined. We found that professional advice provided by financial institutions and government bodies was associated with higher probabilities of annuity uptake. A disproportional reliance on informal channels may explain the higher preference towards bequest motives in rural areas. Thirdly, annuity choices are studied in relation to alternative sources of income in old age. A combination of social security pensions and bequest-sharing arrangements may offset the need for the annuitisation of pension wealth.

**Keywords:** annuities; intrafamily risk sharing; bequest motives; accumulation motives



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## 1. Introduction: Theory and Practice of Annuity Choices

The longevity risk (i.e., the chance that one would live for longer than is currently expected and outlives their savings) has significant implications for financial comfort in retirement. Propositions by the standard (neoclassical) theory assume that a risk-averse agent should disregard a potentially risky investment to a lump sum and buy an annuity (Benartzi et al. 2011, p. 151). The annuitisation of preretirement savings provides an excellent opportunity to insure one's income against longevity risk, as it ensures a smooth income over the rest of one's life. Nevertheless, annuitisation rates are low in developed countries (Alexandrova and Gatzert 2019). Retirees usually annuitise only a fraction of their preretirement wealth. Many people choose to keep their pension wealth untouched, continuously accumulating it, or considering passing part of their savings to their heirs. Annuities remain “displaced, disliked and misunderstood” by common consumers (Lambregts and Schut 2020). The “annuity puzzle” has been the subject of intense debates among economists, sociologists and psychologists.

Economic theory acknowledges a number of rational, semirational or behavioural motives for opting out of an annuity purchase (Ramsay and Oguledo 2018). The rational motives derive from sociodemographic and socioeconomic factors relevant for annuitisation decisions. Key factors include age, gender, marital status, education, bequest motives (Bütler and Teppa 2007; Lockwood 2012, 2018), health reasons (Peijnenburg et al. 2017; Hagen 2015), financial literacy (Pfarr and Schneider 2013; Goedde-Menke et al. 2014; Banks et al. 2015), lifestyle and personal time preferences (Hagen 2022), as well as the existence of alternative sources of old-age income (Teppa 2011).

This research aims at shedding some light on rational and semirational motives for accepting or opting out of an annuity purchase. It explores the impact of socioeconomic and sociodemographic variables, as well as some exogenous factors on annuity choices. The paper uses representative survey data and a multinomial logistic regression to study the annuitisation preferences of members of the Slovak private pension pillar. The fully funded, voluntary, defined-contribution, private Pillar 2 was launched in May 2005 in Slovakia. The introduction of the funded Pillar 2 was part of a wider neoliberal agenda by the Slovak government (Fisher et al. 2007, p. 983). Pillar 2 was an immediate success and transformed the Slovak pension market. Approximately 1.09 million savers (49.2% of total employment) had enrolled in Pillar 2 by the end of 2005. By the end of 2022, there were 1.74 million savers (66.4% of total employment) with assets amounting to EUR 14.67 billion (MLSAF 2023). Each member of the Pillar 2 had four basic options for how to dispose of their savings upon retirement: (i) taking an annuity upon retirement; (ii) delaying the uptake of an annuity and accumulating savings beyond the official age of retirement; (iii) leaving accumulated wealth to heirs (bequest motive); or (iv) cashing-out via programmed withdrawals. The latter option was conditional upon minimum income thresholds and available only to a subset of savers. This research focuses on the first three choices. It analyses the impact of socioeconomic and sociodemographic variables, as well as some exogenous factors on annuity choices. The paper provides some original contributions. Firstly, it relates annuity choices to intrafamily risk sharing. Attention is paid to household structure, income levels, and the presence of dependent children. Secondly, the importance of diverse information resources on the formation of annuity preferences is considered. Most previous studies have focused on information provided by financial advisors only (see Goedde-Menke et al. 2014). Furthermore, this research also explores the influence of the media, friends, family, financial institutions and government bodies. Thirdly, annuity choices are studied in relation to expected income from social security. The importance of alternative sources of old-age income is widely recognised but rarely studied in annuity choices. We found that people with dependent children were more likely to state bequest motives compared to persons with no or grown-up children. People considering expert advice were more likely to annuitise than those following the opinions of family, friends and the media.

The remainder of this paper is organised as follows. The section two provides a literature review on the socioeconomic and sociodemographic correlates and behavioural determinants of annuitisation decisions. The research gap is identified, and hypotheses formulated. Section three introduces an original survey on a representative sample of the Slovak working population (N = 613). The multinomial logit regression is used to elicit preferences towards specific annuity choices in Section four. The concluding part of the paper discusses major findings, notes some important limitations, and suggests directions for further research.

## 2. Literature Review

The literature for review was primarily identified based on searches of the Web of Science, Scopus, and Google Scholar pages for various keywords, e.g., “annuity”, “annuitisation”, “private pension”, “annuity literacy”, “annuity products”, “bequest”, and “accumulation”.

First, we focus on the impact of sociodemographic and socioeconomic factors on annuitisation decisions (Table 1); then, we turn to time preferences, liquidity constraints and information sources.

### 2.1. Sociodemographic and Socioeconomic Factors

Age: There is no agreement on the effect of age upon annuity uptake. Most studies found no or a negative effect of age. Reasons not to take annuities at a higher age may include subjective survival probabilities and shorter planning horizons for the elderly (Hurd and Panis 2006, p. 2217), health status and perceived mortality risk (Guillemette et al. 2016, p. 5)

and hyperbolic discounting (Schreiber and Weber 2016, p. 54). Potential explanations for the higher uptake of annuities with an increasing age may include greater care being paid to retirement planning (Brown et al. 2008), as well as inertia and reluctance on the part of elderly workers with regard to making active choices (Bockweg et al. 2018, p. 401). Teppa (2011) found that people expecting to live longer prefer annuities over lump sums. This finding was robust against controlling for bequest motives.

Table 1. Literature review.

Source	Male Gender	Age	Married	Children	Education	Income	Wealth	Bequest	Model	R2	N
Hurd and Panis (2006)	+	−	+	n/a	+	n/a	+	n/a	Probit	n/a	1243
Brown et al. (2008)	0	+	0	0	−	0	0	0	OL	n/a	790
Inkmann et al. (2011)	+	+	−	0	+	n/a	+	−	Probit	0.245	5233
Teppa (2011)	+	0	n/a	−	0	0	0	−	Probit	0.027	799
Cappelletti et al. (2013)	0	+	0	0	+	+	+	n/a	OP	0.030	4750
Beshears et al. (2014)	0	0	+	0	0	n/a	n/a	n/a	OLS	0.009	4052
Schreiber and Weber (2016)	0	−	0	−	0	0	n/a	n/a	OLS	0.091	1113
Guillemette et al. (2016)	−	−	0	n/a	+	+	0	n/a	OP	n/a	5035
Bateman et al. (2017)	0	n/a	+	n/a	+	n/a	0	−	BBD	n/a	6884
Bockweg et al. (2018)	0	+	0	−	n/a	n/a	+	n/a	OP	0.037	1651
Boyer et al. (2020)	+	−	0	n/a	0	0	0	+	OLS	0.072	15,005
Hurwitz et al. (2020)	+	0	0	n/a	n/a	+	n/a	n/a	Tobit	0.0046	886

Source: author. Notes: BBD = beta-binomial distribution; OP = ordered probit; OL = ordered logit. 0 = no relation; + = positive relation; − = negative relation; n/a = not available.

**Gender:** Females, in particular, tend to account for lower wages and longer career breaks but face a higher risk of longevity. Moreover, females are more likely to accumulate a lower pension wealth in their formal employment (Bütler and Teppa 2007, p. 1961). Teppa (2011, p. 13) explained the lower annuitisation and higher cash-out rates of females via the availability of alternative sources of retirement income and insurance (husband, family). Only one study found a potential higher demand for annuities from females rather than males. Guillemette et al. (2016, p. 17) explained their finding on the stated preferences towards an annuity purchase via longer life expectancy from women.

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

**Children:** Relatively few studies have included the presence of children, and those that did usually did not distinguish between dependent and independent ones. Economic theory assumes that married people and people with children pool their resources and obtain longevity insurance within the family, rather than in standard annuity markets (Kotlikoff and Spivak 1981, p. 380). Furthermore, parents may consider a bequest for their outliving spouses and children. It follows that the higher the number of children, the lower the demand for annuities. Some studies (Bockweg et al. 2018, p. 401) have used children as a proxy for the bequest motive and have found a positive relation between having children and a preference for partial lump sum payments over annuities. Moreover,

Schreiber and Weber (2016, p. 46) found that having children decreased the probability of choosing annuities and explained this result via the bequest motive.

Education, income and wealth: Education, income and wealth tend to be correlated. Educated people tend to have higher levels of financial literacy and should therefore find it easier to value annuities in comparison to people with lower education (Bockweg et al. 2018, p. 416). The literature survey mostly found a positive association between education, wealth and income, on the one hand, and the demand for annuities on the other hand (Brown et al. 2008). These results are mostly reported by studies on stated preferences. The actual rates of annuitisation may differ along with income and wealth (Lambregts and Schut 2020, p. 9). Studies associating lower annuitisation rates with a lower income point to liquidity constraints by poorer households (Hurd and Panis 2006, p. 2222; Cappelletti et al. 2013, p. 799). A higher income and wealth, on the other hand, predict a higher propensity to annuitise (Hurwitz et al. 2020, p. 214).

Bequest motives: Economic theory suggests that a bequest motive may increase the demand for cash-outs and decrease the uptake of annuities (Kotlikoff and Spivak 1981). However, there is no unanimous consensus on the impact of a bequest motive upon an annuity purchase. Most studies have established that bequest motives tend to increase saving and decrease purchasing annuities (Inkmann et al. 2011; Teppa 2011; Lockwood 2012, 2018; Bateman et al. 2017). Other papers (Brown 2001; Brown et al. 2008), using the presence of children, as well as a will or trust, found no evidence that annuity decisions were affected by bequest motives. A survey conducted by Boyer et al. (2020) explicitly asked about bequest motives and established a positive relation between bequest motives and the purchase of annuities. Boyer et al. (2020, p. 895) suggested that an annuity was bought as an income hedge after a benefactor had set apart a portion of wealth for a bequest. An alternative explanation points to the presence of negative bequest motives (Lambregts and Schut 2020, p. 9). Individuals wishing to leave no bequest to their descendants would prefer annuities to cash-outs. Positive and negative bequest motives may cancel each other out and blur the meaning of bequest motives for annuity purchases.

Accumulation motives: Alternative sources of retirement income (e.g., social security benefits, private annuities or defined benefit plans) have mostly a strictly negative impact on the demand for private annuities (Inkmann et al. 2011; Banks et al. 2015; Alexandrova and Gatzert 2019, p. 83). Rules on social security pensions may have implications for annuitisation decisions by specific socioeconomic groups. People with a high income, for example, pay higher contributions to the social security system and may feel that their old-age expenses are well covered by public pensions. Population ageing may result in a further reduction in public pensions for high earners/contributors. High-income contributors may prefer lump sums in comparison to those with lower income and contributions (Brown et al. 2008). Moreover, many social security pensions operate on solidarity principles. Those with high contributions receive comparatively lower pensions. They may consider avoiding social security contributions in order to optimise their pension wealth. Moreover, the uptake of annuities is moderated by annuitisation rules such as the flexibilisation of mandatory annuitisation or tax arrangements (Lambregts and Schut 2020, p. 11). When there is easy access to a tax-free lump sum, prospective annuitants are more likely to consider their retirement savings to be saving/investment instruments rather than longevity insurance (Lee 2016). Such people may continue to accumulate savings beyond the official age of retirement or leave their pension wealth to their descendants.

## 2.2. Cognitive Constraints, Framing and Information Resources

Cognitive constraints may impact on the uptake of annuities. Annuities are complex financial products and there is a link between annuity knowledge and demand (Boyer et al. 2020, p. 897). The cognitive challenges related to the correct valuation of annuities are considerable (Brown et al. 2017, 2021). Most individuals find it difficult to price annuities correctly (Shu et al. 2016).

Professional financial advice may alleviate the problem of making complex financial decisions. The evidence on financial advice is inconclusive. Some studies (Pfarr and Schneider 2013, p. 88) reported a positive impact of professional financial advice upon annuity uptake, but others presented opposing evidence. Goedde-Menke et al. (2014, p. 83) highlighted the importance of specific information resources for annuity literacy, e.g., self-search, family, media, and independent financial advisors. An individual's own research and annuity possession tend to have a positive impact on literacy, while advice from professional financial advisors, rather surprisingly, tends to have a negative impact. This finding may relate to the advisors' self-interest. Ramsay and Oguledo (2018, p. 633) also noted a potential annuity negative framing and conflicts of interest amongst financial advisors.

Less-sophisticated individuals may resort to simplification strategies (heuristics) to form judgements regarding annuity values and purchases. These strategies may include framing, mental accounting and/or loss aversion (Bockweg et al. 2018, p. 388). Framing may have a significant impact on decisions to buy an annuity rather than taking a lump sum (Bockweg et al. 2018). Retirement planning is often framed in terms of wealth accumulation rather than life-long insurance (Brown et al. 2017, p. 453). Given the prevalence of loss aversion, the question of whether a prospective pensioner frames their annuity purchase as a cost (i.e., loss) or as an "investment" is an important factor (Benartzi et al. 2011, p. 157). A one-time large payment for an annuity may be considered a risky gamble with uncertain results. The purchase of an annuity is mentally put into its own account, rather than being integrated with a life-long stream of small payments for consumption expenses (Hu and Scott 2007, p. 73; Thaler 2008, p. 21). Annuity purchases are irreversible. A prospective retiree may consider financial investments to be more flexible than annuities. Persons adopting the "investment frame" may prefer saving accumulation and bequest motives over longevity insurance.

### 2.3. Research Gap

The literature review pointed to several under-researched areas. Annuitisation decisions may be moderated by household structure. Only a couple of studies have focused on the presence of children, and these did not usually distinguish between dependent and independent ones. It is accepted that annuitisation decisions are informed by the availability of alternative sources of retirement income, but few papers have thus far examined trade-offs between annuitisation and income from social security. Many important studies on annuitisation decisions have come from Anglo-Saxon countries (Australia, Canada, the UK and the USA). These countries deliver public pensions with net replacement rates below the OECD average (particularly for high-income earners) (OECD 2021, p. 145) but have highly developed and liquid annuity markets. Private pensions are of higher importance for financial comfort in old age in developed countries than in less developed ones. Very little research has been undertaken on countries with young and immature annuity markets in which a public pension is dominant but a private one is a minor source of old-age income, as is the case in Slovakia. The annuitisation decisions of prospective retirees are informed by a certain amount of knowledge and experience. "Annuity literacy", for example, is an important predictor of annuity uptake (Goedde-Menke et al. 2014). Studies on information resources usually cover advice from banks and financial advisors, but omit informal channels, such as friends, relatives and media.

### 2.4. Research Hypotheses

The research hypotheses reflect findings on household economics and propensity to annuitise. The literature review suggested that people with a higher income would demand higher replacement rates regarding their working-age income. The empirical literature (Alexandrova and Gatzert 2019; Lambregts and Schut 2020), however, has revealed that alternative sources of old-age income, such as intrafamily risk sharing, tend to crowd out the demand for annuities. Social security pensions provided above-average replacement rates<sup>1</sup> and were a key source of old-age income in Slovakia. The average monthly annuity

from Pillar 2 (EUR 24) reflected a short saving period and replaced as little as 2.4% of pre-retirement income. We would therefore expect relatively low interest in annuitisation and a tendency to frame pension savings in terms of wealth rather than long-term insurance, particularly amongst classes with alternative sources of income. People and households with high incomes may therefore consider leaving their pension wealth as bequests. The bequest motives should also be important for households with married couple and dependent children. Individuals and households living on low income, on the other hand, may face severe liquidity constraints and display a higher interest in annuity uptake. Those with medium income and no prominent bequest motives may prefer accumulation to annuitisation. A higher flexibility and better choice of pension products may be of interest to people considering accumulation and bequest motives.

One research hypothesis concerns the impact of information resources on the formation of annuity preferences. Annuities are complex financial products. Formal institutions (such as banks, pension managers and government bodies) are more likely to provide expert advice on annuities than informal resources (family, friends or media). We assumed that nonprofessional people were more likely to opt for annuity uptake when information was provided by formal rather than informal channels.

The following research hypotheses were formulated.

**Hypothesis 1.** *Marital status impacts annuity choices. The bequest motives are preferred by married ones.*

**Hypothesis 2.** *The presence of dependent children impacts annuity choices. People with children would prefer bequest to annuity purchase.*

**Hypothesis 3.** *The level of current income impacts annuity choices.*

**Hypothesis 4.** *The type of information resource impacts annuity choices.*

**Hypothesis 5.** *The expected level of public pension impacts annuity choices.*

**Hypothesis 6.** *The array of pension products impacts annuity choices.*

### 3. Methodology

#### 3.1. Survey on Annuitisation Preferences

A survey on annuitisation preferences was the primary source of data for this research. The largest Slovak private pension manager approached a professional polling agency and implemented a survey amongst a sample of 613 individuals.

This polling agency has been active in Slovakia over 30 years. It implements both regular (omnibus) and ad hoc surveys. Unlike other polling agencies, this agency collects data on a face-to-face basis, rather than via online forms. The online-based collection of data tends to filter out the elderly and/or less educated population groups. The agency maintains a network of pollsters in Slovakia. The pollsters, in turn, uphold contacts with selected members of the public, to provide for a stratified sample of the Slovak population. The stratified sample mirrors the structure of the Slovak adult population in terms of gender, age, educational attainment, income, territorial distribution (NUTS 3 level) and settlement size. A sample of 600 individuals is representative of the working age population. A network of pollsters is a major advantage of the data collection process in case of demanding topics (such as annuity choices). The agency firstly discusses contents of the questionnaire draft with pollsters. It is important to ensure that pollsters understand all the questions in the survey. The final questionnaire is produced once all issues are clarified. The pollster then approaches their respondents in persons and records their answers. The pollster explains any questions a respondent may have. Results of the survey are recorded and provided to clients in the Excel and SPSS files. The sample was representative of the

Slovak working population aged 40–62 years in terms of gender, age, household size and structure, region, town size, occupational type and average monthly income.

Many survey participants likely possessed limited knowledge of annuity properties. The introductory part of the survey therefore explained annuities (based on the Old Age Pension Law, (*Zákony pre ľudí n.d.*) as being “lifetime private pensions”. The participants were informed that, unlike social security pensions, private annuities did not automatically include indexing and/or survivor benefits.

### 3.2. Dependent and Independent Variables

The dependent variable reflected provisions of the Slovak Old Age Pension Saving Law. The law considers lifetime annuities to be a default option for contributors in Pillar 2 but allows for programmed withdrawals once certain income security thresholds have been met. Upon retirement, members of the funded pillar can decide on an immediate uptake of an annuity or to leave their savings with the pension manager. The latter option is favoured by those who wish to increase their savings (accumulation motive) or leave their pension wealth to somebody else (bequest motive).

The following wording was used for the **dependent variable**: Imagine that the social security pension is sufficient to cover all of your expenses. What option would you choose? (0): taking a lifetime annuity from Pillar 2 immediately (62.9%); (1): postponing a lifetime annuity in order to increase the value of my savings in Pillar 2 (25.9%); (2): leaving all of my savings with Pillar 2 as a bequest (11.2%).

Independent predictors included standard sociodemographic and socioeconomic variables (Table 2) and three items: (i) expected social security pension; (ii) key information resources for pension decision-making; and (iii) preferences towards a variety of pension products.

People participating in Pillar 2 divert part of their pension contribution from social security to private pension funds. Such a diversion is reflected in a *lower expected pension from social security*<sup>2</sup>. We asked participants the following question: *Imagine that you have contributed to social security (Pillar 1) for 40 years, 10 years of which you were also contributing to Pillar 2. Your pension from the social security system, therefore, would be lower in comparison to a scenario in which you had never channelled part of your contribution to Pillar 2. How much lower do you expect your pension from social security to be?* By about (0): 10 per cent (50.7%); (1): one-quarter (41.8%); (2): one-half (7.5%).

International comparisons indicate that the Slovak population has rather low levels of financial and saving literacy (Cupák et al. 2019, p. 1610). We were interested in what *sources of information* were relevant for making complex financial decisions: *Please tell us about your main information sources concerning Pillar 2*: (0): I have no information (5.7%); (1): family, friends, mass media, the Internet (51.8%); (2): financial advisors (11.2%); (3): institutional—my bank, my pension manager company, the Ministry of Labour, Family and Social Affairs (31.3%).

More flexible annuity rules and a better choice of pension products may increase the uptake of annuities (Lambregts and Schut 2020, p. 11). The following wording was used to establish *preferences towards the choice of pension products*: *How many pension products would you like to choose from?* (0): I would prefer to choose from two pension products (30.7%); (1): I would prefer to choose from three or more products (69.3%).

A multinomial logistic regression (MLR) was used to analyse the research results. The MLR is applied when the dependent variable is nominal (i.e., categories are unordered) and has more than two categories. Each successive level of the dependent variable is compared against a reference category in an MLR. The regression was performed to create a model of the relationship between the predictor variables and membership in the three groups: (0): immediate uptake of an annuity, (1): accumulation motive and (2): bequest motive. The immediate uptake of an annuity was chosen for the reference category. Firstly, it had the highest frequency in the sample. Secondly, there is a fundamental difference between annuitisation and other uses of pension savings.

**Table 2.** Descriptive statistics and variable coding.

Variable	Annuity Uptake	Accumulation Motive	Bequest Motive	Total
Age				
(0) 40–45	247	105	42	394
(1) 46–50	108	44	23	175
(2) 51–62	30	10	4	44
Total	385	159	69	613
Gender				
(0) Female	192	83	31	306
(1) Male	194	76	38	308
Total	386	159	69	614
Marital status				
(0) Single/divorced/widowed	85	30	9	124
(1) Married/with partner	300	129	59	488
Total	385	159	68	612
Children				
(0) None or independent only	159	61	13	233
(1) Independent and dependent	226	98	55	379
Total	385	159	68	612
Household size				
(0) One	40	12	1	53
(1) Two	70	26	10	106
(2) Three	92	39	25	156
(3) Four	124	72	27	223
(4) Five or more	59	10	6	75
Total	385	159	69	613
Education				
(0) Basic and lower middle, ISCED 0–2	119	46	19	184
(1) Higher middle, ISCED 3–4	206	76	33	315
(2) Tertiary, ISCED 5–6	60	37	16	113
Total	385	159	68	612
Main information resource				
(0) None	28	6	1	35
(1) Family and media	190	79	48	317
(2) Financial advisors	41	25	3	69
(3) Institutional (bank, pension manager, Ministry)	126	49	16	191
Total	385	159	68	612
Personal monthly net income				
(0) Up to EUR 500	111	34	12	157
(1) EUR 501–EUR 700	128	54	21	203
(2) EUR 701–EUR 900	85	34	6	125
(3) EUR 901–EUR 1100	17	16	8	41
(4) over EUR 1101	31	11	15	57
Total	372	149	62	583
Town size				
(0) Up to 5000	100	59	24	183
(1) 5001–50,000	158	47	17	222
(2) 50,001–100,000	57	21	13	91
(3) Over 100,000	70	32	14	116
Total	385	159	68	612

Table 2. Cont.

Variable	Annuity Uptake	Accumulation Motive	Bequest Motive	Total
	Number of pension options			
(0) Maximum two	130	42	16	188
(1) More than two	255	117	52	424
Total	385	159	68	612

Source: pension manager survey. N = 613.

## 4. Results

### 4.1. Descriptive Statistics

The descriptive statistics indicated that most differences in annuity choices revolved around income, household structure, town size and type of information resources (Table 2). An immediate uptake of an annuity was preferred by people coming from smaller households and with no children or independent children. This class of participants tended to report a low income.

The bequest motive, perhaps unsurprisingly, was of little interest to single-member households but was overrepresented in households with three and four members. The accumulation motive, on the other hand, emerged as being relatively important for households with four members. This distribution likely refers to liquidity constraints in old age. Accumulation and bequest motives were disproportionately more preferred by those among the rural population, while the immediate uptake of an annuity was selected more often by inhabitants of small cities (population 5001–50,000).

Preferred information resources significantly impacted annuity choices. Informal sources of information (family, friends and media) were most frequently cited by the survey participants (51.8%). This source, however, was by far the most important for people indicating bequest motives (70.6%), compared to those preferring annuity purchase (49.4%) or saving accumulation (49.7%).

### 4.2. Multinomial Logistic Regression—Overall Results

#### Overall Results

Firstly, we conducted a regression on observable sociodemographic and socioeconomic correlates. Similar to many previous studies (Inkmann et al. 2011; Teppa 2011; Cappelletti et al. 2013; Beshears et al. 2014; Schreiber and Weber 2016; Shu et al. 2018; Bockweg et al. 2018; Boyer et al. 2020; Hurwitz et al. 2020), this research found that observable variables explained a low fraction of the total variation in annuitisation decisions (Cox and Snell R<sup>2</sup> = 0.062, Nagelkerke R<sup>2</sup> = 0.075, McFadden R<sup>2</sup> = 0.037). The inclusion of variables regarding information resources, product options and expected decline in the social security pension significantly improved the explanatory power of the model (Cox and Snell R<sup>2</sup> = 0.148, Nagelkerke R<sup>2</sup> = 0.179, McFadden R<sup>2</sup> = 0.091). Based on McFadden's R-square of 0.091, the full model containing all predictors represented a 9.1% improvement in fit relative to the null model (Table 3).

As for the model fitting information, the likelihood ratio (LR) test indicated that the model containing the full set of predictors represented a significant improvement in fit relative to a null model (LR  $\chi^2(12) = 91.415$ ,  $p < 0.001$ ). The Pearson chi-square test ( $p = 0.472$ ) and the deviance test ( $p = 1.000$ ) also suggested a good fitting model.

The MLR results largely confirmed the findings from the descriptive statistics regarding the importance of household structure, income levels and types of information resources for bequest decisions. There were no significant differences in annuity choices in terms of age, gender or education (Table 3). Household size and number of pension options proved significant only at the 0.1 level. Predictors on children, income, marital status, town size, information resources and expected decline in the social security pension proved significant at the 0.05 level (Table 3). The MLR analysis suggested that participants planning an immediate uptake of an annuity were more similar to those considering ac-

cumulation motives compared to those thinking about bequest. Parameter estimates for specific comparison groups (annuity uptake versus accumulation motive, and annuity uptake versus bequest motive) are presented in Table 4 and discussed below.

**Table 3.** Likelihood Ratio Tests.

Effect	Model Fitting Criteria		Likelihood Ratio Tests		
	−2 Log Likelihood of Reduced Model		Chi-Square	df	Sig.
Intercept	900.782 <sup>a</sup>		0.000	0	
Age	905.342		4.560	4	0.336
Gender	902.628		1.846	2	0.397
Children (dependent/independent)	916.504		15.722	2	<b>0.000</b>
Household size	906.433		5.651	2	0.059
Net personal monthly income (EUR)	912.388		11.606	2	<b>0.003</b>
Marital status	907.997		7.215	2	<b>0.027</b>
Education	902.003		1.221	4	0.875
Town size	916.576		15.794	6	<b>0.015</b>
Information sources	916.455		15.673	6	<b>0.016</b>
Number of pension products	906.163		5.381	2	0.068
Expected decline in the social security pension	920.103		19.321	4	<b>0.001</b>

Source: author's computations. Note: a. The reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

**Table 4.** Multinomial logistic regression.

	B	Wald	Sig.	Exp(B)	95% Conf. Interval for Exp(B)	
					Lower Bound	Upper Bound
<i>Motive: accumulation</i>						
Intercept	−1.704	2.993	0.084			
Age (0) 40–45	0.184	0.188	0.664	1.202	0.523	2.763
Age (1) 46–50	0.182	0.174	0.677	1.200	0.510	2.825
Age (2) 51–62	0 <sup>b</sup>					
Gender (0) female	0.197	0.794	0.373	1.217	0.790	1.875
Gender (1) male	0 <sup>b</sup>					
Children (0) none/independent only	−0.181	0.503	0.478	0.835	0.506	1.376
Children (1) dependent and independent	0 <sup>b</sup>					
Household size	−0.115	0.861	0.353	0.891	0.698	1.137
Personal income	0.083	0.706	0.401	1.087	0.895	1.319
Marital status (0) single/divorced	−0.343	1.180	0.277	0.709	0.382	1.318
Marital status (1) married/with partner	0 <sup>b</sup>					
Education (0) basic/lower middle	−0.025	0.006	0.940	0.975	0.504	1.887
Education (1) higher middle	−0.168	0.314	0.575	0.846	0.471	1.520
Education (2) tertiary	0 <sup>b</sup>					
Town size (0) up to 5000	0.286	0.955	0.328	1.331	0.750	2.364
Town size (1) 5001–50,000	−0.410	2.022	0.155	0.664	0.377	1.168
Town size (2) 50,001–100,000	−0.229	0.432	0.511	0.795	0.401	1.575
Town size (3) 100,001+	0 <sup>b</sup>					
Information sources (0) none	−0.313	0.332	0.564	0.731	0.252	2.121
Information sources (1) family, friends and media	0.080	0.125	0.724	1.084	0.694	1.692
Information sources (2) financial advisors	0.498	2.123	0.145	1.646	0.842	3.218
Information sources (3) institutional	0 <sup>b</sup>					
Number of pension products (0) two	−0.373	2.709	0.100	0.688	0.441	1.074
Number of pension products (1) three and more	0 <sup>b</sup>					
Decrease in the social security pension (0) 10%	1.054	3.050	0.081	2.869	0.879	9.364
Decrease in the social security pension (1) 25%	1.209	3.994	<b>0.046</b>	3.349	1.024	10.958
Decrease in the social security pension (2) 50%	0 <sup>b</sup>					
<i>Motive: bequest</i>						

Table 4. Cont.

	B	Wald	Sig.	Exp(B)	95% Conf. Interval for Exp(B)	
					Lower Bound	Upper Bound
Intercept	0.067	0.003	0.958	0		
Age (0) 40–45	−0.688	1.080	0.299	0.503	0.137	1.840
Age (1) 46–50	−0.019	0.001	0.977	0.981	0.267	3.611
Age (2) 51–62	0 <sup>b</sup>			0		
Gender (0) female	0.397	1.405	0.236	1.487	0.772	2.864
Gender (1) male	0 <sup>b</sup>			0		
Children (0) none/independent only	−1.639	13.749	<b>0.000</b>	0.194	0.082	0.462
Children (1) dependent and independent	0 <sup>b</sup>			0		
Household size	−0.442	5.246	<b>0.022</b>	0.643	0.440	0.938
Personal income	0.476	11.575	<b>0.001</b>	1.609	1.223	2.117
Marital status (0) single/divorced	−1.358	6.144	<b>0.013</b>	0.257	0.088	0.753
Marital status (1) married/with partner	0 <sup>b</sup>			0		
Education (0) basic/lower middle	0.240	0.257	0.612	1.271	0.503	3.212
Education (1) higher middle	−0.105	0.061	0.804	0.900	0.391	2.071
Education (2) tertiary	0 <sup>b</sup>			0		
Town size (0) up to 5000	0.898	3.907	<b>0.048</b>	2.454	1.008	5.979
Town size (1) 5001–50,000	−0.164	0.124	0.725	0.849	0.341	2.114
Town size (2) 50,001–100,000	0.813	2.473	0.116	2.254	0.818	6.210
Town size (3) 100,001+	0 <sup>b</sup>			0		
Information sources (0) none	−1.491	1.603	0.205	0.225	0.022	2.264
Information sources (1) family, friends and media	0.753	4.621	<b>0.032</b>	2.124	1.069	4.220
Information sources (2) financial advisors	−0.615	0.612	0.434	0.540	0.116	2.526
Information sources (3) institutional	0 <sup>b</sup>			0		
Number of pension products (0) two	−0.676	3.339	0.068	0.508	0.246	1.500
Number of pension products (1) three and more	0 <sup>b</sup>			0		
Decrease in the social security pension (0) 10%	−1.686	11.592	<b>0.001</b>	0.185	0.070	0.489
Decrease in the social security pension (1) 25%	−1.160	5.836	<b>0.016</b>	0.313	0.122	0.803
Decrease in the social security pension (2) 50%	0 <sup>b</sup>					

Source: author's computations. Notes: significance levels above 0.05 in bold. Notes: basic education: ISCED 1, lower middle education: ISCED 2, higher middle education: ISCED 3–4, tertiary education: ISCED 5–6. b. This parameter is set to zero because it is redundant.

### 4.3. Discussion of Accumulation and Bequest Motives

#### 4.3.1. Accumulation Motive Compared to Immediate Uptake of an Annuity

Only one predictor proved significant at the 0.05 level in the first regression. The second dummy variable on “expected decrease in the social security pension” proved significant, positive ( $B = 1.209$ ,  $p = 0.046$ ) and with an odds ratio (OR) higher than one. The result implied that people expecting a medium-sized fall in their public pension were more likely to consider an accumulation motive (and less likely to purchase an annuity) compared to people expecting more severe declines in the social security pension.

#### 4.3.2. Bequest Motive Compared to Immediate Uptake of an Annuity

Theoretically, females should be more interested in annuitisation than males because of their lower income and longer life expectancy (Guillemette et al. 2016). As a matter of fact, Slovak females accounted for significantly lower wages and faced much higher longevity risk in comparison to males. In the total sample, for example, only 26.5% of women but 49.8% of men indicated a net monthly income above EUR 701. Gender, however, became an insignificant predictor of the annuity choice. This result may refer to the sample composition. As expected in the sample aged 40–62, most members (79.8%) were married or lived with a partner. Intrafamily risk sharing (Brown and Poterba 2000; Büttler and Teppa 2007; Teppa 2011) and the design of social security pensions provided Slovak women with alternative sources of income and insurance in old age. The average social security widow's pension boosted single females' old-age pension by approximately 60% (SSS 2023).

Indeed, marital status was found to be negative and significant ( $B = -1.358, p = 0.013$ ) in the regression—single/divorced/widowed people were less likely to think about bequest motive (and more likely to opt for an annuity) than those who were married/with partners (Hypothesis 1 confirmed). The result comes as no surprise and aligns with the findings of [Brown \(2001\)](#) and [Hurd and Panis \(2006\)](#). Single people usually face higher liquidity constraints than couples. Married people, on the other hand, benefit from pooling income and wealth resources and account for strong bequest motives.

The presence of dependent and independent children proved highly significant for the annuity decisions. The predictor on children was negative and significant ( $B = -1.639, p = 0.000$ ). The result suggested that people with no children or only independent children were less likely to consider a bequest motive (and more likely to opt for an immediate uptake of an annuity) than people having dependent children. (Hypothesis 2 confirmed). This is in agreement with findings by [Bütler and Teppa \(2007\)](#), [Schreiber and Weber \(2016\)](#) and [Bockweg et al. \(2018\)](#).

The “household size” variable proved negative and significant ( $B = -0.442, p = 0.022$ ). It follows that people coming from larger households were less likely to consider a bequest motive (and more likely to consider annuity purchase) than those coming from smaller households. Household size tended to be associated with the number of dependent children. The results pointed to potential liquidity constraints and the lower accumulation of pension wealth in large households.

The “income” predictor was positive and significant ( $B = 0.476, p = 0.001$ ). This implied that people with higher income were more likely to consider a bequest motive (and less likely to opt for an annuity) than those living on lower incomes (Hypothesis 3 confirmed). This result is in contrast to the findings of [Hurd and Panis \(2006\)](#), [Cappelletti et al. \(2013\)](#) and [Hurwitz et al. \(2020\)](#). We explain this difference via the presence of alternative sources of income (including social security pensions) and tax optimisation motives in Slovakia. High-income households also tend to accumulate higher wealth and consider bequests more, compared to low-income households.

The second dummy variable was only significant and positive for the “information resource” predictor ( $B = 0.753, p = 0.032$ , Hypothesis 4 confirmed). Thus, the result indicated that people relying on information provided by family, friends and the media were more likely to indicate the bequest motive (and less likely to consider the annuity purchase) than people receiving information from other sources. This differs from the results of [Pfarr and Schneider \(2013, p. 88\)](#), who found a positive influence of financial advice upon annuity preferences. Our finding, however, relates only to information provided by informal sources. Preferences for information source followed those for income and town size. The nonparametric test suggested that high-income earners were most likely to seek institutional sources of information, with informal sources being least likely. Low-income earners displayed exactly the opposite preferences (Cramer’s  $V = 0.120, p = 0.014$ ). The same pattern emerged for town size. The first dummy variable only proved significant and positive ( $B = 0.898, p = 0.047$ ) for the “town size” predictor. Therefore, the result implied that people from rural settlements were more likely to consider a bequest motive (and less likely to make an annuity purchase) than those from larger towns. We assumed that people coming from rural areas valued advice from family and friends more than those living in cities. This assumption was supported by the cross-tabulation test for income and town size (Cramer’s  $V = 0.127, p < 0.001$ ).

The predictor on the number of pension products was insignificant at the 0.05 level ( $B = -0.676, p = 0.068$ , Hypothesis 6 unconfirmed).

The expected decline in the social security pension was the only predictor significant in both comparative conditions (see Table 4). Milder and medium-sized declines were generally associated with higher preferences for annuitisation motives, while the severe ones were linked to bequest motives (Hypothesis 5 confirmed). The suggested explanations referred to alternative sources of old-age income, tax optimisation and annuity literacy:

- The saving period (2005–2022) was too short to accumulate meaningful pension wealth or generate meaningful annuities. The average monthly annuity from the Pillar 2 (approximately EUR 22, some 2.4% of the average net wage and 4.6% of the average social security pension in 2022) was of little importance to most annuitants. The savers were more likely to frame their pension decisions in terms of accumulated wealth, rather than insurance.
- Contributions to the funded Pillar 2 were conditional upon contributions to the pay-as-you-go solidarity-based social security Pillar 1. The transfers benefited less educated, low-income earners, who collected disproportionately higher pensions. Contributions to the Pillar 2 were computed from declared income. Many people in low-paid jobs collected undeclared income, particularly in the hospitality and construction sectors. The official minimum wage was complemented by cash payments. Self-employed workers also tried to minimise their social security payments and channel their income to activities not liable for income and social security taxes. Dividend income, for example, went untaxed in the period 2004–2017 in Slovakia. It follows that people with low taxable income were motivated to build pension wealth (and adopted an “investment frame”) rather than saving for an annuity (“insurance frame”).
- Low annuity literacy is related to the decision not to annuitise (Cappelletti et al. 2013, p. 794; Boyer et al. 2020, p. 885; Goedde-Menke et al. 2014, p. 83; Banks et al. 2015; Ramsay and Oguledo 2018, p. 633). The question on the expected decline in the public pension, in fact, tested the annuity literacy of the respondents. If someone had contributed to the social security system for 40 years and diverted approximately 44% of their contributions to a private pension fund in the last 10 years, they should expect about a 10% reduction in the public pension rather than 25% or 50%. We recoded the categories in the social security pension variable as follows: (1): correct answer (10% decrease; indicated by 50.8% of respondents); (0): incorrect answer (decrease by one-quarter or one-half; indicated by 49.2% of respondents). We applied the nonparametric tests to relate annuity choices to annuity literacy. An immediate uptake of an annuity was associated with 53.5% of correct answers. The respective shares for accumulation and bequest motives were 50.0% and 38.2% (Cramer’s  $V = 0.095$ ,  $p = 0.067$ ). It follows that the bequest motive was linked to the lower levels of annuity literacy.

## 5. Conclusions, Limitations and Suggestions for Further Research

This research observed annuity decisions among different household structures, income levels and information resources. Several results are highlighted: (1) the importance of income levels and liquidity constraints for pension choices; (2) the relation between marital status and the presence of dependent children and the preference for bequest motives; (3) the impact of diverse types of information sources on the choice between annuitisation and bequest; and (4) the importance of alternative sources of old-age income for perceived financial comfort in retirement. Moreover, the findings on household structure, income levels, information resources and town size did not remain in isolation. The liquidity constraints relate not only to absolute levels of household income, but also to household size and structure. Households with dependent children often face current liquidity constraints, but at the same time, may consider intrafamily risk pooling and the diversification of old-age income sources. This result resonates with Kotlikoff and Spivak’s (1981, p. 388) assumption that bequest-sharing arrangements within marriage and large households may substitute the longevity insurance obtained in standard annuity markets.

Alternative sources of old-age income, such as social security pensions, private wealth and/or intrafamily risk sharing, tend to crowd out annuitisation (Brown and Poterba 2000; Büttler and Teppa 2007; Teppa 2011). This was also the case with Pillar 2. The structure of old-age income also explains the importance of bequest motives for married couples compared to single people. The Slovak social security system, for example, provides quite generous widow’s pensions. Therefore, it was not unreasonable to disregard the

opportunity for an annuity with low monthly payments, leaving the accumulated wealth to heirs.

Furthermore, the research also confirmed that not all types of information resources were of equal importance for informed pension decisions. The use of informal channels, for example, resulted in a disproportional preference for accumulation and bequest motives. As indicated by the MLR and nonparametric tests, income levels and town size moderated the formation of preferences towards annuitisation. A disproportional reliance on informal channels was likely behind the preference towards bequest motives in rural towns.

Several policy implications can be suggested as a consequence of this research. Individual households differ in their size and composition and, consequently, in their pension needs. Therefore, pension rules must set an adequate accumulation period for people with low savings, to allow them to generate sufficient savings for meaningful annuities. Low-income earners, for example, benefit from solidarity transfers in the social security system. They should be discouraged from diverting their social security contributions to private pension funds, as they lose some part of their life-long public pension but save little with the private pension company. Finally, the government should develop annuity literacy programmes to promote informed decisions on complex financial products.

This research has some important limitations. The stated preferences with regard to annuitisation were elicited via a survey. Subjective survival probability rates (O'Dea and Sturrock 2021) and the perception of annuity fairness (Shu et al. 2018) are important moderators of annuitisation decisions. However, our research did not target these behavioural issues. Furthermore, no information was collected on the financial and nonfinancial wealth of survey participants.

The limitations also suggest directions for further research. Each country has its own set of pension institutions and rules. Moreover, pension choices are also guided by cultural norms and informal information channels. Research on annuitisation decisions has focused on a small number of developed countries. The research would undoubtedly benefit from comparative cross-country evidence. Individual countries account for diverse structures of old-age income and wealth. Most wealth in Slovakia, for example, was tied to home ownership. Approximately 69.0% of Slovak families lived in their own mortgage-free home or apartment (EU27: 43.5%, Eurostat 2022), particularly in rural areas. The availability of debt-free home ownership significantly reduces the cost of living and may strengthen the case for self-annuitisation, including accumulation and bequest motives. At the same time, the high proportion of wealth allocated in illiquid assets should boost the demand for a lifetime income stream. Further research may focus on annuity decisions under diverse wealth structures and liquidity constraints.

The vast majority of research on annuities is quantitative and derives from surveys, experiments or modelling (Chalmers and Reuter 2012; Peijnenburg et al. 2017). Research on complex annuitisation decisions would certainly benefit from qualitative insights. The interesting question remains: what size of alternative pension income is sufficiently relevant for decisions on accumulation and bequest? Qualitative research may also shed light on subtle details regarding relation between the bequest and survivor benefit motives on one hand and the perceived security of retirement income on the other hand.

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## Notes

- <sup>1</sup> The Slovak net replacement ratios were 76.2% for half average, 69.4% for the mean and 64.3% for double average earnings. The respective OECD average replacement rates were 74.4%, 62.4% and 54.9%. Source: (OECD 2021, p. 145).
- <sup>2</sup> 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 the period 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. The contribution to Pillar 2, the return on investments and annuity/withdrawal payments have all been tax-free. Source: Ministry of Labour, Social Affairs and Family of the Slovak Republic (2023) Príspevky na starobné dôchodkové sporenie (contribution to old-age pensions). available at: <https://www.employment.gov.sk/sk/socialne-poistenie-dochodkovy-system/dochodkovy-system/ii-pilier-starobne-dochodkove-sporenie/prispevky-starobne-dochodkove-sporenie-2.html>, accessed on 10 April 2023.

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