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Behavioral drivers of individuals' Term Life Insurance Demand: evidence from a Discrete Choice Experiment*

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Abstract

Term life insurance contracts differ from one another: private information level asked to applicants, options presence in the contract, or claim payment type. Understanding how individuals' demand is influenced by these possibilities is not straightforward. We explore socioeconomic and behavioral characteristics that might influence term life insurance demand through a Discrete Choice Experiment (DCE). On a sample representative of the French population, we estimate individuals' characteristics that influence (1) term life insurance purchasing decision and (2) Willingness to Pay for each feature of the contract without testing new features directly in the market. In addition to socioeconomic characteristics, behavioral factors permit to better understand overall demand for term life insurance product as well as characteristics of such contract. Future concerns, optimism about survival, perceived asset management risk, and altruism influence term life insurance purchasing behavior.

Keywords— Term Life Insurance, Discrete Choice Experiment, Willingness to Pay, Individual Preferences

JEL Codes— C83, D12, G22

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1 Introduction

Term life insurance is a financial instrument designed to provide security and protection to individuals and their families against unforeseen risks and uncertainties. In exchange for a premium paid to the insurer, it allows policyholders to secure an amount of money for their beneficiary(ies) in case of death. Contracts usually cover the policyholder for 10, 15 or 20 years. Unlike life insurance, the premiums paid for term life insurance are non-refundable. Marketing surveys¹ have highlighted that consumers' needs are evolving. They expect from insurers not only to be risk carriers but more globally wellness partners, providing personalized offerings for instance. These surveys highlight that needs differ relative to socioeconomic characteristics. Hence, insurers are exploring innovative ways to address these changing needs. In addition to the "classic" indemnity, insurance contracts increasingly offer additional services. Complementary guarantees are also proposed for specific sub-groups of the population. The whole life-cycle of the insurance product is reviewed, from the underwriting process to the payment of the claim, including the integration of optional preventive measures and riders into their offerings. However, since 2017, the number of new business in force is stuck around 3 million each year (France Assureurs (2022))². In other words, new targeted product propositions from the life insurance industry, based on socioeconomic characteristics, do not seem to match evolving consumer needs.

Using a Discrete Choice Experiment (DCE), we show in this paper how, added to socioeconomic characteristics, behavioral indicators can help better understand term life insurance demand.

Explaining term life insurance demand is not straightforward as this cover differs from other Life & Health insurance products. First, results drawn from standard models of asymmetric information predicting adverse selection (Rothschild & Stiglitz (1976)) are questioned in this market. Indeed, other models argue that the life insurance market induces either "propitious selection" (Hemenway (1990)), where risk averse individuals are both more likely to buy life insurance and less risky, or no existence of adverse selection due to self-exclusion of potential customers aware of their high-risk profiles (Hendren (2013)). Another explanation comes from the presence of medical underwriting in non-group products - such as term life insurance - which permits insurers to refuse applicants deemed too risky³. Empirically, findings are mixed and depend on the data analyzed and assumptions made. Most studies find no evidence of adverse selection in life insurance markets (Cawley & Philipson (1999), Pauly et al. (2003), Hendren (2013), Harris & Yelowitz (2014)), the main argument being the presence of price discrimination (Hedengren & Stratmann (2016)). In contrast, He (2009) found adverse selection in the US life insurance market,

¹See, for instance, Capgemini's Voice of the Customer Survey series.

²In the life insurance sector, the same observation is made for long-term care and annuity products (Lambregts & Schut (2020)).

³In the US, life insurers decline around 3-4% of applications received (Brackenridge et al. (2006)). The same proportion exists in other markets, such as in France.

focusing on a new buyer population. Second, term life insurance differ from one product to another, with different underwriting processes (with more or less selection) and different riders proposed which are likely to influence one way or the other individuals' demand. Third, contrary to health, critical illness or other Life covers, the beneficiary of life insurance contracts is not the individual who purchases the contract but its relatives, which implies bequest motives (Bernheim (1991)).

Literature has highlighted various individual factors that are at stake during the life insurance purchasing decision⁴. In their systematic review, Bhatia et al. (2021) retain 76 articles that emphasize life insurance purchases and highlight the heterogeneity of preferences. In addition to claim risk itself, life insurance demand is correlated with individual characteristics. Authors established relationships between individual demographic (Chen et al. (2001)) as well as household (Luciano et al. (2016), Wang (2019)) characteristics and life insurance demand. Overall, a positive but non-linear relationship exists between age and life insurance demand. Demand for cover is also increasing with education and financial literacy levels. These relations hold at both individual and household levels. Depending on data specificity, authors found both positive (Wang (2019)) and negative (Eisenhauer & Halek (1999)) relationships between the number of children and life insurance demand.

Behavioral indicators such as emotions and optimism (Lucarelli et al. (2014)), risk attitudes (Eisenhauer & Halek (1999), Nagy et al. (2019)) and time preferences (Kakar & Shukla (2010)) also affect insurance demand. Coe et al. (2016) and Mouminoux et al. (2018) provide evidence that behavioral biases such as status quo, money illusion, mental accounting, anchoring, signaling, loss aversion and obfuscation (Ellison & Ellison (2009)) influence as well insurance demand. However, these results are in majority studying insurance demand as a whole. To the best of our knowledge, no studies have explored whether behavioral indicators can help explain term life insurance demand.

Life insurance demand is puzzling, especially when we are interested in the influence of heterogeneity of preferences and the policy's characteristics on purchasing decisions. To study life insurance contracts as a composition of a risk covered and other elements valued by consumers, the economic and management literature often leveraged on Discrete Choice Experiments. Based on Random Utility Theory (McFadden (1973)), it allows estimating how people value different attributes of a good or service and how much they are willing to pay for it. This method has been widely used to elicit preferences for "multidimensional" products (Louviere et al. (2010)) in various areas, including health, transport, agricultural, environmental and insurance economics. Conducted through a survey, it permits at a same

⁴We are focusing on micro-level analyzes that help understand individuals' life insurance demand. Note that macro-level studies have established a link between life insurance consumption and economic indicators. For an extensive literature review, the reader can refer to Outreville (2012). Characteristics of companies (quality of third parties, reputation, ...) are also influencing life insurance demand - see Chow-Chua & Lim (2000), Omar & Owusu-Frimpong (2007), Tan et al. (2009), Braun et al. (2016), Nagy et al. (2019).

time to record participants' characteristics and elicit their behavioral preferences. Most DCEs on the life insurance side⁵ focus on health insurance (Kerssens & Groenewegen (2005), van den Berg et al. (2008), Leukert-Becker & Zweifel (2008), Zweifel et al. (2010)), particularly in market areas where there is an overall undercovered population - see Nanna (2011), Obse et al. (2016), Ozawa et al. (2016), Kazemi karyani et al. (2019), Chen et al. (2022). Demand for long-term care insurance was also assessed, as a benefit of a health insurance plan (Kazemi karyani et al. (2019)) or as a specific insurance product (Brau & Lippi Bruni (2008), Worawan & Wasi (2020), Akaichi et al. (2020)). Results all have in common to highlight the main importance of price during the purchasing decisions. The main relevant attributes selected by authors for the design of these DCEs are distribution channel, insurance provider (public vs. private, well-known brand or not), underwriting process, riders⁶, deductible for prevention, reimbursement ratio and level of coverage. Individuals' characteristics explaining preferences for specific attributes are mainly demographics (gender, age, educational level, income) and health related (self-assessment and linked to smoking habits (Zweifel et al. (2010))). Importance of risk attitudes in attributes preferences are also assessed by Akaichi et al. (2020).

To our knowledge, Braun et al. (2016) are the first and only studying term life insurance demand with Choice-based Conjoint analysis (CBC). They defined term assured, sales channel, underwriting process (basically time consumption of prospects), insurer brand name (well-known, lesser known and well-known but not from the insurance sector) and critical illness rider as attributes of their experiment. Our study differs in two elements. Though authors have demonstrated variability in Willingness to Pay, they didn't focus on individuals' behavioral preferences that might drive these differences. Braun et al. (2016) also have recruited individuals who identified themselves as "insurance decision makers". In this case, the results do not consider undercovered populations. As we want to provide keys to expand term life insurance demand in France, we have recruited participants representative of the French population.

In this research, we are exploring not only socioeconomic but also behavioral characteristics that might influence term life insurance demand. As Braun et al. (2016), we assume that additional aspects such as claim payment method, underwriting process and supplementary benefits play significant roles in shaping consumers' term life insurance choices. We test this assumption through a Discrete Choice Experiment. Our contribution to the literature lies in eliciting main personal traits of individuals that drive heterogeneity of preferences, permitting professionals to design tailored products for subgroups defined not only on socioeconomic characteristics but also through behavioral indicators and attract

⁵Note that the Property & Casualty (P&C) sector has also been studied (Sherrick et al. (2003), Brouwer et al. (2014), Kwofie et al. (2018), Doherty et al. (2021), Shee et al. (2021), Frimpong et al. (2022)). Drivers of purchasing decision are quite different as, contrary to life insurance, P&C insurance policies don't have designated beneficiaries.

⁶The terms "rider" or "benefit" are employed independently.

new consumers.

The rest of the article is organized as follows. In Section 2, the DCE methodology is presented before describing the selection of attributes and levels of policies proposed. We present the estimation strategy in Section 3. Results are then provided in Section 4, highlighting behavioral characteristics driving term life insurance attributes preferences among the population studied. In Section 5, we conclude.

2 Methodology and Design

The implementation of a Discrete Choice Experiment follows three steps: (1) determining the study population and data collection; (2) identification of relevant attributes and levels that characterize the considered good or service and (3) identification of a suitable design to elicit preferences for the attributes independently.

2.1 Data collection

Term life insurance market mainly targets individuals from 25 to 75 years old. The sample aligns with the characteristics of the French general population in terms of age (average age of 49 years old), gender (51% of women) and area of residence (concentration of the population in Parisian basin: 17% and Île-de-France region: 18%).

The questionnaire for the survey was administered online between 8/27/2021 and 11/22/2021 by a survey company (Odity) and is organized in three parts:

1. Socioeconomic characteristics questions used to meet quotas defined.
2. Discrete Choice Experiment choice scenarios.
3. Additional individual information:
 - Socioeconomic characteristics;
 - Insurance contract subscriptions;
 - Declared health conditions;
 - Preferences elicitation (risk, time, altruism, optimism toward survival probability).

Time preference of participants is defined following Falk et al. (2022) (impatience score). To elicit risk preference, a lottery choice (Eckel & Grossman (2008) - see Figure 4 in Supplementary Materials) and self-declaration (Dohmen et al. (2009)) were asked to assess risk preference in general and in the wealth and health domain. Altruism indicator is defined based on willingness to give to charity - see Table 1 for a description of some questions used during the survey. After data collection, we linked for each individual

their survival probability at 75 and 85 years old based on INSEE mortality tables⁷. It considers age and gender and permits us to compute optimism indicator relative to health, comparing the self-perceived survival probability of participants with their actual survival probability⁸.

To ensure the quality of responses, a minimum completion time of the survey was set to five minutes. Before launching the survey, a pretest pilot survey was conducted among 91 individuals to check the respondents' understanding of the attributes and their levels, as well as the questionnaire in general.

Table 1: Description of explanatory variables - Preference elicitation

Name	Description
Risk attitudes (OLS)	Each game offers two possible wins. You have a 50/50 chance of winning each of these two prizes. Please choose your favorite of the five (A to E) coin-toss games. (A lottery without risk, E riskier lottery)
Perceived risk	On a scale of 0 to 10, what is your attitude towards risk? 0 to 10 - Risk averse to risk lovers (Risk in general)
Perceived risk (health)	Idem (Risk for your health)
Perceived risk (wealth)	Idem (Risks to the management of your assets)
Concern about future	Try to place yourself on a scale from 0 to 10 according to whether you feel closer to one or the other portrait-type: 0: a person who lives from day to day and takes life as it comes, without thinking too much about tomorrow or projecting into the future. 10: someone who is concerned about their future (even the distant future), who has strong ideas about what they would like to be or do in the future.
Optimism 75 (85)	Using a number between 0 and 100, what do you think the chances are that you'll live to 75 (85) years-old?
Altruism	How willing would you be to donate money to good causes? Please give your answer on a scale of 0 to 10, where 0 means "not at all willing" and 10 means "very willing".

2.2 Attributes and levels definition

The definition of the 20-year term life insurance contract of €100,000 and the selection of attributes and levels was based on two complementary stages: the literature review on DCE related to term life insurance contracts (detailed in the Introduction) and exchanges

⁷See INSEE website.

⁸Of course, other elements such as diseases or smoking status have impact on survival probability but cannot be considered due to data protection. This variable should be considered with respect to self-perceived health declared by participants.

with professionals from SCOR (reinsurance company).

We identified six life insurance attributes to include in the hypothetical term life insurance policy (Table 2). Benefit Payment Method specifies how benefits are paid out, with options for a lump sum (€100,000 at the time of death) or income (€10,000 plus interest annually for 10 years following death). The two levels represent the most common ways benefits are paid out in life insurance policies. The lump sum is straightforward and provides immediate financial relief, while the income method provides long-term financial security. Health Information indicates the amount of information required during the underwriting process, ranging from no information to a declarative questionnaire about health, family history, and behaviors, to medical examinations and tests. This attribute reflect the spectrum of health information that insurers may require, although asking for no information is very rare in practice. It allows to understand how much policyholders value privacy on potential cost savings for low-risk individuals.

Prevention Program ranges from none to an annual medical check-up, or to a personalized prevention program accessible through a health and wellness application. The no program level represents traditional insurance, while the other levels represent innovative, wellness-focused insurance products. As explained in Introduction, marketing surveys have showed this kind of program seem to be appealing for consumers.

In some contracts, Additional Benefits are proposed such as a daily hospitalization fee or an additional €100,000 in case of accidental death. Survivors' Benefit can also be proposed if the policyholder is alive after the contract ends as a reimbursement of 50% of premiums paid or financing funeral expenses. Both Additional and Survivors' riders can help insurers design more attractive term life products.

Finally, Monthly Premium gives the monthly payment amount, with levels at €26, €37, or €48, representing a range of premiums for a €100,000 policy based on the insurer's risk assessment.

Each level was chosen to represent a realistic range of options in the current life insurance market. The assumed impact of each attributes on individuals demand is summed up in Table 3, showing different impact of levels depending on socioeconomic and behavioral characteristics.

Table 2: Attributes and levels of the DCE

Attribute	Description	Levels
Benefit payment method	Specifies how benefits are paid	Lump sum: the beneficiary receives a single payment (€100,000) at the time of death
		Income: the beneficiary receives a payment of €10,000 plus interest each year following the death for 10 years
		No information
Health information	Indicates the health information that is requested when subscribing to the contract	Declarative questionnaire: You must give information about your state of health, your family history, your chronic conditions and diseases, your consumption behaviors (tobacco, alcohol, ...)
		Medical examinations and medical tests: You need to do blood tests, urine tests and an electrocardiogram
		No prevention program
Prevention program	Specifies the type of prevention program included in the contract	Annual medical check-up: offered every year for the duration of the contract
		Personalized prevention program: This program is accessible through a health and wellness application that offers personalized information and recommendations
		No additional benefits
Additional benefit	Indicates the additional benefits that you or your beneficiary can receive during the 20 years of the contract	Payment of a daily fee for hospitalization (50 €) if you are hospitalized for more than 3 days
		In case of death by accident, payment of an additional €100,000 to the beneficiary. This amount is paid in addition to the amount provided for in the contract
		No benefits
Survivors' benefit	Indicates the additional benefits that you or your beneficiary can receive after the end of the contract (20 years) if you are alive	Reimbursement of 50% of the premiums paid: They are reimbursed to you if you are alive once the 20 years have elapsed
		Financing funeral expenses: €5,000 will be paid to your family at the time of your death to finance the funeral expenses
		€26
Monthly premium	Gives the amount you need to pay to the insurance company every month	€37
		€48

Note:

A contract is defined by picking only one level of each attribute.

Table 3: DCE assumptions







Attribute	Individual Characteristics	Hypothesis
Benefit payment method	High wealth, education, financial literacy, optimism on health	Income preferred over lump sum
	(a) High health risk	(a) No information sharing preferred
Health information	(b) Time preference	(b) Negative relationship between time preference and length of UW
	Risk-aversion, health consciousness	Insurance and prevention seen both as complement and substitute
Additional & Survivors' benefits	(a) Risk-aversion	(a) Accidental death increases risk-averses demand for insurance
	(b) Bequest motives, altruism	(b) Financing funeral expense increases demand

Note:

For the benefit payment method, individuals with high wealth are expected to prefer income over lump sum. High health risk individuals are expected to prefer the no information sharing level.

2.3 Experimental design

The 6 attributes and their levels would allow 486 unique attribute combinations in a full factorial design. A main-effects D efficient design was generated using the methodology developed by Street & Burgess (2007) to reduce this design to a more pragmatic number of 12 choice tasks, allowing independent estimation of preference weights. We used the R package *idefix* (Traets et al. (2020)) to define the scenarios. A pairwise choice format with an opt-out was selected. Concretely, one level of each attribute was selected to define a policy and respondents were asked to mark the alternative they preferred the most (i.e., Policy A, Policy B or neither of the two policies proposed - see an illustrative example in Figure 1).

INSURANCE POLICY FEATURES	POLICY A	POLICY B
Benefit payment 	Lump sum	Income
Health information 	No information	Declarative questionnaire
Prevention Program 	No prevention program	Personalized prevention program
Additional Benefits 	No additional benefits	Payment of a daily fee for hospitalization (€50)
Survivors' Benefits 	Financing of funeral expenses	No benefits
Monthly Premium 	€48	€37

If you could choose between these, or no insurance, which would you prefer?
 Policy A Policy B Neither

Figure 1: Example of choice during the survey (translated from French)

3 Estimation strategy

We first estimated Conditional Logit model (CL). Then, Random Parameter Logit (RPL) - or Mixed Multinomial Logit model (Train (1998), McFadden & Train (2000)) - was estimated, allowing individuals' preferences to be heterogeneous and the Independence of Irrelevant Alternatives (IIA) assumption to be relaxed⁹. Utility U_{ijt} of an individual $i \in [1; N]$ from an alternative j in a choice set t is described as a sum of an observed component $\beta_i' X_{ijt}$ and an unobserved stochastic term ϵ_{ijt} :

⁹Doing so, we consider that attributes of an insurance contract might influence one to another.

$$\begin{aligned}
U_{ijt} = & \alpha_{1i}ASC_{Policy} + \alpha_{2i}ASC_A + \\
& \beta_{1i}Benefitpayment_{2j} + \beta_{2i}Healthinfo_{2j} + \beta_{3i}Healthinfo_{3j} + \\
& \beta_{4i}Prevention_{2j} + \beta_{5i}Prevention_{3j} + \beta_{6i}AddBenefits_{2j} + \beta_{7i}AddBenefits_{3j} + \\
& \beta_{8i}SurvivalBenefits_{2j} + \beta_{9i}SurvivalBenefits_{3j} + \beta_{10i}Premium + \epsilon_{ijt} \quad (1)
\end{aligned}$$

where ϵ_{ijt} is assumed to be an independently and identically distributed (IID) type-I extreme value. β_{fj} ($f \in [1, 10]$) are individual specific parameters associated with the observable variables (levels of attributes). We include also the alternative specific constants ASC_{Policy} and ASC_A , following Sicsic et al. (2018) approach. The coefficient α_{1i} associated with ASC_{Policy} considers the propensity to choose a policy ; α_{2i} associated with ASC_A controls for the tendency of participants to always choose the alternative A. The β coefficients vary across the N individuals in the population with density $(B|\theta)$, where θ is a vector of the true parameter of the distribution. Monthly Premium is coded as a continuous variable.

Equation 1 is estimated through Mixed Multinomial Logit model using 500 Halton draws, where all coefficients are assumed to follow a normal distribution. Although particularly computationally intensive, this model is known to be the most flexible one (Hess & Train (2017)). In particular, it allows accounting for scale heterogeneity, i.e., various degrees of consistency of decisions across respondents.

Heterogeneity in Propensity of choosing a policy and Willingness to pay

As Premium is an attribute of the DCE, we have also computed Willingness To Pay (WTP) for an attribute's level change in a policy. We used the Mixed Multinomial Logit model framework using a parameterization in WTP space allowing direct estimation of WTP parameter distribution (Greene & Hensher (2010)). This model accounts for scale heterogeneity that is especially relevant for stated preference data, where respondents can pay attention and interpret choice situations differently. Note that to test the consistency of the results, estimations were run both with Stata 15 (*MIXLOGITWTP* module - Hole (2015)) and R (*logitr* library - Helveston (2023)) software.

Finally, following Sicsic et al. (2018)¹⁰, Mixed Multinomial Logit model in WTP space permitted to retrieve individuals' WTP of attributes' levels and propensity of choosing a policy. The latters are estimated as a function of individual characteristics gathered during the survey (Sociodemographics, perceived health and behavioral variables) through Multivariate OLS and Linear Probability models¹¹. The choice between OLS and Linear Probability specification is made based on the cumulative distribution functions of the

¹⁰Note that authors have estimated Generalized Multinomial Logit Model.

¹¹Note that Seemingly Unrelated Regressions (Zellner (1962)) were estimated to test correlations between models. No correlations were found.

propensity of choosing a contract and WTPs.

Robustness checks

Several robustness checks were performed. During the DCE, we used an additional question asking, when an alternative is chosen (Policy A or Policy B), about the intention to purchase the policy of participants if such a product were available. In this case, we considered that a choice between policy A or B was made if respondents indicated being "very likely" or "likely" to purchase the contract. Another modeling specification of the DCE was made, removing ASC_A . We also tested the linearity of the premium attribute. The model was re-estimated to test the use by participants of decision heuristics (Dhami et al. (2019)) that may occur during stated preference studies (Cairns et al. (2002)). We assumed mental shortcuts may occurred in relation with premiums. Hence, the model was estimated removing (1) participants that always chose the lowest premium between the two policies proposed and (2) participants that always chose the lowest premium - €26 - when available.

4 Empirical results

Empirical results are analyzed through the following steps. In Section 4.1, we describe the sample studied. We estimate mean preferences for life insurance contract in Section 4.2 before examining individuals' heterogeneity of propensity to choose a policy and WTPs in Section 4.3.

4.1 Description of the sample studied

The characteristics of the sample are described in Appendix A - Tables 7 & 8. Participants can be equally divided in terms of education (49% have lower/upper secondary education as highest degree and 51% have at least a short-cycle tertiary diploma). There is a high variability of monthly household income in the sample: 20% (23%) earn less (more) than 1500 (3500) euros after tax per month. 10% declared having no life insurance policy¹². This figure is inconsistent with public statistics as 95% of the French population has health insurance¹³. Thus, this variable is used as a proxy of insurance literacy or past experience with insurance contracts because individuals who declared not having an insurance policy have probably never read their insurance contract or never underwritten one. Of the sample, 69% have at least one child and 66% are married or live in a couple. The latter would have probably defined their child or spouse as their beneficiary of the term life insurance contract and is thus used as a proxy of bequest motives. 28% of participants declared having acceptable, bad or very bad health, and 24% follow or followed a medical treatment in the past five years. One-third of the population had smoked during the last 24

¹²In the survey, this question takes into account any type of life insurance contract, including health, mortgage and long term care insurance.

¹³Source: DRESS

months. Participants who choose the safe gamble (Eckel & Grossman (2008)) are less risk takers than others. As we elicited risk attitudes with various methods, we are able to check consistency of participants' responses (see Table 9 in Supplementary Materials). Variables on perceived risk (in general, toward health and toward wealth) are highly correlated (Figure 3 in Supplementary Materials).

4.2 Mean preferences

Mean preferences of the French sample are provided with both CL and RPL estimations in Table 4.

Overall, the two models provide quite similar coefficients in terms of sign and statistical significance. The log-likelihood is higher in RPL than CL model. AIC and Schwartz (BIC) criteria also define RPL as the best model - lower AIC and BIC.

Table 4: Estimated consumers' preferences

	Clogit	Mixed logit	Mixed logit sd
Intercept			
ASC _{Policy}	1.417 *** (0.105)	4.964 *** (0.293)	4.221 *** (0.215)
ASC _A	0.009 (0.058)	-0.079 (0.117)	1.011 *** (0.058)
Benefit payment (Reference: Capital)			
Income	-0.1 *** (0.019)	-0.161 *** (0.035)	0.537 *** (0.03)
Health information (Reference: No information)			
Declarative questionnaire	0.02 (0.015)	0.025 (0.025)	0.076 (0.093)
Medical examinations and medical tests	-0.13 *** (0.018)	-0.217 *** (0.034)	0.352 *** (0.042)
Prevention program (Reference: No prevention program)			
Annual medical check-up	0.067 *** (0.015)	0.103 *** (0.025)	0.2 *** (0.044)
Personalized prevention program	-0.036 . (0.021)	-0.023 (0.04)	0.031 (0.055)
Additional Benefits (Reference: No additional benefits)			
Payment of a daily fee for hospitalization	0.005 (0.016)	0.032 (0.029)	0.04 (0.084)
Additional €100,000 in case of accident	0.21 *** (0.034)	0.288 *** (0.07)	0.391 *** (0.048)
Survivors' Benefits (Reference: No survivors' benefits)			
Reimbursement of 50% of the premiums	0.103 *** (0.019)	0.145 *** (0.034)	0.329 *** (0.037)
Financing funeral expenses	0.197 *** (0.023)	0.332 *** (0.048)	0.3 *** (0.046)
Monthly premium	-0.025 *** (0.002)	-0.056 *** (0.004)	0.081 *** (0.004)
Number of observations	32400	32400	
Number of individuals	900	900	
AIC	22193.281	16173.547	
BIC	22280.728	16348.442	
Log-likelihood	-11084.64	-8062.774	

Note:

*** p<.001, ** p<.01, * p<.05, . p<.1. Standard errors are in parentheses.

RPL with 500 Halton draws.

Participants were proposed premiums on average at 36 euros.

The coefficient associated with ASC_{Policy} is positive and significant, showing that respondents had a propensity to choose an insurance contract. There is no significant propensity to choose policy A compared to policy B, indicating that respondents were effectively trading between the two policies (ASC_A). Respondents have, on average, a higher preference

for contracts with a claim payment as capital rather than income. Compared to requesting no information, there is no positive or negative significant effect of asking to complete an underwriting questionnaire. An explanation might be the habit individuals have to respond to a questionnaire during underwriting, as asking for no information is very unlikely in the term life insurance market. Requiring medical tests has an overall negative effect on utility. Proposing prevention program with annual medical check-up has a positive effect on utility. It seems to be seen as a complement to the death cover by participants. The coefficient associated with personalized prevention program is not significant. It seems that participants are not willing to spend additional money on their insurance coverage to have access to a wellness app. Except for payment for a daily fee for hospitalization¹⁴, additional riders have a significant positive effect on utility compared to proposing no additional rider. As expected, the monthly premium has a negative effect on utility.

When considering the intention to purchase the policy of participants, the results show no modifications in results significance and signs of coefficients. A model without ASC_A provides also similar results. Finally, we found no decision heuristics or mental shortcuts to facilitate the decision process linked with premiums. The non-linearity hypothesis of premium attribute was rejected. Results are available in Supplementary Materials (Tables 10, 11, 12 & 13).

Except for the personalized prevention program, declarative questionnaire and hospitalization fee levels, the coefficients of standard deviation are significant, which indicates heterogeneity in preferences that we will study in section 4.3.

4.3 Willingness to pay

Overall results

Table 5 presents the estimated WTPs for each attribute, providing a direct monetary value and facilitating a comparison between attribute levels. As a reminder, contracts were proposed a price of 28, 37 or 48 euros.

Respondents would need a monthly premium reduction of approximately 5 euros per month to choose a contract with income payments rather than lump sum payment. Additionally, they are willing to accept medical examination tests included in the underwriting process for a reduction of 5.7 euros in the monthly premium. Notably, respondents indicate an average WTP of 1.6 euros to the total monthly premium for policies offering annual medical checkups, 3 euros for policies providing an additional €100,000 in case of accidental death, and 2 euros for policies offering a 50% premium reimbursement. The attribute that stands out as significantly more valued by respondents is the option to finance funeral expenses in case of survival, with an average increased WTP of 8.5 euros to the total monthly premium.

¹⁴Note that hospitalization fees are mainly financed by the Social Security system in France.

Table 5: Estimated individual willingness to pay

	Mixed logit WTP	Mixed logit sd
Benefit payment (Reference: Capital)		
Income	-4.799***	(-6.76)
Health information (Reference: No information)		
Declarative questionnaire	0.919*	(1.83)
Medical examinations and medical tests	-5.716***	(-8.99)
Prevention program (Reference: No prevention program)		
Annual medical check-up	1.662***	(3.28)
Personalized prevention program	-0.00124	(-0.00)
Additional Benefits (Reference: No additional benefits)		
Payment of a daily fee for hospitalization	1.329**	(2.29)
Additional €100,000 in case of accident	3.115*	(1.80)
Survivors' Benefits (Reference: No survivors' benefits)		
Reimbursement of 50% of the premiums	2.073**	(2.42)
Financing funeral expenses	8.449***	(9.51)
<hr/>		
Number of observations	32400	
Number of individuals	900	
AIC	16704.2	
BIC	16905.4	

Note:

*** p<.001, ** p<.01, * p<.05, . p<.1. Standard errors are in parentheses.

RPL with 500 Halton draws.

Heterogeneity of WTPs

Figure 2 shows heterogeneity between individuals for propensity to choose a policy and some levels tested in the DCE. A majority of respondents (86%) are willing to pay for a term life insurance contract. The mean value of WTP for income type of claim payment instead of lump sum is -5 euros. 20% of respondents prefer income payment method. In other words, most respondents prefer lump sum type of claim payment. When the application stage includes medical tests and exams, the individual WTP is negative for almost all respondents, with a mean of -5.72 euros indicating that individuals expect a premium reduction when the application process is more invasive. There is heterogeneity for the following riders WTP: double payment in case of accident, 50% of the premium paid if survival and financing funeral expenses if survival.

In contrast, we found little heterogeneity among individual preferences relative to declarative questionnaire during underwriting, annual medical check-up, personalized prevention program and daily fee hospitalization.

The rest of the analysis focuses on results where we found heterogeneity and is of two types: we estimate Linear Probability models for the propensity of choosing a contract and Income WTP and OLS regressions for other WTPs, permitting us to better understand sources of heterogeneity and individual preferences.

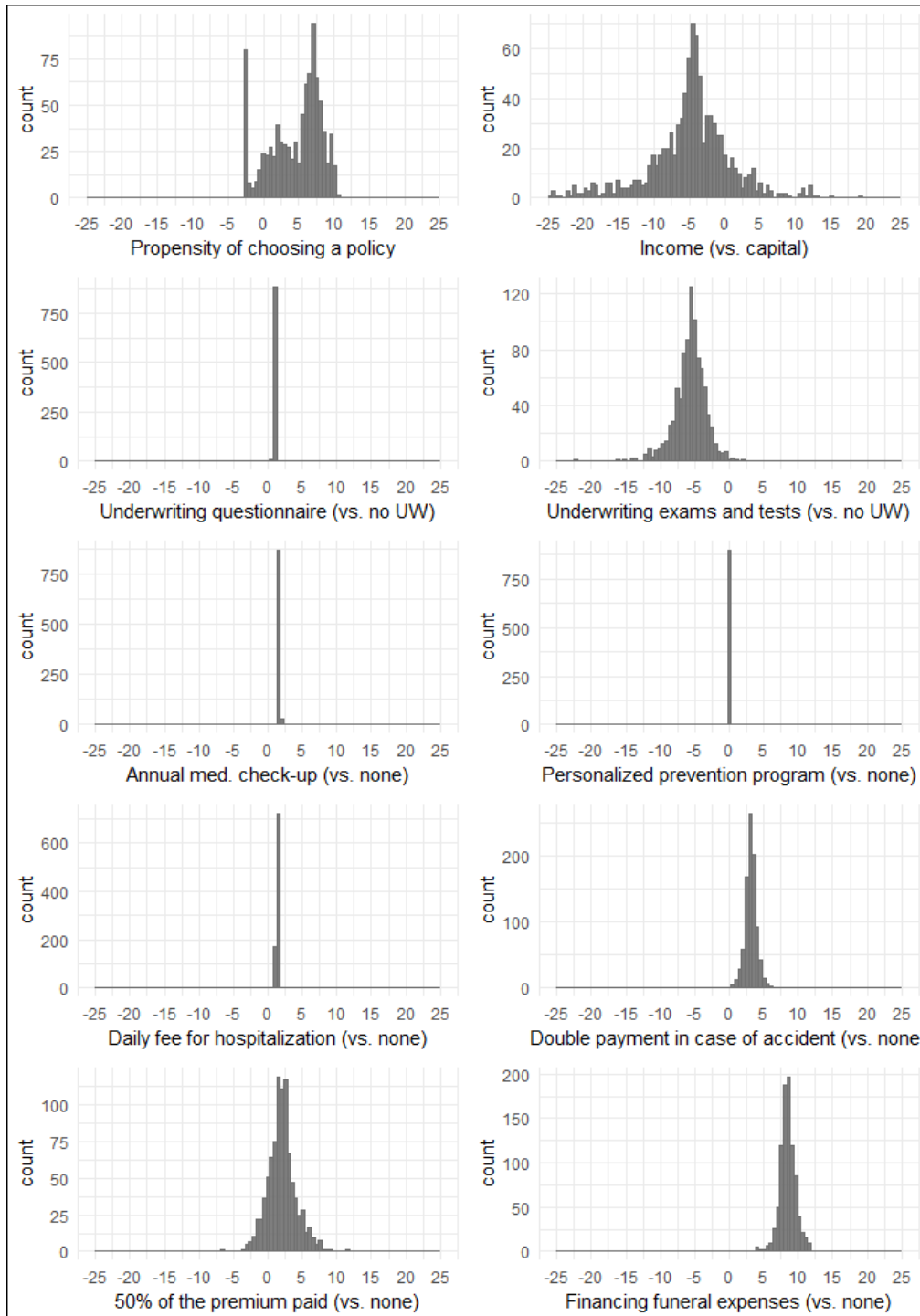


Figure 2: Individuals' propensity to choose a policy & Willingness to pay by attributes' level

4.4 Determinants of heterogeneity

In Table 6, we test different demographic, socioeconomic and behavioral indicators to explain the propensity to choose a policy and WTPs for each attribute level where we found heterogeneity. For all models, the objective is to look at the effect of behavioral

variables when demographic and socioeconomic variables are included.

Model selection

Three model specifications were run, including (1) socioeconomic and demographic variables only, (2) behavioral variables only and (3) both variable types (see Tables 14 & 15 in Supplementary Materials). For the propensity to choose a contract, We found that the model with behavioral variables only has a higher adjusted R2 than the model comprising solely sociodemographic variables. This demonstrates that behavioral variables play a significant role in explaining term life insurance demand.

Note that to avoid co-linearity, behavioral variables with high correlation are not included in the same model. Three perceived risk were elicited (see correlation matrix in Figure 3 in Supplementary Materials). Due to high correlation - above 0.7 - the variable relative to the management of assets ("Perceived risk (wealth)") was selected. Choosing one of the two others variables - perceived risk in general or perceived risk in health - provides similar results, see Tables 16 & 17 in Supplementary Materials.

Table 6: OLS models - Propensity of choosing a contract and WTPs

	Choosing contract	Income	UW Tests	Ben. acci.	Surv. premium reimb.	Surv. fun. expenses
Intercept	0.879 (0.184) ***	-0.192 (0.194)	-6.718 (1.246) ***	3.178 (0.458) ***	2.562 (1.103) *	9.192 (0.63) ***
Women	-0.021 (0.024)	-0.013 (0.025)	-0.189 (0.162)	0.049 (0.059)	0.142 (0.143)	0.076 (0.082)
Age	-0.003 (0.008)	0.008 (0.008)	0.075 (0.052)	0 (0.019)	-0.014 (0.046)	-0.03 (0.026)
Age x Age	0 (0)	0 (0)	-0.001 (0.001)	0 (0)	0 (0)	0 (0)
1 or more child	0.029 (0.025)	0.05 (0.026)	-0.13 (0.17)	-0.085 (0.062)	0.006 (0.15)	-0.081 (0.086)
Education (Ref.: Short-cycle tertiary education)						
Lower/Upper secondary education	0.043 (0.03)	0.047 (0.032)	0.093 (0.205)	-0.003 (0.075)	-0.276 (0.181)	-0.183 (0.104) .
Bachelor's, Master's, doctoral or equivalent	-0.028 (0.033)	0.023 (0.035)	0.194 (0.223)	-0.023 (0.082)	-0.168 (0.197)	-0.325 (0.113) **
Work situation (Reference: Active worker)						
Other/Unemployed	-0.025 (0.033)	0.029 (0.035)	0.078 (0.226)	-0.119 (0.083)	0.06 (0.2)	0.028 (0.114)
Retired	0.032 (0.046)	-0.014 (0.048)	0.541 (0.308)	-0.15 (0.113)	0.286 (0.272)	0.187 (0.156)
No insurance contract	-0.06 (0.038)	0.034 (0.04)	-0.092 (0.26)	0.02 (0.095)	-0.253 (0.23)	-0.201 (0.131)
Perceived health (Reference: Excellent, very good)						
Good	-0.056 (0.028) *	-0.002 (0.03)	-0.074 (0.19)	0.022 (0.07)	-0.21 (0.168)	0.051 (0.096)
Acceptable, Bad, very bad	-0.121 (0.033) ***	0.043 (0.035)	-0.238 (0.222)	0.052 (0.082)	-0.066 (0.197)	0.066 (0.112)
Smoked in last 24 m.	0.025 (0.024)	0.02 (0.026)	0.098 (0.164)	-0.001 (0.06)	0.03 (0.146)	0.128 (0.083)
Risky lottery	0.009 (0.023)	0.048 (0.025)	0.073 (0.158)	0.06 (0.058)	0.144 (0.139)	-0.017 (0.08)
Perceived risk (wealth)	0 (0.004)	-0.001 (0.005)	0.009 (0.03)	-0.031 (0.011) **	-0.076 (0.026) **	-0.053 (0.015) ***
Concerned about future	0.023 (0.005) ***	0.01 (0.005) *	-0.06 (0.033)	0.005 (0.012)	0.02 (0.029)	0.055 (0.017) **
Optimism 85	-0.037 (0.032)	0.065 (0.034)	0.481 (0.219) *	0.002 (0.08)	-0.234 (0.194)	0.058 (0.111)
Optimism 85 (no idea)	-0.105 (0.028) ***	0.038 (0.03)	0.308 (0.19)	0.053 (0.07)	-0.188 (0.168)	-0.06 (0.096)
Altruism	0.009 (0.005)	0 (0.005)	-0.039 (0.032)	-0.009 (0.012)	0.023 (0.028)	0.024 (0.016)
Num. obs.	895	895	895	895	895	895
Adj. R2	0.072	0.012	0.012	0.005	0.012	0.033

Note:

*** p<.001, ** p<.01, * p<.1. Standard errors are in parentheses.

Multivariate linear probability models for the propensity of choosing a contract and Income WTP. Other models are Multivariate OLS regressions. Income type of payment WTP compared to lump sum; UW Tests WTP compared to no medical UW; Ben. acci., Surv premium reimb. and Surv. fun. expenses are WTPs compared to no rider. 5 individuals are missing due to 1 non-response on Smoking status ('Smoked in last 24 m.'). 4 non-responses on Self-perceived health ('Perceived health').

'No insurance contract' used as a proxy of financial literacy. 'Optimism 85' compares the survival probability of surviving above 85 years-old with mortality table. 'Optimism 85 (no idea)' corresponds to individuals who did not answered this question.

Propensity of choosing a policy by individuals

Overall, the model is explained by health and behavioral characteristics. Compared to the literature, we did not find a positive but non-linear relationship between age and life insurance demand (Luciano et al. (2016)). Compared to individuals in "Excellent" and "Very good" health, individuals with poorer health have a lower probability of choosing a contract. This result differs from adverse selection theory but is consistent with the majority of empirical findings on life insurance demand (Cawley & Philipson (1999), Pauly et al. (2003), Hendren (2013), Hedengren & Stratmann (2016)) and advantageous selection theory (Hemenway (1990)).

Looking at personal traits, being concerned about the future has a positive effect on the probability of choosing a contract. Being altruistic also increases the probability of choosing a contract, in line with findings on bequest motives (Bernheim (1991)). We did not find a relationship between risk preference and term life insurance demand. Individuals without idea about their survival probability are less likely to purchase a contract. Though not significant, we can also highlight that having less financial literacy, as a proxy of declaring having or not having an insurance contract, has a negative relationship with propensity of choosing a contract.

Heterogeneity in the type of payment attribute

The only demographic characteristic explaining the type of payment WTP is parenthood. Individuals with one or more child are more likely to prefer income type of payment. This may be explained by the willingness of participants to secure money that can't be spent at once. Individuals who are optimistic about their survival probability above 85 years old significantly prefer income claim payment. This confirms results from Unger et al. (2022) which claim that health-consciousness explains the preference for annuity. The more concerned about future, the more likely individuals are to prefer income type of payment. However, individuals who have chosen one of the risky lotteries also have a higher preference for income claim payment, inconsistent with results from (Agnew et al. (2008)).

WTPs & medical underwriting

The willingness to share medical information through exams and tests increases with age but is non-linear. It seems that young individuals do not want to share information, middle-aged individuals agree to share information, and elderly individuals disagree to share health information through invasive exams. Retired have lower negative utility for this kind of underwriting process. It may be linked with the time cost associated with exams, that might be less important for this age range. These results shed light on the importance given to time by individuals in underwriting. Optimistic individuals about their survival probability have a positive WTP associated with underwriting tests. These individuals seem to be willing to share medical information about their health. On the contrary,

individuals more concerned about the future have a lower WTP for UW tests. Among other demographic and behavioral indicators gathered, we do not observe any significant variable explaining this heterogeneity.

Heterogeneity on additional riders

Heterogeneity for having additional payments in case of death by accident is only explained by risk attitudes toward wealth. The more risk lover toward asset management, the lower the WTP for accidental rider. The same result holds for riders in case of survival.

5 Conclusion

In this article, we investigated the term life insurance demand and examined how various attributes might impact individual preferences. Our primary aim was to elucidate not only socioeconomic and demographic indicators but also behavioral preferences that may impact demand for such contract. To achieve this, we conducted a DCE.

Our empirical analysis reveals that behavioral factors permit to better explain individuals' heterogeneity on propensity to choose a term life insurance contract and WTP for attributes of such contract than socioeconomic and demographic characteristics alone. Future concerns, optimism about survival, perceived asset management risk, and altruism influence term life insurance demand. Individuals with more future concerns are inclined towards policies, prefer income-based claim payments, and demonstrate a higher WTP for funeral expenses option in case of survival. Altruistic individuals are also more inclined towards purchasing a policy. Risk-averse individuals regarding asset management show lower WTP for additional benefits.

Contrary to Braun et al. (2016), the monthly premiums proposed were not dependent on individuals' characteristics, which may have provided higher variability in WTPs results. Still, our work has practical implications for insurers. With DCE, they can better design products that align with customers' needs, enhance their market competitiveness, and offer more appealing insurance solutions to potential policyholders. In an environment where innovation ranks as a top priority of many insurers, such insights can greatly benefit the life insurance industry as a whole, increasing both the number of individuals covered and the profitability of products.

There are promising avenues for future research. One aspect is the role of prevention in life insurance choices. Indeed, while medical check-up was valued by participants, this was not the case for the prevention program defined in our design. This result is probably linked with individuals' care about data privacy (Biener et al. 2020). Hence, delving into the issue of prevention program as the main subject of a DCE could be relevant.

References

- Agnew, J. R., Anderson, L. R., Gerlach, J. R. & Szykman, L. R. (2008), ‘Who chooses annuities? an experimental investigation of the role of gender, framing, and defaults’, *American Economic Review* **98**(2), 418–22.
URL: <https://www.aeaweb.org/articles?id=10.1257/aer.98.2.418>
- Akaichi, F., Costa-Font, J. & Frank, R. (2020), ‘Uninsured by choice? a choice experiment on long term care insurance’, *Journal of Economic Behavior & Organization* **173**, 422–434.
- Bernheim, B. D. (1991), ‘How strong are bequest motives? evidence based on estimates of the demand for life insurance and annuities’, *Journal of Political Economy* **99**(5), 899–927.
- Bhatia, R., Bhat, A. & Tikoria, J. (2021), ‘Life insurance purchase behavior: A systematic review and directions for future research’, *International IJC* **45**.
- Biener, C., Eling, M. & Lehmann, M. (2020), ‘Balancing the desire for privacy against the desire to hedge risk’, *Journal of Economic Behavior & Organization* **180**, 608–620.
- Brackenridge, R., Croxson, R. & Mackenzie, R. (2006), *Brackenridge’s Medical Selection of Life Risks, 5th ed.*, Palgrave Macmillan, New York.
- Brau, R. & Lippi Bruni, M. (2008), ‘Eliciting the demand for long-term care coverage: A discrete choice modelling analysis’, *Health economics* **17**, 411–33.
- Braun, A., Schmeiser, H. & Schreiber, F. (2016), ‘On consumer preferences and the willingness to pay for term life insurance’, *European Journal of Operational Research* **253**(3), 761–776.
URL: <https://www.sciencedirect.com/science/article/pii/S0377221716300601>
- Brouwer, R., Tinh, B. D., Tuan, T. H., Magnussen, K. & Navrud, S. (2014), ‘Modeling demand for catastrophic flood risk insurance in coastal zones in vietnam using choice experiments’, *Environment and Development Economics* **19**(2), 228–249.
- Cairns, J., van der Pol, M. & Lloyd, A. (2002), ‘Decision making heuristics and the elicitation of preferences: being fast and frugal about the future’, *Health Economics* **11**(7), 655–658.
- Cawley, J. & Philipson, T. (1999), ‘An empirical examination of information barriers to trade in insurance’, *The American Economic Review* **89**(4), 827–846.
- Chen, N., Bai, J., Nicholas, S., Maitland, E., Tan, J. & Wang, J. (2022), ‘Preferences for private health insurance in china: A discrete choice experiment’, *Frontiers in Public Health* **10**.
URL: <https://www.frontiersin.org/articles/10.3389/fpubh.2022.985582>
- Chen, R., Wong, K. & Lee, H. (2001), ‘Age, period, and cohort effects on life insurance purchases in the u.s.’, *The Journal of Risk and Insurance* **68**, 303.
- Chow-Chua, C. & Lim, G. (2000), ‘A demand audit of the insurance market in singapore’, *Managerial Auditing Journal* **15**, 372–382.

- Coe, N., Belbase, A. & Wu, A. (2016), ‘Overcoming barriers to life insurance coverage: A behavioral approach: Overcoming barriers to life insurance coverage’, *Risk Management and Insurance Review* **19**, 307–336.
- Dhami, S., al Nowaihi, A. & Sunstein, C. R. (2019), ‘Heuristics and public policy: Decision-making under bounded rationality’, *Studies in Microeconomics* **7**(1), 7–58.
- Doherty, E., Mellett, S., Norton, D., McDermott, T. K., Hora, D. O. & Ryan, M. (2021), ‘A discrete choice experiment exploring farmer preferences for insurance against extreme weather events’, *Journal of Environmental Management* **290**, 112607.
URL: <https://www.sciencedirect.com/science/article/pii/S0301479721006691>
- Dohmen, T., Falk, A. & Huffman, D. (2009), ‘Individual risk attitudes: Measurement, determinants and behavioral consequences’, *Journal of the European Economic Association* **5517**, 522–550.
- Eckel, C. C. & Grossman, P. J. (2008), ‘Forecasting risk attitudes: An experimental study using actual and forecast gamble choices’, *Journal of Economic Behavior & Organization* **68**(1), 1–17.
- Eisenhauer, J. & Halek, M. (1999), ‘Prudence, risk aversion, and the demand for life insurance.’, *Applied Economics Letters* **6**, 239–42.
- Ellison, G. & Ellison, S. F. (2009), ‘Search, obfuscation, and price elasticities on the internet’, *Econometrica* **77**(2), 427–452.
- Falk, A., Becker, A., Dohmen, T., Huffman, D. & Sunde, U. (2022), ‘The preference survey module: A validated instrument for measuring risk, time, and social preferences’, *Management Science* **69**(4), 1935–1950.
URL: <https://doi.org/10.1287/mnsc.2022.4455>
- France Assureurs (2022), ‘L’Assurance Française, Données clés 2021’.
- Frimpong, E., Howard, G. & Kruse, J. (2022), ‘Homeowner preference for household-level flood mitigation in us: Analysis of a discrete choice experiment’, *Journal of Agricultural and Applied Economics* **54**(2), 262–285.
- Greene, W. H. & Hensher, D. A. (2010), *Modeling Ordered Choices: A Primer*, Cambridge University Press.
- Harris, T. & Yelowitz, A. (2014), ‘Is there adverse selection in the life insurance market? evidence from a representative sample of purchasers’, *Economics Letters* **124**(3), 520–522.
- He, D. (2009), ‘The life insurance market: Asymmetric information revisited’, *Journal of Public Economics* **93**(9), 1090–1097.
- Hedengren, D. & Stratmann, T. (2016), ‘Is there adverse selection in the life insurance markets?’, *Economic Inquiry* **54**(1), 450–463.
- Helveston, J. P. (2023), ‘logitr: Fast estimation of multinomial and mixed logit models with preference space and willingness-to-pay space utility parameterizations’, *Journal of Statistical Software* **105**(10), 1–37.

- Hemenway, D. (1990), ‘Propitious Selection’, *The Quarterly Journal of Economics* **105**(4), 1063–1069.
URL: <https://doi.org/10.2307/2937886>
- Hendren, N. (2013), ‘Private information and insurance rejections’, *Econometrica* **81**(5), 1713–1762.
- Hess, S. & Train, K. (2017), ‘Correlation and scale in mixed logit models’, *Journal of choice modelling* **23**(C), 1–8.
- Hole, A. R. (2015), ‘MIXLOGITWTP: Stata module to estimate mixed logit models in WTP space’, Statistical Software Components, Boston College Department of Economics.
URL: <https://ideas.repec.org/c/boc/bocode/s458037.html>
- Kakar, P. & Shukla, R. (2010), ‘The determinants of demand for life insurance in an emerging economy–india’, *Margin: The Journal of Applied Economic Research* **4**, 49–77.
- Kazemi karyani, A., Baba akbari, A. & Woldemichael, A. (2019), ‘Eliciting preferences for health insurance in iran using discrete choice experiment analysis’, *International Journal of Health Policy and Management* **8**, 488–497.
- Kerssens, J. & Groenewegen, P. (2005), ‘Consumer preferences in social health insurance’, *The European journal of health economics : HEPAC : health economics in prevention and care* **6**, 8–15.
- Kwofie, C., Yormekpe, D. D., Osei Mensah, S. & Botchwa1, P. (2018), ‘Choosing between alternative motor insurance policies: A discrete choice experiment’, *International Journal of Mathematics and Mathematical Sciences* .
- Lambregts, T. R. & Schut, F. T. (2020), ‘Displaced, disliked and misunderstood: A systematic review of the reasons for low uptake of long-term care insurance and life annuities’, *The Journal of the Economics of Ageing* **17**, 100236.
- Leukert-Becker, K. & Zweifel, P. (2008), ‘Age and choice in health insurance: Evidence from a discrete choice experiment’, *The Patient: Patient-Centered Outcomes Research* **1**, 27–40.
- Louviere, J. J., Flynn, T. N. & Carson, R. T. (2010), ‘Discrete choice experiments are not conjoint analysis’, *Journal of Choice Modelling* **3**(3), 57–72.
- Lucarelli, C., Marinelli, N. & Brighetti, G. (2014), ‘Do emotions affect insurance demand?’, *Review of Behavioral Finance* **Volume 6**, 136–154.
- Luciano, E., Outreville, J. & Rossi, M. (2016), ‘Life insurance ownership by italian households: A gender-based differences analysis’, *The Geneva Papers on Risk and Insurance Issues and Practice* **41**.
- McFadden, D. (1973), ‘Conditional logit analysis of qualitative choice’, *Frontiers in Econometrics* **17**, 105–142.
- McFadden, D. & Train, K. (2000), ‘Mixed mnl models for discrete response’, *J. Appl. Econom.* **64**, 207–240.

- Mouminoux, C., Rullière, J.-L. & Loisel, S. (2018), ‘Obfuscation and Honesty Experimental Evidence on Insurance Demand with Multiple Distribution Channels’. working paper or preprint.
URL: <https://hal.archives-ouvertes.fr/hal-01819522>
- Nagy, B., Alt, M., Benedek, B. & Saplacan, Z. (2019), ‘How do loss aversion and technology acceptance affect life insurance demand?’, *Applied Economics Letters* **27**, 1–5.
- Nanna, A. (2011), Health insurance in developing countries : willingness to pay for health insurance in Thailand using discrete choice experiment methods, PhD thesis, Curtin University.
- Obse, A., Ryan, M., Heidenreich, S., Normand, C. & Hailemariam, D. (2016), ‘Eliciting preferences for social health insurance in ethiopia: A discrete choice experiment’, *Health Policy and Planning* **31**.
- Omar, O. & Owusu-Frimpong, N. (2007), ‘Life insurance in nigeria: An application of the theory of reasoned action to consumers’ attitudes and purchase intention’, *The Service Industries Journal* **27**, 963–976.
- Outreville, J. (2012), ‘The relationship between insurance and economic development: 85 empirical papers for a review of the literature’, *Risk Management and Insurance Review* **16**, 71–122.
- Ozawa, S., Grewal, S. & Bridges, J. F. (2016), ‘Household size and the decision to purchase health insurance in cambodia: Results of a discrete-choice experiment with scale adjustment’, *Applied Health Economics and Health Policy* **14**(2), 195–204.
- Pauly, M. V., Withers, K. H., Subramanian-Viswana, K., Lemaire, J. & Hershey, J. C. (2003), Price elasticity of demand for term life insurance and adverse selection, Working Paper 9925, National Bureau of Economic Research.
- Rothschild, M. & Stiglitz, J. (1976), ‘Equilibrium in competitive insurance markets: An essay on the economics of imperfect information’, *The Quarterly Journal of Economics* **90**(4), 629–649.
URL: <https://doi.org/10.2307/1885326>
- Shee, A., Turvey, C. G. & Marr, A. (2021), ‘Heterogeneous Demand and Supply for an Insurance-linked Credit Product in Kenya: A Stated Choice Experiment Approach’, *Journal of Agricultural Economics* **72**(1), 244–267.
URL: <https://ideas.repec.org/a/bla/jageco/v72y2021i1p244-267.html>
- Sherrick, B., Barry, P., Schnitkey, G., Ellinger, P. & Wansink, B. (2003), ‘Farmers’ preferences for crop insurance attributes’, *Review of Agricultural Economics* **25**, 415–429.
- Sicsic, J., Pelletier-Fleury, N. & Moumjid, N. (2018), ‘Women’s benefits and harms trade-offs in breast cancer screening: Results from a discrete-choice experiment’, *Value in Health* **21**(1), 78–88.
URL: <https://www.sciencedirect.com/science/article/pii/S1098301517303248>
- Street, D. & Burgess, L. (2007), ‘The construction of optimal stated choice experiments’, *Wiley Series in Probability and Statistics* .

- Tan, H.-B., Wong, M.-F. & Law, S. (2009), ‘The effect of consumer factors and firm efficiency on malaysian life insurance expenditure’, *International Journal of Business and Society* **10**, 59–73.
- Traets, F., Sanchez, D. G. & Vandebroek, M. (2020), ‘Generating optimal designs for discrete choice experiments in r: The idefix package’, *Journal of Statistical Software* **96**(3), 1–41.
- Train, K. (1998), *Discrete Choice Methods with Simulation*, Cambridge University Press.
- Unger, F., Steul-Fischer, M. & Gatzert, N. (2022), ‘How default effects and decision timing affect annuity uptake and health consciousness’, *The Geneva Papers on Risk and Insurance* .
- van den Berg, B., Van Dommelen, P., Stam, P., Laske-Aldershof, T., Buchmueller, T. & Schut, F. T. (2008), ‘Preferences and choices for care and health insurance’, *Social Science & Medicine* **66**(12), 2448–2459.
URL: <https://www.sciencedirect.com/science/article/pii/S0277953608001135>
- Wang, N. (2019), ‘The demand for life insurance in a heterogeneous-agent life cycle economy with joint decisions’, *The Geneva Risk and Insurance Review* **44**(2), 176–206.
- Worawan & Wasi, N. (2020), ‘Incorporating discrete choice experiments into policy decisions: Case of designing public long-term care insurance’, *Social Science & Medicine* **258**, 113044.
- Zellner, A. (1962), ‘An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias’, *Journal of the American Statistical Association* **57**(298), 348–368.
URL: <http://www.jstor.org/stable/2281644>
- Zweifel, P., Leukert-Becker, K. & Berner, S. (2010), ‘Preferences for health insurance in germany and the netherlands – a tale of two countries’, *Health Economics Review* .

A Appendix - Descriptive statistics

Table 7: Description of the samples (1/2)

	Individuals, N = 900
Age	49 (14)
Female	458 (51%)
Living Area	
Parisian basin	155 (17%)
Centre-East	112 (12%)
East	86 (9.6%)
Mediterranean region	111 (12%)
Nord - Pas-De-Calais	53 (5.9%)
West	129 (14%)
South-West	94 (10%)
Ile De France region	160 (18%)
Education	
Lower/Upper secondary education	443 (49%)
Short-cycle tertiary education	181 (20%)
Bachelor's, Master's, doctoral or equivalent level	276 (31%)
Monthly household income	
Less than 1500	181 (20%)
[1500 -2500]	250 (28%)
(2500- 3500]	220 (24%)
More than 3500	211 (23%)
Missing values	38 (4.2%)
Work situation	
Active worker	540 (60%)
Other/Unemployed	144 (16%)
Retired	216 (24%)
No insurance contract	93 (10%)
Children	
0	283 (31%)
1	215 (24%)
2	263 (29%)
3 and more	139 (15%)
Marital status	
Single	304 (34%)
Relationship	596 (66%)
Self-perceived health	
Excellent, very good	273 (30%)
Good	369 (41%)
Acceptable, Bad, very bad	254 (28%)
Missing values	4 (0.4%)
Medical treatment in the last 5 years	
Yes	215 (24%)
No	679 (75%)
Missing values	6 (0.7%)
Smoker during the last 24 months	
Yes	305 (34%)
No	594 (66%)
Missing values	1 (0.1%)

¹ Mean (SD); n (%)

Note:

The French sample is representative of the general population in terms of age, gender and living area.

Table 8: Description of the samples (2/2)

	Individuals, N = 900
Score impatient	18 (11)
Unknown	214
Risk attitudes (OLS)	
A - 16/16	448 (50%)
B - 24/12	275 (31%)
CDE	177 (20%)
Perceived risk	4.42 (2.76)
Perceived risk (health)	3.68 (2.93)
Perceived risk (wealth)	3.87 (2.85)
Concern about future	6.21 (2.36)
Optimism 75	
0	310 (34%)
1	197 (22%)
Unknown	393 (44%)
Optimism 85	
0	245 (27%)
1	255 (28%)
Unknown	400 (44%)
Altruism	4.08 (2.65)

¹ Mean (SD); n (%)

Note:

The French sample is representative of the general population in terms of age, gender and living area.

Supplementary Materials

Variables selection

Table 9: Comparison between risk elicitations

Lottery choice	Overall, N = 900	A - 16/16, N = 448	BCDE, N = 452	p-value
Perceived risk	4.42 (2.76)	3.85 (2.90)	4.98 (2.49)	<0.001
Perceived risk (health)	3.68 (2.93)	3.36 (3.03)	3.99 (2.80)	<0.001
Perceived risk (wealth)	3.87 (2.85)	3.32 (2.95)	4.41 (2.63)	<0.001

¹ Mean (SD)

² Wilcoxon rank sum test

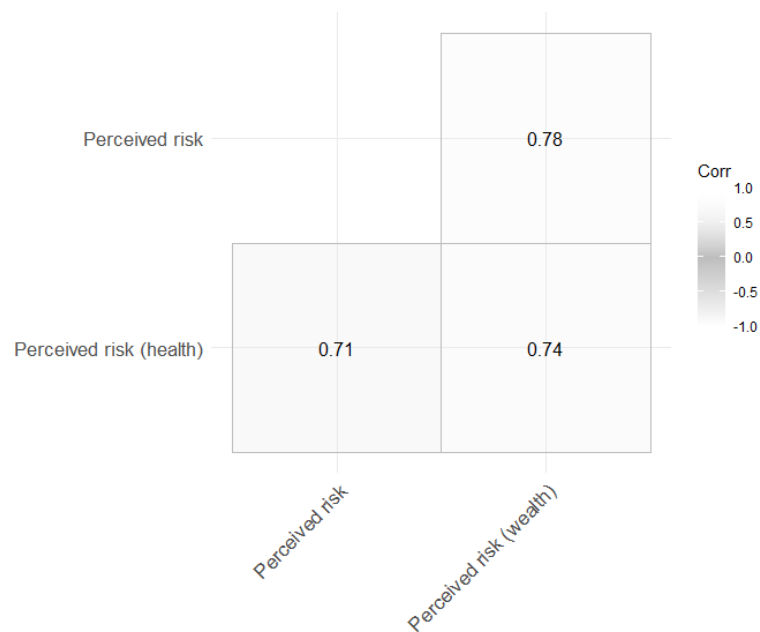


Figure 3: Correlation matrix of perceived risk variables

“Each game offers two possible wins. You have a 50/50 chance of winning each of these two prizes. Please choose your favorite of the five (A to E) coin-toss games.”

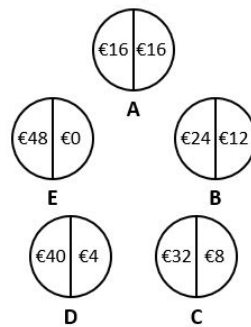


Figure 4: Lottery choice from Eckel & Grossman (2008)

Robustness checks

DCE model specifications

Table 10: Estimated consumers' preferences: choices vs. intention to purchase

	Prefences	Intention to purchase
Intercept		
ASC _{Policy}	1.417 *** (0.105)	-0.147 (0.099)
ASC _A	0.009 (0.058)	0.047 (0.06)
Benefit payment (Reference: Capital)		
Income	-0.1 *** (0.019)	-0.068 *** (0.02)
Health information (Reference: No information)		
Declarative questionnaire	0.02 (0.015)	0.007 (0.018)
Medical examinations and medical tests	-0.13 *** (0.018)	-0.079 *** (0.02)
Prevention program (Reference: No prevention program)		
Annual medical check-up	0.067 *** (0.015)	0.054 ** (0.019)
Personalized prevention program	-0.036 . (0.021)	0.003 (0.023)
Additional Benefits (Reference: No additional benefits)		
Payment of a daily fee for hospitalization	0.005 (0.016)	0.004 (0.019)
Additional €100,000 in case of accident	0.21 *** (0.034)	0.188 *** (0.034)
Survivors' Benefits (Reference: No survivors' benefits)		
Reimbursement of 50% of the premiums	0.103 *** (0.019)	0.084 *** (0.02)
Financing funeral expenses	0.197 *** (0.023)	0.181 *** (0.024)
Monthly premium	-0.025 *** (0.002)	-0.023 *** (0.002)
Number of observations	32400	32400
Number of clusters	900	900
Number of events	10800	10800

Note:

*** p<.001, ** p<.01, * p<.05, . p<.1. Standard errors are in parentheses.

Conditional logit models. Intention to purchase considers both choices between pairs of contracts and responses to purchasing intention question ("If the contract were available, I would definitely/probably buy it.").

Table 11: Estimated consumers' preferences (without ascA)

	Mixed logit	Mixed logit sd
Intercept		
ASC _{Policy}	4.507 *** (0.166)	2.87 *** (0.027)
Benefit payment (Reference: Capital)		
Income	-0.139 *** (0.024)	0.5 (0.049)
Health information (Reference: No information)		
Declarative questionnaire	0.033 (0.023)	0.01 *** (0.034)
Medical examinations and medical tests	-0.197 *** (0.027)	0.363 (0.064)
Prevention program (Reference: No prevention program)		
Annual medical check-up	0.093 *** (0.021)	0.092 (0.058)
Personalized prevention program	-0.034 (0.024)	0.006 (0.054)
Additional Benefits (Reference: No additional benefits)		
Payment of a daily fee for hospitalization	0.026 (0.023)	0.074 *** (0.034)
Additional €100,000 in case of accident	0.275 *** (0.032)	0.543 *** (0.039)
Survivors' Benefits (Reference: No survivors' benefits)		
Reimbursement of 50% of the premiums	0.156 *** (0.025)	0.264 *** (0.037)
Financing funeral expenses	0.299 *** (0.026)	0.318 *** (0.003)
Monthly premium	-0.046 *** (0.003)	0.065 *** (0.027)
<hr/>		
Number of observations	32400	32400
Number of individuals	900	900
AIC	15851.972	
BIC	16010.137	
Log-likelihood	-7903.986	

Note:

*** p<.001, ** p<.01, * p<.05, . p<.1. Standard errors are in parentheses.

RPL with 500 Halton draws.

Participants were proposed premiums on average at 36 euros.

Table 12: Estimated consumers' preferences - Robustness check on premium heuristic

	Premium heuristic (1)	Premium heuristic (2)
Intercept		
ASC _{Policy}	1.236 *** (0.103)	1.136 *** (0.102)
ASC _A	-0.046 (0.059)	-0.056 (0.059)
Benefit payment (Reference: Capital)		
Income	-0.112 *** (0.019)	-0.117 *** (0.019)
Health information (Reference: No information)		
Declarative questionnaire	0.013 (0.015)	0.01 (0.016)
Medical examinations and medical tests	-0.134 *** (0.018)	-0.134 *** (0.019)
Prevention program (Reference: No prevention program)		
Annual medical check-up	0.06 *** (0.015)	0.059 *** (0.016)
Personalized prevention program	-0.016 (0.022)	-0.012 (0.022)
Additional Benefits (Reference: No additional benefits)		
Payment of a daily fee for hospitalization	0.018 (0.016)	0.018 (0.017)
Additional €100,000 in case of accident	0.182 *** (0.034)	0.183 *** (0.034)
Survivors' Benefits (Reference: No survivors' benefits)		
Reimbursement of 50% of the premiums	0.116 *** (0.019)	0.12 *** (0.019)
Financing funeral expenses	0.207 *** (0.024)	0.212 *** (0.024)
Monthly premium	-0.02 *** (0.002)	-0.018 *** (0.002)
Number of observations	31104	30456
Number of individuals	864	846
AIC	21491.666	21087.415
BIC	21578.624	21174.12
Log-likelihood	-10733.833	-10531.708

Note:

*** p<.001, ** p<.01, * p<.05, . p<.1. Standard errors are in parentheses.

Conditional logit models. Premium heuristic (1) removes all participants that always chosen the lowest premium. Premium heuristic (1) removes all participants that always chosen the 26 premium, when available.

Participants were proposed premiums on average at 36 euros.

Table 13: Estimated consumers' preferences - Robustness check on premium linearity

	Clogit	Clogit - Premium squared
Intercept		
ASC _{Policy}	1.417 *** (0.105)	1.503 *** (0.289)
ASC _A	0.009 (0.058)	0.003 (0.06)
Benefit payment (Reference: Capital)		
Income	-0.1 *** (0.019)	-0.102 *** (0.019)
Health information (Reference: No information)		
Declarative questionnaire	0.02 (0.015)	0.02 (0.015)
Medical examinations and medical tests	-0.13 *** (0.018)	-0.131 *** (0.018)
Prevention program (Reference: No prevention program)		
Annual medical check-up	0.067 *** (0.015)	0.067 *** (0.015)
Personalized prevention program	-0.036 . (0.021)	-0.034 (0.021)
Additional Benefits (Reference: No additional benefits)		
Payment of a daily fee for hospitalization	0.005 (0.016)	0.005 (0.016)
Additional €100,000 in case of accident	0.21 *** (0.034)	0.208 *** (0.035)
Survivors' Benefits (Reference: No survivors' benefits)		
Reimbursement of 50% of the premiums	0.103 *** (0.019)	0.102 *** (0.019)
Financing funeral expenses	0.197 *** (0.023)	0.199 *** (0.024)
Monthly premium	-0.025 *** (0.002)	-0.029 * (0.015)
Monthly premium2		0.001 (0.001)
Number of observations	32400	32400
Number of individuals	900	900
AIC	22193.281	22195.211
BIC	22280.728	22289.946
Log-likelihood	-11084.64	-11084.606

Note:

*** p<.001, ** p<.01, * p<.05, . p<.1. Standard errors are in parentheses.

Conditional logit models.

Propensity & WTPs models' specifications

Table 14: OLS models - Propensity of choosing a contract and WTPs - Models comparison (1/2)

	Choosing contract			Income			UW Tests		
	Sociodemo.	Behav.		Sociodemo.	Behav.		Sociodemo.	Behav.	
Intercept	0.99 (0.179) ***	0.732 (0.043) ***		-0.006 (0.184)	0.02 (0.045)		-6.688 (1.181) ***	-5.576 (0.286) ***	
Women	-0.021 (0.023)	-		-0.017 (0.024)	-		-0.28 (0.155)	-	
Age	-0.002 (0.008)	-		0.005 (0.008)	-		0.069 (0.051)	-	
Age x Age	0 (0)	-		0 (0)	-		-0.001 (0.001)	-	
1 or more child	0.04 (0.026)	-		0.055 (0.026) *	-		-0.125 (0.169)	-	
Education (Ref.: Short-cycle tertiary education)									
Lower/Upper secondary education	0.021 (0.031)	-		0.043 (0.032)	-		0.137 (0.204)	-	
Bachelor's, Master's, doctoral or equivalent	-0.02 (0.034)	-		0.026 (0.035)	-		0.195 (0.223)	-	
Work situation (Reference: Active worker)									
Other/Unemployed	-0.021 (0.023)	-		-0.017 (0.024)	-		-0.28 (0.155)	-	
Retired	-0.04 (0.034)	-		0.026 (0.035)	-		0.052 (0.222)	-	
Perceived health (Reference: Excellent, very good)									
No insurance contract	0.037 (0.046)	-		-0.027 (0.048)	-		0.472 (0.306)	-	
Good	-0.053 (0.028)	-		-0.002 (0.029)	-		-0.148 (0.187)	-	
Acceptable, Bad, very bad	-0.118 (0.032) ***	-		0.035 (0.033)	-		-0.365 (0.212)	-	
Smoked in last 24 m.	0.03 (0.025)	-		0.016 (0.026)	-		0.068 (0.164)	-	
Risky lottery	-	0.01 (0.023)		-	0.05 (0.024) *		-	0.067 (0.155)	
Perceived risk (wealth)	-	0.003 (0.004)		-	0.001 (0.005)		-	0.026 (0.029)	
Concerned about future	-	0.02 (0.005) ***		-	0.01 (0.005) *		-	-0.07 (0.032) *	
Optimism 85	-	-0.002 (0.031)		-	0.06 (0.032)		-	0.561 (0.205) **	
Optimism 85 (no idea)	-	-0.1 (0.028) ***		-	0.037 (0.029)		-	0.282 (0.188)	
Altruism	-	0.01 (0.005) *		-	-0.001 (0.005)		-	-0.032 (0.031)	
Num. obs.	895	900		895	900		895	900	
Adj. R2	0.021	0.054		0.007	0.006		0.007	0.009	

Note:

*** p<.001, ** p<.01, * p<.05, . p<.1. Standard errors are in parentheses.

Multivariate linear probability models for the propensity of choosing a contract and Income WTP. Other models are Multivariate OLS regressions. Income type of payment WTP compared to lump sum; UW Tests WTP compared to no medical UW; Ben. acci., Surv premium reimb. and Surv. fun. expenses are WTPs compared to no rider.

'No insurance contract' used as a proxy of financial literacy. 'Optimism 85' compares the survival probability of surviving above 85 years-old with mortality table. 'Optimism 85 (no idea)' corresponds to individuals who did not answered this question.

5 individuals are missing due to 1 non-response on Smoking status ('Smoked in last 24 m. '), 4 non-responses on Self-perceived health ('Perceived health').

Table 15: OLS models - Propensity of choosing a contract and WTPs - Models comparison (2/2)

	Ben. acci.		Surv. premium reimb.		Surv. fun. expenses	
	Sociodemo.	Behav.	Sociodemo.	Behav.	Sociodemo.	Behav.
Intercept	3.031 (0.434) ***	3.218 (0.105) ***	2.145 (1.046) *	2.234 (0.254) ***	9.197 (0.604) ***	8.293 (0.145) ***
Women	0.082 (0.057)	-	0.216 (0.137)	-	0.122 (0.079)	-
Age	0.001 (0.019)	-	-0.008 (0.045)	-	-0.024 (0.026)	-
Age x Age	0 (0)	-	0 (0)	-	0 (0)	-
1 or more child	-0.095 (0.062)	-	0.005 (0.15)	-	-0.07 (0.086)	-
Education (Ref.: Short-cycle tertiary education)						
Lower/Upper secondary education	0.005 (0.075)	-	-0.306 (0.181) .	-	-0.222 (0.104) *	-
Bachelor's, Master's, doctoral or equivalent	-0.024 (0.082)	-	-0.157 (0.198)	-	-0.307 (0.114) **	-
Work situation (Reference: Active worker)						
Other/Unemployed	0.082 (0.057)	-	0.216 (0.137)	-	0.122 (0.079)	-
Retired	-0.103 (0.082)	-	0.041 (0.197)	-	0.027 (0.114)	-
Perceived health (Reference: Excellent, very good)						
No insurance contract	-0.149 (0.113)	-	0.339 (0.272)	-	0.209 (0.157)	-
Good	0.04 (0.069)	-	-0.171 (0.165)	-	0.055 (0.095)	-
Acceptable, Bad, very bad	0.084 (0.078)	-	0.019 (0.188)	-	0.068 (0.108)	-
Smoked in last 24 m.	-0.01 (0.06)	-	0.04 (0.145)	-	0.117 (0.084)	-
Risky lottery	-	0.066 (0.057)	-	0.133 (0.137)	-	-0.013 (0.078)
Perceived risk (wealth)	-	-0.033 (0.011) **	-	-0.089 (0.026) ***	-	-0.056 (0.015) ***
Concerned about future	-	0.007 (0.012)	-	0.02 (0.029)	-	0.055 (0.016) ***
Optimism 85	-	-0.013 (0.075)	-	-0.275 (0.182)	-	-0.003 (0.104)
Optimism 85 (no idea)	-	0.053 (0.069)	-	-0.203 (0.166)	-	-0.075 (0.095)
Altruism	-	-0.01 (0.011)	-	0.028 (0.028)	-	0.026 (0.016) .
Num. obs.	895	900	895	900	895	900
Adj. R2	-0.00039	0.01	0.004	0.013	0.006	0.027

Note:

*** p<.001, ** p<.01, * p<.05, . p<.1. Standard errors are in parentheses.

Multivariate linear probability models for the propensity of choosing a contract and Income WTP. Other models are Multivariate OLS regressions. Income type of payment WTP compared to lump sum; UW Tests WTP compared to no medical UW; Ben. acci., Surv premium reimb. and Surv. fun. expenses are WTPs compared to no rider.

'No insurance contract' used as a proxy of financial literacy. 'Optimism 85' compares the survival probability of surviving above 85 years-old with mortality table. 'Optimism 85 (no idea)' corresponds to individuals who did not answer this question.

5 individuals are missing due to 1 non-response on Smoking status ('Smoked in last 24 m. '), 4 non-responses on Self-perceived health ('Perceived health').

Table 16: OLS models - Propensity of choosing a contract and WTPs - Perceived risk in general

	Choosing contract	Income	UW Tests	Ben. acci.	Surv. premium reimb.	Surv. fun. expenses
Intercept	0.875 (0.185) ***	-0.176 (0.195)	-6.773 (1.251) ***	3.168 (0.461) ***	2.691 (1.108) *	9.179 (0.636) ***
Women	-0.021 (0.024)	-0.015 (0.025)	-0.184 (0.161)	0.065 (0.059)	0.154 (0.143)	0.101 (0.082)
Age	-0.003 (0.008)	0.008 (0.008)	0.076 (0.052)	-0.001 (0.019)	-0.018 (0.046)	-0.031 (0.026)
Age x Age	0 (0)	0 (0)	-0.001 (0.001)	0 (0)	0 (0)	0 (0)
1 or more child	0.029 (0.025)	0.051 (0.026)	-0.131 (0.17)	-0.09 (0.062)	0.002 (0.15)	-0.088 (0.086)
Education (Ref.: Short-cycle tertiary education)						
Lower/Upper secondary education	0.042 (0.03)	0.048 (0.032)	0.089 (0.205)	-0.002 (0.076)	-0.264 (0.182)	-0.18 (0.104)
Bachelor's, Master's, doctoral or equivalent	-0.028 (0.033)	0.023 (0.035)	0.195 (0.223)	-0.022 (0.082)	-0.168 (0.197)	-0.324 (0.113) **
Work situation (Reference: Active worker)						
Other/Unemployed	-0.025 (0.033)	0.028 (0.035)	0.081 (0.226)	-0.112 (0.083)	0.063 (0.2)	0.039 (0.115)
Retired	0.032 (0.046)	-0.015 (0.048)	0.543 (0.308)	-0.142 (0.113)	0.294 (0.272)	0.2 (0.156)
No insurance contract	-0.06 (0.038)	0.034 (0.04)	-0.087 (0.259)	0.005 (0.095)	-0.291 (0.229)	-0.227 (0.132)
Perceived health (Reference: Excellent, very good)						
Good	-0.056 (0.028) *	-0.002 (0.03)	-0.072 (0.19)	0.024 (0.07)	-0.212 (0.168)	0.054 (0.097)
Acceptable, Bad, very bad	-0.121 (0.033) ***	0.043 (0.035)	-0.237 (0.222)	0.058 (0.082)	-0.059 (0.197)	0.076 (0.113)
Smoked in last 24 m.	0.024 (0.024)	0.021 (0.026)	0.096 (0.164)	-0.004 (0.061)	0.029 (0.146)	0.123 (0.084)
Risky lottery	0.008 (0.023)	0.051 (0.025) *	0.065 (0.158)	0.046 (0.058)	0.143 (0.14)	-0.039 (0.08)
Perceived risk	0.001 (0.005)	-0.004 (0.005)	0.018 (0.031)	-0.014 (0.011)	-0.072 (0.027) **	-0.026 (0.016)
Concerned about future	0.023 (0.005) ***	0.01 (0.005) *	-0.059 (0.033)	0.003 (0.012)	0.016 (0.029)	0.053 (0.017) **
Optimism 85	-0.037 (0.032)	0.065 (0.034)	0.482 (0.219) *	-0.003 (0.081)	-0.245 (0.194)	0.05 (0.111)
Optimism 85 (no idea)	-0.105 (0.028) ***	0.037 (0.029)	0.311 (0.189)	0.042 (0.07)	-0.215 (0.168)	-0.08 (0.096)
Altruism	0.009 (0.005)	0.001 (0.005)	-0.041 (0.032)	-0.015 (0.012)	0.021 (0.028)	0.014 (0.016)
Num. obs.	895	895	895	895	895	895
Adj. R2	0.072	0.013	0.012	-0.002	0.01	0.022

Note:

*** p<.001, ** p<.01, * p<.05, . p<.1. Standard errors are in parentheses.

Multivariate linear probability models for the propensity of choosing a contract and Income WTP. Other models are Multivariate OLS regressions. Income type of payment WTP compared to lump sum; UW Tests WTP compared to no medical UW; Ben. acci., Surv premium reimb. and Surv. fun. expenses are WTPs compared to no rider. 5 individuals are missing due to 1 non-response on Smoking status ('Smoked in last 24 m.'). 4 non-responses on Self-perceived health ('Perceived health'). 'No insurance contract' used as a proxy of financial literacy. 'Optimism 85' compares the survival probability of surviving above 85 years-old with mortality table. 'Optimism 85 (no idea)' corresponds to individuals who did not answered this question.

Table 17: OLS models - Propensity of choosing a contract and WTPs - Perceived risk in health

	Choosing contract	Income	UW Tests	Ben. acci.	Surv. premium reimb.	Surv. fun. expenses
Intercept	0.887 (0.185) ***	-0.194 (0.194)	-6.805 (1.249) ***	3.217 (0.459) ***	2.751 (1.102) *	9.244 (0.633) ***
Women	-0.023 (0.024)	-0.012 (0.025)	-0.178 (0.161)	0.056 (0.059)	0.143 (0.142)	0.09 (0.081)
Age	-0.003 (0.008)	0.008 (0.008)	0.076 (0.052)	-0.002 (0.019)	-0.019 (0.046)	-0.032 (0.026)
Age x Age	0 (0)	0 (0)	-0.001 (0.001)	0 (0)	0 (0)	0 (0)
1 or more child	0.03 (0.025)	0.05 (0.026)	-0.131 (0.17)	-0.089 (0.062)	0.001 (0.15)	-0.087 (0.086)
Education (Ref.: Short-cycle tertiary education)						
Lower/Upper secondary education	0.043 (0.03)	0.047 (0.032)	0.084 (0.205)	0.004 (0.075)	-0.251 (0.181)	-0.172 (0.104)
Bachelor's, Master's, doctoral or equivalent	-0.029 (0.033)	0.023 (0.035)	0.199 (0.223)	-0.027 (0.082)	-0.181 (0.197)	-0.331 (0.113) **
Work situation (Reference: Active worker)						
Other/Unemployed	-0.026 (0.033)	0.029 (0.035)	0.085 (0.226)	-0.117 (0.083)	0.055 (0.199)	0.032 (0.114)
Retired	0.031 (0.046)	-0.013 (0.048)	0.549 (0.307)	-0.149 (0.113)	0.279 (0.271)	0.19 (0.156)
No insurance contract	-0.06 (0.038)	0.034 (0.04)	-0.089 (0.259)	0.006 (0.095)	-0.285 (0.229)	-0.224 (0.131)
Perceived health (Reference: Excellent, very good)						
Good	-0.056 (0.028) *	-0.002 (0.03)	-0.081 (0.19)	0.032 (0.07)	-0.18 (0.168)	0.067 (0.096)
Acceptable, Bad, very bad	-0.121 (0.033) ***	0.044 (0.035)	-0.243 (0.222)	0.063 (0.082)	-0.037 (0.196)	0.085 (0.113)
Smoked in last 24 m.	0.025 (0.024)	0.02 (0.026)	0.089 (0.165)	0.004 (0.06)	0.05 (0.145)	0.134 (0.083)
Risky lottery	0.01 (0.023)	0.047 (0.024)	0.069 (0.156)	0.045 (0.057)	0.117 (0.137)	-0.044 (0.079)
Perceived risk (health)	-0.002 (0.004)	0 (0.004)	0.027 (0.028)	-0.028 (0.01) **	-0.092 (0.025) ***	-0.044 (0.014) **
Concerned about future	0.023 (0.005) ***	0.01 (0.005) *	-0.059 (0.033)	0.004 (0.012)	0.018 (0.029)	0.054 (0.017) **
Optimism 85	-0.037 (0.032)	0.065 (0.034)	0.483 (0.219) *	-0.004 (0.08)	-0.248 (0.193)	0.048 (0.111)
Optimism 85 (no idea)	-0.104 (0.028) ***	0.037 (0.03)	0.299 (0.19)	0.055 (0.07)	-0.174 (0.167)	-0.06 (0.096)
Altruism	0.01 (0.005) *	0 (0.005)	-0.043 (0.031)	-0.011 (0.011)	0.023 (0.027)	0.018 (0.016)
Num. obs.	895	895	895	895	895	895
Adj. R2	0.072	0.012	0.013	0.005	0.018	0.03

Note:

*** p<.001, ** p<.01, * p<.05, . p<.1. Standard errors are in parentheses.

Multivariate linear probability models for the propensity of choosing a contract and Income WTP. Other models are Multivariate OLS regressions. Income type of payment WTP compared to lump sum; UW Tests WTP compared to no medical UW; Ben. acci., Surv premium reimb. and Surv. fun. expenses are WTPs compared to no rider.

5 individuals are missing due to 1 non-response on Smoking status ('Smoked in last 24 m.'). 4 non-responses on Self-perceived health ('Perceived health').

'No insurance contract' used as a proxy of financial literacy. 'Optimism 85' compares the survival probability of surviving above 85 years-old with mortality table. 'Optimism 85 (no idea)' corresponds to individuals who did not answered this question.