



Universiteit
Leiden
The Netherlands

Preferences for In-Kind and In-Cash Home Care Insurance

Bresser, J. de; Knoef, M.G.; Ooijen, R. van

Citation

Bresser, J. de, Knoef, M. G., & Ooijen, R. van. (2021). *Preferences for In-Kind and In-Cash Home Care Insurance*. *CentER Discussion Paper Series*. Tilburg: Center for Economic Research. doi:10.2139/ssrn.3971499

Version: Publisher's Version

License: [Leiden University Non-exclusive license](#)

Downloaded from: <https://hdl.handle.net/1887/3304126>

Note: To cite this publication please use the final published version (if applicable).



No. 2021-033

**PREFERENCES FOR IN-KIND AND
IN-CASH HOME CARE INSURANCE**

By

Jochem de Bresser, Marike Knoef,
Raun van Ooijen

25 November 2021

ISSN 0924-7815
ISSN 2213-9532

Preferences for in-kind and in-cash home care insurance*

Jochem de Bresser^a Marike Knoef^b Raun van Ooijen^c

^a*Tilburg University, P.O. Box 90153, 5000 LE Tilburg, the Netherlands*

^b*Leiden University, P.O. Box 9520, 2300 RA Leiden, the Netherlands*

^c*University of Groningen, P.O. Box 800, 9700 AV Groningen, the Netherlands*

November 1, 2021

Abstract

We study preferences for different types of home care insurance using a discrete choice experiment. We consider domestic, personal, and social care, a home care annuity, and home adaptations lump-sum. To understand variation in preferences, we relate willingness to pay to personal circumstances, preferences, and expectations. We find that the majority value in-kind and in-cash insurance above the actuarial premium. While most respondents value coverage for basic levels of support, we find diminishing marginal utility for higher levels of support. For in-kind care, willingness to pay is positively associated with respondent characteristics: being single, household income, home ownership, risk aversion, low bequest motives, expected length of home care use, expected expenditures when in need of care, and low expected availability of informal care. In contrast, in-cash support is valued regardless of respondent characteristics, possibly because its inherent flexibility. These results contribute to the design of insurance schemes for home care.

Keywords: long-term care insurance, home care, willingness to pay, discrete choice experiment, saving motives, health expectations

JEL classification: D14, I13, J14, J18

*This version of the paper was submitted to *Journal of Health Economics*, which has since asked for revisions. A new version is expected by February 2022. Corresponding author: Raun van Ooijen; email: R.van.Ooijen@rug.nl. We are grateful to the comments and suggestions by Esther de Bekker-Grob, Raymond Montizaan, Bram Wouterse, Ceu Mateus, Erik French, Giacomo Pasini, Pascal St-Amour, and all seminar participants at the Ca' Foscari University of Venice, European Health Economics Association conference, University of Groningen, Tilburg University, International Health Conference, Lowlands Health Economic Study Group conference, and Netspar International Pension Workshop, and Netspar for support. Jochem de Bresser gratefully acknowledges financial support of the research programme Innovative Research Incentives Scheme Veni with project number 451-15-018, which is financed by the Netherlands Organisation for Scientific Research (NWO).

1 Introduction

In response to rising costs of long-term care (LTC) and people's preference for aging in their home environment, assistance with routine activities of daily living (ADLs) is increasingly provided at home instead of in a nursing home (see e.g. Swartz 2013, Costa-Font et al. 2015). At the same time, the supply of informal care has declined because of smaller families and increased female labor force participation (Pestieau & Ponthière 2012, Costa-Font et al. 2017). Therefore, the shift towards LTC at home often implies more financial responsibility and flexibility to choose personalized care arrangements. Insurers in several countries, such as France and Germany, already started to offer supplementary insurance for home care (Costa-Font et al. 2015). Home care insurance can be both in-cash or in-kind. Cash-for-care schemes are common in Europe and the U.S. because they allow people to tailor LTC services to their needs (Da Roit & Le Bihan 2010, Ethan et al. 2019). Also, cash benefits allow for a monetary recognition of otherwise unpaid informal care. Instead, in-kind home care arrangements better protect people against increases in the price of LTC services. Moreover, in-kind benefits may be less demanding and more appropriate when people become frail, particularly when they develop cognitive impairments (Kodner 2003, Timonen et al. 2006).

This paper examines preferences for in-kind and in-cash support for home care using a discrete choice experiment. The experiment was fielded in the Longitudinal Internet Studies for the Social sciences (LISS) panel, a large representative household panel in the Netherlands. We use a series of choices between two insurance policies to elicit preferences for different types of in-kind and in-cash support, including domestic care, personal care, social services, a monthly home care annuity, and a one-off lump sum for home adaptations. We relate the willingness to pay (WTP) for these different types of support to actuarially fair premiums to interpret their relative valuation.¹ Next, to understand the preferences for different types of in-kind and in-cash support, we relate the WTP to respondents' characteristics: personal circumstances, preferences (e.g., risk aversion and bequest motives), and expectations (e.g., home care use and availability of informal care). We consider similar characteristics as examined by Sloan & Norton (1997) and Brown et al. (2012) for LTC insurance ownership.

Our contribution to the literature is threefold. First, rather than focusing on LTC insurance that protects against excessive expenditures *in an LTC facility*, we consider insurance covering LTC *at home*. This fits the trend towards aging-in-place. Most of the previous literature focused on intensive and more complex care in nursing homes rather than assistance with routine activities at home, which are not necessarily medical. Second, we examine the relationship between personal circumstances, preferences, expectations

¹Actuarial premiums are calculated for a well-functioning market without adverse selection or moral hazard; see e.g. Einav & Finkelstein (2018) for the challenges of modeling health expenditures in case of adverse selection and moral hazard.

and the WTP for different types of support for home care. Earlier studies focused on the demand for general LTC insurance covering out-of-pocket expenditures but did not consider different types of in-kind and in-cash support. Third, our rich discrete choice experiment allows us to examine preferences for different levels of support. It thus provides the first quantification of diminishing marginal utility for different types of support for home care.

Our paper relates to a growing literature investigating the demand for LTC insurance based on observed ownership or stated preferences.² Previous research has focused on the LTC insurance puzzle: the low take-up rate of LTC insurance even in systems where public insurance is limited (e.g. Sloan & Norton 1997, Brown et al. 2012, Ameriks et al. 2018, Boyer et al. 2020, Akaichi et al. 2020). Recent work suggests that adverse selection and limited trust in insurers play an important role (Briggs & Tonetti 2019, Boyer et al. 2020). It also shows that take-up is higher when insurance is voluntary, benefits are permanent and health checks absent (Akaichi et al. 2020). We focus on home care insurance and analyze people's preferences for different types of support, either in-kind or in-cash. Furthermore, we investigate diminishing marginal utility and preference heterogeneity for both types of support. Nieboer et al. (2010), Kaambwa et al. (2015) and Amilon et al. (2020) also examine stated preferences for in-kind care support. They have a different focus than our paper. Nieboer et al. (2010) investigate relative preferences for several in-kind care services and modes of care delivery for different groups of hypothetical patients, specifically for frail and demented elderly, and not for the respondents themselves. Furthermore, they examine preference heterogeneity by income but not by other personal characteristics. Like Nieboer et al., Amilon et al. (2020) consider a hypothetical patient but do not allow for preference heterogeneity. Kaambwa et al. (2015) focus on preferences for personal care budgets that enable people to choose care services and modes of delivery but do not investigate preference for in-kind care services themselves.

The Netherlands provides an interesting institutional setting that complements the existing literature on the demand for LTC insurance. Most studies consider the U.S. or other countries where people have a lot of responsibility for financing LTC. In the Netherlands, people are used to the fact that the government almost fully insures LTC in nursing homes and home settings.³ Out-of-pocket LTC expenditures are relatively low (Van Ooijen et al. 2018) and private LTC insurance is uncommon because of the large role of the government. Moreover, compared to other countries such as the U.S., the Dutch have high trust in financial institutions, including private insurers (Van der Crujzen et al.

²See also De Bekker-Grob et al. (2012) on the increasing use of discrete choice experiments to elicit preferences in the field of health economics. Royalty & Hagens (2005) shows that revealed and stated preferences yield similar price elasticities for demand for health insurance.

³OECD figures show that the Netherlands is one of the countries with the highest public LTC expenditures (3.7% of GDP in 2017), which are double the OECD average and more than seven times higher than the United States (OECD 2019).

2019). We fielded the experiment after a comprehensive LTC reform in 2015 that implied a shift from nursing home care towards more intensive home care, with an increased focus on informal and private provision of home care services (Alders & Schut 2020, Krabbe-Alkemade et al. 2020). The reform went hand-in-hand with significant budget cuts and a public discussion about individual responsibility for LTC, which provided a context to formulate realistic insurance options in the fielded discrete choice experiment.

We have three main results. First, our estimates show a high average WTP for home care insurance relative to actuarially fair insurance premiums. About 77 percent of respondents value insurance at or above the actuarial premium for at least one type of in-kind support, and 88 percent are interested in insurance containing at least one type of in-cash support. Preferences do vary substantially around the average for all types and levels of support. Second, we find diminishing marginal utility in the level of support for all types of support except the home care annuity. As we find decreasing marginal utility, the percentage of people with a WTP above the actuarially fair price decreases for higher levels of care. Third, we find that WTP is associated with several personal characteristics, especially for in-kind support. Particularly, the WTPs of domestic care and personal care are positively associated with personal circumstances (being single, household income and home ownership), preferences (risk aversion and having low bequest motives), and expectations (home care use, expenditures when in need of care, and low availability of informal care). These results are in line with earlier findings for LTC insurance ownership (Sloan & Norton 1997, Brown et al. 2012). Our estimates, however, reveal comparatively weak associations with WTP for in-cash support.

Understanding heterogeneity in preferences for different types of support for home-care helps policymakers to make choices about the generosity and design of the LTC system. It helps insurance companies to offer suitable home-care policies. The estimates suggest that in-kind support should focus on domestic and personal care rather than social services. As the fraction of people who value in-kind support above the actuarial premium decreases with the level of support – and because there is substantial variation in preferences at all levels – there may be welfare gains from a system of compulsory basic insurance with voluntary top-up insurance.⁴ Providing cash benefits rather than in-kind support is another way to offer home care insurance and would be highly valued by most persons, possibly because its inherent flexibility.

The remainder of the paper is organized as follows. Section 2 explains the discrete choice experiment and the mixed logit model used to compute WTPs for various attributes of care and support. Section 3 describes the data, after which Section 4 presents the results regarding the level of and variation in preferences. Section 5 concludes the paper.

⁴In their examination of the U.K. LTC insurance market Mayhew et al. (2010) conclude that top-up LTC care insurance plans could bridge the expected difference between basic state support, personal income and the cost of care at the time of need.

2 Discrete choice experiment

2.1 In-kind home care and cash benefits

To elicit preferences for different types of in-kind and in-cash support, we fielded a survey with a discrete choice experiment.⁵ The experiment consists of choices between two hypothetical home care insurance schemes. The questionnaire starts with a brief explanation of the difference between home care and nursing home care. After a major LTC reform in 2015, the emphasis shifted from residential care to home care, with an increased focus on informal care provision. Access to a nursing home is only available for severe care needs.

Changes in the long-term care system for the elderly

Before answering the questions, we would like to draw your attention to the most important changes in the long-term care system for the elderly. Since January 1st 2015, the government distinguishes between two types of care:

1. Care in a nursing home (severe care needs)

- People who require care and supervision all day are entitled to a place in a nursing home. This concerns severe care.

2. Home care (light or moderate care needs)

- People whose needs are light or moderate will receive care at home.
- Health insurance entitles people to nursing and personal care by healthcare professionals.
- The municipality is responsible for support and guidance in housekeeping. In the provision of support and guidance in housekeeping, the municipality will decide on what someone can do him- or herself and whether informal arrangements can be made, such as with family, friends or neighbors.

Next, we ask people to imagine that they are responsible for LTC at home, except for nursing care. We emphasize that nursing care is covered by universal health insurance. We are interested to what extent people are willing to insure home care in case the government would just provide a basic safety-net:

⁵The data and documentation of our assembled study are publicly available (Van Ooijen et al. 2016). All variables in the estimated specifications, other than basic demographics, were elicited in the same survey and selected based on previous studies for LTC insurance ownership (Sloan & Norton 1997, Brown et al. 2012).

- Imagine that you are yourself responsible for long-term care at home. You can purchase long-term care insurance that entitles you to help by health care professionals (offered by either the government or an insurance company). Nursing care will be provided through your basic health insurance policy.
- There is a safety net for which you are eligible if your gross household income is lower than 16.000 euro (for singles) or 22.500 (for multi-person households) and informal care is not available. Based on the safety net, you will receive 1 hour of support in housekeeping per week and 45 minutes of personal care per day.

Respondents face ten choices between two realistic insurance plans with different care levels along several dimensions. These dimensions are attributes that could improve the wellbeing of individuals with ADL problems. Consistent with the LTC situation in the Netherlands, we selected the following attributes and corresponding levels:

- Premium, percentage of equivalized gross household income (1.5; 3; 4.5; 6)
- Domestic care, hours per week (0; 2; 5)
- Personal care, minutes per day (0; 45; 90)
- Social services, hours per week (0; 5; 10)
- Lump sum budget in euro for home adaptations (0; 4000; 8000)
- Monthly annuity in euro, e.g., for assisting devices and services, (0; 50; 100)

The survey mentions that all monetary amounts will be adjusted for price inflation (all amounts are in real terms). A realistic range of premiums is computed using an actuarial gender-specific pricing model of the duration of home care use (premiums are rounded to multiples of 10 euro). We instruct respondents to imagine that the premium has to be paid from age 40 onward. The budget for home adaptations is based on quoted amounts on the websites of large municipalities in the Netherlands. In line with the actual institutions that govern LTC in the Netherlands, we used the home care criteria by the Care Assessment Centre (Centrum Indicatiestelling Zorg, CIZ) to set realistic levels for the attributes. The questionnaire was constructed in cooperation with the Ministry of Health, Welfare and Sport, and it was tested among a small group of people to ensure that the wording used in the questionnaire was well understood.

2.2 Design of choice situations

Each choice situation in the discrete choice experiment consists of a choice between two insurance plans with different premiums and coverage. A careful design of these situations

helps to estimate preference parameters precisely. The trick of optimal design is to simulate decisions from a pre-specified model and choose combinations of attribute levels that minimize the variances of estimates obtained from the simulations. The objective to be minimized is the determinant of the asymptotic covariance matrix of the estimates, resulting in a D-efficient design (Bliemer & Rose 2009). Prior information on parameters is required to construct an efficient combination of choices. Though prior estimates did not exist at the time the study was designed, we assumed that respondents prefer lower premiums and higher amounts of care. Moreover, we improved robustness by introducing uncertainty into these prior estimates, generating a so-called Bayesian-efficient design (Bliemer & Rose 2009).

We created a Bayesian-efficient design with 36 choice situations, divided into three blocks of twelve. Within each block, we dropped the two scenarios in which one alternative most clearly dominated the other. In the experiment, each respondent was randomly presented one of these three blocks of ten choices. Previous research indicates that answering ten choice sets does not impose an excessive burden on respondents (see e.g. Watson et al. 2017 about the quality of the design of discrete choice experiments and response rates).

Two additional randomizations were carried out across respondents: first, the order in which we presented the ten choice situations; second, the order of the attributes, except for the premium. The premium was always presented first because we want the price of insurance to be equally salient in all decisions. Figure 1 shows an example of a choice set.

Figure 1: Example of a choice set

	Plan A	Plan B
Monthly premium per person	90 euro	130 euro
Domestic care per week	0 hours	2 hours
Personal care per day	60 minutes	0 minutes
Social services per week	5 hours	10 hours
Monthly annuity for e.g., assisting devices and services	50 euro	100 euro
Lump sum budget for home adaptations	8000 euro	4000 euro

Which of these plans would you choose?

Plan A	
Plan B	

We did not include an opt-out option in the experiment since the tendency to choose an opt-out when confronted with a complex decision may unduly limit the informativeness of the data (Veldwijk et al. 2014). Therefore, the results reflect preferences for different

types of care and financial support conditional on having to choose a plan. However, the range of premiums and levels for the different attributes was constructed to be broad enough to allow elicitation of a wide range of preferences. While the individual choices did not include an opt-out, at the end, respondents were asked whether they would buy a similar home care insurance product to the packages presented in the experiment. As a sensitivity check, we estimate whether results are different between respondents who are and are not willing to buy such a product.

2.3 Model

To approximate preferences for attributes of LTC in a flexible way, we use a mixed logit model; detailed descriptions of the mixed logit can be found in Revelt & Train (1998) and in Train (2003). A mixed logit model is appropriate for the setting of a stated preference experiment because it allows for differences in tastes between individuals. Variation in preferences is a key aspect of modeling repeated choices of the same respondents. Formally, the utility individual i derives from choosing alternative j from choice set t is given by:

$$U_{ijt} = \mathbf{x}'_{ijt}\boldsymbol{\beta}_i + \varepsilon_{ijt}; \quad j = 1, 2; \quad t = 1, 2, \dots, 10 \quad (1)$$

Here \mathbf{x}_{ijt} is a vector of attributes, $\boldsymbol{\beta}_i$ is a vector of preference parameters and error ε_{ijt} is assumed to follow a type 1 extreme value distribution. Since the errors ε_{ijt} are independent across the different choice scenarios faced by an individual, the standard logit with fixed $\boldsymbol{\beta}$ restricts all differences in tastes to be independent across the sequence of choices. The mixed logit model allows the preferences for attributes, $\boldsymbol{\beta}_i$, to be random and vary across individuals, inducing correlation between answers (e.g. an individual may show a preference for domestic care in all scenarios, while someone else prefers social care). We specify the mixing distribution of preferences to be multivariate normal and allow for correlations between preference parameters in some specifications. Estimation proceeds by Maximum Simulated Likelihood and 500 Halton draws are used to integrate over the mixing distribution.

The mixing distribution of preferences captures variation in the population and does not condition on observed decisions. The richness of the data, containing ten scenarios for each individual, allows this prior distribution to be combined with observed choices to construct a much narrower posterior distribution for the preferences of each individual in the sample. We approximate individual-specific preferences by means of these posterior distributions and analyze how they vary with observed characteristics of respondents using linear regression analyses.

3 Data

We fielded the discrete choice experiment and the accompanying survey on expectations and preferences in the Longitudinal Internet Studies for the Social sciences (LISS) panel in January 2016 (Van Ooijen et al. 2016). LISS is an internet-based household panel of approximately 4500 households that is representative of the non-institutionalized Dutch population. It is administrated by CentERdata, which is affiliated to Tilburg University. CentERdata uses several approaches to safeguard the representativeness of the panel. First, households are recruited through address-based sampling to avoid self-selection into the panel. Second, household members receive an incentive if they complete a questionnaire, limiting attrition. Third, households are provided with a computer or internet connection if necessary for participation.

We fielded our discrete choice experiment and accompanying survey to household heads and spouses aged 40 years and older who have non-zero household income. The response rate was 86 percent, 2444 respondents started the survey and 2412 respondents completed it. We merged the questionnaire to background variables on sociodemographic characteristics from the same month of the survey. In addition, we merge information on whether the respondents had experience with informal care provision over the last five years from the module ‘Social integration and leisure’ fielded in January 2016–2011. In the empirical analysis, we excluded observations with missing information on background characteristics, leaving us with a sample of 2190 respondents. Table 1 shows descriptive statistics of background variables.

3.1 Expectations

This section describes the measurement of expectations about future home care use, the availability of informal care, and expenditures when in need of LTC.

Expectations about future home care needs

Adverse selection is a problem in many insurance markets and LTC insurance is likely to be no exception. Purchasers of insurance may have private information on their possible future use of LTC, for instance, based on their family history or their current health. We measure respondents’ subjective expectations of future home care use to understand how these relate to preferences for LTC insurance. The literature on subjective expectations has shown that beliefs can be elicited as probabilities, which helps to make answers comparable across individuals (Manski 2004, Hurd 2009).

We ask respondents to indicate the probability that they will need home care for more than 1, 3, 5, 7, and 9 years. We construct a distribution that characterizes beliefs for each respondent by linear interpolation between these five probabilities. Next, for each

Table 1: Descriptive statistics of background characteristics, N=2190

	Mean	SD
Sociodemographic characteristics		
Female	0.51	0.50
Partner	0.72	0.45
Age	60.4	11.5
Has children	0.83	0.38
Homeowner	0.75	0.43
Net HH income (monthly)	2917	1487
Education – lower secondary	0.35	0.48
Education – vocational	0.33	0.47
Education – university	0.33	0.47
Health		
Health – no problems	0.84	0.37
Health – has problems	0.13	0.34
Health – needs care	0.03	0.16
Experience with informal care provision over the last five years		
Providing personal care	0.12	0.33
Providing domestic care or social support	0.43	0.49

subjective distribution, we compute summary statistics such as the median and Inter-Quartile Range (IQR). Survey respondents may find it hard to report on a probability scale, especially when the subject is abstract or lacks salience. Such difficulty could explain the lower number of observations (N=1702). Anticipating this, we also elicited expectations of future care use by asking respondents whether they expect to receive care at home for a relatively long or short period compared to the average individual of the same age and gender.⁶

Table 2 (panel a.) shows that the average respondent reports a median expected duration of 2.6 years and that 75% of respondents report medians below 5 years (the average actual lifetime use of home care in 2006). Moreover, the uncertainty is substantial, with an average IQR of 3.2 years. Both the median duration and the IQR vary widely across the sample, with standard deviations of 2.8 and 3.1 years, respectively. We also ask respondents with a partner to indicate the probability that they will need home care simultaneously for more than 1, 3, and 5 years. On average, respondents with partners expect the median period during which both partners require care to be 1.5 years. Table 2 (panel b.) shows that respondents expect not to spend a long time in care relative to their peers: 61 percent expect to be close to the average, while 30 percent expect to receive care for a relatively short period, and only 9 percent expect to receive care longer than average. This tendency to expect a below rather than above-average care duration extends to one's

⁶Using these qualitative expectations gives very similar results in the regression analyses.

Table 2: Descriptive statistics of home care use expectations

a. Quantitative expectations^a					
<i>Expected home care use (years)</i>					
	Mean	SD	p25	p50	p75
Median – own care	2.6	2.8	0.6	1.0	5.0
IQR – own care	3.2	3.1	0.6	2.1	5.0
N	1702				
Median – both care ^b	1.5	1.5	0.5	0.6	2.0
IQR – both care ^b	1.9	1.8	0.5	0.6	3.3
N	1271				
b. Qualitative expectations					
<i>Expected home care use relative to average for gender/cohort</i>					
	Own		Partner's		
	Mean	SD	Mean	SD	
(1) Much shorter	0.06	0.24	0.06	0.23	
(2) Shorter	0.24	0.42	0.21	0.41	
(3) Average	0.61	0.49	0.62	0.49	
(4) Longer	0.09	0.29	0.11	0.31	
N	2190		1568		

^a Based on observations who report subjective probabilities that are internally consistent.

^b Expected number of years that respondents expect to need care for their own and for their partner at the same time.

partner, for whom qualitative expectations are similar in the aggregate.

Information experiment

Previous work suggests that people who do not have experience with LTC may have difficulties forming expectations. For instance, Coe et al. (2015) show that LTC use of parents increases the purchase of LTC insurance by children, presumably because they re-evaluate risks. This result suggests that providing information about home care use might lead respondents to revise expectations. To test this hypothesis, we provided a random two-thirds of the sample with information on average home care use among the Dutch population. We included the following information intervention in the questionnaire before measuring respondents' subjective expectations of future home care use:

To give you an idea about home care use:

- About 7 percent of persons aged 65 to 80 received formal home care, and 32 percent of persons above age 80 received formal home care in 2014.
- The average lifetime use of home care was 5 years (3.1 years for men en 6.5 years for women) in 2006.

Table 3: Descriptive statistics of informal care by someone else than the partner

	Overall		Children		No children	
	Mean	SD	Mean	SD	Mean	SD
Definitely	0.06	0.23	0.06	0.24	0.03	0.18
Probably	0.17	0.37	0.18	0.39	0.09	0.29
Maybe	0.33	0.47	0.34	0.47	0.28	0.45
Probably not	0.30	0.46	0.29	0.45	0.33	0.47
Definitely not	0.15	0.36	0.13	0.33	0.27	0.44
N	2190		1811		379	

We find that providing information significantly increased expected home care use (see Appendix A). For the qualitative measures, the intervention raised both own expected home care use and that of the partner relative to the gender/cohort average. The sizes of these effects are 0.14 and 0.09, respectively, on the scale from Table 2 (panel b.). The quantitative measures show that the information increased the average subjective median by 0.3 years. Still, it did not affect uncertainty or the expected length of the period during which both partners require care. Given that respondents tend to expect to use home care for a relatively short period, such upward revisions probably lead to more realistic expectations in the aggregate.

Availability of informal care

Personal expectations with regard to the availability of informal care may crowd out in-kind home care insurance (Van Houtven et al. 2015, Mommaerts 2020, Donder & Pestieau 2017). We asked respondents whether they expect someone else than their partner to provide informal care, e.g., their family or friends. Table 3 shows that respondents are not very hopeful that they can rely on such informal care: 45% of the respondents indicate that it will “definitely” or “probably” not be available. Only 23% expect to receive informal care, and the remaining third of the sample expresses substantial uncertainty. This outlook is different for individuals with and without children: 24% of those with children and 12% of those without children expect that informal care will be available, while 42% and 60%, respectively, expect this will not be the case.

Health and expenditures

The demand for home care insurance may also be affected by the way health changes preferences for consumption or necessitates certain expenses. Respondents were asked about their perception of the effect of long-term sickness on overall medical plus non-medical expenditures. This effect may vary across individuals since some people might cut back expenditures on holidays or hobbies that are no longer feasible while sick, while others

Table 4: Descriptive statistics medical and non-medical expenditures

When I am in need of home care, expenditures will...		
	Mean	SD
...strongly decrease	0.10	0.30
...decrease	0.07	0.26
...stay constant	0.08	0.28
...increase	0.30	0.46
...strongly increase	0.43	0.50
N	2190	

have preferences for more extensive LTC at home. Table 4 shows that three-quarters of respondents expect that total expenditures will *increase* when they need care. Only 17% expect that expenditures will decline.

3.2 Preferences

In the survey, we also measured risk aversion, time preferences, and bequest motives, as they may be related to the demand for home care insurance.

Risk aversion and time preferences

The certainty provided by home care insurance is valuable for risk-averse people. The higher the degree of risk aversion, the more we expect someone is willing to pay for home care insurance. Time preferences may also influence the demand for home care insurance. More patient and restrained people may be more likely to forego present consumption in order to be insured for home care costs that may occur later in life. In the survey, we measure risk-aversion, patience, and restraint on a scale from 1 to 7. Table 5 shows the descriptive statistics.

Table 5: Descriptive statistics preferences

	Mean	SD	Min	p25	p50	p75	Max
Risk aversion (scale 1-7)	4.8	1.4	1	4	5	6	7
Patience (scale 1-7)	4.8	1.5	1	4	5	6	7
Restraint (scale 1-7)	4.9	1.3	1	4	5	6	7
N	2190						

Bequest motive

The demand for home care insurance may depend on bequest motives. Lockwood (2018) shows that if bequests are luxury goods, bequest motives decrease the demand for LTC insurance. That is because bequest motives reduce the opportunity cost of precautionary saving. On the other hand, uncertainty about LTC costs exposes bequests to a considerable risk. When people are risk-averse over bequests, bequest motives increase the demand for LTC insurance. People who prefer help from children over formal care may decide not to buy LTC insurance and use the bequest to reward informal care from children (Pauly 1990, Zweifel & Strüwe 1996). Following Ameriks et al. (2011), we measure the relative importance of bequest and precautionary motives to save through a vignette question. Respondents are placed in a hypothetical situation in which they divide 100 thousand euro over two lockboxes that represent bequests and LTC. The money in the bequest box will be left to the respondents' relatives after their death. The LTC box can only be used to buy supplementary private care for the respondents or their partners. The money in this box will not be part of a bequest.

Panel a. of Table 6 shows how respondents divide their budget over the two boxes. Respondents mostly split the budget over both: only 15% allocate all money to either bequests or care. Moreover, the data reveal substantial heterogeneity in preferences. One-third divide the money evenly over the boxes, one-third put most of the money in the bequest box, and one-third choose to allocate most of the money to the LTC box. This distribution is comparable to that of Ameriks et al. (2011), who conducted the survey on single elderly in the U.S. Separating the sample into those with and without children shows that respondents who have children tend to allocate a larger share of the windfall to the bequest box.

After dividing 100 thousand euros between bequests and LTC, respondents were also asked to divide the money in the bequest box among family, friends, charity, and other recipients. Table 6 (panel b.) shows how respondents divided their bequest over these groups. For each type of recipient, we define a dummy equal to one if an individual intends to leave a positive amount to that type (the categories are not mutually exclusive). Members of the nuclear family are by far the most likely to receive a positive inheritance: 75% of the respondents want to leave money to their partner and 73% to their children. 20% intend to leave a bequest to siblings or other family members, 15% to charity, and only 7% intend to give to friends. Respondents without children more often include charity and friends. The shares reported in panel 6 (panel b.) are the average share out of the total bequest left to each type of recipient. These shares corroborate that people want to leave the bulk of their bequest to their partner and children (90% on average).

Panel c. of Table 6 divides respondents into groups according to the type of bequest motive. These motives were only elicited if the respondent allocated a positive bequest

Table 6: Descriptive statistics bequest motive

a. Strength of bequest motive relative to LTC^a					
	Mean	SD			
Fraction of windfall in bequest box (%)	47.6	26.6			
Fraction = 0%	0.10	0.31			
1-20%	0.09	0.29			
21-49%	0.16	0.36			
50%	0.33	0.47			
51-80%	0.23	0.42			
81-99%	0.03	0.17			
100%	0.05	0.22			
N	1964				
b. Intended recipient(s)^b			c. Type of motive		
	Mean	Share		Mean	SD
Partner	0.75	0.47	Partner only	0.19	0.39
Children	0.73	0.43	Charity only	0.00	0.07
Siblings	0.13	0.03	Warm glow	0.49	0.50
Other family	0.07	0.03	Altruistic	0.12	0.33
Friends	0.07	0.02	Strategic	0.22	0.40
Charity	0.15	0.02	Other	0.04	0.19
Other	0.03	0.01			
N	1759				

^a Respondents are asked to divide 100 thousand euro over two lock boxes that represent bequests and LTC.

^b Based on observations that allocate a positive share of the windfall to the bequest box.

to recipients other than the partner or charity. Moreover, respondents could choose multiple motives, so categories are not mutually exclusive. Panel c. shows that 22% of the respondents who have a bequest motive indicate that they consider giving a larger bequest to individuals who provide them informal care (strategic bequest motive).

4 Results

4.1 Mixed logit estimates

Table 7 shows the estimation results of the mixed logit models that we use to map sets of ten choices between two insurance products into preferences for different types of care and support for each individual. We consider three different specifications for the mixing distribution. Model (1) is our preferred model (as from now the baseline model). It has a fixed coefficient on price, which means that all respondents dislike paying higher premiums equally. The other coefficients are random and multivariate normal, allowing for correlations between tastes. For comparison, models (2) and (3) restrict the coefficients to be uncorrelated, and model (3) includes a random coefficient for the premium.

The parameters of the multivariate normal mixing distributions are estimated extremely

Table 7: Estimated parameters of the mixed logit models

a. Estimates of normal mixing distribution for preferences						
	(1)		(2)		(3)	
	Corr. preferences		Uncorr. preferences		Random coefficient on price ^a	
Mean						
Price (euro)	-0.0157***	(0.000657)	-0.0146***	(0.000629)	-0.0175***	(0.000818)
Domestic care (hrs/wk)	0.281***	(0.0105)	0.266***	(0.00949)	0.282***	(0.0101)
Personal care (hrs/wk)	0.162***	(0.00630)	0.144***	(0.00550)	0.153***	(0.00582)
Social services (hrs/wk)	0.0398***	(0.00443)	0.0302***	(0.00397)	0.0264***	(0.00431)
Annuity (euro/month)	0.00400***	(0.000318)	0.00390***	(0.000291)	0.00435***	(0.000318)
Lump sum/1000 (euro)	0.0889***	(0.00482)	0.0827***	(0.00463)	0.0888***	(0.00505)
Standard deviation						
Price	–	–	–	–	0.0230***	(0.00109)
Domestic care	0.315***	(0.0115)	0.243***	(0.00902)	0.224***	(0.0104)
Personal care	0.191***	(0.00695)	0.149***	(0.00566)	0.127***	(0.00678)
Social services	0.138***	(0.00580)	0.0845***	(0.00508)	0.0897***	(0.00546)
Annuity	0.00680***	(0.000561)	0.00458***	(0.000647)	0.00544***	(0.000621)
Lump sum	0.156***	(0.00638)	0.153***	(0.00611)	0.173***	(0.00685)
Individuals	2412		2412		2412	
Log-likelihood	-14,364.72		-14,567.78		-14,259.74	
b. Correlation matrix model (1)						
	Domestic care	Personal care	Social services	Annuity	Lump sum	
Domestic care	1					
Personal care	0.53***	1				
Social services	0.62***	0.65***	1			
Annuity	0.53***	0.41***	0.70***	1		
Lump sum	0.05	0.05	-0.01	0.05	1	

Robust standard errors in parentheses; *** p<0.01

^a In model (3) random parameters are assumed to be uncorrelated. The fraction with a negative preference for higher prices (premiums) is estimated to be $\Phi\left(\frac{-0.0175}{0.0230}\right) = 0.78$ (SE = 0.011).

precisely; all are significant at 1%. Moreover, the means of all coefficients have the expected sign. Individuals dislike paying high premiums, and on average, they put a positive value on domestic and personal care, social services, the annuity and lump sum. The standard deviations show that there is considerable variation among respondents in their preferences for the attributes.

While estimates are very similar for all three models, we prefer model (1) and will focus on those results in the remainder of the paper. We prefer model (1) over (2) because panel b. of Table 7 shows that tastes for most dimensions of care are positively correlated. Hence, independent mixing distributions are not appropriate. Model (1) also has the edge over model (3) because the random coefficient on price in model (3) yields unrealistically high WTP for some part of the distribution. These considerations matter only for quantities that are derived directly from the mixing (prior) distribution, without any additional information. The posterior means used to analyze preference heterogeneity, condition on the ten observed choices for an individual, containing a lot of information about that person's preferences. Because the conditional means use the information in the choices made by a respondent, they are robust across the different specifications of the (prior) mixing distribution listed in Table 7. Table B1 in Appendix B shows that posterior

Table 8: Average willingness to pay for attributes

	Actuarial premium ^a	Mean ^b	SE	WTP \geq premium (%)	SE
Domestic care (1 hr/wk)	8.43	17.93	(0.79)	68	(1.1)
Personal care (1 hr/wk)	11.39	10.30	(0.44)	46	(1.5)
Social services (1 hr/wk)	5.23	2.54	(0.27)	38	(1.4)
Annuity (100 euro/month)	9.73	25.48	(2.02)	64	(1.8)
Lump sum (1000 euro once)	1.25	5.66	(0.34)	67	(1.2)
In-kind: at least one WTP \geq premium				77	(1.1)
In-cash: at least one WTP \geq premium				88	(1.1)
At least one WTP \geq premium				94	(0.6)

^a Actuarially fair monthly premium based on premium payment from age 40 up to first claiming (or death) with a waiting period of 1 year during which the contract is canceled if the need for care would arise. Price of domestic care is 20 euro/hr; price of personal care is 27.02 euro/hr; price of social services is 12.41 euro/hr. Prices for personal care and social services are taken from “personal budget” (PGB) for 2014, see <https://www.nationalehulpguids.nl/forms/PGBWeektarieven2011-2015.pdf>. Actuarially fair premiums are calculated using an LTC risk model for the Netherlands (Van der Vaart et al., 2020).

^b Mean willingness to pay as a monthly premium for the various types of in-kind care and cash benefits listed in the table. E.g., on average, respondents would be willing to pay a monthly premium of €17.93 from age 40 onward in order to receive 1 hour of domestic care per week. Loading factor: 18%, discount rate 2%.

means computed from these three sets of estimates are strongly correlated (correlation coefficients are between 0.50 and 0.99). Hence, once choices are taken into account, the exact specification for the prior distribution of preferences becomes less important.

4.2 Willingness to pay

Table 8 shows (WTP) estimates, computed from the estimated mixing distribution for the baseline model (1). The WTP of attribute k is minus one times the ratio of the coefficient of the attribute and the price coefficient ($WTP^k = -\beta^k / \beta^{Price}$). Given that the price coefficient is not random in the baseline model, the normal marginal distributions for the attributes yield straightforward normal marginal distributions for WTP. Table 8 summarizes the distribution of WTP by means of its expected value. To improve the ease of interpretation, the table also lists the actuarially fair insurance premiums that would be charged for annuities that cover the price of each attribute. An hour of domestic care, for instance, costs about 20 euro in 2015 according to the government website “National Care Guide”. Using an LTC risk model for the Netherlands based on administrative data on LTC use and mortality (Van der Vaart et al. 2020), we calculate that the corresponding premium as from the age of 40 is 8.43 euro per month (which would cover one hour per week at a price of $20 \times 52/12 = 86.67$ euro per month).⁷ The average WTP is 18 euro

⁷To compute actuarially fair prices, we follow Brown & Finkelstein (2008): future benefits and premiums are discounted at the risk free rate assumed to be 2% a year, and there is a 18 percent load. We further assume that people receive inkind care and/or cash benefits when in need of LTC (either home care or nursing home care). People pay uniform (i.e. non-gender specific) premia from age 40 until

per month, so according to our estimates, the average individual would buy realistically priced insurance that covers domestic care (if public policy could achieve actuarially fair pricing in the market).

Indeed, 68% of the population is simulated to have a WTP for domestic care at or above the market price. Similarly, 64% would be interested in buying insurance that provides a monthly budget of 100 euro when one is in need of home care to buy support equipment or services. A lump sum of 1000 euro to improve the comfort and suitability of one's house would be attractive for 67% of the respondents. For personal care and social support, the average WTPs are only 10.30 and 2.54 euro per month, respectively. These averages are lower than the actuarial premiums, and the share of respondents with a WTP larger than the actuarially fair premium is relatively low (46% for personal care and 38% for social support). The low WTP for social support may be because social support can be substituted with informal care fairly easily (if informal care is available). Informal care substitution is much more difficult for personal care, so finding a low average valuation of personal care is surprising. Maybe people are less familiar with personal care, or they do not want to think about needing it. As shown in Table 1, only 12% of the sample provided personal care in the last five years. Together, the estimates imply that 94% of respondents have a WTP that exceeds the market premium for at least one dimension of coverage. About 77% of respondents value insurance at or above the actuarial premium for at least one type of in-kind support, and 88% are interested in insurance containing at least one type of in-cash support.

4.3 Quality and robustness of the willingness to pay estimates

Appendix C provides evidence that the variation in WTPs uncovered by the mixed logit models in Table 7 reflects meaningful preference heterogeneity. In particular, the Appendix shows that a majority of respondents found the questions clear and not difficult. Suspicious reporting is rare: only 9% choose either the first or second option at least eight times out of ten. Neither question difficulty nor careless reporting accounts for a large share of the variation in preferences. Moreover, elicited preferences are not sensitive to the provision of general information on the duration of LTC usage in the population.

After the discrete choice experiment, we asked respondents whether they would be interested in buying any home care insurance product similar to the packages presented in the experiment. About 52% of the sample is interested in buying insurance. If the discrete choice experiment measures meaningful preferences for the different dimensions of care, we would expect those who express interest to have substantially higher WTPs. Table D1 in Appendix D shows that this is indeed the case. The average WTPs for those interested in insurance are about twice as high as those not interested in insurance. Only

the moment of first claiming.

for the monthly home care annuity, the gap between both subgroups is much smaller. Almost two-thirds of those with little interest in LTC insurance would nonetheless value a health-dependent home care annuity above the market price.

The mixed logit models in Table 7 and the corresponding WTP estimates in Table 8 capture preference heterogeneity by means of continuous (multivariate normal) distributions. To assess the robustness of the results, we also modeled the population as consisting of a finite set of discrete types or latent classes. Each such type has different preferences, which are estimated jointly with the fraction of the population that belongs to that class. These latent class models allow us to relax the parametric restrictions of a pre-specified mixing distribution at the cost of many additional parameters to be estimated. Appendix E presents the WTPs of these models. While the estimates from latent class models are considerably less precise, they reveal similar patterns as the mixed logit model.

4.4 Decreasing marginal utility

In sections 4.1 and 4.2, we specified a linear relationship between the level of an attribute and the associated utility. The WTP per unit, hour or euro, was assumed to be constant. However, we expect that marginal utility will eventually decrease, leading to a lower WTP per unit for sufficiently high levels of the attributes. To capture this, we estimate an extended model with separate dummies for all attribute levels that were used in the discrete choice experiment. The estimation results in Table 9 show decreasing marginal utility across the relevant range of levels. For example, the coefficient for five hours of domestic care per week is higher than that for two hours, but the first two hours give substantially more utility than the additional three hours of domestic care. This pattern is even starker for the expected value of the WTP per hour, which is close to 31 euro/hour for two hours per week and only around 17 euro/hour for five hours of care. The same holds for personal care, for which the mean WTP declines from close to 16 euro/hour for 45 minutes per day to just over 9 euro/hour for 90 minutes. Social services are the only type of in-kind support for which the mean *absolute* WTP is roughly flat, which results in a steep decline of mean WTP per hour from 4 euro/hour at 5 hours per week to 2 euro/hour at 10 hours. As for financial support, the mean WTP for a one-off lump sum follows the general pattern of steep decline with higher levels: it drops from around 10 euro per 1000 for a lump sum of 4000 euro to 5 euro per 1000 for a payment of 8000 euro. The pattern for the annuity is much flatter and is the only case where the drop in mean WTP per unit is not statistically significant: it declines from 33 euro for 100 euro/month for the lower level to 28 euro for the higher level. Perhaps the highest level of 100 euro/month is still too low for diminishing marginal utility to bite.

Corroborating the linear specifications in Table 7, the standard deviations in Table 9

Table 9: Estimated parameters of the mixed logit model with dummies for attribute levels

a. Estimates of normal mixing distribution for preferences					
	Parameter estimates		WTP per unit of attribute ^a		
	Estimate	SE	Estimate	SE	
Mean					
Price (euro)	-0.0188***	(0.000914)	-	-	
Domestic care (2 hrs/wk)	1.164***	(0.0476)	30.929***	(1.446)	
Domestic care (5 hrs/wk)	1.577***	(0.0685)	16.751***	(0.733)	
Personal care (45 min/day)	1.564***	(0.0708)	15.823***	(0.827)	
Personal care (60 min/day)	1.740***	(0.0741)	13.209***	(0.612)	
Personal care (90 min/day)	1.821***	(0.0823)	9.211***	(0.437)	
Social services (5 hrs/wk)	0.383***	(0.0397)	4.069***	(0.411)	
Social services (10 hrs/wk)	0.364***	(0.0558)	1.936***	(0.266)	
Annuity (50 euro/month)	0.307***	(0.0349)	32.626***	(4.072)	
Annuity (100 euro/month)	0.519***	(0.0372)	27.549***	(1.947)	
Lump sum (4000 euro)	0.732***	(0.0415)	9.721***	(0.687)	
Lump sum (8000 euro)	0.777***	(0.0471)	5.159***	(0.372)	
Standard deviation					
Price	-	-	-	-	
Domestic care (2 hrs/wk)	1.036***	(0.0581)	27.518***	(1.929)	
Domestic care (5 hrs/wk)	1.897***	(0.0798)	20.153***	(1.075)	
Personal care (45 min/day)	1.903***	(0.0828)	19.259***	(1.059)	
Personal care (60 min/day)	2.017***	(0.0842)	15.311***	(0.808)	
Personal care (90 min/day)	2.228***	(0.0956)	11.272***	(0.580)	
Social services (5 hrs/wk)	0.892***	(0.0612)	9.482***	(0.707)	
Social services (10 hrs/wk)	1.470***	(0.0790)	7.810***	(0.468)	
Annuity (50 euro/month)	0.596***	(0.0743)	63.331***	(8.141)	
Annuity (100 euro/month)	0.546***	(0.0843)	28.984***	(4.501)	
Lump sum (4000 euro)	1.062***	(0.0579)	14.105***	(0.947)	
Lump sum (8000 euro)	1.597***	(0.0657)	10.605***	(0.597)	
Individuals	2412				
Log-likelihood	-13,697.75				
b. Correlation matrix					
	Domestic (2 hrs/wk)	Personal (45 hrs/day)	Social services (5 hrs/wk)	Annuity (50 euro/month)	Lump sum (4000 euro)
Domestic care (2 hrs/wk)	1				
Domestic care (5 hrs/wk)	0.99***				
Personal care (45 hrs/day)	0.09	1			
Personal care (60 hrs/day)	0.36***	0.94***			
Personal care (90 hrs/day)	0.20***	0.93***			
Social services (5 hrs/wk)	0.57***	0.48***	1		
Social services (10 hrs/wk)	0.51***	0.26***	0.96***		
Annuity (50 euro/month)	-0.34***	0.55***	0.13	1	
Annuity (100 euro/month)	0.45***	0.44***	0.63***	0.40***	
Lump sum (4000 euro)	0.13**	0.11*	-0.00	0.15	1
Lump sum (8000 euro)	0.18***	-0.06	0.09	0.08	0.91***

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10

^a Units are hours per week for domestic and personal care and social services. For financial support, units are 100 euro/month for the annuity and 1000 euro once for the lump sum.

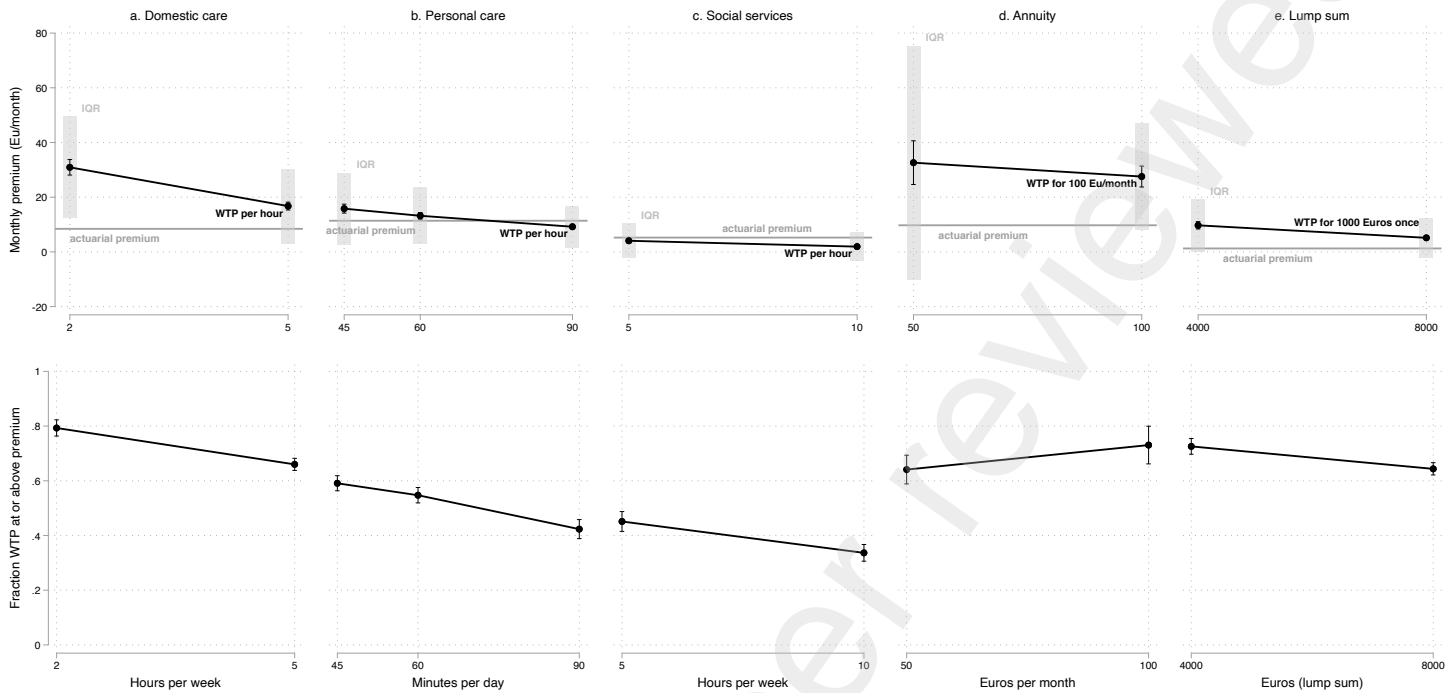
show that preferences for the attributes vary widely between respondents. The standard deviations increase with the number of hours of care, indicating that the variation in preferences increases with the level of attributes. The one exception is the health-contingent annuity with roughly constant dispersion for 50 or 100 euro per month. While preferences are more dispersed at higher attribute levels, the rightmost columns of panel a. indicate that the differences between levels are slightly smaller than would be observed for a constant variance of WTP *per unit* of the attributes. All standard deviations are large relative to the means.

The model in Table 9 allows for unrestricted correlations between the preferences for the different attributes and attribute levels. An overview of the estimated correlations is presented in the bottom panel of that table. The correlations between preferences for different levels of the same attribute are positive and large, above 0.90 for all dimensions of care and for the lump sum. The interpretation is that people report consistent tastes for different levels of a given type of care, e.g., someone who places above average value on two hours of domestic care is likely to do the same for five hours. Only for the annuity do we find a much weaker correlation of 0.40. Combined with the large dispersion at the lower level of 50 euro/month, this may suggest that people find it hard to value such a relatively small amount.

Correlations between attributes are moderate in magnitude but still mostly positive and statistically significant. Different types of in-kind care show positive and significant associations with correlations between 0.20 and 0.57. Among the two types of financial support, the correlations between the annuity of 100 euro/month and both levels of the lump sum are of similar magnitude, 0.40 for 4000 euro and 0.27 for 8000 euro (not in table). The higher annuity also correlates relatively strongly with the three dimensions of in-kind care: coefficients range from 0.40 to 0.63. However, neither level of the lump sum is strongly associated with in-kind care, as correlations are smaller than 0.18 in absolute value. All in all, Table 9 confirms Table 7 in that tastes for different types of care and for the annuity are all positively correlated, but the lump sum does not fit that pattern.

Figure 2 shows the mean WTPs, the dispersion as measured by the inter-quartile range (IQR) and the fraction of respondents with a WTP above the actuarially fair premium. The top panels illustrate the decline in WTP per unit of the attributes in relation to the level of an actuarially fair insurance premium. The mean WTP for domestic care and for both types of financial support are above the actuarial premium for all levels of those attributes. The WTP for an hour of personal care is relatively high at 45 and 60 minutes per day but dips below the insurance premium for 90 minutes per day. For social services, both WTPs are below the actuarial premium. However, these averages hide sizable variation in preferences, especially for domestic care and the monthly annuity. As a result, a substantial fraction would be willing to pay an actuarially fair premium for all attributes and levels, ranging from 35% for 10 hours of social services per week to

Figure 2: Willingness to pay for different levels of the attributes (spikes are 95% confidence intervals on the mean WTP)



80% for 2 hours of domestic care.⁸ The next subsection relates variation in preferences to demographics, expectations and preferences.

4.5 Heterogeneity in preferences

To better understand heterogeneity in preferences for home care, we relate individual-specific WTP estimates to personal circumstances, preferences, and expectations. We simulate posterior means of the WTP for each attribute based on the linear specification in Table 7. The advantage of the linear model is that it uses the 10 choices of an individual to calibrate one single taste-coefficient per attribute, rather than multiple coefficients as in the dummy-model. The fact that preferences are summarized in a single parameter per attribute facilitates subsequent analysis. Table 10 shows estimates from linear models that regress the posterior mean WTP for each attribute on a broad range of variables (columns ‘Domestic care’-‘Lump sum’).

⁸Appendix D presents a similar figure that distinguishes between respondents who would and would not consider buying home care insurance. In line with the results reported in the main text, the dummy models confirm that those who are interested in home care insurance have substantially higher WTPs than those who are not interested.

Personal circumstances

Table 10 shows that respondents who live with a partner have a significantly lower WTP for domestic care insurance (-2.71 euro), personal care (-1.40 euro), social services (-1.12 euro), and a home care annuity (-4.12 euro). These respondents probably expect informal care from their partners that can substitute for formal care. A lump sum for home adaptations, on the other hand, cannot be substituted by care from the partner and is not significant. Other personal circumstances are mainly associated with domestic care or personal care – both in-kind services with a relatively high WTP.

Log net household income has significantly positive coefficients for domestic and personal care, indicating that income-rich households are willing to pay more for insurance covering these two types of care. They can afford more care, and the fact that they are further away from the safety net may also induce demand for additional insurance.⁹ Homeowners have a significantly higher WTP for personal care, maybe because this allows them to stay at home longer. They may also have more financial resources to purchase insurance. Tastes for the other attributes are not related to homeownership. This may be due to the fact that reverse mortgages are rare in the Netherlands, so people have to move house in order to use their home equity to pay for LTC. As the elderly do not like this prospect (Bresser & Knoef 2015), home care insurance is not crowded out by home equity.

For the other characteristics, women and individuals with children do not have a significantly different WTP for most types of care if we control for expectations regarding the availability of informal care. Controlling for the availability of informal care is important as women have a higher life expectancy than men and therefore rely more on LTC (Van der Vaart et al. 2020). People who have experience providing informal care do not have significantly different WTPs than individuals who do not have such experience. Also, current health does not predict preferences for different attributes significantly. Preferences for personal care and social services decline with age, possibly because older people become more optimistic about coping without these services.

Table 10: Multiple linear regression for the willingness to pay for several types of home care insurance

	(1)	(2)	(3)	(4)	(5)
	Domestic care	Personal care	Social services	Annuity	Lump sum
Actuarially fair premium	8.43	11.39	5.23	9.73	1.25
Average WTP	17.93	10.30	2.54	25.48	5.66
Personal circumstances					
Female	1.38 *	0.62	0.30	1.35	-0.04
	(0.75)	(0.46)	(0.31)	(1.28)	(0.35)
Partner	-2.71 ***	-1.40 **	-1.12 ***	-4.12 **	0.37

Continued on next page

⁹An additional dummy for incomes sufficiently low to qualify for the safety net specified in the experiment does not enter the models significantly. Estimates available on request.

Table 10 – *Continued from previous page*

	(1)	(2)	(3)	(4)	(5)
	Domestic care	Personal care	Social services	Annuity	Lump sum
	(0.95)	(0.58)	(0.39)	(1.64)	(0.48)
Has Children	-0.55	-0.51	-0.37	-1.51	-0.90 *
	(1.06)	(0.62)	(0.43)	(1.82)	(0.49)
Homeowner	0.78	1.38 **	0.61	0.49	-0.15
	(0.95)	(0.58)	(0.40)	(1.66)	(0.43)
Log net HH income	2.37 **	1.22 **	0.56	1.84	0.56
	(0.97)	(0.59)	(0.40)	(1.63)	(0.42)
Vocational	-2.06 **	0.63	-0.01	0.38	-0.03
	(0.91)	(0.55)	(0.38)	(1.60)	(0.42)
University	-2.06 **	0.18	-0.43	-1.42	-0.30
	(0.98)	(0.60)	(0.41)	(1.67)	(0.45)
Providing personal care	0.19	0.81	0.46	2.63	-0.15
	(1.21)	(0.74)	(0.50)	(2.08)	(0.53)
Providing domestic care or support	-0.09	0.01	-0.33	-1.38	0.15
	(0.82)	(0.51)	(0.34)	(1.37)	(0.37)
No health problems	0.70	1.33 *	0.69	2.07	-0.78
	(1.09)	(0.72)	(0.46)	(1.87)	(0.48)
Needs care	3.64	0.08	0.71	1.13	-0.03
	(2.54)	(1.52)	(1.04)	(4.12)	(1.31)
Age/100	-19.93	-31.17 *	-29.46 **	-73.90	14.84
	(31.71)	(18.31)	(12.83)	(53.00)	(14.97)
Age squared/100	0.13	0.22	0.22 **	0.52	-0.18
	(0.26)	(0.15)	(0.11)	(0.43)	(0.12)
Preferences					
Risk aversion (scale 1-7)	0.83 ***	0.30 *	0.22 **	0.65	-0.01
	(0.26)	(0.17)	(0.11)	(0.45)	(0.12)
Patience (scale 1-7)	0.30	0.13	0.06	0.30	-0.01
	(0.27)	(0.16)	(0.11)	(0.47)	(0.12)
Restraint (scale 1-7)	-0.19	-0.14	-0.10	-0.21	-0.05
	(0.30)	(0.19)	(0.13)	(0.52)	(0.14)
Bequest motive: relative importance (baseline: no bequest motive, 0% of windfall in bequest box)					
Weak (1-20%)	2.45	-0.84	0.05	0.49	1.60 **
	(1.76)	(1.09)	(0.73)	(2.96)	(0.76)
Below average (21-49%)	4.55 ***	1.86 *	1.00	4.39 *	1.53 **
	(1.56)	(0.97)	(0.66)	(2.65)	(0.76)
Average (50%)	1.81	-0.36	0.23	1.35	1.25 *
	(1.42)	(0.91)	(0.60)	(2.37)	(0.66)
Above average (51-80%)	2.37	-0.57	0.42	2.99	1.29 *
	(1.51)	(0.93)	(0.61)	(2.47)	(0.68)
Strong (81-99%)	-2.37	-4.88 ***	-0.94	-2.40	-0.41
	(2.68)	(1.69)	(1.18)	(4.65)	(1.15)
Very strong (100%)	-2.37	-3.42 ***	-1.97 **	-5.62 *	0.79
	(2.05)	(1.31)	(0.85)	(3.36)	(0.89)
Bequest motive: type (baseline: warm glow)					
Strategic	-1.23	-1.65 ***	-0.38	-1.32	-0.76 *
	(0.99)	(0.64)	(0.42)	(1.72)	(0.46)
Altruistic	-1.69	-0.69	-0.30	0.69	-0.83
	(1.22)	(0.80)	(0.53)	(2.15)	(0.65)
Other	-0.52	-1.42	-0.16	0.54	-0.19
	(2.43)	(1.40)	(0.98)	(3.88)	(0.97)
Partner only	-1.19	-1.06	-0.75	-3.42 *	-0.82 *
	(1.10)	(0.67)	(0.46)	(1.94)	(0.50)
Charity only	-0.03	2.74	1.24	5.92	-0.08

Continued on next page

Table 10 – *Continued from previous page*

	(1)	(2)	(3)	(4)	(5)
	Domestic care	Personal care	Social services	Annuity	Lump sum
Missing	(7.60)	(2.85)	(2.11)	(11.73)	(1.63)
	-0.13	-1.12	0.15	1.42	0.29
	(1.70)	(1.09)	(0.70)	(2.79)	(0.82)
Expectations					
Availability informal care by someone else than partner (baseline: definitely not)					
Definitely	-3.74 **	-1.15	-0.87	-4.69	1.17
	(1.65)	(1.08)	(0.75)	(2.99)	(0.82)
Probably	-0.26	-0.61	0.27	-1.17	0.27
	(1.30)	(0.80)	(0.55)	(2.22)	(0.61)
Maybe	0.07	-0.08	0.32	0.11	0.55
	(1.13)	(0.70)	(0.48)	(1.97)	(0.55)
Probably not	-0.30	0.04	0.34	-0.52	0.29
	(1.13)	(0.70)	(0.48)	(1.96)	(0.53)
Home care use (years)					
Median	0.27 *	0.24 ***	0.08	0.43	0.06
	(0.16)	(0.09)	(0.07)	(0.27)	(0.06)
Inter quartile range	-0.02	-0.04	-0.01	-0.09	-0.02
	(0.13)	(0.08)	(0.06)	(0.23)	(0.06)
	(0.13)	(0.08)	(0.06)	(0.23)	(0.06)
Expenditures when in need of care (baseline: decrease or stay constant)					
Increase	0.89	1.46 ***	0.66 *	1.46	0.79 **
	(0.81)	(0.51)	(0.35)	(1.44)	(0.39)
Constant	1.56	8.01	6.07	32.10	-1.01
	(12.07)	(7.03)	(4.83)	(20.03)	(5.64)
Observations	1702	1702	1702	1702	1702

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Preferences

Regarding preferences, again, most variables are mainly associated with the WTP for domestic and personal care. We find, as expected, that more risk-averse people have higher WTPs for home care insurance, which holds for domestic and personal care and social services, but not for the annuity and the lump sum. Patience and impulsiveness (restraint) are not significantly related to the demand for home care insurance. Respondents who find bequests important relative to LTC have a significantly lower WTP for personal care (-3.42 euro) and social care (-1.97 euro), but not for domestic care. The type of bequest motive does not correlate significantly with preferences for most attributes. However, for personal care, respondents with a strategic bequest motive have a lower WTP (-1.65 euro) compared to those with a warm glow motive (baseline), suggesting that bequest motives could be important for LTC insurance decisions, in line with Zweifel & Strüwe (1996) and Pauly (1990).

Expectations

Expectations are also mainly associated with the WTPs for domestic and personal care. Those who feel certain that informal care will be available have, on average, a lower WTP

for domestic care insurance (-3.74 euro) than those who do not expect any informal care. This estimate speaks to the substitutability between formal and informal care that has been documented in previous work (Orsini 2010, Kim & Lim 2015). Longer expected duration of home care use is positively associated with the demand for domestic and personal care insurance.¹⁰ Uncertainty about home care use, measured by the inter-quartile range, is not significantly related to home care insurance. Regarding the impact of expenditures (health state-dependence), the results show that those who believe that expenditures increase when in need of care have a higher WTP for personal care, social care and the lump sum for home adaptations.

5 Conclusion

Formal long-term care (LTC) is increasingly provided at home. This paper contributes to our understanding of the demand for home care insurance. We examine the willingness to pay (WTP) for domestic care, personal care, social services, a monthly home care annuity, and a lump sum for home adaptations. We contribute to existing studies by focusing on preferences to insure different types of in-kind and in-cash support that assist people with day-to-day activities in a home setting or assisted living instead of more intensive and complex care in nursing homes. Furthermore, we investigate decreasing marginal utility in the level of support and heterogeneity in preferences to better understand the personal characteristics associated with the valuation of different types of support for care at home.

We fielded a discrete choice experiment in the Dutch LISS panel, in which we asked people to choose between home care insurance plans that differ in coverage and price. Whereas most studies are based on countries in which the implicit default option is not to have LTC insurance – except for a means-tested safety net – the norm in the Netherlands is that everyone is insured for LTC. Comparing the WTP for insurance with actuarially fair prices, we find that the Dutch value home care relatively highly in the aggregate. For 77% of the respondents, the WTP to insure at least one type of in-kind support is higher than the actuarially fair price. For in-cash support, this even holds for 88% of the respondents. Among the different types of in-kind support, there is a relatively high demand for domestic care (68%), while the demand for personal care (46%) and social services (38%) is lower.

While most people value coverage for basic levels of LTC support, there is substantial variation in the WTP at all levels. Moreover, we find diminishing marginal utility for all

¹⁰Appendix F shows an alternative regression in which we used qualitative expectations about home care needs instead of quantitative expectations. The results show that those who expect to be an average or relatively long care user, have a significantly higher WTP for LTC insurance compared to those who expect to use home care relatively much shorter than average (for all attributes the WTP in the ‘average’ and ‘longer’ categories are not statistically significant from each other). For the other variables, the results in both specifications are very similar.

types of support except the home care annuity. Analyzing heterogeneity in preferences, we find that the following personal characteristics are associated with a higher WTP for domestic or personal care: being single, homeowner, risk-averse, having a higher household income and having low expectations regarding the receipt of informal care. Individuals who expect to use more home care are also willing to pay more for home care insurance. Furthermore, people who believe that expenditures increase when in need of care have a higher WTP, particularly for personal care. Finally, people with a strategic bequest motive have a lower demand for personal care, while not so much for other services. The valuation of in-cash support, on the other hand, varies less strongly with personal characteristics. This may be due to the higher flexibility offered by cash benefits compared to in-kind services.

Our findings are relevant for the design of LTC insurance schemes for home care. The results are consistent with adverse selection into insurance. However, we also find that characteristics other than expected home care use play an important role for the valuation of LTC insurance. For example, we provide empirical evidence that more risk-averse people have a stronger taste for insurance, which offsets selection into the market, as these individuals might have a lower risk than the insurance company would predict (Finkelstein & McGarry 2006). Based on our results, one could think of mandatory home care insurance (either public or private) providing coverage for basic levels of support. The fraction of people who value in-kind support above the actuarial premium decreases with the level of support because of decreasing marginal utility. As there is substantial variation in preferences at all levels, top-up home care insurance plans could be viable (see also Mayhew et al. 2010 for the UK). Such top-ups can help people to bridge the expected difference between basic state support, personal income and the cost of care when care needs arise. Providing cash benefits rather than in-kind support is another way to offer home care insurance and is highly valued by most.

References

- 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.
- Alders, P. & Schut, F. (2020), 'Financing long-term care: the role of culture and social norms', *International Journal of Health Policy and Management* **9**(4), 179–181.
- Ameriks, J., Briggs, J., Caplin, A., Shapiro, M. D. & Tonetti, C. (2018), The long-term-care insurance puzzle: Modeling and measurement, Working Paper 22726, National Bureau of Economic Research.

- Ameriks, J., Caplin, A., Laufer, S. & Nieuwerburgh, S. V. (2011), ‘The Joy of Giving or Assisted Living? Using Strategic Surveys to Separate Public Care Aversion from Bequest Motives’, *The Journal of Finance* **66**(2), 519–561.
- Amilon, A., Ladenburg, J., Siren, A. & Vernstrøm Østergaard, S. (2020), ‘Willingness to pay for long-term home care services: Evidence from a stated preferences analysis’, *The Journal of the Economics of Ageing* **17**, 100238.
- Bliemer, M. & Rose, J. (2009), Designing stated choice experiments: state of the art, in R. Kitamura, T. Yoshii & T. Yamamoto, eds, ‘The expanding sphere of travel behaviour research, selected papers from the 11th IATBR Conference’, Emerald Publishing, United Kingdom, pp. 499–537.
- Boyer, M., De Donder, P., Fluet, C., Leroux, M. & Michaud, P. (2020), ‘Long-term care insurance: Information frictions and selection’, *American Economic Journal: Economic Policy* **12**(3), 134–169.
- Bresser, J. d. & Knoef, M. (2015), ‘Can the Dutch meet their own retirement expenditure goals?’, *Labour Economics* **34**, 100–117.
- Briggs, J. S. & Tonetti, C. (2019), Risky insurance: Insurance portfolio choice with incomplete markets, Meeting Paper 1388, Society for Economic Dynamics.
- Brown, J. R. & Finkelstein, A. (2008), ‘The Interaction of Public and Private Insurance: Medicaid and the Long-Term Care Insurance Market’, *American Economic Review* **98**(3), 1083–1102.
- Brown, J. R., Goda, G. S. & McGarry, K. (2012), ‘Long-Term Care Insurance Demand Limited By Beliefs About Needs, Concerns About Insurers, And Care Available From Family’, *Health Affairs* **31**(6), 1294–1302.
- Coe, N. B., Skira, M. M. & Van Houtven, C. H. (2015), ‘Long-term care insurance: Does experience matter?’, *Journal of Health Economics* **40**, 122–131.
- Costa-Font, J., Courbage, C. & Swartz, K. (2015), ‘Financing Long-Term Care: Ex Ante, Ex Post or Both?’, *Health Economics* **24**(S1), 45–57.
- Costa-Font, J., Courbage, C. & Zweifel, P. (2017), ‘Policy Dilemmas in Financing Long-term Care in Europe’, *Global Policy* **8**(S2), 38–45.
- Da Roit, B. & Le Bihan, B. (2010), ‘Similar and yet so different: Cash-for-care in six european countries long-term care policies’, *The Milbank Quarterly* **88**(3), 286–309.
- De Bekker-Grob, E. W., Ryan, M. & Gerard, K. (2012), ‘Discrete choice experiments in health economics: A review of the literature’, *Health Economics* **21**(2), 145–172.

- Donder, P. d. & Pestieau, P. (2017), 'Private, social, and self-insurance for long-term care in the presence of family help', *Journal of Public Economics Theory* **19**, 1837.
- Einav, L. & Finkelstein, A. (2018), 'Moral Hazard in Health Insurance: What We Know and How We Know It', *Journal of the European Economic Association* **16**(4), 957–982.
- Ethan, M., Lieber, J. & Lockwood, L. (2019), 'Targeting with in-kind transfers: evidence from medicaid home care', *American Economic Review* **109**(4), 1461–1485.
- Finkelstein, A. & McGarry, K. (2006), 'Multiple dimensions of private information: evidence from the long-term care insurance market', *American Economic Review* **96**, 938958.
- Hurd, M. D. (2009), 'Subjective probabilities in household surveys', *Annual Review of Economics* **1**(1), 543–562.
- Kaambwa, B., Lancsar, E., McCaffrey, N., Chen, G., Gill, L., Cameron, I., Crotty, M. & Ratcliffe, J. (2015), 'Investigating consumers' and informal carers' views and preferences for consumer directed care: a discrete choice experiment', *Social Science and Medicine* **140**, 81–94.
- Kim, H. B. & Lim, W. (2015), 'Long-term care insurance, informal care, and medical expenditures', *Journal of public economics* **125**, 128–142.
- Kodner, D. (2003), 'Consumer-directed services: lessons and implications for integrated systems of care', *International journal of integrated care* **3**(17), 1–7.
- Krabbe-Alkemade, Y., Makai, P., Shestalova, V. & Voesenek, T. (2020), 'Containing or shifting? health expenditure decomposition for the aging dutch population after a major reform', *Health Policy* **124**(3), 268–274.
- Lockwood, L. M. (2018), 'Incidental bequests and the choice to self-insure late-life risks', *American Economic Review* **108**(9), 25132550.
- Manski, C. F. (2004), 'Measuring expectations', *Econometrica* **75**(5), 1329–1376.
- Mayhew, L., Karlsson, M. & Rickayzen, B. (2010), 'The Role of Private Finance in Paying for Long Term Care', *The Economic Journal* **120**(548), F478–F504.
- Mommaerts, C. (2020), 'Long-term care insurance and the family', *Mimeo* .
- Nieboer, A. P., Koolman, X. & Stolk, E. A. (2010), 'Preferences for long-term care services: Willingness to pay estimates derived from a discrete choice experiment', *Social Science & Medicine* **70**(9), 1317–1325.

- OECD (2019), *Health at a Glance 2019*.
- Orsini, C. (2010), 'Changing the way the elderly live: Evidence from the home health care market in the united states', *Journal of Public Economics* **94**(1-2), 142–152.
- Pauly, M. V. (1990), 'The Rational Nonpurchase of Long-Term-Care Insurance', *Journal of Political Economy* **98**(1), 153–168.
- Pestieau, P. & Ponthière, G. (2012), Long-term care insurance puzzle, in 'Financing long-term care in Europe', Springer, pp. 41–52.
- Revelt, D. & Train, K. (1998), 'Mixed logit with repeated choices: Households' choices of appliance efficiency level', *Review of Economics and Statistics* **80**(4), 647–657.
- Royalty, A. B. & Hagens, J. (2005), 'The effect of premiums on the decision to participate in health insurance and other fringe benefits offered by the employer: evidence from a real-world experiment', *Journal of health economics* **24**(1), 95–112.
- Sloan, F. & Norton, E. (1997), 'Adverse selection, bequests, crowding out, and private demand for insurance: evidence from the long-term care insurance market', *Journal of Risk and Uncertainty* **15**, 201–219.
- Swartz, K. (2013), 'Searching for a Balance of Responsibilities: OECD Countries' Changing Elderly Assistance Policies', *Annual Review of Public Health* **34**(1), 397–412.
- Timonen, V., Convery, J. & Cahill, S. (2006), 'Care revolution in the making: a comparison of cash-for-care programmes in four european countries', *Ageing and Society* **26**(4), 455–474.
- Train, K. (2003), *Discrete Choice Methods with Simulation*, Cambridge University Press, Cambridge.
- Van der Crujisen, C., de Haan, J. & Roerink, R. (2019), Financial knowledge and trust in financial institutions, Working Paper 662, De Nederlandsche bank.
- Van der Vaart, J., Alessie, R., Groneck, M. & Van Ooijen, R. (2020), Inequalities in long-term care needs and mortality, Working Paper.
- Van Houtven, C. H., Coe, N. B. & Konetzka, R. T. (2015), 'Family structure and long-term care insurance purchase', *Health economics* **24**, 58–73.
- Van Ooijen, R., De Bresser, J. & Knoef, M. (2018), Health and household expenditures, Netspar Design Paper 103.

Van Ooijen, R., De Bresser, J., Knoef, M., Van Megen, M. & CentERdata (2016), 'LISS panel - Healthcare costs'.

URL: <https://doi.org/10.17026/dans-zwy-4kwn>

Veldwijk, J., Lambooi, M. S., de Bekker-Grob, E. W., Smit, H. A. & de Wit, G. A. (2014), 'The Effect of Including an Opt-Out Option in Discrete Choice Experiments', *PLoS ONE* **9**(11), e111805.

Watson, V., Becker, F. & de Bekker-Grob, E. (2017), 'Discrete Choice Experiment Response Rates: A Meta-analysis', *Health Economics* **26**(6), 810–817.

Zweifel, P. & Strüwe, W. (1996), 'Long-term care insurance and bequests as instruments for shaping intergenerational relationships', *Journal of Risk and Uncertainty* **12**(1), 65–76.

Appendix

A Information experiment

Table A1: Information provision and expected home care use

Dependent variable: qualitative or quantitative expectations	Qualitative expectations		Quantitative expectations			
	Own care	Partner's care	p50	IQR	p50	IQR
			Own care	Own care	Both care	Both care
Any info	0.144*** (0.0347)	0.0918** (0.0416)	0.344** (0.145)	0.222 (0.171)	0.0689 (0.0913)	0.0247 (0.111)
Constant	2.623*** (0.0281)	2.736*** (0.0336)	2.362*** (0.114)	3.160*** (0.140)	1.411 (0.0730)	1.907 (0.0905)
F(1, N-3)	17.33***	4.87**	5.64**	1.69	0.57	0.05
N	1901	1393	1513	1513	1155	1155

Robust standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.01

B Correlations between posterior means obtained from different models

Table B1: Correlations between posterior means from the three mixed logit models described in Table 7

	Domestic care			Personal care		
	(1)	(2)	(3)	(1)	(2)	(3)
(1) uncorr. preferences	1			1		
(2) corr. preferences	0.89***	1		0.88***	1	
(3) random pref. price	0.96***	0.82***	1	0.96***	0.85***	1
	Social services			Annuity		
	(1)	(2)	(3)	(1)	(2)	(3)
(1) uncorr. preferences	1			1		
(2) corr. preferences	0.77***	1		0.62***	1	
(3) random pref. price	0.97***	0.65***	1	0.97***	0.52***	1
	Lump sum					
	(1)	(2)	(3)			
(1) uncorr. preferences	1					
(2) corr. preferences	0.99***	1				
(3) random pref. price	0.99***	0.98***	1			

Model (1) has a fixed coefficient on price and a multivariate normal mixing distribution with unrestricted correlations for all other coefficients; model (2) restricts correlations in the multivariate normal distribution to zero; model (3) includes a random coefficient on price and restricts correlations to zero.

*** $p < 0.01$

C Data quality

This appendix analyzes the quality of the data elicited by the discrete choice experiment. The key question is whether the hypothetical choices measure meaningful preferences for different types of support in case one needs long-term care. We analyze both direct evidence from survey questions that evaluate the clarity and difficulty of the questionnaire and indirect evidence derived from response patterns. In addition to the *level* of quality, the analysis below shows its *association* with average WTP. The overall conclusion is that a majority of respondents found the questions clear (63%) and not too difficult (60%). Moreover, only 9% of respondents chooses either the first or second option in at least eight choices out of ten, which suggest the vast majority took the questionnaire seriously. Variation in elicited WTP cannot be explained by differences along these dimensions. Furthermore, elicited preferences are robust to the provision of information on actual LTC use.

Evaluation questions

Each survey fielded in the LISS panel ends with five evaluation questions that ask for the difficulty, clarity and enjoyment of the survey as experienced by respondents. Table C1 shows that 60% did not find the questionnaire difficult. Reported difficulty may reflect opaqueness of questions, which would negatively affect data quality, and/or genuinely hard tradeoffs between different aspects of care. The fact that only 15% of respondents indicate that the questions were not clear to them suggests that the vast majority did understand the decisions they were asked to make.

Panels b. and c. of Table C1 show the relationships between average WTP for the different types of support and difficulty and clarity of the questions. Though panel b. indicates that average WTPs for personal care and for a lump sum vary significantly with question difficulty, this accounts for only 1% of variation in either WTP. Moreover, the differences in average WTP across levels of difficulty are less than 2 euro, while the standard deviations at a given level of difficulty are around 9 euro for personal care and 5-6 euro for the lump sum. These associations are weak relative to variability in the sample and they do not reflect a monotonic pattern across difficulty. As for clarity of the questions, panel c. shows that none of the WTPs varies significantly with self-reported clarity. All in all, the results in Table C1 show that variation in elicited WTP cannot be explained by direct measures of data quality.

Controlling for difficulty or clarity does not affect the estimated regression coefficients for the other variables. Estimates for the extended regression specifications are available on request.

Table C1: Direct measures of answer quality and WTPs elicited in discrete choice experiment

a. Descriptive statistics of evaluation questions							
	Mean	Std. Dev.	Fraction equal to (%)				
			1 (not)	2	3	4	5 (very)
Questions difficult	2.9	1.5	27	15	18	22	19
Questions clear	3.8	1.1	4	11	23	30	33
Made you think	3.4	1.2	9	11	31	28	21
Topic interesting	3.6	1.1	6	8	31	31	24
Enjoyable to participate	3.5	1.1	6	8	37	24	25
N	1702						
b. WTP by difficulty of the questionnaire							
	F-stat ^a	R ²	Average WTP given difficulty ^b				
			1 (not)	2	3	4	5 (very)
Domestic care	1.27 [0.28]	< 0.005	16.81 (15.07)	18.18 (14.40)	17.25 (14.28)	18.94 (14.22)	18.08 (14.88)
Personal care	3.29 [0.01]	0.01	9.70 (9.18)	10.88 (9.04)	10.16 (9.06)	11.80 (9.38)	9.82 (8.76)
Social services	1.01 [0.40]	< 0.005	2.32 (6.33)	2.53 (6.29)	2.07 (5.86)	2.96 (6.13)	2.49 (6.04)
Annuity	0.07 [0.99]	< 0.005	25.24 (25.93)	25.20 (24.55)	24.74 (24.29)	25.78 (25.54)	25.12 (24.57)
Lump sum	3.13 [0.01]	0.01	5.58 (6.79)	6.49 (6.74)	6.07 (6.61)	6.07 (6.05)	4.71 (6.90)
N	1702		452	254	302	367	327
c. WTP by clarity of the questions							
	F-stat ^a	R ²	Average WTP given clarity ^b				
			1 (not)	2	3	4	5 (very)
Domestic care	1.02 [0.39]	< 0.005	16.13 (12.19)	16.38 (14.09)	18.57 (14.72)	17.79 (14.42)	17.92 (15.13)
Personal care	0.40 [0.81]	< 0.005	9.24 (8.54)	10.31 (9.52)	10.41 (9.01)	10.68 (9.21)	10.40 (9.08)
Social services	0.43 [0.78]	< 0.005	1.90 (6.03)	2.51 (6.16)	2.49 (6.18)	2.71 (6.05)	2.31 (6.22)
Annuity	1.43 [0.22]	< 0.005	19.75 (21.51)	24.17 (24.33)	26.02 (25.37)	26.22 (25.01)	24.75 (25.49)
Lump sum	1.33 [0.26]	< 0.005	3.98 (7.25)	5.38 (6.02)	6.09 (6.98)	5.79 (6.52)	5.77 (6.61)
N	1702		61	184	383	511	563

^a F-statistics follow a $F(4, 1697)$ distribution under the null; p -values in square brackets

^b Standard deviations in parentheses

Table C2: Tendency to always choose either first or second option and WTPs elicited in discrete choice experiment

a. Descriptives statistics					
	Mean	Std. Dev.	Fraction equal to (%)		
			4-6	7	≥ 8
Number of times same option is selected	5.33	1.52	71	20	9
N	1702				
b. WTP by tendency to choose same option (at least eight times vs. fewer)					
	F-stat ^a	R^2	Conditional average WTP ^b		
			< 8	≥ 8	
Domestic care	0.00 [0.97]	< 0.005	17.80 (14.89)	17.77 (11.62)	
Personal care	0.63 [0.43]	< 0.005	10.48 (9.32)	10.00 (6.92)	
Social services	10.81 [0.001]	0.01	2.33 (6.17)	3.91 (5.73)	
Annuity	4.86 [0.03]	< 0.005	24.89 (25.55)	28.60 (19.53)	
Lump sum	1.79 [0.18]	< 0.005	5.68 (6.70)	6.35 (5.93)	
N	1702		1544	158	

^a F-statistics follow a $F(1, 1700)$ distribution under the null; p -values in square brackets

^b Standard deviations in parentheses

Suspicious responses

In addition to direct measures of data quality, the way a respondent answered the discrete choices may also contain information on the effort put into the answers. We focus on one response pattern that could be indicative of low data quality: the tendency to always choose either the first or the second alternative. The configuration of options within a choice was random, so there is no inherent feature in the experiment that would justify individuals to always go for the option that is presented either on the left or right. Therefore, a systematic tendency to be influenced by the order in which alternatives are presented bodes ill for data quality.

Panel a. of Table C2 shows the distribution of the number of choice situations in which a respondent chooses either the left or right option. Very few respondents appear to be influenced by the position of options on the screen: 9% of individuals choose the same option in at least eight out of ten choices and 71% choose both options at least four times. Panel b. displays the associations between average WTPs and an indicator for choosing the same option at least eight times in ten choices. The average WTPs for social services and for the annuity are significantly higher for those respondents who always choose the same position. However, the variation between these groups is small

Table C3: Randomizations and WTPs elicited in discrete choice experiment

	F-stat ^a	R^2	Conditional average WTP ^b	
			No information	Information
Domestic care	0.66 [0.42]	< 0.005	17.39 (14.68)	18.00 (14.59)
Personal care	0.01 [0.92]	< 0.005	10.46 (9.21)	10.42 (9.09)
Social services	0.52 [0.47]	< 0.005	2.33 (5.97)	2.55 (6.23)
Annuity	1.64 [0.20]	< 0.005	24.17 (24.34)	25.79 (25.43)
Lump sum	0.27 [0.60]	< 0.005	5.63 (6.68)	5.80 (6.61)
N	1702		579	1123

^a F-statistics follow a $F(1, 1700)$ distribution under the null; p -values in square brackets

^b Standard deviations in parentheses

relative to the within-group standard deviations. Most importantly, none of the regression estimates described in the main text changes once we control for such flatlining (estimates of specifications that control for flatlining are available on request).

Randomized information treatment

In addition to the evaluation questions and response pattern described above, as a final check on data quality we estimate the sensitivity of elicited WTPs to the randomized information treatment embedded in the survey. This treatment provided information on actual LTC usage to a subsample of respondents (the effect of this information on expected use is shown in Appendix A).

While Appendix A documents that information on actual LTC usage shifts respondents' expectations, Table C3 shows that none of the WTPs changes substantially as a result. All differences are statistically insignificant and smaller than 2 euros. The fact that preferences are stable when confronted with general information on duration of LTC use corroborates the notion that our stated preference experiment elicits robust preferences.

D WTP separately for takers and non-takers

Table D1: Average willingness to pay for attributes for subsamples that WOULD or WOULD NOT consider buying home care insurance

	Actuarial premium ^a	WOULD (52%)				WOULD NOT (48%)			
		Mean ^b	SE	WTP \geq premium (%)	SE	Mean ^b	SE	WTP \geq premium (%)	SE
Domestic care (1 hr/wk)	8.43	23.76	(1.44)	76	(1.4)	12.96	(0.87)	60	(1.6)
Personal care (1 hr/wk)	11.39	14.15	(0.81)	58	(2.0)	6.89	(0.48)	33	(2.3)
Social services (1 hr/wk)	5.23	3.60	(0.42)	43	(1.9)	1.55	(0.34)	32	(2.0)
Annuity (100 euro/month)	9.73	28.37	(3.22)	66	(2.7)	22.74	(2.55)	62	(2.4)
Lump sum (1000 euro)	1.25	7.84	(0.58)	75	(1.7)	3.81	(0.41)	60	(1.7)
In-kind: at least one WTP \geq premium				85	(1.3)			68	(1.8)
In-cash: at least one WTP \geq premium				93	(1.3)			82	(1.8)
At least one WTP \geq premium				98	(0.4)			89	(1.2)

^a Actuarially fair monthly premium based on premium payment from age 40 up to first claiming (or death) with a waiting period of 1 year during which the contract is canceled if the need for care would arise. Price of domestic care is 20 euro/hr; price of personal care is 27.02 euro/hr; price of social services is 12.41 euro/hr. Prices for personal care and social services are taken from “personal budget” (PGB) for 2014, see <https://www.nationalehulpguids.nl/forms/PGBWeektarieven2011-2015.pdf>. Actuarially fair premiums are calculated using an LTC risk model for the Netherlands (Van der Vaart et al., 2020).

^b Mean willingness to pay as a monthly premium for the various types of in-kind care and cash benefits listed in the table. E.g., on average, respondents would be willing to pay a monthly premium of €17.93 from age 40 onward in order to receive 1 hour of domestic care per week. Loading factor: 18%, discount rate 2%.

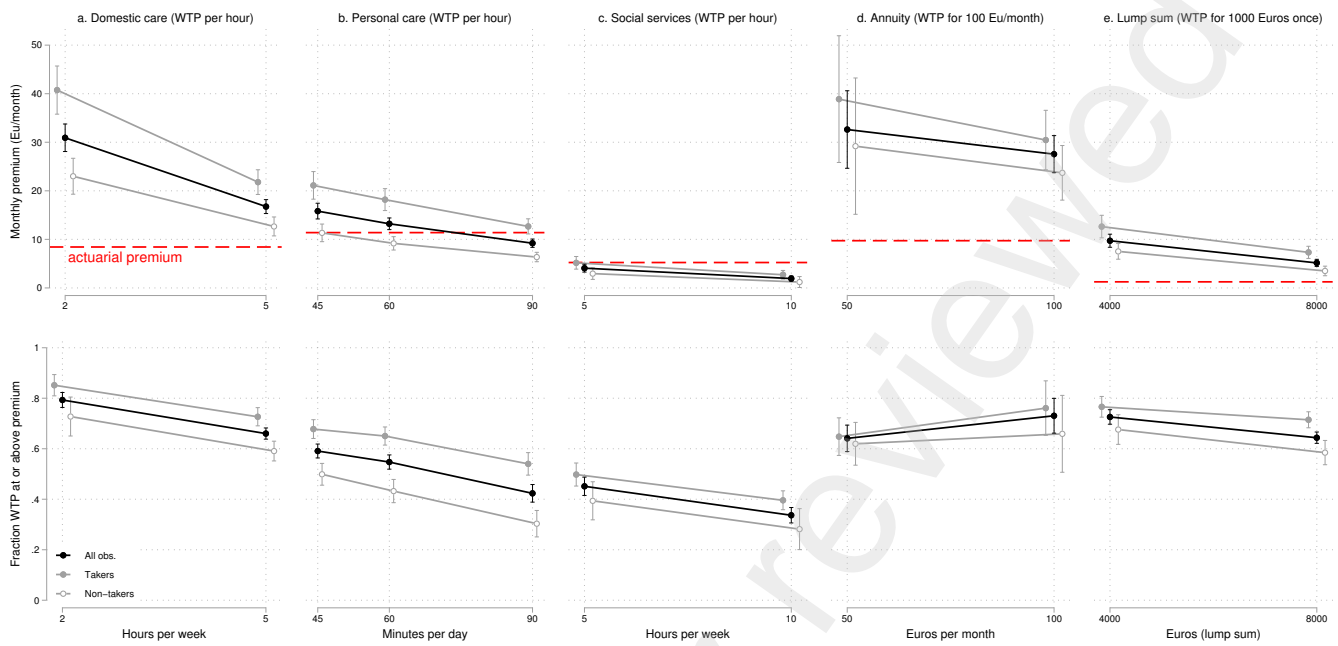


Figure D1: Willingness to pay for different types of LTC insurance, overall and separately for takers and non-takers

E Latent class models

This appendix presents estimates of latent class models in which heterogeneity is captured by a finite set of discrete types (or latent classes). Table E1 presents information for the selection of the number of latent classes. While information criteria suggest 11 classes, a simpler model with 7 classes already yields imprecise estimates of preferences for some groups, resulting in broad interval estimates of the corresponding WTPs. Table E2 shows the average WTP for attributes, computed from latent class models with 7 and 9 classes. Figures E1 to E3 present more details about the separate classes.

Comparing the average WTPs with those reported in Table 8, we note that while all averages are substantially higher for the latent class models the same is true for the accompanying standard errors. In light of this difficulty of estimating preferences for some latent classes, we distinguish between types for which the entire confidence interval of WTP lies either above or below the actuarial premium and types for which the premium falls within the interval for WTP. Summing the population shares across types for which WTP exceeds the premium, both latent class models confirm that large fractions of the Dutch population would be willing to pay realistic insurance premiums for domestic care, a monthly annuity that is contingent on LTC and a one-off lump sum payment at the onset of care needs. While the mixed logit models indicate that roughly two thirds of the population has a WTP that is higher than the actuarially fair premium for each of these attributes, the fraction for which we can confidently conclude the same is between 29% and 70% in the latent class models. Moreover, the fractions for which the estimates unambiguously indicate that WTP is above the market premium for personal care and social services are lower at 22-31%. For 7 latent classes the market premiums fall within the 95% confidence intervals of WTP for 11-42% of the population and those fractions are even higher at 16-64% for the model with 9 classes. Both models yield substantial fractions for which we cannot determine whether WTP is above or below the actuarial premium. Hence, we conclude that while estimates from latent class models are considerably less precise, they reveal similar qualitative patterns as do mixed logit models.

Table E1: Selection of number of latent classes

Classes	LLF	Parameters	AIC	CAIC	BIC
2	-14823.33	13	29672.67	29760.91	29747.91
3	-14527.96	20	29095.93	29231.69	29211.69
4	-14288.76	27	28631.51	28814.80	28787.80
5	-14206.67	34	28481.34	28712.14	28678.14
6	-14083.56	41	28249.12	28527.44	28486.44
7	-13973.15	48	28042.3	28368.14	28320.14
8	-13955.42	55	28020.83	28394.18	28339.18
9	-13864.51	62	27853.01	28273.88	28211.88
10	-13838.82	69	27815.64	28284.02	28215.02
11	-13789.08	76	27730.16	28246.07	28170.07
12	-13786.30	83	27738.61	28302.03	28219.03
13	-13754.64	90	27689.28	28300.22	28210.22
14	-13753.40	97	27700.8	28359.25	28262.25
15	-13710.49	104	27628.98	28334.95	28230.95
16	-13697.55	111	27617.11	28370.60	28259.60
17	-13708.28	118	27652.56	28453.57	28335.57
18	-13682.75	125	27615.5	28464.03	28339.03
19	-13678.35	132	27620.69	28516.74	28384.74
20	-13673.78	139	27625.57	28569.13	28430.13

Estimation by Expectation Maximization algorithm. The maximum number of iterations was capped at 150 to limit runtime. Subsequent estimation of the models with 5, 7, 9 or 11 classes proceeds without binding cap on the number of iterations.

Table E2: Average willingness to pay for attributes, derived from latent class models

	7 latent classes						9 latent classes					
	Actuarial premium ^a	Mean ^b	SE	WTP > premium (%)	Premium in 95% CI (%)	WTP < premium (%)	Mean ^b	SE	WTP > premium (%)	Premium in 95% CI (%)	WTP < premium (%)	
Domestic care (1 hr/wk)	8.43	30.29	(10.97)	45	42	13	34.63	(15.39)	37	45	18	
Personal care (1 hr/wk)	11.39	16.47	(5.55)	22	24	54	16.99	(6.73)	27	39	34	
Social services (1 hr/wk)	5.23	11.97	(11.04)	28	11	60	13.43	(15.17)	31	16	53	
Annuity (100 euro/month)	9.73	57.96	(33.08)	70	11	19	61.95	(42.49)	43	44	13	
Lump sum (1000 euro once)	1.25	8.08	(6.11)	43	27	30	6.15	(10.96)	29	64	7	
In-kind: at least one				51					37			
In-cash: at least one				75					49			
At least one				75					49			

^a Actuarially fair monthly premium based on premium payment from age 40 up to first claiming (or death) with waiting period of 1 year during which the contract is cancelled if the need for care would arise. Price of domestic care is 20 euro/hr; price of personal care is 27.02 euro/hr; price of social services is 12.41 euro/hr. Prices for personal care and social services are taken from "personal budget" (PGB) for 2014, see <https://www.nationalehulpgrads.nl/forms/PGBWeektarieven2011-2015.pdf>. Actuarially fair premiums are calculated using an LTC risk model for the Netherlands (Van der Vaart et al., 2020).

^b Mean willingness to pay as a monthly premium for the various services listed in the table. E.g., according to the model with 7 classes, respondents would on average be willing to pay a monthly premium of €30.29 from age 40 onward in order to receive 1 hour of domestic care per week. Loading factor: 18%, discount rate 2%.

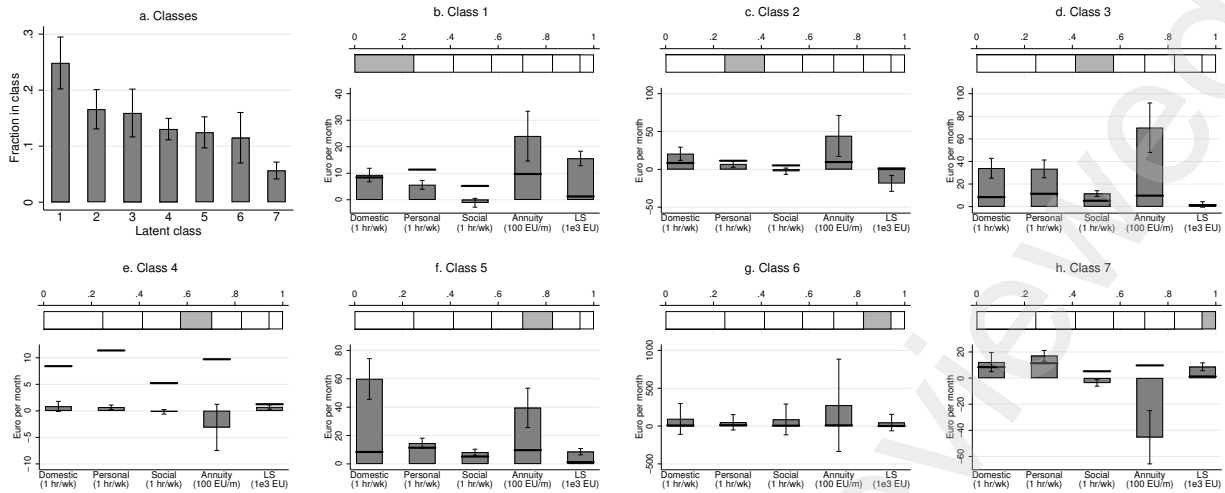


Figure E1: Distribution of willingness to pay for attributes derived from latent class model with 7 classes (LLH = -13,973.11)

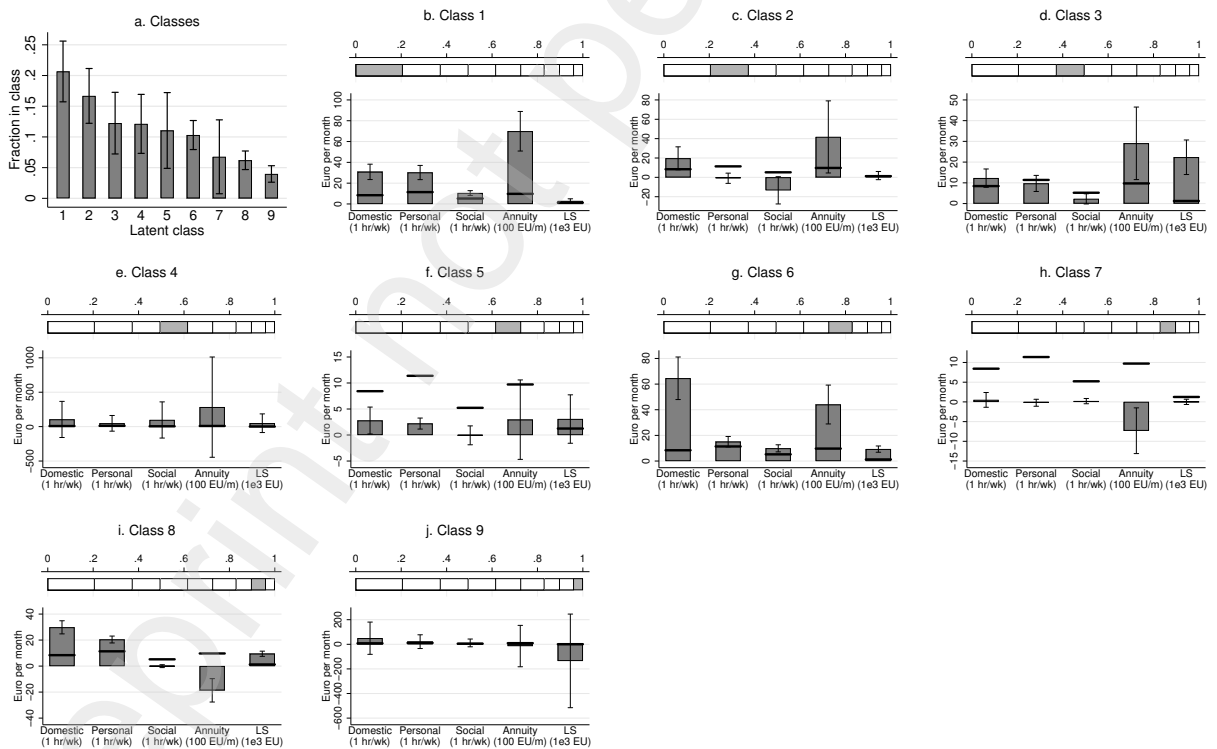


Figure E2: Distribution of willingness to pay for attributes derived from latent class model with 9 classes (LLH = -13,862.99)

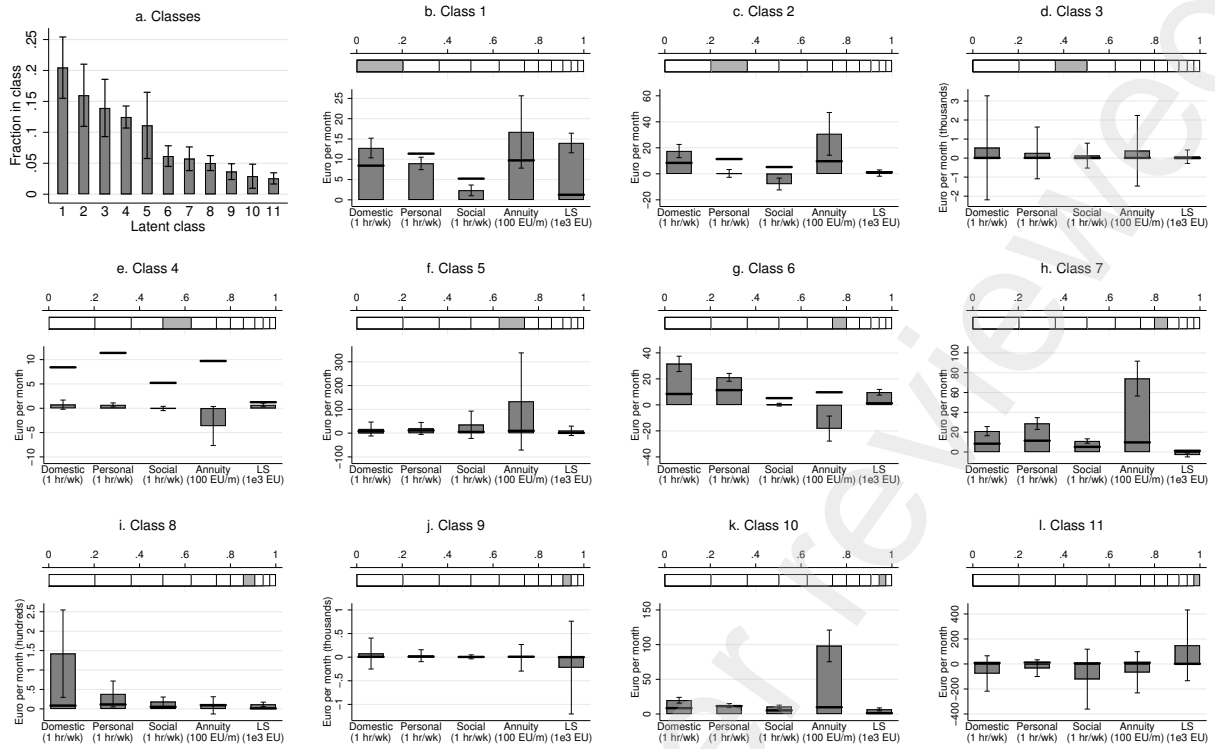


Figure E3: Distribution of willingness to pay for attributes derived from latent class model with 11 classes (LLH = -13,786.89)

F Alternative specification for models that describe heterogeneity in WTP for care: qualitative expectations

Table F1: Multiple linear regression for willingness to pay for home care services (difference with main text: qualitative rather than quantitative measures of expectations of future care use)

	(1) Domestic care	(2) Personal care	(3) Social services	(4) Annuity	(5) Lump sum
Personal circumstances					
Female	1.40 ** (0.65)	0.64 (0.40)	0.17 (0.27)	1.06 (1.12)	0.39 (0.31)
Partner	-2.53 *** (0.84)	-1.51 *** (0.52)	-1.00 *** (0.35)	-3.43 ** (1.44)	0.27 (0.42)
Age/100	-23.44 (27.66)	-16.22 (15.64)	-23.24 ** (10.96)	-75.92 * (45.14)	17.82 (12.59)
Age squared/100	0.18 (0.23)	0.11 (0.13)	0.18 ** (0.09)	0.59 (0.37)	-0.20 ** (0.10)
Has children	-0.66 (0.92)	-0.31 (0.56)	-0.43 (0.38)	-1.71 (1.58)	-0.55 (0.44)
Homeowner	0.20 (0.82)	1.22 ** (0.50)	0.40 (0.34)	0.07 (1.42)	0.02 (0.38)
Log net HH income	2.26 *** (0.84)	1.36 *** (0.51)	0.61 * (0.35)	1.96 (1.42)	0.36 (0.38)
Vocational	-1.57 ** (0.79)	0.73 (0.48)	0.18 (0.33)	0.78 (1.39)	0.09 (0.38)
University	-1.16 (0.86)	0.20 (0.53)	-0.07 (0.36)	-0.15 (1.47)	-0.13 (0.40)
Providing personal care	2.05 * (1.06)	1.38 ** (0.63)	0.73 * (0.43)	3.76 ** (1.82)	-0.35 (0.46)
Providing domestic care or support	0.05 (0.72)	0.05 (0.44)	-0.27 (0.30)	-1.43 (1.20)	-0.12 (0.33)
No health problems	0.34 (0.93)	0.96 * (0.57)	0.52 (0.38)	1.39 (1.60)	-0.69 (0.42)
Needs care	3.36 (2.07)	0.74 (1.18)	0.73 (0.79)	0.87 (3.34)	-0.35 (1.05)
Preferences					
Risk aversion (scale 1-7)	0.76 *** (0.23)	0.23 (0.15)	0.21 ** (0.10)	0.82 ** (0.39)	-0.01 (0.11)
Patience (scale 1-7)	0.22 (0.24)	0.08 (0.14)	0.00 (0.10)	0.07 (0.42)	-0.07 (0.11)
Restraint (scale 1-7)	-0.09 (0.27)	-0.09 (0.17)	-0.09 (0.11)	-0.18 (0.48)	-0.03 (0.12)
Bequest motive: relative importance (baseline: no bequest motive)					
Weak	3.19 ** (1.54)	-0.28 (0.96)	0.32 (0.64)	1.96 (2.59)	1.82 *** (0.68)
Below average	4.39 *** (1.37)	1.61 * (0.86)	1.04 * (0.58)	4.71 ** (2.30)	1.60 ** (0.66)
Average	2.36 * (1.24)	-0.38 (0.80)	0.36 (0.52)	2.80 (2.06)	1.14 ** (0.58)
Above average	3.22 ** (1.24)	-0.20 (0.80)	0.57 (0.52)	4.06 * (2.06)	0.99 * (0.58)

Continued on next page

– Continued from previous page

	(1)	(2)	(3)	(4)	(5)
	Domestic care	Personal care	Social services	Annuity	Lump sum
Strong	(1.32) -1.59	(0.82) -4.20 ***	(0.54) -0.61	(2.15) -0.15	(0.59) -0.41
Very strong	(2.53) -1.54	(1.60) -2.85 **	(1.11) -1.55 **	(4.42) -3.13	(1.12) 0.45
Missing	(1.86) 1.3	(1.23) -0.43	(0.79) 0.86	(3.16) 3.78	(0.82) 0.1
Bequest motive: type (baseline: warm glow)	(1.42) -1.16	(0.89) -1.27 **	(0.59) -0.33	(2.34) -1.41	(0.68) -0.34
Strategic	(0.87) -2.09 *	(0.56) -0.82	(0.36) -0.37	(1.49) -0.05	(0.42) -0.21
Altruistic	(1.08) -1.20	(0.69) -1.12	(0.45) -0.14	(1.86) -1.06	(0.57) -1.16
Other	(2.09) -1.33	(1.16) -0.72	(0.85) -0.47	(3.36) -3.48 **	(0.88) -0.79 *
Partner only	(0.96) -0.59	(0.60) 2.86	(0.41) 0.66	(1.71) 3.37	(0.45) 0.37
Charity only	(6.65) 1.42	(2.34) -0.34	(1.86) 0.86	(10.42) 3.75	(1.43) 0.06
Missing	(1.43) -1.16	(0.89) -1.27 **	(0.59) -0.33	(2.35) -1.41	(0.68) -0.34
Expectations					
Availability informal care by someone else than partner (baseline: definitely not)					
Definitely	-3.03 **	-0.72	-0.50	-2.13	1.34 *
	(1.44)	(0.94)	(0.65)	(2.62)	(0.75)
Probably	-0.33	-0.74	0.38	0.32	0.61
	(1.14)	(0.69)	(0.48)	(1.94)	(0.54)
Maybe	-0.75	-0.51	0.14	-0.05	0.73
	(0.98)	(0.60)	(0.41)	(1.68)	(0.49)
Probably not	-0.44	-0.17	0.31	0.30	0.33
	(0.97)	(0.60)	(0.41)	(1.67)	(0.47)
Expenditures when care needs arise (baseline: decrease or stay constant)					
Increase	0.37	1.14 **	0.27	0.19	0.88 **
	(0.71)	(0.45)	(0.30)	(1.25)	(0.35)
Care use relative to average (baseline: much shorter)					
Shorter	0.62	0.93	-0.04	-1.49	-0.34
	(1.43)	(0.90)	(0.61)	(2.57)	(0.65)
Average	3.09 **	2.14 ***	1.13 **	3.41	-0.42
	(1.34)	(0.83)	(0.58)	(2.44)	(0.63)
Longer	2.70	1.53	1.32 *	4.50	-1.22
	(1.65)	(1.02)	(0.70)	(2.94)	(0.80)
Constant	1.48	1.62	3.34	28.39	-0.43
	(10.70)	(6.26)	(4.27)	(17.60)	(4.93)
Observations	2190	2190	2190	2190	2190

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1