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Preferences for in-kind and in-cash home care insurance[☆]

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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 a lump-sum for home adaptations. 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.

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. [Costa-Font et al., 2015](#); [Swartz, 2013](#)). At the same time, the supply of informal care has declined because of smaller families and increased female labor force participation ([Costa-Font et al., 2017](#); [Pestieau and Ponthière, 2012](#)). 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, have 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 and 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.

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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 (DCE). 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 for assisting devices or services, and a one-off lump sum for home adaptations. We compare the willingness to pay (WTP) for these different types of support with 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 and 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 is not necessarily medical. Second, we examine the relationship between personal circumstances, preferences, expectations, 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 DCE 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., Akaichi et al., 2020; Ameriks et al., 2018; Boyer et al., 2020; Brown et al., 2012; Sloan and Norton, 1997). Recent work suggests that adverse selection and limited trust in insurers play an important role (Boyer et al., 2020; Briggs and Tonetti, 2019). It also shows that take-up is higher when insurance is voluntary, benefits are permanent, and health checks are 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 study the support itself instead of its insurance, and examine preference heterogeneity by income but not by other personal characteristics. Like Nieboer et al. (2010), Amilon et al. (2020) consider a hypothetical patient and 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.

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). Moreover, compared to other countries such as the U.S., the Dutch have high trust in financial institutions, including private insurers (Van der Crujssen et al., 2019). This reduces nonperformance risk, which may (at least partly) explain underinsurance (Peter and Ying, 2020). We fielded the experiment after a comprehensive LTC reform in 2015. As the idea behind the reform was to increase individuals' responsibility for home care, and quite extensive budget cuts were planned (Alders and Schut, 2020; Krabbe-Alkemade et al., 2020; Maarse and Jeurissen, 2016), it provided a context to formulate realistic insurance options for home care insurance in the fielded experiment. The reform implied a shift from nursing home care towards more intensive home care for persons with mild needs, with an increased focus on informal and private provision of home care services. Nursing home access was increasingly limited to individuals who need constant supervision or care close at hand for 24 h a day. Municipalities became responsible for support and guidance in housekeeping. Before providing such support and guidance in housekeeping, municipalities consider what someone can do themselves and whether informal arrangements can be made, such as with family, friends, or neighbors.

We have three main results. First, our estimates show a high average WTP for home care insurance relative to actuarially fair insurance premiums. About 78 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 for assisting devices or services. 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 and personal

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

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

³ OECD 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).

Table 1
Attributes and levels used for in-home care insurance^a.

Attribute	Description	Levels
Monthly premium per person	The premium that you pay to the public or private insurance company from the age of 40. ^b	€30, €60, €90, €120 ^c
Hours of domestic care per week	For instance, cleaning, tidying the house, doing the dishes and laundry.	0h, 2h, 5h
Minutes of personal care per day	Such as help with getting dressed and undressed and with showering.	0m, 45m, 60m, 90m
Hours of personal supervision and company per week	Such as looking after daily affairs and administration, activities in and around the house, or daycare in groups.	0h, 5h, 10h
Monthly annuity for assisting devices or services	Budget to use special transportation, a meal delivery service, a shopping delivery service, and so on.	€0, €50, €100
One-off budget for home adaptations	One-off contribution to home adaptations such as a staircase lift, bathroom modifications, alarm system, and so on.	€0, €4000, €8000

^a In 2018, in the Netherlands, about 400,000 individuals received domestic help, about 300,000 individuals received personal care, and about 300,000 individuals received support at home (Statistics Netherlands and Vektis factsheet).

^b Additional information provided to respondent: “If you are older than 40 years, assume that you have been paying this premium since you turned 40. The amount of the premium depends on your household income. The premium is per person (your partner needs to take out separate insurance).”

^c The displayed premium amounts represent a respondent with average gross household income living in a single-person household. The amounts are computed as a percentage (1.5%, 3%, 4.5%, or 6%) of the respondent’s equivalized gross household income and are rounded to multiples of 10 euros.

care are positively associated with personal circumstances (being single, household income, and homeownership), 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 (Brown et al., 2012; Sloan and Norton, 1997). 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, possibly because its of inherent flexibility.

The remainder of the paper is organized as follows. Section 2 explains the DCE 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 the variation in preferences. Section 5 concludes the paper.

2. Discrete choice experiment

2.1. Attribute selection

To define the attributes of the in-home care insurance, we started with the conceptual model developed by Nieboer et al. (2010) of LTC services and modes of delivery that contribute to people’s physical and mental wellbeing. As in our case, they applied their model to the Dutch LTC setting. They defined the following LTC services: personal care, domestic care, adequate living situation, social activities, and transportation.⁵ These five attributes are also relevant for people with care needs living at home.

Next, we interviewed a panel of two experts at the Dutch Ministry of Health, Welfare and Sports involved in the Dutch taskforce on elderly care about the completeness and relevance of the selected set of attributes. The expert panel confirmed that these attributes are essential for individuals with LTC needs living at home and made two recommendations. First, in addition to transportation, they mentioned meal and shopping delivery services and assisting devices as essential assets for living independently. They stressed the importance of giving people control over the choice of assisting devices or services through a monthly annuity. Second, they mentioned the relevance and existence of vouchers (lump sum budget) for home adaptations to improve one’s living situation. Based on their feedback, we adapted the wording and description of the attributes (Table 1).

The levels of the attributes were chosen in dialog with the expert panel to cover a realistic range. The levels of the in-kind services (personal care, domestic care, social services) are based on home care criteria by the Care Needs Assessment Centre (Centrum Indicatiestelling Zorg, CIZ). The lump sum for home adaptations is based on quoted amounts on the websites of large municipalities and the monthly annuity for assisting devices or services was determined in consultation with the expert panel. In the DCE, we

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

⁵ Regarding modes of delivery, which is not the focus of our study, they defined the following attributes: same person providing care, room for individual preferences, coordination of care, punctuality, and short time on a waiting list.

	Plan A	Plan B
Monthly premium per person	€90	€120
Hours of domestic care per week	0 hours	2 hours
Minutes of personal care per day	60 minutes	0 minutes
Hours of personal supervision and company per week	5 hours	10 hours
Monthly annuity for assisting devices or services	€50	€100
Once-off budget for home adaptations	€8000	€4000

Which of these plans would you choose?

Plan A	
Plan B	

Fig. 1. Example of a choice set.

mention that all monetary amounts will be adjusted for price inflation: “The prices are adjusted for inflation. This means that the budget for facilities and home adjustments will buy you as much in the future as today.”

For the cost attribute levels, i.e., the monthly insurance premium, a realistic range of premiums is computed using an actuarial gender-specific pricing model of the risk and duration of LTC use, including home care use, based on Van der Vaart et al. (2022) for the Netherlands. The range of premiums and levels for the different attributes was constructed to be broad enough to elicit a wide range of preferences.⁶ Research indicates that including a cost attribute, i.e., the monthly insurance premium, requires careful attention in DCEs on healthcare (Essers et al., 2010). The payment vehicle should fit with the type of choice offered in the DCE so that costs are credible and heeded by respondents (Genie et al., 2021; Pedersen et al., 2011; Sever et al., 2019). A monthly premium for health insurance is natural in the Dutch context. All adults living in the Netherlands pay an insurance premium for basic health care every month.⁷ While this mandatory basic health insurance covers all medically necessary costs, individuals can choose to insure additional services such as physiotherapy, dentistry, glasses, and contact lenses. Hence, our framework of top-up insurance for home care fits the institutional context of the respondents.

2.2. Design of choice situations

Each choice situation in the DCE consists of two home care insurance plans with different premiums and attribute levels; Fig. 1 shows an example of a choice task. The offered home insurance plans are realistic, as the attributes are consistent with the LTC situation in the Netherlands. The plans cover far less than 24 h of care a day and are not a substitute for publicly available nursing home care. Public nursing home care is only available for individuals who need round-the-clock care or supervision, assessed by the Care Needs Assessment Centre. The elicited preferences for the attributes have to be seen in the context of light to moderate LTC needs. To make this clear to the respondents, the introductory texts that people read before the choice tasks start provide a brief explanation of the difference between home care (for people with light or moderate care needs) and nursing home care (for people with severe care needs who require care and supervision all day). Also, we make explicit that after the LTC reform in 2015, municipalities became responsible for support and guidance in housekeeping. Further, we mention that in providing support and guidance in housekeeping, municipalities will first decide on what someone can do themselves and whether informal arrangements can be made, such as with family, friends or neighbors.

Also, we mention that due to the reform, people can no longer assume that the government will finance all types of home care, except for nursing care that is covered by health insurance. Finally, we again emphasize our focus on insurance for home care and that people who need constant supervision or care for 24 h a day are entitled to publicly funded care in a nursing home. Appendix A contains the exact wording of the introductory texts the respondents read before the choice tasks. The text was determined in consultation with the expert panel to ensure that it is easy to understand and conveys the new institutional context.

⁶ The data confirm that the range of premiums was sufficiently broad, since no more than 10% of respondents always choose the most expensive option and less than 5% always choose the cheapest alternative.

⁷ Individuals in low-income households receive a means-tested health care allowance which refunds (part of) the health insurance premium.

Both at the start of the survey and before the choice tasks, we mention ADL-based criteria for receiving home care to the respondents: “You need home care if you need help with everyday personal care: with washing and getting dressed, with getting up and going to bed. You are no longer able to perform most of the housekeeping work.” This definition is in line with the criteria used by the Care Needs Assessment Centre and was validated by the expert panel. We did not specify the actual center providing the needs assessment but conjecture that respondents have the procedure of the Care Needs Assessment Centre in mind. To make sure that respondents remember the definition of home care throughout the survey, we asked them to relate it to their current health situation through the question “How is your health situation at present?”

The six attributes result in a large number of unique combinations. A Bayesian D-efficient design was used to create a much smaller subset of choice tasks with limited loss of information (Bliemer and Rose, 2009). Such careful design of the choice situations helps to estimate preference parameters precisely. An optimal D-efficient design simulates decisions from a pre-specified model and chooses 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. 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 more care. Moreover, we improved robustness by introducing uncertainty into these prior estimates, generating a so-called Bayesian-efficient design.

We created a Bayesian D-efficient design based on the main effects in a mixed logit model 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. Each respondent was randomly presented one of these three different 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 DCEs 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 taken into account in all decisions. Eye-tracking data suggest that placing the insurance premium on top of the list of attributes reinforces its salience (Ryan et al., 2018). However, we cannot control for possible ordering effects that result from the fact that price is always placed on top of the attribute list (Kjaer et al., 2006).

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 (Pedersen et al., 2011; Veldwijk et al., 2014). Therefore, the results mostly reflect preferences for different types of care and financial support conditional on having to choose a plan. While the ten choice scenarios presented to a respondent did not include an opt-out, we did ask a single binary question whether the respondent would buy home care insurance similar to the plans presented in the DCE. To utilize that information, we add a synthetic opt-out in which respondents choose between insurance plans with the average characteristics of the ten insurance policies that they prefer and an outside option with all attributes set to zero. The data for a respondent thus consist of answers to ten forced-choice scenarios and one synthetic opt-out.

2.3. Model

We use a mixed logit model to approximate preferences for attributes of LTC in a flexible way.⁸ Detailed descriptions of the mixed logit can be found in Revelt and 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 repeated choices by the same respondents.

Formally, the utility individual i derives from alternative j in choice set t is given by:

$$U_{ijt} = \alpha_i p_{ijt} + \mathbf{x}'_{ijt} \boldsymbol{\beta}_i + \varepsilon_{ijt}; \quad j = 1, 2; \quad t = 1, 2, \dots, 11 \tag{1}$$

Here p_{ijt} is the monthly premium, the ‘price’ in our DCE, with associated preference parameter α_i ; \mathbf{x}_{ijt} is a vector of attributes; $\boldsymbol{\beta}_i$ is a vector of preference parameters for attributes other than price; and error ε_{ijt} is assumed to follow a type 1 extreme value distribution. Our main model includes an alternative-specific constant among \mathbf{x}_{ijt} to account for left-right reading bias (Ryan et al., 2018). Since the errors ε_{ijt} are independent across the different choice scenarios faced by an individual, the standard logit with fixed α and $\boldsymbol{\beta}$ restricts all variation in tastes to be independent across the sequence of choices. The mixed logit model allows the preferences for attributes 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 services).

We are primarily interested in the Willingness To Pay (WTP) per unit of the attributes since preferences are easier to interpret when scaled in terms of money. For instance, in our case, the WTP for various LTC services can be compared with actuarial premiums. Previous research indicates that the model should be estimated in WTP space if the focus lies on the distribution of WTP (Hole and Kolstad, 2012). Therefore, Eq. (1) is reformulated as:

$$U_{ijt} = -\alpha_i \left(-p_{ijt} + \mathbf{x}'_{ijt} \boldsymbol{\gamma}_i \right) + \varepsilon_{ijt} \tag{2}$$

Where $\boldsymbol{\gamma}_i = -\frac{\boldsymbol{\beta}_i}{\alpha_i}$ contains the WTPs for all attributes other than price. We specify $-\alpha_i$ to follow a log-normal distribution, i.e. tastes for premiums are restricted to be negative, and the coefficient on log-price is multivariate normal with the WTPs $\boldsymbol{\gamma}_i$. All random

⁸ We prefer the mixed logit over latent class models, because estimation of the latter was substantially less precise and led to unreasonable valuations of the attributes for some latent classes.

parameters are allowed to be correlated with each other. Estimation proceeds by Maximum Simulated Likelihood and Halton draws are used to integrate over the mixing distribution.

The mixing distribution captures variation in preferences between individuals. The richness of the data, containing ten choices and a synthetic opt-out for each respondent, allows one to combine the mixing distribution with observed choices to approximate preferences for each individual in the sample. In Bayesian terms, the mixing distribution is a prior for individual-level preferences, which does not condition on the choices made by a specific individual. By conditioning on those choices, we obtain a posterior distribution for that person's preferences. We approximate individual-specific preferences by the means of these posterior distributions and analyze how they vary with observed characteristics of respondents using linear regressions. An alternative and equivalent approach is to include interactions between attributes of choice options and observed characteristics directly in the mixed logit model. However, the two-step approach has the advantage of requiring substantially less computer time.

3. Data

3.1. Survey and sample

The survey including the DCE was fielded in the Longitudinal Internet Studies for the Social sciences (LISS) panel in January 2016.⁹ LISS is an internet-based household panel of approximately 5000 households that is representative of the non-institutionalized Dutch population. Households are provided with a computer or internet connection if necessary for participation. The LISS panel is administrated by Centerdata, which is affiliated to Tilburg University. Its sampling frame is the complete address registry of non-institutionalized Dutch households maintained by Statistics Netherlands. The fact that there is no self-selection is a strong feature of the panel. Another strength is that panel members receive an incentive if they complete a questionnaire, increasing the response rate. We fielded our DCE and accompanying survey to household heads and spouses aged 40 years and older who have non-zero household income. The selection of middle-aged and older individuals limits the sample to people for whom LTC insurance could be relevant and who might have some experience caring for their parents. In total, 2812 individuals were selected for the survey, which is a sufficiently large sample to examine preference heterogeneity.¹⁰

The survey has three parts. The first part collects information on respondents' characteristics, expectations about future home care use, the availability of informal care, and expenditures when in need of LTC. Relevant variables were selected based on previous studies on LTC insurance ownership (Brown et al., 2012; Sloan and Norton, 1997). The second part of the survey consists of the DCE choice tasks and the final part contains evaluation questions about the quality, complexity and relevance of the questionnaire. The survey was constructed in cooperation with the expert panel, and it was tested in a small pilot to ensure that the wording used in the questionnaire was well understood. Also, experts from Centerdata provided detailed feedback on the comprehensibility of survey questions. The text of the questionnaire was adjusted in several rounds based on feedback from the expert panel, Centerdata, and participants in the small pilot.

3.2. Variable definitions

We relate preferences for attributes of in-home care insurance to several variables obtained from the survey. In terms of personal circumstances, we include sociodemographic characteristics (age, gender, net household income, educational attainment, marital status, having children, and homeownership) and health. To measure health, we asked whether respondents have chronic health problems and whether they require or receive care at home. We mentioned that people need home care if they need help with daily personal care (with washing and getting dressed, getting up and going to bed) and can no longer perform most housekeeping work. Sociodemographic characteristics are taken from LISS background variables from the month of the survey. Information on whether the respondents had experience with informal care provision over the last five years is derived from the LISS module on Social Integration and Leisure for 2011–2016.

For preferences, we include the degree of risk aversion, patience, restraint, and the strength and type of bequest motive. The literature has shown that these preferences are associated with saving and insurance decisions. We expect the certainty provided by home care insurance to be valuable for risk-averse people. The higher the degree of risk aversion, the more 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 to be insured for home care costs that may occur later in life. We adopt widely used, short and validated measures (using laboratory experiments) for risk aversion, patience, and restraint. Dohmen et al. (2005) analyzes the measure of risk aversion and Ameriks et al. (2003, 2007) and Gathergood (2012) focus on patience and restraint. The question that measures risk-aversion is: "Are you generally a person who is fully prepared to take risks, or do you try to avoid taking risks?" Answers are coded on a 7-point scale, with 1 referring to "always avoid risk" and 7 to "fully prepared to take risks." We reverse the coding such that a higher score corresponds to more aversion to risk. For patience and restraint the questions are: "Are you generally an impatient person, or someone who always shows great patience?" and "Are you generally an impulsive person, or someone who always acts with caution?" Both are coded on a 7-point scale.

⁹ The questionnaire and original data are available via DANS, the Dutch national centre of expertise and repository for research data (Van Ooijen et al., 2016).

¹⁰ Following the rule of thumb mentioned in De Bekker-Grob et al. (2015), a minimal sample size of completed data from 100 respondents is required for estimating the main effects: $(500 \times 4 \text{ levels; maximum no. of levels}) / (10 \text{ choice tasks} \times 2 \text{ alternatives})$.

We measure the importance respondents attach to saving for bequests versus saving for future LTC needs. Following the literature on saving for LTC, we expect that those with a strong bequest motive prefer to self-insure for LTC instead of buying in-home care insurance, as this insurance reduces the expected amount of the bequest (Lockwood, 2018). In particular, when people prefer informal care from their children (either as a substitute or complement to formal care), they might prefer to put money away for a bequest to reward informal care from children (Pauly, 1990; Zweifel and Strüwe, 1996). To be able to distinguish between both motives, we use a vignette question developed by Ameriks et al. (2011). Respondents are placed in a hypothetical situation where they divide an unexpected gain of 100 thousand euro over two lockboxes that represent bequests and LTC. The money in the bequest box will be distributed after the respondent's death. The LTC box can only be used to buy extra LTC at home or in a nursing home for themselves or their partners and will not be part of a bequest. After dividing 100 thousand euros between bequests and LTC, respondents were asked to divide the money in the bequest box between family, friends, charity, and other recipients, and they were asked about their motive for giving a bequest: warm glow, altruistic, strategic, or other.

For expectations, we include measures of the perceived availability of informal care provided by someone else than their partner, e.g., their family or friends; the expected change in medical and non-medical consumption when home care needs arise; and expected future home care needs. The literature shows that the availability of informal care crowds out formal LTC and may therefore reduce preferences for LTC insurance (Van Houtven and Norton, 2004; Charles and Sevak, 2005). This may particularly hold in the case of less severe care needs in a home care setting instead of a nursing home (Bonsang, 2009 and Bergeot and Tenand, 2021). Similarly, preferences for in-home care insurance may depend on expected changes in medical and non-medical expenditures when care needs arise. Empirical research about the relationship between health and the marginal utility of consumption provides mixed results, in favor of positive (Finkelstein et al., 2013) negative (Lillard and Weiss, 1997) or against health state dependence (De Nardi et al., 2010). The effect may also depend on whether the disease is physical or mental (Kools and Knoef, 2019) and may vary across individuals as some people might prefer cutting back expenditures on holidays or hobbies in poor health, while others prefer more extensive LTC at home.

Regarding expected future home care needs, we have two measures. First, we ask respondents to indicate the probability of needing home care for more than 1, 3, 5, 7, and 9 years. The literature on subjective expectations has shown that beliefs can be elicited as probabilities, which helps to make answers comparable across individuals (Hurd, 2009; Manski, 2004). Using these probabilities, we constructed a distribution that characterizes beliefs for each respondent by linear interpolation between these five probabilities. Second, we asked 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. This second measure may be easier to report for those who find it hard to report on a probability scale, especially when the subject is abstract or lacks salience.

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 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 in 2006 (3.1 years for men en 6.5 years for women)."

4. Results

4.1. Sample descriptives

In total, 2412 respondents completed the survey, which is 86% of the panel members that were invited to participate. In the first step, the full sample of $N = 2412$ is used for the mixed logit estimates to derive preferences for attributes of in-home care insurance. In the second step, we use a smaller sample of $N = 1702$ to relate preferences to covariates. The reduction in sample size is due to missing information on covariates. First, in the merged LISS modules on Background variables and Social integration and leisure, some variables (mainly household income) are missing leaving a sample of $N = 2190$ respondents. Second, for our derived measure of expected home care use, we have missings due to internally inconsistent reporting of probabilities, leaving a sample of $N = 1702$. Anticipating this, we also elicited expectations of home care 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. Using these expectations ($N = 2190$) gives very similar results in the regression analyses.

Table 2 shows descriptive statistics for our sample. Regarding home care expectations, respondents have a median expected duration of 2.6 years and an average interquartile range (IQR) of 3.2 years, indicating substantial uncertainty about the exact duration. Both the median duration and the IQR vary widely across the sample with standard deviations of 2.8 and 3.1 years. Actual LTC use also varies in the population due to, e.g., socioeconomic inequalities in health. However, respondents expect not to spend a long time in care relative to people of the same age and gender. About 61% expect to be close to the average, while 30% expect to receive care for a relatively short period, and only 9% expect to receive care longer than average. Providing a random two-thirds of the sample with information on average home care use among the Dutch population raised the subjective median expected home care use by 0.34 year on average and home care use relative to the age/gender by 0.14 on a five-point scale (Appendix B). It did not significantly affect uncertainty measured by the IQR. 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.

Table 2
Descriptive statistics of regressors ($N = 2190$).

	Mean	SD		Mean	SD
Personal circumstances			Preferences		
Female	0.51	0.50	Risk aversion (scale 1–7)	4.8	1.4
Partner	0.72	0.45	Patience (scale 1–7)	4.8	1.5
Age	60.4	11.5	Restraint (scale 1–7)	4.9	1.3
Has children	0.83	0.38	Bequest motive: relative importance to LTC		
Homeowner	0.75	0.43	No (0% of unexpected gain in the bequest box)	0.10	0.31
Net household income (monthly)	2918	1487	Weak (1–20%)	0.09	0.29
Education: Lower secondary	0.35	0.48	Below average (21–49%)	0.16	0.36
Education: Vocational	0.33	0.47	Average (50%)	0.33	0.47
Education: University	0.33	0.47	Above average (51–80%)	0.23	0.42
Health: No chronic problems	0.84	0.37	Strong (81–99%)	0.03	0.17
Health: Has chronic problems	0.13	0.34	Very strong (100%)	0.05	0.23
Health: Needs home care	0.03	0.16	Bequest motive: type ^b		
Experience providing personal care	0.12	0.33	Partner only	0.19	0.39
Experience providing domestic or social care	0.43	0.49	Charity only	0.00	0.07
Expectations			Warm glow	0.49	0.50
Availability of informal care by someone else than partner			Altruistic	0.12	0.33
Definitely	0.06	0.23	Strategic	0.22	0.42
Probably	0.17	0.37	Other	0.04	0.19
Maybe	0.33	0.47			
Probably not	0.30	0.46			
Definitely not	0.15	0.36			
Home care use (years) ^a					
Median	2.6	2.8			
Interquartile range	3.2	3.1			
Home care use relative to average for age/gender					
Much shorter	0.06	0.24			
Shorter	0.24	0.42			
Average	0.61	0.49			
Longer	0.09	0.29			
Medical and non-medical expenditures when in need of LTC					
Strongly decrease	0.10	0.30			
Decrease	0.08	0.26			
Stay constant	0.08	0.28			
Increase	0.30	0.46			
Strongly increase	0.43	0.50			

^a Based on 1702 observations who report subjective probabilities that are internally consistent.

^b Response percentage exceeds 100% as the question allows respondents to select multiple motives for leaving a bequest.

The majority of the respondents (73%) expect that total expenditures will increase when they need care. Only 17% expect that expenditures will decline. Respondents are not very hopeful that they can rely on informal care by someone else than the partner: 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.¹¹ Still, a substantial part of the sample provided domestic or social care over the last 5 years (43%). This includes all recipients, such as one’s partner, relatives, friends or neighbors. The prevalence of informal personal care provision is much lower (12%).

Finally, the data reveal substantial heterogeneity in the relative importance of spending on LTC versus leaving a larger bequest measured by the division of a hypothetical unexpected gain among both purposes. About 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.¹² Also, respondents report different types of bequest motives. For example, 22% of the respondents who have a (non-zero) bequest motive indicate that they consider giving a larger bequest to individuals who provide them informal care (a strategic bequest motive).

4.2. Mixed logit estimates

Table 3 contains the estimation results of the mixed logit model that we use to map observed choices into preferences for different types of care and support for each individual. Panel a. shows that the means and standard deviations of the multivariate normal mixing

¹¹ 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.

¹² Separating the sample into those with and without children shows that respondents who have children tend to allocate a larger share of the unexpected gain to the bequest box.

Table 3
Estimates of the mixed logit model in WTP space.

a. Estimates of normal mixing distribution for preferences				
	Mean		Standard deviation	
Price ^a	-0.0162***	(0.000672)	0.702***	(0.0843)
Domestic care (h/wk)	19.323***	(0.795)	17.873***	(0.845)
Personal care (h/wk)	10.659***	(0.464)	11.411***	(0.576)
Social services (h/wk)	3.046***	(0.294)	6.251***	(0.465)
Annuity/100 (euro/month)	29.677***	(2.192)	31.726***	(2.857)
Lump sum/1000 (euro)	5.821***	(0.405)	9.101***	(0.573)
ASC (2nd option) ^b	-8.956***	(1.675)	27.021***	(2.690)
Individuals	2412			
Log-likelihood ^c	-15,960.12			

b. Correlation matrix							
	Domestic care	Personal care	Social services	Annuity	Lump sum	ASC (2nd)	Log-price
Domestic care	1						
Personal care	0.60***	1					
Social services	0.62***	0.80***	1				
Annuity	0.57***	0.44***	0.80***	1			
Lump sum	0.10**	0.12**	0.02	0.31***	1		
ASC (2nd option)	0.35***	0.24***	0.41***	0.48***	-0.28***	1	
Log-price	-0.58***	-0.36***	-0.66***	-0.75***	-0.20***	0.06	1

^a The preference for negative price follows a log-normal distribution, log-price and the other preferences follow a multivariate normal distribution.

^b Alternative-Specific Constant: indicator for the second, rightmost, alternative in a choice scenario.

^c Likelihood simulated using 5000 Halton draws. The data consist of 10 choices between two insurance policies and a synthetic opt-out for each respondent. Robust standard errors in parentheses; *** p<0.01, ** p<0.05.

distribution are estimated extremely precisely; all are significant at 1%. Moreover, the means of the coefficients on all attributes have the expected sign. Individuals significantly dislike paying high premiums, and, on average, put a positive value on domestic and personal care, social services, a monthly home care annuity for assisting devices or services and a one-off lump sum for home adaptations. At around 19 euro/month, in terms of a monthly premium as from age 40 onwards, the mean WTP for an hour of domestic care is highest among the different types of in-kind services, while the averages for personal care and social services are 11 and 3 euro/month, respectively.¹³ The mean WTP for an annuity of 100 euro/month is high at close to 30 euro per month and a lump sum of 1000 euro is valued at just under 6 euro/month on average. The negative mean estimated on the alternative-specific constant (ASC) for the second option indicates that, on average, respondents tend towards the first option. This pattern is in line with the left-right reading bias documented in [Ryan et al. \(2018\)](#).

The standard deviations in the third column of [Table 3a](#). show considerable variation in preferences for the attributes. The standard deviations for domestic and personal care and for the annuity are of similar magnitude as the corresponding means. For social services and the lump sum the spread in preferences is twice and one and a half times the mean. This variation in preferences for the attributes will be analyzed further below, where we regress individual-specific preference estimates on background variables. The standard deviation of the alternative-specific constant is estimated at three times the mean. The wide dispersion in the alternative-specific constant may reflect heterogeneity in information processing strategies: on average, respondents have a tendency towards the left alternative, but some do not or even tend towards the rightmost option.

Panel b. of [Table 3](#) shows that the three types of in-kind services are fairly strongly positively correlated with each other, correlations 0.6–0.8, and with the annuity, correlations 0.44–0.80. Correlations between the lump sum and the other attributes are weaker, ranging from 0.02 to 0.31. These correlations show that individuals who place a high value on one dimension of LTC, such as personal care, tend to also value most of the other aspects relatively highly. The weaker associations for the lump sum may be because it concerns a larger one-off payment instead of recurring care or benefits. Ranging from -0.28 to 0.48, the correlations between the alternative-specific constant and preferences are weaker than those between preferences. These estimates indicate that answer behavior is only moderately associated with elicited preferences. Sensitivity to price is negatively related to tastes for attributes, with correlations between -0.20 and -0.75.

4.3. Willingness to pay

[Table 4](#) contains more information regarding the multivariate normal distribution of WTP for the different attributes in terms of a monthly insurance premium. In addition to the mean WTPs, 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, cost about 20 euro in 2015

¹³ We rescale personal care from minutes per day to hours per week to facilitate comparison between the in-kind attributes.

Table 4
Willingness to pay for attributes.

	Actuarial premium ^a	Mean ^b	SE	WTP ≥ premium (%)	SE
Domestic care (1 hr/wk)	8.43	19.32	(0.79)	73	(1.3)
Personal care (1 hr/wk)	11.39	10.66	(0.46)	48	(1.7)
Social services (1 hr/wk)	5.23	3.05	(0.29)	37	(2.2)
Annuity (100 euro/month)	9.73	29.68	(2.19)	74	(2.6)
Lump sum (1000 euro once)	1.25	5.82	(0.41)	69	(1.7)
In-kind: at least one WTP ≥ premium ^c				78	(1.3)
In-cash: at least one WTP ≥ premium ^c				88	(1.6)
At least one WTP ≥ premium ^c				95	(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. Loading factor: 18%, discount rate 2%. 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.nationalehulpvragen.nl/forms/PGBWeektarieven2011-2015.pdf>. Actuarially fair premiums are calculated using an LTC risk model for the Netherlands (Van der Vaart et al., 2022).

^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 € 19.32 from age 40 onward in order to receive 1 h of domestic care per week.

^c The fraction with a WTP at or above the actuarial premium is obtained using the Stata function *mvnp* and 1000 Halton draws. Standard errors are calculated by parametric bootstrap over the asymptotic distribution of the Maximum Simulated Likelihood estimator (500 bootstrap replications).

according to the government website “National Care Guide.” Using a LTC risk model for the Netherlands based on administrative data on LTC use and mortality (Van der Vaart et al., 2022), 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).¹⁴ While this single premium does not take into account price discrimination based on risk factors that predict actual care use, in Section 4.6 we investigate to what extent individual-level variation in WTP is related to subjective expected use and objective risk factors. The average WTP is around 19 euro 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).

In total, 73% of the population has a WTP for domestic care at or above the market price ($1 - \Phi\left(\frac{8.43-19.32}{17.87}\right) = 0.73$). Similarly, 74% 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 69% of the respondents. For personal care and social services, the average WTPs are only 10.66 and 3.05 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: 48% for personal care and 37% for social services. The relatively low WTP for social services may be due to easy substitutability with informal care, if 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.

The estimates imply that 95% of respondents have a WTP that exceeds the market premium for at least one dimension of coverage. About 78% 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 covering at least one type of in-cash support.

4.4. Quality and robustness of the willingness to pay estimates

The analysis described in Sections 4.2 and 4.3 relies on a mixed logit model estimated in WTP space in which the coefficients on log-price and the other attributes follow a multivariate normal distribution. Table C.1 in Appendix C shows that the mean WTPs and the fractions willing to pay at least actuarial fair premiums for the various types of care are robust to changes in the specification of preferences. Panel a. reproduces the baseline results from Table 4 and panels b. to d. present results for alternative specifications. Comparing panels a. and b. we find that the results are similar whether or not an alternative-specific constant is included in the model. This was to be expected, since there are no systematic differences between the average attributes of options that are presented first (left) or second (right). Panel c. indicates that estimates are not sensitive to estimation in preference space, with a fixed coefficient on price and a normal distribution for the other attributes. Finally, panel d. illustrates robustness when the synthetic opt-out is omitted.

¹⁴ To compute actuarially fair prices, we follow Brown and Finkelstein (2008): future benefits and premiums are discounted at the risk free rate assumed to be 2% a year, and there is a 18% load. We further assume that people receive in-kind 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 the moment of first claiming.

Table 5
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 h/wk)	1.164***	(0.0476)	30.929***	(1.446)	
Domestic care (5 h/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 h/wk)	0.383***	(0.0397)	4.069***	(0.411)	
Social services (10 h/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 h/wk)	1.036***	(0.0581)	27.518***	(1.929)	
Domestic care (5 h/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 h/wk)	0.892***	(0.0612)	9.482***	(0.707)	
Social services (10 h/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 ^b	-13,697.75				
b. Correlation matrix					
	Domestic (2 h/wk)	Personal (45 h/day)	Social services (5 h/wk)	Annuity (50 euro/month)	Lump sum (4000 euro)
Domestic care (2 h/wk)	1				
Domestic care (5 h/wk)	0.99***				
Personal care (45 h/day)	0.09	1			
Personal care (60 h/day)	0.36***	0.94***			
Personal care (90 h/day)	0.20***	0.93***			
Social services (5 h/wk)	0.57***	0.48***	1		
Social services (10 h/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***

^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.

^b Likelihood simulated using 1000 Halton draws. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10.

Differences relative to the baseline in the fractions with WTP above the actuarial premiums are never more than 14% or 10 percentage points.

While the DCE does not include choices intended to check response quality, e.g. choices in which one option dominates the other, [Appendix D](#) assesses data quality based on two types of indicators. The first are survey evaluation questions included at the end of each survey fielded in LISS. The descriptives show that a large majority of respondents found the questions clear (85%) and not difficult (58%). The second indicator is suspicious reporting, i.e. the tendency to always choose either the first or second option. Such reporting is rare: only 9% choose either the first or second option at least eight times out of ten.

[Appendix D](#) provides extensive evidence that the variation in WTPs uncovered by the model in [Table 3](#) reflects meaningful preference heterogeneity. 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.

4.5. Decreasing marginal utility

In [sections 4.2](#) and [4.3](#), 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 DCE. In light of the computational costs of estimating a mixed logit model with many random parameters and the robustness of the results in [Appendix C](#), we do not include a random coefficient on price or an alternative-specific constant in the extended model.

The estimation results in [Table 5](#) 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/h for two hours per week and only around 17 euro/h for five hours of care. The same holds for personal care, for which the mean WTP declines from close to 16 euro/h for 45 min per day (higher than the actuarially fair premium) to just over 9 euro/h for 90 min (lower than the actuarially fair premium). 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/h at 5 h per week to 2 euro/h at 10 h. As for financial support, the mean WTP for a one-off lump sum for home adaptations 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 monthly home care annuity for assisting devices or services 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 3](#), the standard deviations in [Table 5](#) 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 5](#) 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 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 5](#) confirms [Table 3](#) 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.

[Fig. 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 min per day but dips below the insurance premium for 90 min 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 h of social services per week to 80% for 2 h of domestic care. The diminishing marginal utility for support provides insights for policy decisions on the level of basic coverage. The higher the basic level of coverage, the higher the share of people for whom the benefits do not exceed the costs anymore. In the top panel of [Fig. 2](#) we find that there is substantial variation in preferences, such that top-up home care insurance could be viable. The subsequent section relates variation in preferences for attributes of LTC at home to personal circumstances, preferences, and expectations.

4.6. 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 3](#). The advantage of the linear model is that it uses the 11 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 6](#) 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’).¹⁵ These estimates measure the association between

¹⁵ [Appendix E](#) describes the marginal densities of individual-specific WTPs by means of Kernel densities. There is substantial variation in WTP for all attributes. Moreover, the distributions are left-skewed, especially for personal and domestic care and for the annuity.

Table 6
Multiple linear regression for the willingness to pay for several attributes of home care insurance.

	(1) Domestic care	(2) Personal care	(3) Social services	(4) Annuity	(5) Lump sum
Personal circumstances					
Female	0.55 (0.63)	0.35 (0.41)	-0.01 (0.22)	-0.83 (0.97)	-0.12 (0.30)
Partner	-3.07*** (0.81)	-1.81*** (0.52)	-1.04*** (0.28)	-3.76*** (1.27)	0.19 (0.42)
Has children	-0.40 (0.88)	-0.45 (0.56)	-0.18 (0.30)	-1.21 (1.40)	-0.89** (0.43)
Homeowner	0.81 (0.83)	1.24** (0.53)	0.50* (0.28)	0.84 (1.27)	-0.08 (0.37)
Log net household income	2.79*** (0.83)	1.62*** (0.54)	0.63** (0.28)	2.13* (1.21)	0.66* (0.37)
Education: Vocational	-1.07 (0.77)	0.72 (0.49)	0.36 (0.26)	0.84 (1.24)	0.11 (0.37)
Education: University	-0.73 (0.83)	0.49 (0.53)	0.16 (0.28)	-0.30 (1.28)	-0.07 (0.39)
Providing personal care	-0.01 (1.02)	0.47 (0.67)	0.31 (0.35)	1.05 (1.58)	-0.12 (0.47)
Providing domestic or social care	-0.43 (0.69)	-0.13 (0.45)	-0.24 (0.24)	-1.45 (1.05)	0.11 (0.32)
No chronic health problems	0.25 (0.95)	0.92 (0.66)	0.45 (0.34)	0.16 (1.42)	-0.71* (0.41)
Needs home care	2.40 (2.03)	0.07 (1.30)	-0.09 (0.67)	-1.03 (3.52)	-0.10 (1.19)
Age/100	1.49 (26.75)	-23.67 (16.37)	-13.39 (8.72)	-16.03 (41.67)	13.10 (13.02)
Age squared/100	-0.06 (0.22)	0.15 (0.13)	0.09 (0.07)	-0.00 (0.34)	-0.16 (0.11)
Preferences					
Risk aversion (scale 1–7)	0.71*** (0.22)	0.32** (0.15)	0.15* (0.08)	0.45 (0.35)	-0.03 (0.10)
Patience (scale 1–7)	0.07 (0.23)	0.04 (0.15)	-0.01 (0.08)	-0.21 (0.37)	-0.03 (0.10)
Restraint (scale 1–7)	-0.13 (0.26)	-0.14 (0.17)	-0.05 (0.09)	0.03 (0.42)	-0.04 (0.12)
Bequest motive: relative importance (baseline: no bequest motive, 0% in bequest box)					
Weak (1-20%)	1.55 (1.42)	-0.66 (0.94)	-0.28 (0.47)	1.67 (2.19)	1.39** (0.67)
Below average (21-49%)	3.63*** (1.32)	1.71** (0.86)	0.57 (0.44)	2.86 (2.07)	1.53** (0.66)
Average (50%)	1.28 (1.20)	-0.29 (0.80)	-0.06 (0.40)	1.96 (1.83)	1.25** (0.59)
Above average (51-80%)	0.81 (1.28)	-0.79 (0.82)	-0.24 (0.41)	1.64 (1.90)	1.20** (0.59)
Strong (81-99%)	-4.80** (2.31)	-5.45*** (1.57)	-2.03** (0.85)	-4.06 (3.65)	-0.79 (1.01)
Very strong (100%)	-5.41*** (1.82)	-4.42*** (1.21)	-2.61*** (0.62)	-9.37*** (2.76)	0.24 (0.80)
Bequest motive: type (baseline: warm glow)					
Strategic	-0.33 (0.84)	-1.10* (0.56)	-0.10 (0.30)	0.85 (1.34)	-0.60 (0.40)
Altruistic	-0.71 (1.06)	-0.41 (0.71)	0.16 (0.37)	1.18 (1.66)	-0.55 (0.55)
Other	-1.20 (2.03)	-1.42 (1.24)	-0.46 (0.65)	-1.01 (2.93)	-0.15 (0.79)
Partner only	-0.45 (0.93)	-0.73 (0.62)	-0.36 (0.34)	-1.93 (1.53)	-0.77* (0.43)
Charity only	3.88 (5.39)	3.14 (2.78)	2.39* (1.39)	10.93 (6.99)	-0.36 (1.22)
Missing	0.03 (1.45)	-0.91 (0.95)	0.12 (0.47)	3.53 (2.16)	0.36 (0.72)
Expectations					
Availability informal care by someone else than partner (baseline: definitely not)					
Definitely	-3.77*** (1.45)	-1.37 (0.97)	-0.78 (0.51)	-2.32 (2.38)	0.67 (0.72)
Probably	-1.50 (1.11)	-0.91 (0.72)	-0.39 (0.38)	-1.24 (1.73)	-0.01 (0.53)

(continued on next page)

Table 6 (continued)

	(1) Domestic care	(2) Personal care	(3) Social services	(4) Annuity	(5) Lump sum
Maybe	-0.40 (0.96)	-0.17 (0.62)	-0.04 (0.32)	0.30 (1.50)	0.26 (0.49)
Probably not	-0.43 (0.96)	0.04 (0.63)	0.04 (0.33)	0.09 (1.53)	0.11 (0.47)
Home care use (years)					
Median	0.28** (0.13)	0.22*** (0.08)	0.09** (0.04)	0.32 (0.20)	0.05 (0.06)
IQR	-0.01 (0.11)	-0.04 (0.07)	-0.01 (0.04)	-0.01 (0.17)	-0.00 (0.05)
Expenditures when in need of care (baseline: decrease or stay constant)					
Increase	0.44 (0.68)	1.18*** (0.45)	0.37 (0.24)	0.72 (1.11)	0.69** (0.34)
Constant	-2.95 (10.29)	4.73 (6.32)	2.33 (3.34)	22.47 (15.28)	-1.16 (4.93)
N	1702	1702	1702	1702	1702

Robust standard errors in parentheses based on seemingly unrelated estimation of the five equations; *** p<0.01, ** p<0.05, * p<0.1.

WTP and background variables and cannot be interpreted as causal effects. While the mixed logit models discussed above use the full sample of respondents who completed the DCE, a sample of 2412 individuals, the models in Table 6 drop respondents for whom data on covariates are missing, mainly due to missing income and some internally inconsistent reporting of probabilities of future home care use. The resulting sample consists of 1702 respondents.

Personal circumstances

Table 6 shows that respondents who live with a partner have a significantly lower WTP for domestic care insurance (-3.07 euro), personal care (-1.81 euro), social services (-1.04 euro), and a home care annuity (-3.76 euro). These respondents probably expect informal care from their partner 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 the partner-dummy is not significant in that equation.

Log net household income has significantly positive coefficients for all three types of in-kind care, indicating that income-rich households are willing to pay more for insurance covering those. Household income is also marginally significant in the two equations for in-cash insurance, but standard errors are large. The positive associations probably reflect the fact that higher incomes

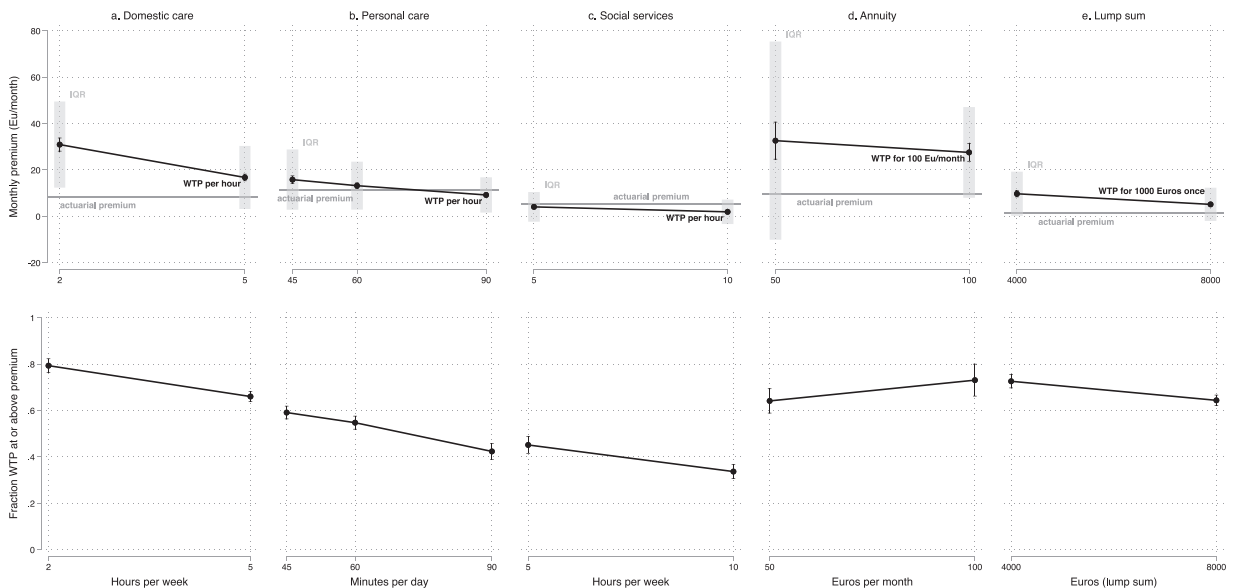


Fig. 2. Willingness to pay for different levels of the attributes (spikes are 95% confidence intervals on the mean WTP and fraction with WTP above the actuarially fair premium).

afford more care, and the larger distance from the safety net may also induce demand for additional insurance.¹⁶ 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 significantly 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 (De Bresser and Knoef, 2015), home care insurance is not crowded out by home equity.

The estimates for the other variables that measure personal circumstances are almost all insignificant. For example, 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., 2022). People who have experience providing informal care do not have significantly different WTPs than individuals who do not have such experience. Also, neither the self-reported absence of health problems, a rough measure of current health, nor age predicts preferences for different attributes significantly.

Preferences

Regarding preferences, we find, as expected, that more risk-averse people have higher WTPs for home care insurance. This holds for domestic and personal care, 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, who place more than 80% of the unexpected gain in the bequest box, have a significantly lower WTP for personal and domestic care (around -5 euro) and social services (around -3 euro) compared to those who earmark the entire sum for LTC. Those who pass on the entire gain as a bequest also have a 9.37 euro lower WTP for the annuity. The type of bequest motive does not correlate significantly with preferences for the attributes.

Expectations

Expectations also predict WTPs for in-kind care significantly. Those who feel certain that informal care will be available have, on average, a lower WTP for domestic care insurance (-3.77 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 (Kim and Lim, 2015; Orsini, 2010), and suggests easier substitution for relatively low-skilled domestic care (Bergeot and Tenand, 2021; Bonsang, 2009) compared to the other types of support. Longer expected duration of home care use is positively associated with the demand for insurance covering all three types of in-kind care.¹⁷ Uncertainty about home care use, measured by the inter-quartile range, is not significantly related to home care insurance. Regarding the expected change in 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 and for the lump sum for home adaptations, which are less substitutable for informal support than the other in-kind and in-cash services.

Objective risk factors

The models in Table 6 control for current health by an indicator variable for the absence of health problems. It is interesting to see whether the patterns described above are robust to controlling for the detailed information that insurers in countries such as the U.S. use when they assess an individual's LTC risk, since doing so disentangles preferences and private information from known factors that drive individuals' objective risks. For instance, it could be that the positive relationship between risk aversion and the WTP for insurance reflects a higher objective risk among those who are risk averse. Similarly, the positive association between expected care use and WTPs may or may not be captured by objective risk variables that are typically elicited by insurers. Finkelstein and McGarry (2006) and Boyer et al. (2020) list such risk factors that are used in the industry to decide who can buy insurance and at what premium, though note that these policies cover stays in nursing homes rather than lighter care at home. These risk factors mostly reflect the presence of chronic disease (e.g., diabetes and heart disease); health behavior (smoking, obesity); and limitations in ADLs and Instrumental ADLs. Appendix G shows that the patterns documented above are robust to controlling for such objective risk. For instance, the estimated coefficient on subjective expected home care use in Table 6 is 0.28, which becomes 0.27 when we control for objective risk variables. Hence, subjective expectations capture perceptions or private information that is not reflected in detailed measures of current health. However, in the absence of data on care we cannot verify whether subjective variables predict actual care use. Few risk factors predict WTPs significantly. The one chronic disease that stands out is Alzheimer: those who have been diagnosed with dementia since they joined the panel have an average WTP that is 15 euro lower for domestic care, 11.73 euro

¹⁶ An 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.

¹⁷ Appendix F shows alternative regressions in which we used the measure about expected home care relative to average age/gender instead of the measure based on probability questions. The results show that those who expect to need care for as long as or longer than average have a significantly higher WTP for LTC insurance compared to those who expect to use home care much shorter than average (for all attributes the differences between WTP in the "average" and "longer" categories are not statistically significant). For the other variables, the results in both specifications are very similar. Estimates are also similar when missing values for the measure based on probability questions are recoded to an arbitrary number and a missing value indicator is included in the specification (estimates available on request).

lower for the annuity and 7.41 euro lower for the lump sum. This could be evidence of an impact of the disease on answer behavior, or may reflect the prospect of the disease progressing to the point where one cannot stay at home.

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 for assisting devices or services, 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.

We fielded a discrete choice experiment in the Dutch LISS panel in which people choose between home care insurance plans that differ in coverage and price. The setting of insurance with premiums as the payment vehicle is appropriate to elicit preferences for LTC in the Dutch context, where health insurance is mandatory and universal, and optional add-ons can be purchased to cover non-medically necessary care. Comparing the WTP for insurance with actuarially fair prices, we find that the Dutch value home care relatively highly in the aggregate. For 78% 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 (73%), while the demand for personal care (48%) and social services (37%) are lower. The ordering of price at the top of the attribute list may have contributed to the high average WTPs. According to [Kjaer et al. \(2006\)](#) price sensitivity may be higher when the price attribute is placed at the end, which would reduce WTPs.

While most people value coverage for basic levels of LTC support at home, there is substantial variation in the WTP at all levels. Moreover, we find diminishing marginal utility for all types of support except the monthly home care annuity for assisting devices or services. Analyzing heterogeneity in preferences, we find that the following characteristics are associated with a higher WTP for domestic or personal care: being single, homeowner, having a higher household income, risk-aversion and low bequest motives. Individuals who expect to use more home care are also willing to pay more for home care insurance. Further, people who do not expect any informal care have a higher WTP for (unskilled) formal domestic care, but not for personal care which is less substitutable. Similarly, people who believe that expenditures increase when in need of care have a higher WTP, particularly for personal care. 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. Although we have described the conditions to qualify for home care and nursing home admission in the survey, part of the heterogeneity in WTPs and the diminishing WTPs for home care insurance may be due to potential differences in implicit threshold criteria individuals have in mind.

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 may offset selection into the market, as these individuals might have a lower risk than the insurance company would predict ([Finkelstein and McGarry, 2006](#)). We do not observe actual reliance on care and thus cannot test whether such subjective variables have predictive power for eventual use.

The high fraction of people with WTPs above the actuarial premium underlines the value of a universal system. Therefore, based on our results, policy makers could think of mandatory home care insurance, either public or private, that provides coverage for basic levels of support. This study also shows how decreasing marginal utility leads to a negative relationship between the level of support and the fraction of people who value in-kind support above the actuarial premium, which is relevant for the level of basic coverage. For example, whereas 60 min of personal care per day is valued above the actuarial premium on average, this does not hold for 90 min of personal care per day. Furthermore, the level of social services could be reassessed, as the WTP to insure these services appears to be low. Although domestic (non-medical) care is internationally often not seen as part of formal LTC, the WTP to insure domestic care is substantial, especially when the availability of informal care is uncertain. Such uncertainty will probably increase in the future due to smaller families and increased female labor force participation.

As there is substantial variation in preferences, top-up home care insurance plans could be viable; see also [Mayhew et al. \(2010\)](#) for the UK. Such plans are currently not available in the Netherlands or in many other countries (France and Germany are exceptions). The heterogeneity analysis shows that in-kind services could be targeted especially at singles, high-income households, who are risk averse, and are not sure about the availability of informal care. Inflation-adjusted cash benefits for home adaptations and assisting devices and services, on the other hand, are valued regardless of respondents characteristics, possibly because of its inherent flexibility. In-kind and in-cash top-ups can thereby help people to bridge the expected difference between basic state support, personal income and the cost of support when home care needs arise.

Appendix A. Context provided to survey respondents

The DCE consists of choices between two hypothetical home care insurance schemes. The survey 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.

Before the choice tasks, we ask people to imagine that they are responsible for LTC at home, except for nursing care:

- People who need care or supervision all day are entitled to live in a care institution. People with a lighter care need will, from now on, receive care at home. This question is about home care for elderly people.
- 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 h of support in housekeeping per week and 45 min of personal care per day.

The choice tasks, are introduced as follows:

- Next, we ask you to choose 10 times between two plans: home care plan A or home care plan B. In addition to the plan, you can personally purchase care when needed or call on informal care providers. The chosen care plan will apply for the rest of your life.
- The plans all have six attributes. Each time, even if none of the plans suits your needs perfectly, please choose the plan that best suits your wishes.
- This is about the amount of care you will receive if you need help every day with personal care (such as dressing and undressing and showering) and you are unable to perform most of the domestic work.
- The prices are adjusted for inflation. This means that the budget for facilities and home adjustments will buy you as much in the future as today.

Appendix B. Information experiment

Table B1
Information provision and expected home care use.

	Relative to average age/gender	In years (based on probability questions)	
		p50	IQR
Any info	0.144*** (0.0347)	0.344** (0.145)	0.222 (0.171)
Constant	2.623*** (0.0281)	2.362*** (0.114)	3.160*** (0.140)
F(1, N-3)	17.33***	5.64**	1.69
N	2190	1702	1702

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

Appendix C. Robustness of the WTP estimates

Table C1
Robustness of willingness to pay for attributes.

	Actuarial premium ^a	Mean ^b	SE	WTP ≥ premium (%)	SE
a. Baseline: mixed logit estimated in WTP space; including synthetic opt-out and ASC					
Domestic care (1 hr/wk)	8.43	19.32	(0.79)	73	(1.3)
Personal care (1 hr/wk)	11.39	10.66	(0.46)	48	(1.7)
Social services (1 hr/wk)	5.23	3.05	(0.29)	37	(2.2)
Annuity (100 euro/month)	9.73	29.68	(2.19)	74	(2.6)
Lump sum (1000 euro once)	1.25	5.82	(0.41)	69	(1.7)
In-kind: at least one WTP ≥ premium ^c				78	(1.3)
In-cash: at least one WTP ≥ premium ^c				88	(1.6)
At least one WTP ≥ premium ^c				95	(0.6)
b. Mixed logit estimated in WTP space; including synthetic opt-out without ASC					
Domestic care (1 hr/wk)	8.43	20.64	(0.81)	76	(1.2)
Personal care (1 hr/wk)	11.39	11.12	(0.48)	49	(1.7)
Social services (1 hr/wk)	5.23	3.37	(0.34)	38	(2.1)
Annuity (100 euro/month)	9.73	30.66	(2.23)	79	(2.4)
Lump sum (1000 euro once)	1.25	6.22	(0.45)	70	(1.5)
In-kind: at least one WTP ≥ premium ^c				82	(1.1)
In-cash: at least one WTP ≥ premium ^c				88	(2.0)
At least one WTP ≥ premium ^c				94	(0.9)
c. Mixed logit estimated in preference space; including synthetic opt-out without ASC					
Domestic care (1 hr/wk)	8.43	17.85	(0.71)	70	(1.1)
Personal care (1 hr/wk)	11.39	10.09	(0.43)	46	(1.5)
Social services (1 hr/wk)	5.23	2.12	(0.24)	34	(1.4)
Annuity (100 euro/month)	9.73	24.30	(1.85)	67	(2.5)
Lump sum (1000 euro once)	1.25	5.74	(0.36)	67	(1.2)
In-kind: at least one WTP ≥ premium ^c				79	(1.1)
In-cash: at least one WTP ≥ premium ^c				86	(1.4)
At least one WTP ≥ premium ^c				94	(0.7)
d. Mixed logit estimated in preference space; without synthetic opt-out or ASC					
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 ≥ premium ^c				77	(1.1)
In-cash: at least one WTP ≥ premium ^c				88	(1.1)
At least one WTP ≥ premium ^c				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. Loading factor: 18%, discount rate 2%. 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.nationalehulpgrad.nl/forms/PGBWeektarieven2011-2015.pdf>. Actuarially fair premiums are calculated using an LTC risk model for the Netherlands (Van der Vaart et al., 2022).

^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 € 19.32 from age 40 onward in order to receive 1 h of domestic care per week.

^c The fraction with a WTP at or above the actuarial premium is obtained using the Stata function *mvnp* and 1000 Halton draws. Standard errors are calculated by parametric bootstrap over the asymptotic distribution of the Maximum Simulated Likelihood estimator (500 bootstrap replications).

Appendix D. Data quality

This appendix analyzes the quality of the data elicited by the DCE. The key question is whether the hypothetical choices measure meaningful preferences for different types of support in case one needs LTC. 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 (85%) and not too difficult (58%). Moreover, only 9% of respondents choose 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.

Table D1

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	0.79	< 0.005	18.44	19.68	19.35	19.91	19.44
	[0.53]		(13.05)	(12.20)	(12.76)	(12.15)	(12.30)
Personal care	2.63	0.01	10.16	11.29	10.73	11.82	10.24
	[0.03]		(8.42)	(8.18)	(8.42)	(8.39)	(7.96)
Social services	0.30	< 0.005	2.96	3.07	3.00	3.26	3.01
	[0.88]		(4.46)	(4.36)	(4.39)	(4.27)	(4.25)
Annuity	0.15	< 0.005	29.95	29.47	29.84	29.03	29.24
	[0.96]		(20.16)	(20.00)	(19.86)	(18.71)	(19.07)
Lump sum	3.24	0.01	5.72	6.62	6.18	6.12	4.97
	[0.01]		(5.89)	(5.97)	(5.79)	(5.24)	(6.15)
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	0.47	< 0.005	18.28	18.35	19.45	19.52	19.41
	[0.76]		(11.61)	(12.06)	(12.75)	(12.38)	(12.80)
Personal care	0.46	< 0.005	9.89	10.78	10.57	11.13	10.78
	[0.76]		(8.24)	(8.57)	(8.24)	(8.30)	(8.30)
Social services	0.64	< 0.005	2.72	3.14	2.87	3.28	3.00
	[0.63]		(4.51)	(4.49)	(4.32)	(4.32)	(4.34)
Annuity	0.64	< 0.005	26.53	29.34	29.15	30.48	29.29
	[0.63]		(22.38)	(19.44)	(19.46)	(19.47)	(19.41)
Lump sum	1.13	< 0.005	4.42	5.61	6.12	6.00	5.85
	[0.34]		(6.43)	(5.28)	(6.02)	(5.79)	(5.81)
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.

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 D.1 shows that 58% 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 D.1 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 8 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 D.1 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.

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

Table D2
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	0.78 [0.38]	< 0.005	19.36 (12.81)	18.64 (9.50)	
Personal care	0.07 [0.79]	< 0.005	10.82 (8.51)	10.68 (6.05)	
Social services	1.55 [0.21]	< 0.005	3.02 (4.42)	3.40 (3.61)	
Annuity	0.95 [0.33]	< 0.005	29.38 (19.54)	30.97 (19.64)	
Lump sum	7.64 [0.006]	< 0.005	5.77 (5.90)	6.92 (4.91)	
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.

Table D3
Information on actual duration of LTC use and WTPs elicited in discrete choice experiment.

	F-stat ^a	R ²	Conditional average WTP ^b	
			No information	Information
Domestic care	0.43 [0.51]	< 0.005	19.02 (12.72)	19.44 (12.45)
Personal care	0.09 [0.77]	< 0.005	10.89 (8.44)	10.76 (8.25)
Social services	0.08 [0.78]	< 0.005	3.02 (4.33)	3.08 (4.36)
Annuity	1.59 [0.21]	< 0.005	28.70 (19.29)	29.95 (19.68)
Lump sum	0.17 [0.68]	< 0.005	5.80 (5.81)	5.92 (5.83)
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.

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 D.2](#) shows the distribution of the number of choice situations in which a respondent chooses either the left or right option. Very few respondents show worrisome response patterns: 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 WTP for the lump sum is significantly higher for those respondents who consistently choose the same position. However, the variation between these groups is small 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 B](#)).

While Appendix B documents that information on actual LTC usage shifts respondents' expectations, Table D.3 shows that none of the WTPs change substantially as a result. All differences are statistically insignificant and smaller than 2 euro. 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.

Appendix E. Distributions of individual-specific WTP within the sample

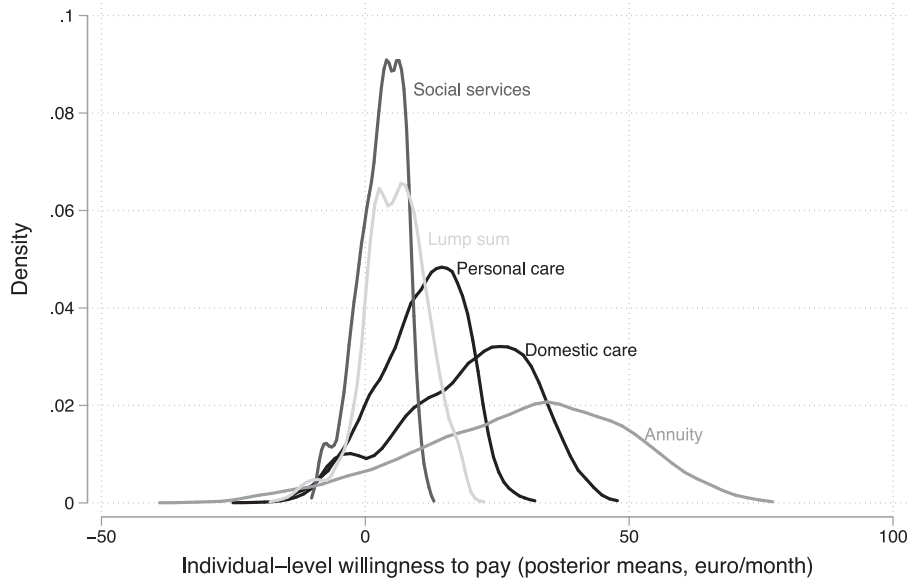


Fig. E1. Kernel densities of individual-specific WTP for the five attributes.

Appendix F. Alternative specification for models that describe heterogeneity in WTP for care: expected home care use relative to average age/gender

Table F1

Multiple linear regression for willingness to pay for home care services (difference with main text: expected home care use relative to average age/gender instead of the measure based on probability questions).

	(1) Domestic care	(2) Personal care	(3) Social services	(4) Annuity	(5) Lump sum
Personal circumstances					
Female	0.68 (0.55)	0.41 (0.36)	-0.05 (0.19)	-0.60 (0.85)	0.29 (0.27)
Partner	-2.98*** (0.72)	-1.90*** (0.47)	-1.02*** (0.25)	-3.50*** (1.13)	0.09 (0.37)
Has children	-0.40 (0.76)	-0.30 (0.50)	-0.20 (0.26)	-1.21 (1.20)	-0.59 (0.38)
Homeowner	0.13 (0.71)	0.96** (0.45)	0.31 (0.24)	0.22 (1.10)	0.03 (0.33)
Log HH income	2.77*** (0.72)	1.74*** (0.47)	0.74*** (0.25)	2.51** (1.07)	0.54 (0.33)
Educ.: vocational	-0.78 (0.67)	0.81* (0.43)	0.39* (0.23)	0.94 (1.07)	0.18 (0.33)
Educ.: university	-0.26 (0.72)	0.47 (0.47)	0.21 (0.25)	0.21 (1.12)	-0.01 (0.34)
Providing personal care	1.63* (0.89)	1.07* (0.57)	0.54* (0.30)	1.73 (1.38)	-0.33 (0.41)

(continued on next page)

Table F1 (continued)

	(1) Domestic care	(2) Personal care	(3) Social services	(4) Annuity	(5) Lump sum
Providing domestic care and support	-0.02 (0.61)	-0.02 (0.40)	-0.14 (0.21)	-1.07 (0.93)	-0.12 (0.29)
No health problems	0.11 (0.81)	0.70 (0.52)	0.33 (0.28)	-0.18 (1.20)	-0.59 (0.36)
Needs care	2.45 (1.69)	0.77 (1.03)	0.21 (0.54)	-0.45 (2.80)	-0.45 (0.95)
Age/100	-10.78 (23.13)	-13.76 (14.17)	-11.30 (7.68)	-28.31 (36.50)	15.11 (10.96)
Age squared/100	0.05 (0.19)	0.08 (0.12)	0.08 (0.06)	0.13 (0.30)	-0.17* (0.09)
Preferences					
Risk aversion (scale 1–7)	0.56*** (0.19)	0.22* (0.13)	0.11 (0.07)	0.36 (0.31)	-0.03 (0.09)
Patience (scale 1–7)	0.09 (0.21)	0.03 (0.13)	-0.02 (0.07)	-0.29 (0.33)	-0.08 (0.09)
Restraint (scale 1–7)	-0.08 (0.23)	-0.10 (0.15)	-0.05 (0.08)	-0.10 (0.38)	-0.01 (0.11)
Bequest motive: relative importance (baseline: no bequest motive, 0% in bequest box)					
Weak (1-20%)	2.11* (1.28)	-0.25 (0.85)	-0.11 (0.44)	2.41 (1.97)	1.56*** (0.59)
Below average (21-49%)	3.53*** (1.17)	1.45* (0.77)	0.58 (0.39)	3.60** (1.82)	1.56*** (0.58)
Average (50%)	1.82* (1.07)	-0.31 (0.72)	0.03 (0.37)	2.75* (1.64)	1.17** (0.51)
Above average (51-80%)	1.93* (1.13)	-0.34 (0.73)	0.04 (0.37)	2.71 (1.69)	0.96* (0.52)
Strong (81-99%)	-3.93* (2.20)	-4.81*** (1.49)	-1.70** (0.82)	-2.69 (3.50)	-0.67 (0.97)
Very strong (100%)	-4.18** (1.68)	-3.77*** (1.15)	-2.13*** (0.60)	-7.31*** (2.62)	0.06 (0.73)
Bequest motive: type (baseline: warm glow)					
Strategic	-0.24 (0.73)	-0.74 (0.49)	-0.04 (0.26)	0.88 (1.16)	-0.26 (0.36)
Altruistic	-1.63* (0.94)	-0.72 (0.62)	-0.11 (0.32)	0.27 (1.42)	-0.15 (0.49)
Other	-1.18 (1.73)	-0.95 (1.03)	-0.16 (0.55)	-1.05 (2.58)	-0.91 (0.74)
Partner only	-0.39 (0.82)	-0.37 (0.54)	-0.14 (0.30)	-1.32 (1.36)	-0.80** (0.39)
Charity only	1.90 (4.92)	2.52 (2.39)	1.57 (1.32)	5.99 (7.11)	-0.16 (1.07)
Missing	1.82 (1.22)	0.02 (0.80)	0.75* (0.40)	6.08*** (1.84)	0.31 (0.59)
Expectations					
Availability informal care by someone else than partner (baseline: definitely not)					
Definitely	-3.60*** (1.28)	-1.19 (0.85)	-0.69 (0.45)	-1.75 (2.08)	0.95 (0.65)
Probably	-1.69* (0.96)	-1.03* (0.62)	-0.37 (0.33)	-0.59 (1.49)	0.37 (0.47)
Maybe	-1.35 (0.83)	-0.65 (0.54)	-0.29 (0.28)	-0.47 (1.29)	0.43 (0.42)
Probably not	-0.59 (0.81)	-0.15 (0.54)	0.02 (0.28)	0.47 (1.29)	0.22 (0.41)
Care use relative to average age/gender (baseline: much shorter)					
Shorter	0.73 (1.22)	1.16 (0.80)	0.27 (0.43)	-1.08 (1.97)	-0.44 (0.57)
Average	2.51** (1.15)	2.04*** (0.75)	0.89** (0.41)	1.71 (1.86)	-0.38 (0.54)
Longer	2.86** (1.41)	1.74* (0.92)	1.11** (0.50)	3.05 (2.24)	-0.88 (0.69)
Expenditures when in need of care (baseline: decrease or stay constant)					
Increase	-0.14 (0.60)	0.77* (0.40)	0.07 (0.21)	-0.51 (0.97)	0.69** (0.30)
Constant	-0.31 (9.04)	0.09 (5.62)	0.66 (2.98)	23.48* (13.56)	-0.79 (4.31)
N	2190	2190	2190	2190	2190

Robust standard errors in parentheses based on seemingly unrelated estimation of the five equations; *** p<0.01, ** p<0.05, * p<0.1.

Appendix G. Alternative specification for models that describe heterogeneity in WTP for care: including individual-level risk factors

Table G1

Multiple linear regression for the willingness to pay for several types of home care insurance.

	(1) Domestic care	(2) Personal care	(3) Social services	(4) Annuity	(5) Lump sum
Personal circumstances					
Female	0.41 (0.65)	0.24 (0.42)	-0.07 (0.22)	-0.95 (1.00)	-0.09 (0.30)
Partner	-3.27*** (0.82)	-1.96*** (0.54)	-1.10*** (0.28)	-3.78*** (1.29)	0.26 (0.43)
Has children	-0.44 (0.89)	-0.49 (0.56)	-0.26 (0.30)	-1.60 (1.43)	-0.81* (0.44)
Homeowner	0.65 (0.84)	1.09** (0.53)	0.44 (0.28)	0.83 (1.28)	0.02 (0.38)
Log HH income	2.96*** (0.85)	1.78*** (0.55)	0.69** (0.29)	2.14* (1.24)	0.58 (0.38)
Educ.: vocational	-1.38* (0.78)	0.64 (0.49)	0.35 (0.27)	1.04 (1.24)	0.25 (0.37)
Educ.: university	-1.21 (0.84)	0.31 (0.54)	0.09 (0.28)	-0.18 (1.30)	0.18 (0.40)
Providing personal care	-0.27 (1.03)	0.17 (0.67)	0.17 (0.35)	0.62 (1.59)	-0.16 (0.47)
Providing domestic care or support	-0.19 (0.70)	-0.04 (0.46)	-0.19 (0.24)	-1.21 (1.07)	0.08 (0.33)
No health problems	0.01 (1.11)	1.25* (0.74)	0.51 (0.39)	0.02 (1.65)	-0.34 (0.47)
Needs care	2.38 (2.08)	0.18 (1.31)	-0.20 (0.68)	-2.19 (3.51)	0.10 (1.23)
Age/100	5.88 (27.02)	-17.78 (16.50)	-11.26 (8.88)	-15.05 (41.90)	10.95 (13.13)
Age squared/100	-0.11 (0.22)	0.10 (0.14)	0.07 (0.07)	-0.00 (0.35)	-0.13 (0.11)
Preferences					
Risk aversion (scale 1-7)	0.67*** (0.22)	0.31** (0.15)	0.13* (0.08)	0.31 (0.36)	-0.05 (0.10)
Patience (scale 1-7)	0.03 (0.24)	0.07 (0.15)	-0.00 (0.08)	-0.21 (0.38)	-0.02 (0.11)
Restraint (scale 1-7)	-0.12 (0.26)	-0.15 (0.18)	-0.05 (0.09)	0.07 (0.42)	0.00 (0.12)
Bequest motive: relative importance (baseline: no bequest motive, 0% in bequest box)					
Weak (1-20%)	1.77 (1.43)	-0.61 (0.94)	-0.24 (0.48)	1.84 (2.22)	1.36** (0.67)
Below average (21-49%)	3.75*** (1.33)	1.72** (0.87)	0.60 (0.44)	3.16 (2.09)	1.59** (0.67)
Average (50%)	1.76 (1.22)	-0.06 (0.82)	0.08 (0.41)	2.66 (1.87)	1.30** (0.59)
Above average (51-80%)	1.00 (1.31)	-0.75 (0.83)	-0.16 (0.42)	2.34 (1.96)	1.34** (0.60)
Strong (81-99%)	-5.02** (2.28)	-5.64*** (1.58)	-2.09** (0.85)	-4.04 (3.61)	-0.78 (1.03)
Very strong (100%)	-5.19*** (1.86)	-4.68*** (1.24)	-2.65*** (0.64)	-8.95*** (2.81)	0.22 (0.81)
Bequest motive: type (baseline: warm glow)					
Strategic	-0.53 (0.86)	-1.15** (0.58)	-0.08 (0.31)	1.12 (1.36)	-0.59 (0.40)
Altruistic	-0.51 (1.09)	-0.32 (0.74)	0.24 (0.38)	1.81 (1.70)	-0.32 (0.55)
Other	-1.54 (2.03)	-1.61 (1.26)	-0.58 (0.66)	-1.39 (2.98)	-0.07 (0.80)
Partner only	-0.48 (0.94)	-0.69 (0.62)	-0.35 (0.34)	-1.93 (1.55)	-0.74* (0.44)
Charity only	3.26 (5.14)	3.08 (2.69)	2.36* (1.31)	10.86 (6.87)	0.00 (1.27)

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Table G1 (continued)

	(1)	(2)	(3)	(4)	(5)
	Domestic care	Personal care	Social services	Annuity	Lump sum
Missing	0.35 (1.45)	-0.77 (0.96)	0.20 (0.48)	3.91* (2.20)	0.43 (0.72)
Expectations					
Availability informal care by someone else than partner (baseline: definitely not)					
Definitely	-3.61** (1.47)	-1.09 (0.99)	-0.71 (0.52)	-2.63 (2.40)	0.55 (0.74)
Probably	-1.30 (1.13)	-0.70 (0.73)	-0.36 (0.38)	-1.47 (1.76)	0.04 (0.54)
Maybe	-0.42 (0.98)	-0.03 (0.64)	0.03 (0.33)	0.44 (1.54)	0.28 (0.50)
Probably not	-0.34 (0.98)	0.33 (0.64)	0.15 (0.34)	0.16 (1.56)	0.12 (0.48)
Home care use (years)					
Median	0.27** (0.13)	0.19** (0.08)	0.07* (0.04)	0.25 (0.20)	0.04 (0.06)
IQR	-0.02 (0.12)	-0.03 (0.07)	-0.00 (0.04)	0.02 (0.18)	0.01 (0.05)
Expenditures when in need of care (baseline: decrease or stay constant)					
Increase	0.60 (0.70)	1.22*** (0.46)	0.39 (0.25)	0.79 (1.12)	0.68** (0.34)
Individual risk factors (based on Finkelstein and McGarry, 2006, and Boyer et al., 2020)					
Chronic disease (diagnosed since respondent entered panel)					
Diabetes	-2.07* (1.20)	-1.31 (0.81)	-0.58 (0.40)	-0.94 (1.74)	0.39 (0.57)
High blood pressure	0.26 (0.74)	-0.61 (0.49)	-0.11 (0.25)	0.52 (1.16)	0.07 (0.35)
Heart disease	-0.28 (1.36)	0.43 (0.90)	-0.12 (0.46)	-1.09 (2.02)	0.57 (0.63)
Stroke	0.65 (2.14)	0.53 (1.27)	0.06 (0.63)	-1.41 (3.01)	-0.86 (0.97)
Cancer	1.32 (1.52)	0.50 (1.10)	0.63 (0.54)	4.28* (2.30)	0.03 (0.76)
Lung disease	-0.93 (1.71)	-0.39 (1.04)	-0.36 (0.56)	-1.49 (2.60)	0.12 (0.66)
Dementia	-15.11*** (1.79)	-6.79 (6.99)	-2.25 (1.87)	-11.73*** (4.04)	-7.41*** (1.07)
Risk behavior (since respondent entered panel)					
Smoking	-1.73** (0.73)	-0.64 (0.48)	-0.48* (0.26)	-1.66 (1.17)	0.91*** (0.35)
Obesity (BMI \geq 30)	0.81 (0.83)	0.70 (0.54)	0.42 (0.28)	2.10* (1.24)	0.46 (0.37)
ADL limitations (ever since respondent entered panel)					
Dressing	0.50 (0.94)	0.70 (0.60)	0.01 (0.32)	-1.57 (1.50)	0.03 (0.44)
Walking across room	-1.40 (1.76)	-1.01 (1.13)	-0.13 (0.58)	1.22 (2.67)	0.14 (0.85)
Bathing	0.52 (1.55)	0.08 (1.03)	-0.11 (0.53)	-1.44 (2.41)	-0.57 (0.66)
Using toilet	1.54 (1.41)	1.35 (0.92)	0.59 (0.49)	1.21 (2.26)	-0.24 (0.57)
IADL limitations (ever since respondent entered panel)					
Eating	0.66 (1.62)	0.01 (1.05)	0.41 (0.55)	3.33 (2.55)	0.14 (0.69)
Shopping	-1.27 (1.08)	0.45 (0.69)	-0.01 (0.37)	-0.79 (1.75)	0.78 (0.50)
Taking medication	-0.83 (1.13)	-1.09 (0.73)	-0.53 (0.40)	-0.92 (1.83)	0.24 (0.54)
Constant	-4.17 (10.46)	1.66 (6.42)	1.34 (3.41)	22.40 (15.49)	-1.33 (5.00)
N	1658	1658	1658	1658	1658

Robust standard errors in parentheses based on seemingly unrelated estimation of the five equations; *** p<0.01, ** p<0.05, * p<0.1.

CRedit authorship contribution statement

Jochem de Bresser: Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing, Funding acquisition. **Marika Knoef:** Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing, Funding acquisition. **Raun van Ooijen:** Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing, Funding acquisition.

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