Insuring Health Risk for Elderly People: A Note Based on Stated Preferences Evidence

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1. Introduction

Major concerns have been expressed over the increasing trend in LTC expenditures that challenge the financial sustainability of welfare systems and raise delicate equity issues. Furthermore, it is well known that private insurance markets for LTC tend to be very small. A series of arguments have been raised in order to find a rational for this phenomenon that involves very different countries (Norton, 2000). Potential explanations have been suggested both for the supply and demand side although it has recently been shown that supply side constraints do not seem to be primarily responsible for small market size (Brown and Finkelstein, 2004). This finding reinforces the importance of a better understanding of demand patterns. For this scope, we develop a demand-side analysis by applying stated preferences techniques. We adopt a discrete choice modelling approach, that allows to identify the main determinants of the demand for LTC coverage. A choice experiment was carried out on a sample representative of the population of the Italian region Emilia-Romagna. Italy represents an institutional context where it would be impossible to evaluate the demand for LTC coverage from expenditure surveys given that the LTC insurance market is nearly non-existent.

While choice modelling has become standard practice in health economics, to our knowledge these techniques have never been used for studying the demand for LTC services. With our approach we aim to identify the relative importance of the characteristics of the insurance program. Moreover, special attention is paid to the modelling of the choice whether or not opting for the existing uncovered situation.

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2. The Dataset and the Discrete Choice Experiment

In order to collect information on the potential interest for implementing new programs aimed at financing LTC expenditures, a questionnaire collecting information on socio-economic status, health conditions and household demographic composition was submitted by means of personal interviews to a representative sample of the population of the region Emilia-Romagna in year 2002. The interview included the elicitation of WTP for LTC coverage by means of a discrete choice experiment.

A hypothetical scenario was defined following the indications of a panel of experts. Insurance coverage was anchored to a specific health status, described as a condition in which people need help for several hours per day for activities of daily living and for which both home and residential care can be considered clinically appropriate.

Moreover, respondents were told that the prices for the insurance plans proposed in the choice experiment were to be considered as covering only the respondent, notwithstanding the existence of wider range of possibilities in the real world, where extension to one or more family members are usually feasible.

Starting from this common framework, various hypothetical insurance schemes for LTC risk are offered to the respondent. Each alternative varies with respect to the values and characteristics assumed by four relevant attributes: a) the insurance premium, b) the funding scheme, c) the copayment rate, d) the option right for extending coverage to the additional expenditures determined by the eventual choice of residential care. The following table describes the attributes and related levels which were used in the choice experiments.

For the public funding case, the interviewer specified that the proposed solution consisted of a homogeneous coverage provided to the whole population and financed by means of an increase in the income tax at that time paid by the respondent. For the case of private insurance, participation is voluntary, and the level of coverage allowed to vary according to the subscriber's preferences.

The "option for covering additional costs'', consists of the possibility to apply the copayment rate to the entire amount of expenditures also in case the subscriber would choose a "residential'' LTC provision. In the hypothetical choice sets, also a "status quo alternative" was introduced, consisting of no additional coverage with respect to the level currently ensured by the public sector. Figure 1 below presents as an example one of the show-cards submitted during the interviews. Each respondent was faced with 10 different show-cards.

Table 1: The Attributes and Related Levels Used in the Choice Experiment

Attributes	*Levels*
Financing schemes	Public (general taxation/compulsory participation) Private (insurance premium/voluntary participation)
Yearly cost of coverage in €	103 258 387 516 775
Degree of coverage	Low coverage (70% copayment rate) Medium coverage (50% copayment rate) High coverage (25% copayment rate) Total coverage (0% copayment rate)
Option for covering additional costs of residential care	Included Not included

Figure 1: An Explanatory Show-card Used for the Choice Experiment Interviews

Let us assume that only the three options below are made available.
Which one would you choose?

Characteristics of the service	Solution A	Solution B	
Way of payment	Public coverage	Private insurance	Present situation
Copayment rate	Total coverage (0% left to the patient)	High coverage (25% left to the patient)	
Option for covering additional costs	Without the option to cover residential costs	With the option to cover residential costs	
Cost of the coverage	Lire 500,000 (€ 258) per year	Lire 1,500,000 (€ 775) per year	
Preference (check only one)	❑	❑	❑

3. Econometric Approach and Main Results

The most used model for processing data arising from choice experiments is the *multinomial logit* (henceforth, MNL) (Mc Fadden, 1984). The probabilistic structure of the MNL has some implications which may result problematic in our case, so that less straightforward approaches may become more appropriate. Namely, in the MNL the individual random components ε_k^h are assumed to be independently and identically distributed (IID) with an extreme value type 1 distribution. The previous assumption leads to the following specification of the probability that household h chooses alternative k:

$$P[y_h = k] = \frac{\exp\left(\mu\beta'\mathbf{x}_k\right)}{\sum_{l=1}^{K}\exp\left(\mu\beta'\mathbf{x}_l\right)},$$

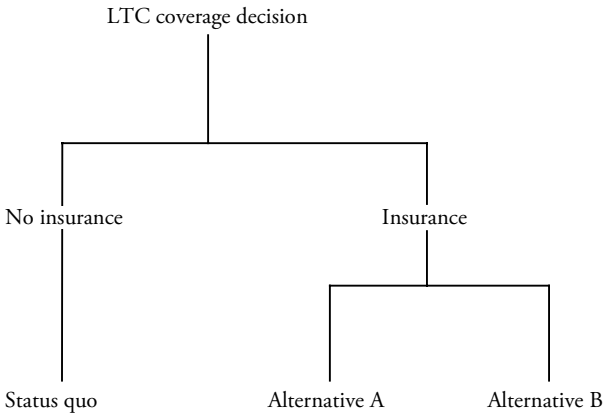
where y_h is an index of the choice made by household h . The scale parameter μ is usually normalised to 1.

The IID assumption leads to the independence of irrelevant alternatives (IIA) property, which is likely to be violated if some alternatives are perceived as closer substitutes than others. When there are subsets of similar alternatives, it is quite likely to have, within these subsets, common unobserved factors which affect the standard deviation of the unobservables in a way that is different from less similar alternatives. Consequently, the MNL could be unfit to our case, where two alternatives implying a different coverage are confronted with a third solution characterised by no additional cover. For each respondent, each repetition of the choice experiment can be interpreted as the outcome of two (simultaneous) decisions:

– whether extending coverage against the risk of LTC or opting for the present level of coverage;
– choice of the preferred insurance scheme between two alternatives that differ in the levels of four relevant attributes.

Consistently with this framework a *nested logit* (NL) model can be estimated, so that the variance of unobservable heterogeneity is allowed to differ across "nests of choices" (here, extension vs. status quo). In the first nest the respondent chooses whether or not to buy additional cover; in the second one he selects the preferred alternative conditional on having chosen to insure, or otherwise he opts for the status quo.

Figure 2: The LTC Insurance Decision Tree



This structure yields a "NL with partial degeneracy". One of the advantages of this specification is that, when 'non participation' reposes on a likely distinct economic rationale, it is possible to include any observation-specific effects (demographic, health and socio-economic variables) in a utility expression for the top level decision (Louvière et al., 2000). The joint probability that respondent h chooses alternative j belonging to upper level i is given by the product between a marginal and a conditional probability:

$$\Pr[y_h = i, j] = \Pr[w_h = i] \times \Pr[s_h = j \mid i].$$

The previous expression defines the "probability choice system" (PCS), which includes the marginal choice probabilities associated to the choice at the upper level, the conditional probabilities associated to the choices at the lower level, and the so called "inclusive value". The formal expressions for the PCS of the NL can be found in some recent contributes (Hensher and Greene, 2002). Here, we simply point out that we opted for a "upper level scale normalization", sometimes labelled as "random utility model 2".[1]

Some of the results of our estimates are reported in Table 2.

1 This specification has the advantage to enable the researcher to carry out a direct confrontation of NL estimates with the parameters obtained with a MNL model and to relate normalization to the total variance of the error distribution (Carrasco and Ortùzar, 2002).

Table 2: Main Econometric Results

Explanatory variables	*Nested Logit (RU2 normalization)*		
	Coefficient	*t-stat.*	*Prob*
"Choice of alternatives" process			
Financing scheme (0 private, 1 public)	0.1930	9.80	0.000
Extension to residential care	0.3413	12.88	0.000
Degree of% coverage	0.0120	14.78	0.000
Yearly cost of coverage	–0.0011	–14.50	0.000
ASC (0 for status quo)	–1.1563	–4.81	0.000
IV parameters			
No insurance	Unidentified		
Insurance	0.5487	14.545	0.000
Diagnostic statistics and tests	*Value*		
Log likelihood function	–11117.7		
Pseudo R-squared	0.156		
Number of observations	11760 (1176)		

We note first that the value of the IV parameter (0.549 and 0.566) and its high significance level confirm the statistical appropriateness of adopting the two level NL specification (this parameter must lie between 0 and 1, where the latter value implies a MNL specification). Second, the four attributes included in the insurance package are all highly significant. The coefficients of the continuous variables (cost and degree of coverage) both have the expected sign. The same happens for the option to extend cover to additional residential care expenses (dummy equals 1 when the option is included). The financing scheme has been coded by setting the private insurance as a base for the related dummy variable. Implicit prices for the attributes can be easily obtained simply by computing the ratio between the first three estimated parameters and the cost parameter.

In addition to exploring the role of the attributes, the NL model allows us to use individual specific indicators as explanatory variables for the top level of the decision tree (LOUVIÈRE et al., 2000), which is here represented by the choice of extending or not LTC cover. A large number of controls that potentially influence the demand for LTC coverage have been used for this purpose.

For sake of brevity, results are not presented in detail, but several points can be highlighted.

– Family income positively influences the probability of extending coverage. This suggests that the price hurdle limits access to additional coverage at low income levels.
– Younger generations are more favourably oriented towards a coverage extension and the result challenges the view that the lack of demand of LTC insurance is simply due to a myopic attitude by young people.
– A group of regressors refers to health status. While generic bad health conditions do not increase the demand for coverage, both chronic conditions and hospitalisation in the year prior the survey have a positive influence on the probability of opting for a larger coverage. Chronic diseases and previous hospitalisation can be taken as more precise evidence of physical frailty, which is also often directly associated with a direct experience of disability.
– Another group of variables refers to respondent's educational and employment status. Differences in education produce relatively larger influences than those in working position.

4. Discussion

In this note we have briefly presented a choice experiment which provides a better understanding of the characteristics of the demand for LTC risk coverage. A basic scenario was varied according to the levels of four main attributes and the main aim was to analyse both the propensity to insurance coverage and the choice probability for different insurance prospects.

We find a strong significance of selected attributes in determining the WTP. Also demographic and personal status indicators display clear significance in modelling the opt-out (i.e. choice of the status quo) stage in the NL framework. Although very briefly, it can be of interest to conclude by reporting the implicit prices implied by our estimates. The value of the degree of coverage is probably the most interesting indicator for the evaluation of the marginal WTP in the case of a service sold in the market.

The estimated value is of 11 Euros per 1% increase in coverage. An interesting result is the high value attached to the extension of the coverage to residential care expenditures (315 Euros), that is as 28.5% percent point of coverage.

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