

Public vs private demand for covering long term care expenditures

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For Peer Review

Public vs private demand for covering long term care expenditures

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Abstract

This paper studies the determinants of the willingness to pay (WTP) for long-term care (LTC) insurance coverage. Two alternatives are considered, one compulsory, financed through taxes, the other purchased on a voluntary basis and paid through a premium. WTP was elicited through open-ended contingent valuation within a survey conducted in the Italian region Emilia-Romagna about LTC population needs. We model information on individual WTP as a two-stage process, where respondents first establish their interest for LTC cover, then state their WTP. Results show that interest and WTP are influenced by different variables, and that differences arise also between the WTP for public and private coverage.

Keywords: Health Insurance, Long Term Care, Willingness to Pay, Hurdle Models.

JEL classification: I11, I18, H40, C34.

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1. Introduction

The financial impact of ageing is one of the most debated issues in health economics. Many studies have tried to assess the impact of demographic changes on different areas of welfare expenditures, including Long-Term Care (LTC, henceforth). Even with a persistent degree of uncertainty, it is generally agreed that ageing will increase the demand for elderly care in the future (e.g. Hancock *et al.*, 2003). Moreover, the increasing participation of women in the job market, together with the reduction in households' size, will further limit the availability of unpaid informal care. Accordingly, families are likely to face an increase in their expenditures for LTC services.

Despite the availability of insurance schemes for transferring the financial risk of age-related disabilities, the market for LTC private policies is negligible in size, and elderly people are often exposed to high expenditure risk. Several theoretical arguments have been put forward as possible explanations for this phenomenon. They include adverse selection and moral hazard typically affecting health insurance, as well as market failures peculiar to the LTC sector, usually attributed to intra-family strategic behaviour (e.g. Pauly, 1990) or to non-diversifiable aggregate risk (Cutler, 1993). A further justification is the availability of substitutes, such as out-of-pocket payments or public programs covering expenditures and/or directly providing elderly care, which may crowd out private insurance.

What is largely missing in the literature is a direct investigation of people's preferences in order to identify the individual characteristics that make consumers willing (or not) to transfer a share of the risk they are exposed to, and their preferred institutional arrangement for achieving this objective. This paper contributes to filling this gap by using a survey on a representative sample of families in the Italian region of Emilia Romagna. It studies the determinants of willingness to pay (WTP) for covering LTC risk and outlines how potential demand differs between social groups.

The survey collected data on stated WTP through an 'open ended' contingent valuation (CV) question regarding hypothetical programs covering LTC expenditures, aimed at topping up the support ensured by the public sector. Thanks to the 'open ended' format, information on WTP has been made available for two hypothetical alternative packages differing only in the financing scheme. The first one related to a private insurance policy, the second one to a public fund financed through taxation.

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3 Most CV methods applied to health care provide a monetary quantification of the benefits derived
4 from specific treatments and are typically aimed at complementing clinical indicators for resource
5 allocation decisions, whereas they are less frequently applied to evaluating health care programs
6 addressed to the general population¹. The latter design requires to move from an ex-post to an ex-ante
7 perspective, which is more appropriate when health care need is a potential rather than an actual
8 experience, and programs are evaluated in terms of option value. Some of these analyses have studied
9 problems related to elderly care (e.g. Nocera-Bonato-Telser, 2002; Shackley-Donaldson, 2002) but only
10 recently Costa Font-Rovira Forns (2008) have proposed an application to LTC insurance market.
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21 A recent strand of literature has used stated preferences also to investigate the determinants of
22 provision of LTC and in particular the choice between formal and informal care. Several methods have
23 been employed, from CV (van den Berg *et al.* 2005b,c) to discrete choice experiments (van den Bergh,
24 2005a) and well-being valuation method (van den Berg-Ferrer i Carbonell 2007). On the whole, this
25 literature firmly advocates the use of stated preferences for studying decisions concerning LTC on the
26 grounds that these methods provide more comprehensive indications than the opportunity cost and the
27 replacement cost method for important dimensions such as the burden of caregiving and the
28 interdependencies between caregiver and care recipient.
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The increasing utilisation of CV for assessing different issues related to LTC permits a first check of
the robustness of our empirical evidence across different institutional systems, although our analysis
differs from previous contributions on several aspects - in particular in that we evaluate the impact on
individual WTP of considering different payment mechanisms. Given the nature of the exercise proposed,
our paper is also in line with the “joint evaluation” approach of studies such as Luchini-Protière-Moatti
(2003), where several programs are simultaneously evaluated, whereas the prevailing strategy in health
economics is to develop separate surveys and perform separate evaluations.

Besides complementing with stated preferences data the studies on LTC insurance demand, so far
mostly focused on the US (Sloan-Norton, 1997; Mellor, 2001), we investigate the implications of using
alternative payment schemes for financing health care programs. Two competing hypothesis are usually

¹ For an example of the first approach see Clarke 2000, while the second is followed, among others, by Costa Font-Rovira Forns (2005) and Pavlova-Groot-Van Merode 2004.

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3 proposed to justify differences between WTP in a insurance-based approach, financed through premiums,
4 and in a community-based approach, where resources are collected through taxation (Olsen *et al.* 2004).
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7 The first hypothesis suggests that the community approach leads respondents to merely include an
8 altruistic add-on to their WTP due to caring externalities. The second one states that moving from a
9 private to a community frame leads to the elicitation of WTP for two intrinsically different services, so
10 that respondent's characteristics are expected to influence WTP according to different patterns in the two
11 situations.² Our analysis supports the second hypothesis, and the separate identification of the
12 determinants of demand for LTC coverage provides a better understanding of the welfare consequences
13 of alternative reforms.
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23 A second issue tackled here is the analysis of the decisions that induce a substantial share of
24 respondents not to contribute to both kind of programs. This may be determined not only by the
25 comparison between individual expected costs and benefits, but also by prior judgements reflecting non-
26 economic motives, such as a strong ethical commitment in favour of family caregiving, lack of adequate
27 prior information, and cognitive difficulties in evaluating the problem. This is important because,
28 depending on the reason why individuals are not willing to purchase insurance (e.g. Propper, 1993),
29 different policy implications can be derived, and distortions may arise from mixing answers determined
30 by the two different sets of motivations (broadly speaking, economic and non-economic). We control for
31 this behaviour by way of a two-step modelling of WTP. We firstly identify the process which leads to the
32 inclusion of LTC coverage in the respondents' choice set, then we analyse the determinants of WTP on
33 the sub-sample of those who declare interest in LTC cover.
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47 The paper is organised as follows. The next section presents a basic model for the interpretation of
48 the answers, section 3 illustrates the survey and the database on which this paper is based, section 4
49 discusses the empirical approach, section 5 summarises the empirical results and section 6 concludes.
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54 **2. A model of WTP for Long-Term Care insurance**

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56 In this section, we present a simple theoretical framework which accounts for the process underlying
57 stated WTP and reflects the structure of the CV exercise included in the survey, whose design was
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² The mandatory nature of the public program may be justified on the ground that, in a n-individuals setting, it solves free-riding problems associated with the presence of caring externalities (e.g. Hochman-Rodgers, 1969). On the role of altruism in the evaluation of health care programmes see also Chanel *et al.* (2004)

dictated by the main characteristics of existing public programs and private policies for LTC, as well as by the need to keep the scenario simple enough to be easily understood by respondents.

We consider a two-period and two-state of the world model, where the respondent is either *healthy* (H) or *dependent-in need of LTC* (D).³ In t_0 , the respondent is H with probability 1, whereas in t_1 he has a positive probability of becoming D . In t_0 each respondent states how much he is willing to pay for participating in programs which cover LTC risk in t_1 .⁴

Distinguishing features of long-term vis à vis health care are that the former typically addresses chronic conditions and that, in most cases, the initial health capital cannot be restored. We therefore assume here that dependency is irreversible and LTC does not improve health per se, but it is needed for exerting the other activities of daily living. In our model, the occurrence of disability generates a lump-sum loss for the individual represented by the (fixed) amount of resources that has to be invested in LTC and which cannot be traded-off for different forms of consumption. Disability is also assumed to be observable, since its high persistency substantially reduces the effort required for monitoring consumers conditions and cuts down the related costs.⁵

When disability occurs, LTC has to be provided either by family members or purchased in the market, according to the following relationship:

$$(1) \quad C = \alpha b + (1 - \alpha)f,$$

where C is the (exogenous) amount of care, expressed in monetary units, that is necessary when the consumer becomes D . The combination between formal (b) and family care (f) can vary according to the proportion α chosen by the family. When $\alpha = 1$, the entire amount of LTC is financed through out-of-pocket expenditures. As α decreases, the contribution of informal care increases and its cost of provision is given by forgone earnings (f), due to reduced working time.

Given that our empirical analysis is based on an ex-ante perspective and focuses on attitudes towards insuring monetary risk rather than on (ex-post) provision of LTC, the model presented here does not

³ Coverage against LTC risk involves decisions taken over a long run time horizon. It is assumed that the second period summarises all future utility flows.

⁴ Without loss of generality, the level of coverage ensured by current public support for frail elderly people is normalised to zero.

⁵ This a standard assumption in the (scant) theoretical literature on LTC (e.g. Zweifel and Struwe 1998 and, more recently, Pestieau and Sato 2008).

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3 endogenise the amount of informal care provided, since the latter decision is typically taken after the
4 onset of disability. Such issue has been extensively explored by a strand of literature that uses stated
5 preferences to elicit WTP and WTA from (informal) caregivers and care recipients. Also in that case, the
6 total amount of care needed is typically assumed as exogenous, but the analysis focuses specifically on
7 the factors that influence the optimal informal/formal care mix.
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14 In order to assess WTP, the respondent compares his expected utility (henceforth EU) when he takes
15 up either a public (CP_u) or a private (CP_r) coverage to the EU achieved in the status quo (SQ). EU is
16 made up by a baseline component u_i , weighed by a subjective probability (p_i) that the respondent
17 attributes to the event of becoming D in t_1 . The probability p_i is a measure of self-perceived disability risk
18 and is assumed to depend on age, current health state, and a vector ϕ of additional variables which may
19 influence projections over future health states (e.g. education): $p_i = p(\text{age}_i, h_i, \phi_i)$.
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27 We represent u_i through the following expression:
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31 (2)
$$u_i = u(yd_i; a_i),$$

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34 so that u_i is assumed to depend on disposable family income yd_i and a vector a_i of other personal
35 characteristics. In principle, vector a_i includes variables that influence the decision to take up coverage in
36 a uniform way between the public and private case, from those whose impact differs in the two cases.⁶
37 Disposable income is given by the difference between an exogenous individual component y_i and a share
38 of the cost of care (C) contingent on the respondent becoming D and being or not covered by LTC
39 insurance. The reimbursement scheme, introduced not to design an optimal solution in the trade off
40 between risks and incentives, but to mimic the (simplified) hypothetical scenario submitted through the
41 questionnaire, is such that the insured person receives a reimbursement equal to 75% of his expenditures
42 in case of dependency. Finally, when insured, the respondent either pays a premium π for the private
43 program, or a tax price T for the public one.⁷
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59 ⁶ Since WTP depends on the comparison of EU contingent on being insured or not, the only variables that should
60 enter a_i are those producing a different impact on u_i in the two cases.

⁷ According to the hypothesised reimbursement scheme, disposable income for a dependent person amounts to $yd_i = y_i - C$ in case of no additional coverage, to $yd_i = y_i - 0.25C - \pi$ if coverage is private, and to $yd_i = y_i - 0.25C - T$ if coverage is public.

The WTP statement corresponds to the compensative surplus of the respondent, i.e. the monetary amount (insurance premium or tax price) which makes him indifferent between joining the program or maintaining the *SQ*. For the private case, WTP corresponds to a premium π^* such that:

$$EU_i^{CPr}(\pi^*) - EU_i^{SQ} = [p_i u(yd_i^{D,CPr}; a_i) + (1 - p_i) u(yd_i^{H,CPr}; a_i)] - [p_i u(yd_i^{D,SQ}; a_i) + (1 - p_i) u(yd_i^{H,SQ}; a_i)] = 0.$$

By making explicit yd and a_i , the expression can be rewritten as follows:

$$(3) \quad [p_i u(y_i - \pi_i^* - 0.25C; a_i) + (1 - p_i) u(y_i - \pi_i^*; a_i)] - [p_i u(y_i - C; a_i) + (1 - p_i) u(y_i; a_i)] = 0.$$

For the public case, WTP is the tax price T_i^* such that:

$$(4) \quad p_i u(y_i - T_i^* - 0.25C; a_i) + (1 - p_i) u(y_i - T_i^*; a_i) - p_i u(y_i - C; a_i) + [1 - p_i] u(y_i; a_i) = 0$$

Expressions (3) and (4) show that, when the respondent is covered, EU negatively depends on the insurance premium (or the tax price), whereas the contribution does not influence expected utility in the *SQ*. Corner solutions (WTP = 0) occur when the respondent prefers the *SQ* even if his hypothetical contribution is zero. In contrast, if the *EU* of joining a program exceeds what the respondent gets in the *SQ*, WTP is strictly positive.

WTP statements in (3) and (4) have a straightforward interpretation. Reimbursement schemes under the private and the public option work in a similar way, but different WTP between the two schemes can be obtained, depending on the effects of the variables entering the vector a_i . One of the main purposes of this work consists of detecting the set of variables entering vector a_i . Our focus is twofold since, on the one hand, we are interested in identifying those factors influencing the decision to take up (any kind of) coverage. On the other hand, we want to check whether the impact of some variables may differ between the private and public option. Both economic theory and empirical studies provide indications on a series of possible determinants of demand for LTC coverage, which are summarised in the following.

As for *socioeconomic conditions*, education is believed to increase WTP by promoting awareness towards potential LTC needs and reducing myopic attitudes. For similar reasons, propensity to seek coverage should increase when one or more members of the household are experiencing disability. The main expected influence of employment status is related to the way it affects respondents' allocation of time. Retired or not working individuals, who have a relatively low opportunity cost of time, should

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3 attach a lower value to coverage against LTC risk, whereas self-employed workers should be relatively
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5 more willing to take up coverage than the other categories of occupied and non occupied individuals.
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8 *Demographic variables.* When the potential for informal care provided within the household
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10 increases, as it happens with household size and the presence of a spouse, this is expected to negatively
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12 affect WTP by reducing the demand for formal care, and the value of reimbursing related expenses. This
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14 effect should be larger when there are adult children in the household and the spouse is a female, as these
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16 groups usually bear most of the burden of caregiving. On the contrary, the role of age is multifaceted. In
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18 the first instance, older individuals should attach higher value to coverage since they have a higher
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20 probability of becoming care recipients. Yet, counterbalancing effects could take place. Due to
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22 uncertainty over future availability of adequate support if no reform is promptly undertaken, younger
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24 generations could be induced to favour programs aimed at channelling additional investments in the LTC
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26 sector well in advance with respect to their potential need.
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29 Also *health conditions* are potentially important drivers of demand for LTC coverage. To the extent
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31 that poor health conditions are associated to higher probability of disability, they increase the average and
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33 variance of LTC expenditures, thus augmenting demand for insurance. The same happens for risk
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35 aversion, although the latter is particularly hard to measure empirically.
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38 As for the difference between public and private WTP, the CV literature has explored its possible
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40 rationales in a number of applications.⁸ The baseline framework of these studies builds on the idea that, if
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42 individuals are strictly self-interested, only minor discrepancies in WTPs and their determinants should be
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44 observed, since individual benefits do not vary with the choice of a specific financing mechanism. In
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46 contrast, if agents take up a broader view in evaluating the utility obtained from the two programs, the
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48 *compulsory-public* nature of one alternative vis à vis the *voluntary-private* one of the other might
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50 differentially affect the WTP.
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53 The healthcare literature identifies altruism, typically attributed to caring externalities, as the main
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55 justification of potential discrepancies in average WTP and/or in its determinants. In the context of the
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57 present paper, we find appropriate to adopt a more specific perspective, that emphasises in particular the
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⁸ Most of these studies compare public and private WTP for safety interventions. Although the literature is not unanimous on the point, quite surprisingly and contrary to theoretical predictions, private WTP tends to exceed in most cases the public one. For a survey see de Blaeij et al. (2003).

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3 role personal views on how social services should be organised and financed. For instance, citizens who
4 support a widespread public involvement in welfare services, including socialisation of the risks of old
5 age dependency, shall be more willing to contribute to the public solution, whereas those who believe that
6 elderly care is mainly a family responsibility are likely to display higher WTP for private coverage.
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11 Finally, we consider the relationship between *income* and WTP. It is well know from the insurance
12 literature that such relationship results from the interaction between two conflicting effects. Since
13 foregone utility due to higher costs of coverage falls at the margin as income increases, WTP should be
14 positively correlated with income. At the same time, income acts as a self-insuring device and this pushes
15 the relation between WTP and income in the opposite direction. Therefore, establishing whether LTC
16 coverage is a luxury (or, at least, a normal) good or not is essentially an empirical issue, although most of
17 the available evidence confirms that elasticity is positive in sign.
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27 Our last point relates to differences in income elasticity due to the way the service is financed. Using
28 tax prices instead of insurance premia for financing the same program has distributive implications and
29 individuals with different incomes may display different interests in expanding public services because,
30 among other things, they anticipate bearing different shares of the implied tax burden (Hall-Preston,
31 2000). Once other potential sources of differences in WTP such as altruism and political views are
32 accounted for, a residual significant gap in income elasticity could be originated by the fact that
33 individuals in low income deciles gain in terms of redistribution from community-based provision, while
34 individuals in high income deciles loose. If this is the case, we expect WTP to be more responsive to
35 income when private insurance is proposed.
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3. Survey and data description

50 Our empirical analysis is based on a cross-sectional survey carried out on a sample of families in the
51 Italian region Emilia-Romagna (around 4 millions inhabitants). Focusing on a single region has the
52 advantage of avoiding differences in the institutional settings that have acquired increasing importance in
53 Italy, widening interregional divergence (Giannoni-Hitris, 2002) and increasing patients' mobility
54 (Levaggi-Zanola 2004). The original survey consists of 1415 face-to-face interviews conducted by a
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3 professional survey firm between winter 2002 and spring 2003.⁹ A section of the questionnaire was
4 devoted to eliciting the WTP for covering LTC expenditure risk by means of CV questions. This section
5 included an introduction which provides a description of what is meant by disability in activities of daily
6 living, together with indications on the incidence of disability among the elderly. Furthermore, current
7 forms of support ensured by the public sector were described as well as alternative arrangements that such
8 as family or paid home care.
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16 Afterwards, a hypothetical scenario was illustrated, consisting of a program aimed at covering a
17 respondent's "disability state requiring help in activities of daily living for several hours per day". Given
18 that CV requires the exact specification of the service to be evaluated, individuals were asked to consider
19 a program covering a fixed proportion (75%) of disability related expenditures, which at the time of the
20 interview were reckoned to amount on average to 1033 Euros per month if the disabled person is cared
21 for at home and to 1550 Euros if he chose residential care.¹⁰ The policy issue investigated is "WTP for an
22 extension of coverage with respect to the status quo".¹¹ Respondents were asked to consider expenditures
23 as being net of the support presently ensured by the public sector, which are deemed to be insufficient to
24 meet present and future needs. Two types of coverage were proposed: a first one provided by the public
25 sector and financed through a compulsory increase in personal income tax; a second one in which
26 insurance is voluntarily purchased in the market and paid through a premium. Hence, each respondent
27 provided two WTP statements.
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42 Several critiques can be made to stated preferences methods. Answers may not adequately reflect a
43 binding budget constraint, they may be influenced by the specific framing of the questions or be
44 influenced by respondents' attempts to game the system for their own gain. For instance, if agents believe
45 that the results of the questionnaire can actually influence public decision-making, participants in the
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53 ⁹ Households were selected following a design aimed at ensuring balanced geographic and socio-economic
54 representation in the sample. A total of 41 municipalities was surveyed, including all the 21 towns with more than
55 25,000 inhabitants, together with a sample of 20 smaller municipalities, selected according to size, demographic
56 composition and supply conditions of elderly care. Next, families were randomly drawn from municipal archives
57 according to family size and age of the head of household.

58 ¹⁰ Under the health conditions described in the scenario both home and institutionalised care are appropriate from a
59 medical point of view. Monetary costs are consistent with current average out-of-pocket expenditures for this kind
60 of services in Italy. Since we focus on the *ex-ante* choice of insurance, it is not relevant whether *ex-post* the disable
chooses domicile or residential care.

¹¹ This perspective is sometimes referred to as "marginal context". It is typical of WTP studies where an *ex-ante*
approach is adopted and most decisions on the way resources are allocated within the health care sector must be
taken as given (Olsen *et al.* 2004).

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3 interview may overstate (understate) their WTP in order to support (oppose) the implementation of a
4 particular program.¹² A sizeable body of methodological literature has addressed the robustness of stated
5 preference methods in terms both of their internal and external validity.¹³ Although these developments
6 have not entirely closed the gap between revealed and stated preferences analyses in terms of their
7 reliability, this is one of those cases where these methods are able to provide insights which could not be
8 obtained otherwise given that LTC insurance policies are marketed only to a very limited extent.
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11 To tackle these problems, the survey conformed to some of the best practices suggested by the
12 methodological literature in order to minimise potential distortions. First, given that the evaluation of
13 hypothetical LTC policies represents per se a difficult task, the elicitation format adopted was as simple
14 as possible (open ended).¹⁴ This choice may have resulted in WTP estimates being “conservative”, given
15 results in the previous literature,¹⁵ but this study is comparatively less focused on the determination of the
16 real absolute value of WTP, than on identifying the economic determinants of LTC coverage and the
17 differences between private and public schemes. Second, an accurate description of all possible
18 alternatives and good components was made before starting the evaluation exercise, including the fact
19 that the individual payment vehicle would have been whether a voluntary premium or compulsory
20 personal taxation. In this way, the survey conformed to what Bateman *et al* (2004) call an “advanced
21 disclosure design” which, according to their experimental findings, is able to minimize ordering and
22 “warm glow” effects. The robustness of the CV exercise should also be fostered by having left coverage
23 unchanged between the two programs, this way pre-empting the occurrence of “additional good
24 sequence” biases, a potential weakness for surveys where multiple programs are evaluated.
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28 In addition to the two WTP statements, a variable which registered the asserted interest (or non
29 interest) for LTC coverage was recorded (see appendix). This additional information enables us to better
30 assess the very nature of zero WTP statements, since it permits to detect whether or not zero WTPs imply
31 that the respondent excludes LTC cover from his choice set (i.e. not being interested in). This is important
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¹² For instance, if agents believe that the results of the questionnaire can actually influence public decision-making, participants in the interview may overstate (understate) their WTP in order to support (oppose) the implementation of a particular program.

¹³ For the health economics literature, see for instance Hanley-Ryan-Wright, 2003, Telser-Zweifel, 2007.

¹⁴ The literature that applies CV methods to LTC explicitly recommends this format, as respondents are encouraged to take the broad and comprehensive perspective required by the complexity of problems encompassed here (Van den Berg *et al.*, 2005b). Moreover, it has been shown to perform comparatively better than a binary choice with follow-up format, when an altruistic component is a potentially relevant determinant of WTP (Onwujekwe-Uzochukwu, 2004).

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3 both from a normative perspective - since it helps identifying the mode of intervention which would lead
4 to the greatest improvements in social welfare (by matching collective preferences) - and from a positive
5 perspective, since it provides further insights on the most likely outcome of a political process for the
6 choice between alternative financing schemes. Moreover, this information allows us to appraise 'non
7 interest', which could not necessarily stem just from a 'protest attitude' but it could also represent the
8 outcome of a separate 'rational' process where familiarity to the service under evaluation is crucial.
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16 At this stage, it is important also to assess whether distortions typically affecting insurance markets,
17 such as adverse selection and moral hazard, play a role in the present context. We argue that adverse
18 selection is unlikely to affect WTP for various reasons. Under public coverage, compulsory participation
19 rules out any potential for adverse selection. Under private coverage, informational asymmetries are on
20 average lower than in the health insurance case, since by managing epidemiological data on a large scale,
21 insurers can usually predict the probability of old-age disability more precisely than young and middle
22 age individuals are able to do themselves. In spite of that, some empirical evidence suggests that self
23 perception of disability risk can be still positively associated with probability of holding a LTC insurance
24 policy (e.g. Sloan and Norton 1997). Nonetheless, a more fundamental argument related to the very
25 nature of stated preferences data suggests that adverse selection should not be a serious concern in our
26 framework. Even if some agents are rationed in case they enter the LTC insurance market, by relying on
27 stated preferences, we deal with data that depend exclusively on demand factors and not on the supply
28 schedule. Consequently, as the survey elicit the (ex-ante) propensity to purchase LTC coverage,
29 consumers' WTP is not expected to be influenced by insurers' (ex-post) decisions.
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47 In contrast, moral hazard potentially influences WTP statements. A reimbursement scheme such as
48 the one illustrated in our hypothetical scenario is not a first best solution, as it subsidises LTC at the
49 margin potentially inducing (ex-post) moral hazard. This scheme was chosen since it embodied the basic
50 features of an LTC insurance program and was simple enough to be understood by a sample of the
51 general population. While moral hazard under LTC insurance has been recognised as potentially more
52 severe than in health insurance markets , the presence of a copayment rate (25%), which leaves on
53 respondents a non negligible expenditure share, was intended to contain the incentives to demand
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¹⁵ Donaldson Thomas Torgerson (1997) point out the risk of a higher proportion of zero responses and lower survey completion

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3 excessive care. The adoption of more sophisticated solutions including the introduction of deductibles
4 and/or a maximum levels of reimbursement could have further reduced distortions.¹⁶ Nevertheless, this
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6 would have increased cognitive difficulties of respondents with potential adverse effects on the reliability
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8 of their answers.
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11 Table 1 reports mean WTP for private and public insurance, first considering the entire sample, then
12 only those observations that display a strictly positive WTP. While in the first case the difference in the
13
14 WTP between the private policy and the public program is negligible (€ 291 vs € 283), in the second case
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16 the private policy outweighs the public of about 20%. The section on the right reports the number of cases
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18 with WTP = 0, together with the number of respondents declaring to be interested in LTC coverage
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20 although they cannot afford any expenditure for the service. As can be seen, there is a large proportion of
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22 zeros for both the public and private solutions, and a large share of them is the result of mere disinterest
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24 for the service under evaluation. The number of zeros is much larger for the private program. Although
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26 still preliminary, this evidence contrasts with the hypothesis that the public nature of a LTC program
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28 implies a mere altruistic add-on to individual WTPs because of the presence of caring externalities. At the
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30 opposite, the result is in line with the idea that differences in the payment scheme produce the perception
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32 of facing two intrinsically different alternatives.
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38 INSERT TABLE 1 HERE
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40 The last part of the questionnaire contains information on family composition, socio-economic
41
42 status, working and health conditions, and on respondents' general attitudes towards health and social
43
44 expenditures, which provide useful indications on the factors potentially influencing WTP.
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46 Table 2 reports definitions and descriptive statistics for the variables used for regression analysis.
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48 Variables accounting for respondent's socio-demographic conditions are age, sex, education and career
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50 position. Health conditions are proxied by self-assessed health status and presence of one or more chronic
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52 diseases. A set of dummies is included to capture judgements on the perceived quality of health and LTC
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57 rates with respect to payment card (or scale) techniques. For a review of pros and cons of the various CV elicitation methods see
58 also Ryan-Scott-Donaldson (2004).

59 ¹⁶ Although widely discussed at the theoretical level, there is little empirical evidence on the influence of moral hazard in the
60 demand of LTC services. An exception is Van den Berg and Hassink (2005) who analyse the Dutch system of demand-side
subsidies and confirm the presence of substantial increases in demand when LTC is subsidised at the margin. Moral hazard is
identified through the observed (upward) effect on the price of care due to the presence of a component of the cash benefit
systems for which the dependent person acts as residual claimant.

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3 services.¹⁷ There are also dummies aimed at capturing the previous experience of disability, proxied by
4 the presence of a disabled person in the family. The economic condition of the household is represented
5 by net monthly family income, which refers to respondent's and (when present) spouse's income. Finally,
6 the survey collects respondents' opinions on the appropriate role of the public sector in financing LTC.
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INSERT TABLE 2 HERE

4. Empirical model and estimation procedure.

The summary results in Table 1 show that a relevant fraction of individual stated a WTP = 0. Since this was partly expected because of the open ended format of the CV exercise, the question on 'interest' was included so as not to allocate these answers into an unspecified category of 'protest zeroes'.¹⁸

The problem of dealing with zero-inflated data has been extensively studied in the literature on selectivity and double-hurdle models and found frequent applications in health care (Jones, 2000). Mass probability at zero may be due to infrequency of purchase, rationing, corner solutions and aversion to a particular good (also referred to as preference heterogeneity or abstention). For our analysis, the distinction between the last two sources of zeros is central. Observations with WTP = 0 can be referred either to individuals who are not interested in the extension of LTC cover, who may decline additional coverage because the service does not provide them benefits in any case, or to those who, despite being interested in coverage, are not willing to pay for it since their current level of income, or other individual attributes, induce them to allocate available resources to other kinds of expenditures (corner solution).¹⁹

The reasons why individuals display heterogeneous preferences with respect to an extension of coverage can be ascribed to some peculiarities of LTC. First, since age related disabilities affect a small

¹⁷ Respondents were asked to rate their health state and judge the quality of health and social care services on a scale ranging from 1 (very bad) to 5 (excellent). The dummy variables employed group individuals whose evaluation is between 1 and 3 and those between 4 and 5.

¹⁸ Some respondents may reject the offer simply because of difficulties in understanding the submitted scenarios or because they judge the interview too invasive. However, the notion of preference heterogeneity that we adopt is wider than the one implied by a mere protest attitude which is usually analysed in the empirical studies based on hypothetical data. See Bateman *et al* (2002), for methodological considerations on protest zeros, and Dalmau-Matarrodona (2001), for an application to health care. For a case where "true zeros" are detected with an approach similar to ours see Luchini *et al* (2003) and Protière *et al* (2004).

¹⁹ This distinction between interested and non-interested respondents partially recalls the idea developed by Propper (1993), who classifies individuals as being 'captive' to the National Health Service when households not holding a supplementary health insurance policy claim that they have never seriously considered purchasing one. In our context, the broader concept of interest seems more appropriate than captivity, since individual attitude does not reflect a specific aversion towards the private solution, but more general considerations on the benefits obtainable from extending LTC coverage.

fraction of the population, some respondents might have an extremely vague perception of the problem and do not feel involved in the definition of strategies for financing LTC. Moreover, personal caregiving might be perceived as a filial obligation that ought not to be delegated outside the family. In this case, insurance coverage provides no benefit since the only way considered ethically admissible to take care of the elderly is through informal family care.²⁰

We model the separate identification of the determinants of interest and WTP since this not only provides unbiased and/or more efficient estimates of the parameters, but also identifies potentially different economic and non-economic factors influencing the two zero-generating processes. We argue that the interest for LTC cover may be mainly driven by how aware people are of the relevance of this issue, which is likely to be influenced by prior experience of the problem. Let the net value for an individual stating interest in coverage be summed up by the following latent variable specification:

$$(6) \quad I_i^* = \mathbf{z}_i' \boldsymbol{\gamma} + v_i;$$

where \mathbf{z}_i includes observables determining I_i^* .

In contrast, for the sub-sample of respondents who receive a positive utility from extending LTC cover, the net value of the service is modeled as follows:

$$(7) \quad WTP_i^* = \mathbf{x}_i' \boldsymbol{\beta} + u_i.$$

Given the two distinct zero generation process, the corresponding stated WTP is given by:

$$(8) \quad WTP_i = \begin{cases} WTP_i^* & \text{iff } \mathbf{x}_i' \boldsymbol{\beta} > u_i \\ 0 & \text{if } \mathbf{x}_i' \boldsymbol{\beta} \leq v_i \text{ or } \mathbf{x}_i' \boldsymbol{\beta} \leq u_i \end{cases}$$

We achieved the separation between ‘participants’ and ‘non participants’ by means of the supplementary information on non interested respondents within the group of those with $WTP = 0$. This allows us to disentangle the estimation problem in a probit estimation for the interest process, and a tobit equation for positive WTP and standard corner solutions ($WTP = 0$ for the subset of interested people).²¹ Though, additional complications characterize the two-stage respondents’ decision process. First, it embeds a sequential structure, in which interest for the services considered in the CV question pre-exists

²⁰ See Joesch-Heidemann (2002) for a similar argument applied to child care.

²¹ When no information is available for separating interested and non interested zeros, a general specification for (8) is given by the “double hurdle model with dependence” (e.g. Jones, 1989).

the WTP statement. Namely, there is a common initial interest process followed by two separate statements (one for each of the programs considered), observed only in the sub-sample of the interested population. In addition, interest for LTC coverage, represented by equation (6), is to be related to two structural equations like (7), one for the private policy, and one for the public program. Hence, the nature of the relationship between interest and (stated) expenditures must be studied as two different cases. Likewise, the determinants of WTP within the sub-sample of interested respondents also have to be studied separately according to which of the two different institutional arrangements is considered.

Within this framework, three estimation issues must be addressed. The first one is the assessment of the independence between the interest and the WTP declaration process, since problems of selectivity bias could arise for the estimates run on the sub-sample of interested respondents. In order to check for that, we first approach the interest process as a selectivity problem by means of Heckman's two-step estimation method. By augmenting the WTP equation with a term (the inverse mills ratio (IMR)), the possible selectivity bias is treated as an omitted variable problem on the sub-sample, and the significance of the IMR can be used as an independence test, i.e. as a test for whether we can separately estimate a 'participation' equation, and two WTP equations for interested respondents.

The second estimation issue is censoring and arises when modelling the WTP equations, due to the presence of a large number of zeros due to standard corner solutions. This leads us carrying out two tobit regressions.

$$(9) \quad \begin{aligned} WTP_{i,PRIV}^* &= \mathbf{x}'_{i,PRIV} \boldsymbol{\beta}_{PRIV} + u_{iPRIV} \\ WTP_{i,PUB}^* &= \mathbf{x}'_{i,PUB} \boldsymbol{\beta}_{PUB} + u_{iPUB} \end{aligned}$$

The third problem relates to the likely correlation between the two WTP statements. As was said in the introduction, in this paper we are analysing a 'joint evaluation' CV study, a procedure which entails a likely correlation between the two stochastic components of the processes that determine WTP for the private and public program. From a theoretical viewpoint, reasons why the two WTPs can display high statistical correlation comes primarily from the fact that individual benefits are same in the two programs. To deal with the joint evaluation issues, several approaches could be considered. For example, Luchini *et al.* (2003) deal with a similar case by means of a SUR estimation, that has the main advantage of providing efficient estimates where a different set of regressors appears in the various WTP models,

although separate estimates are consistent (e.g. Greene, 2003, pp. 342-43). Here, in order to allow for the presence of correlation between the two WTP answers without neglecting the censoring issue, we apply a bivariate tobit model where the equations in (9) are simultaneously estimated by considering the following common error term structure:

$$(10) \quad u_{iPRIV}, u_{iPUB} \rightarrow N[0, \sigma_{PRIV}^2, \sigma_{PUB}^2, \rho].$$

Bivariate tobit explicitly accounts for common unobserved heterogeneity, therefore efficiency gains are expected in the presence of a statistically significant correlation parameter (ρ).

5. Results

Consistently with the modelling strategy previously described, we have estimated two models, one for private and one for public coverage. The first stage estimates are common to both models. In the second stage, WTPs (in logs) are regressed against the control variables listed in Table 2. All specifications also include two sets of dummies controlling for the respondent's municipality of residence and for the identity of the interviewer. This accounts for unobservable systematic differences in local conditions or in the way the interview was administered.

We first tested for the presence of selectivity bias by checking the significance of the IMR within a Heckman's two-step procedure. In none of the cases the coefficient for the IMR was significant. In view of that, the participation and expenditure decisions can be treated as independent and we finally estimated a bivariate tobit model on the subsample of interested individuals to check whether previous results were affected by allowing for correlation among the two WTPs.

The econometric results are presented in Table 3.²² The first part shows coefficients and *t*-statistics for the decision of whether or not to participate in the demand for LTC coverage estimated on the whole sample. Marginal effects are also included in order to quantify the impact of the regressors on the probability of being interested in extending coverage.²³

²² Observations which WTP exceeded sample average by more than four times the standard deviation were dropped in order to control for outliers. Due to missing information on family income, more 148 observations were dropped, leading to a total of 1257 interviews used for estimations.

²³ No marginal effects for the bivariate model are reported since the construction of a joint probability does not allow an unambiguous economic interpretation of the former. Consequently the discussion on the impact of the set of control variables is based on the separate specification, whereas a comparison between the two works as a robustness test for the extent to which correlation may influence the results..

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3 Overall, the results suggest that interest is mostly dictated by variables related to LTC conditions
4 rather than to demographic and economic factors. In particular, neither age nor income significantly
5 influence the probability of being interested.²⁴ Educational dummies display the expected increasing
6 pattern, although differences with respect to the non-educated class, chosen as a base group, are
7 significant only for those with a university degree.²⁵ Family composition and type of occupation are not
8 significant. Conversely, controls more directly related to LTC and health issues play an influential role.
9 For instance, self assessed poor health is associated with a significantly lower probability of being
10 interested. The result may seem contrary to expectations, since poor health status increases the expected
11 utility of insurance and possible justifications for it will be discussed more in depth when we analyse the
12 determinants of WTP.
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25 An important role is played by the variables that proxy the awareness of the consequences of
26 disability. Both respondents giving a negative evaluation of existing LTC services and having a disabled
27 person in the family are more interested in channelling additional resources into this area. The programs
28 proposed in the two CV questions seem to be perceived as instruments to improve the quality of existing
29 LTC services, especially by those citizens who currently consider them inadequate. In this perspective,
30 awareness of the LTC problems are expected to influence interest in coverage *per se* but not necessarily
31 the WTP for a predefined program, whose degree of coverage does not change with the contribution.
32 Consistently with this conjecture, the respondent's judgements on the quality of existing social care
33 services never proved to influence WTP.
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45 Finally, indicators broadly reflecting political views affect interest. These results confirm findings
46 already pointed out in the literature on demand for supplementary health insurance. In contexts with a
47 dominant public supplier of health care, political beliefs influence support towards additional welfare
48 expenditures and decisions over purchasing supplementary medical insurance (Propper 1993, Besley-
49 Hall-Preston, 1999). Here, political beliefs are expressed by a categorical variable for respondents'
50 opinions on the appropriate role of the public sector in LTC financing. The base case is represented by
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58 ²⁴ Interestingly, the insignificance of the income coefficient – which on the contrary will be a crucial determinant for
59 WTP- adds to the argument that interest is basically driven by a priori attitudes, whereas more stringent economic
60 motivations will be at the origin of differences in demand patterns between the private and public scheme.

²⁵ This result is in line with evidence provided by Hopkins and Kidd (1992) for the health insurance market, who extensively discuss the role of education in purchasing additional coverage against health risks.

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3 individuals who think that the State should provide free care to everybody independently of income,
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5 whilst the other categories single out respondents whose stance on this issue progressively moves from
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7 universal to selective supporting schemes. Interest probability is significantly higher for individuals who
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9 support public intervention which ensures free care only for the basic services to everybody, whilst it does
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11 not differ from the base case for respondents who agree with public intervention limited to means tested
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13 provision of basic services.
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INSERT TABLE 3 HERE

The estimates for the private and public WTP on the sub-sample of interested respondents are reported in the second and the third part of Table 3, where we include both the standard and the bivariate tobit models. In addition to marginal effects, “robust” standard errors were computed with the Huber-White “sandwich” estimator of variance to account for heteroscedasticity.²⁶

Differently from the interest equation, the income variable has a strong positive influence on WTP in both the private and public cases. Marginal effects indicate that private coverage is a luxury (income elasticity above 1) while the public program is a normal good. The result is consistent with the idea, illustrated in section 2, that WTP between private and public provision of a given service may differ because the latter is perceived as intrinsically more redistributive.

For the analysis of the income variable (and subsequently of health-related variables), useful indications can be derived also by a comparison with the literature which analyses the choice between formal and informal care by CV methods. The positive association between income and WTP (or WTA) identified in that case (Van den Berg *et al.* 2005b, Van den Berg *et al.* 2005c) is confirmed also in our context, which focuses on LTC financing rather than provision.²⁷ Consistently with the results of the “interest” process, poor health conditions -- measured either by self assessed health status or the presence

²⁶ The residuals from the separate tobit specifications estimated in the initial stages of this work failed homoscedasticity and normality tests. We have addressed these problems in a number of ways. We first made additional checks for outlier effects; then we estimated “structural” multiplicative heteroscedasticity models, after having detected a significant effect on the non constant variance of the regression by the continuous variables age and income. However, with this modelling the Pagan-Vella’s (1989) conditional moment test for normality showed a clear-cut worsening of the normality problem. Since point and interval estimates proved to be robust to the different modelling of heteroscedasticity, we chose to contain the normality problem. Therefore, we opted for the simple standard error correction with the Huber-White method.

²⁷ Note that, differently from the studies mentioned, in our survey income is measured at the household level and not imputed as zip-code average.

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3 of chronic conditions -- reduce WTP for LTC insurance. Yet, we would have expected a positive
4 association between WTP and poor health conditions, since the value of coverage should increase with
5 the risk of disability, in accordance with theoretical and empirical findings outlined by CV studies that
6 analyse both the provision (Van den Berg *et al.* 2005b) and financing (Costa Font-Rovira Forns, 2008)
7 side of LTC services. One possible explanation for our different evidence is that the (perceived)
8 protection already ensured to chronically ill patients under the current regime induces the (mistaken)
9 belief of being entitled to free LTC, in analogy with healthcare services covered by the National Health
10 Service, thus crowding-out the allocation of additional resources to LTC.
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21 In some cases, demographic indicators such as age and sex affect the size of the contribution, whilst
22 they had no role in determining interest. Again, differences between the private and the public program
23 can be observed, with age being statistically significant only in the former case, and sex only in the latter.
24 The age variable signals a propensity of the younger generations to go private, a result which can be
25 rationalised in different ways. One can think of a general attitude that sees young people less inclined to
26 think of the public sector as having a key role in providing welfare services.²⁸ An alternative explanation
27 is that young respondents may perceive the sustainability of a public program as being more uncertain
28 than older people do, given the longer horizon over which they are likely to need coverage and,
29 consequently, they are relatively more attracted by privately financed solutions.
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40 Educational dummies are statistically significant in both cases (although mostly at a 10% level) and
41 the coefficients are very similar to each other, suggesting that the only relevant difference is between
42 people with no education (base case) and the rest of the population. Working status never influences the
43 WTP, similarly to what was observed for the interest equation. On the contrary, holding a health
44 insurance policy has a different effect in the two models: it increases WTP for the private option, but not
45 for the public one. Therefore, the variable can be interpreted as an indicator of preference for privately
46 oriented solutions rather than as an indicator of a general propensity to cover health risks through ex-ante
47 coverage as opposed to out of pocket expenditures.
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²⁸ However, we expect that at least part of this generational effect, if present, is captured by the dummies reflecting political opinions.

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Finally, there is a statistically significant effect of the dummies reflecting the role attributed to the public sector in financing LTC services. The impact works in different directions for the public and the private case. In the former, no significant difference emerges between those who would like the public sector to make the entire range of services freely available to everybody (base case) and those supporting free provision only of basic services. Consistently with expectations, respondents who support free care only for those who cannot afford to pay, want to contribute significantly less with respect to the base case when coverage is provided by the public sector. Contrariwise, a significantly higher WTP with respect to the basis case emerges by considering private coverage.

The above findings are corroborated by the results from the bivariate tobit model. Also when correlation between the private and public WTP responses is controlled for (model 4 in Table 3), the coefficients discussed above confirm their magnitude and significance. Higher statistical significance is usually reached due to the efficiency gains in the estimation procedure.

More in general, the econometric analysis outlines that differences in WTP are not merely attributable to altruistic motivations that may induce sympathetic agents to raise their contributions when the proposed solution is public, as a consequence of caring externalities entering their objective function. The nature of the differences in the coefficients between public and private coverage suggests that the two services are perceived as intrinsically different. These results supports evidence from previous works such as Olsen et al.(2004), but they add further robustness to the analysis in that they are obtained after controlling for potential selection effects in the participation decision.

6. Conclusions

In this paper we have studied WTP for LTC coverage on the base of a survey carried out on a representative sample of the population of the Italian region Emilia Romagna. We aimed to shed light on aspects which have become crucial in the political agenda of many countries, related in particular to the support that programs for extending LTC coverage can receive from public opinion.

The descriptive results confirm that a substantial share of the population (around one third) is not willing to contribute to such programs. Conversely, the remaining part of the population seems ready to increase expenditures to an extent that could ensure a substantial increase in the level of coverage. Interestingly, the average WTP, despite different sample sizes (1257 vs 400), interview techniques (face-

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3 to-face vs. telephone), elicitation formats (open ended vs. close ended single bound) and fairly different
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5 social and institutional frameworks, is consistent with the result emerging from the study by Costa-Font
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7 and Rovira-Forns (2008), since their average 20.3 Euros monthly premium can be projected into an
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9 average yearly premium of 243.6 Euros.
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12 Our econometric analysis has focused on the determinants of WTP for the two schemes proposed in
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14 the survey, one organised through private policies and one publicly financed. The availability of auxiliary
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16 information made possible to split the sample of respondents between those who reject the proposal
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18 because they are not interested and the rest of the population. We assessed the potential selection induced
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20 by interest, and the independence results obtained enabled us to present separate estimations for the
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22 interest process, which refers to the whole sample, and for the amount of expenditures, which only applies
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24 to interested respondents. We show that the variables that influence the probability of being interested in
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26 the service differ substantially from those that determine the amount of the contribution. Interest is mainly
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28 influenced by indicators related to previous experience with LTC, whereas socio-economic variables are
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30 more influential on the decision of how much to spend in coverage. This difference has important
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32 implications. As for market behaviour, it indicates that some individuals do not “consume” because their
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34 utility maximization problem yields a zero corner solutions, but they are expected to respond to financial
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36 incentives, e.g. by choosing positive consumption levels when having different incomes or facing
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38 different prices. On the contrary, for those whose decision not to consume stems from aversion or
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40 disinterest, changes in financial subsidies, such as tax deductions on insurance premiums, would not
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42 modify expenditure allocations. From a public choice perspective, interested households with $WTP = 0$
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44 are implicitly asking for exemption from contribution, but are not opposing the program in itself, as it is
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46 for the non interested. As a consequence, a highly progressive contribution schedule - possibly including
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48 exemptions for individuals below some income thresholds- may gain the support of part of this group
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50 despite their null WTP.
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56 We have also assessed the difference in WTP arising from the adoption of a private and a community
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58 based financing scheme. From the descriptive statistics it emerges that, while the difference in average
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60 WTP is negligible, the number of zeros is substantially larger for the private solution. This suggests that

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3 the public nature of the program favours positive, but quantitatively limited, contributions, whereas
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5 private policies induce high WTPs in people particularly attracted by the service.
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8 The econometric analysis has focused then on the analysis of the determinants of WTP in the public
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10 and private case. Being the two programs equivalent in terms of reimbursement, differences in the sign
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12 and/or absolute values of the coefficients can be related either to the different redistributive implications
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14 of the two schemes, or to personal attitudes towards public provision of welfare services. Both aspects are
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16 to a good extent controlled for in the estimates. In particular, we have shown that the income variable
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18 does not influence the interest probability but plays a relevant (and different) role in the WTP equations.
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20 The estimated coefficients reveal a higher effect for the private scheme, which emerges as a luxury good,
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22 whereas the public solution is more clearly defined as a (weak) necessity. Within this framework, the
23
24 striking difference in income elasticity between private and public coverage can be attributed to the fact
25
26 that public programs (which is typically built on an income based contribution scheme) are perceived as
27
28 intrinsically more redistributive than private insurance. In high income groups this limits the rise in public
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30 WTP with respect to the private case because they expect to be adversely affected by redistribution.
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Appendix. The formulation of the WTP question and the follow-up on “zero WTPs”

Let us consider two programs that extend coverage against LTC risk with respect to the status quo, displaying the following features:

- Coverage relates to a disability condition that requires help *for several hours per day in activities of daily living* ...²⁹

(note for the interviewer: when required, explain that the program would provide coverage also for less and more severe conditions, although here, for ease of exposition, the focus is on this specific form of intervention).

- For this hypothetical condition, home and residential care can be considered equally appropriate from a medical point of view. The choice between the two is therefore driven by your preferences rather than by clinical reasons. Still, the two solutions entail different monetary costs and a different amount of informal care that must be provided by the family. In particular, it is estimated that, net of current support ensured by the public sector, monthly costs of care amount to 2.000.000 ITL (Euro 1.033) for home care; and to 3.000.000 ITL (Euro 1.550) for residential care.
- The program covers 75% of such expenditures (25% copayment rate). The cover also extends to the additional expenditures you would incur in case you opt for residential care.
- For each program, a positive financial contribution ensures coverage only to you and does not automatically extend it to other family members.
- Coverage can be provided either through a public program characterised by compulsory participation and financed out of an increase in personal income tax or through a private scheme financed on voluntary basis by means of insurance premiums.

Now, we would like to know your annual MAXIMUM WTP today for programs covering LTC risk of the kind described above. When answering, please consider the effective expenditure capacity by you and your family, the fact that you could receive informal care by relatives and friends, and your expected health conditions in the future

What is your MAXIMUM willingness to pay when the above program is provided through private insurance _____ ITL (_____ Euros)?

Now suppose that the same coverage program is being provided by the public sector, financed out of compulsory taxation (an increase of your income tax). The coverage is the same for all the population.

What is your MAXIMUM willingness to pay in this case for public coverage _____ ITL (_____ Euros)?

.....

Follow up:

You stated that your WTP would be zero both in the case of private insurance provision and in the case of public coverage. Which of the following two alternatives better explains your own answer? (*only one*)

1. *I am not interested in this kind of services*
2. *I would be interested, but I know that I could not afford the actual cost of such services*

²⁹ Disability in activities for daily living (ADLs) is defined according to the standards set by Italian National Institute of Statistics and it includes conditions such that the elderly person is unable or has permanent difficulties in performing autonomously standard tasks of everyday life even if supported by medical devices (e.g. prosthesis, glasses etc...). The list of ADLs includes tasks such as bathing, eating, clothing, walking, climbing stairs, sitting and lying down etc...

Table 1: *Willingness to pay for private and public coverage*

| | Totals | | Positive WTP | | Interested obs. | | Zero WTP | |
|-------------------|---------------|---|---------------------|---|------------------------|----------------------|-----------------|------------|
| | Obs. | Mean WTP in Euros (<i>std. dev.</i>) | Obs. | Mean WTP in Euros (<i>std. dev.</i>) | Obs. | Mean WTP in Euros | Obs. | Interested |
| PRIVATE POLICY | 1257 | 290.77 (418.12) | 724 | 504.10 (442.98) | 1006 | 362.79 | 533 | 282 |
| PUBLIC PROGRAM | 1257 | 282.67 (371.64) | 849 | 418.01 (401.28) | 1006 | 352.77 | 408 | 157 |

Table 2: *Definition and descriptive statistics of the variables used in the regression analysis*

| Variable | Definition | Average (share of 1) | Std Dev |
|---|---|-------------------------|---------|
| Log of Income | Log of family income (PR*+ PR spouse, if present) | 7.46 | 0.48 |
| Age | Age of PR in years | 48.99 | 12.74 |
| Male | = 1 if PR is a male, =0 if PR is a female | (0.55) | 0.50 |
| Spouse | = 1 if PR is married, 0 otherwise | (0.72) | 0.45 |
| University degree | = 1 if PR has a university degree, 0 otherwise | (0.14) | 0.35 |
| Secondary school | = 1 if PR has a secondary school qualification, 0 otherwise | (0.41) | 0.49 |
| Compulsory education | = 1 if PR has a compulsory education certificate, 0 otherwise | (0.43) | 0.50 |
| White Collar | = 1 if PR is a white collar employee, 0 otherwise | (0.25) | 0.43 |
| Blue Collar | = 1 if PR is a blue collar employee, 0 otherwise | (0.13) | 0.34 |
| Other | = 1 if PR is neither employed nor retired, 0 otherwise | (0.02) | 0.15 |
| Retired | = 1 if PR is retired, 0 otherwise | (0.27) | 0.44 |
| Not Working | = 1 if PR is not working, 0 otherwise | (0.12) | 0.33 |
| Not good health during last year | = 1 if PR self assessed health is rated very poor or poor, 0 otherwise | (0.23) | 0.42 |
| Chronic disease | = 1 if PR suffers from one or more chronic diseases, 0 otherwise | (0.20) | 0.40 |
| Negative opinion of existing LTC services | = 1 if PR declared existing LTC services as unsatisfactory | (0.54) | 0.50 |
| No opinion on existing LTC services | = 1 if PR did not declare any opinion of existing LTC services, 0 otherwise | (0.23) | 0.42 |
| Private health insurance | = 1 if PR holds a supplementary health insurance, 0 otherwise | (0.20) | 0.40 |
| State should pay only basic services to all | = 1 if PR thinks that the State should pay basic LTC to everybody, 0 otherwise | (0.47) | 0.50 |
| State should pay only to those who can't afford | = 1 if PR thinks that the State should pay basic LTC services only to the poor and other citizens should provide by themselves, 0 otherwise | (0.31) | 0.46 |
| Person with LTC problem in the family | = 1 if there is a disabled person in the family, 0 otherwise | (0.24) | 0.43 |

* PR= person responding to the survey

Table 3: Summary of the econometric results

| | (1) Interest | | (2) WTP Private Tobit with robust SE | | (3) WTP Public Tobit with robust SE | | (4) Bivariate Tobit Private Public | |
|---|---------------------|---------------------|---|--------------------------|--|--------------------------|---------------------------------------|------------------------|
| | Coeff. (std err) | Marg Eff (dy/dx) | Coeff. (std err) | Marg Eff (dy/dx) | Coeff. (std err) | Marg Eff (dy/dx) | Coeff. (std err) | Coeff. (std err) |
| Age | -0.002 (0.006) | 0.000 | -.03** (0.012) | -0.025 | 0.011 (0.008) | 0.011 | -0.04** (0.014) | 0.002 (0.009) |
| Male | 0.02 (0.112) | 0.005 | 0.17 (0.22) | 0.153 | 0.46*** (0.167) | 0.454 | 0.36 (0.27) | 0.52*** (0.181) |
| University degree | .848** (0.401) | 0.137 | 1.32 (1.14) | 1.205 | 1.44* (0.79) | 1.418 | 1.19 (0.94) | 1.46* (0.74) |
| Secondary school | 0.52 (0.37) | 0.113 | 1.47 (1.13) | 1.312 | 1.38* (0.78) | 1.350 | 1.13 (0.94) | 1.35* (0.70) |
| Compulsory education | 0.404 (0.36) | 0.090 | 1.32 (1.11) | 1.179 | 1.37* (0.76) | 1.343 | 1.11 (0.88) | 1.35* (0.67) |
| Log of Income | -0.156 (0.12) | -0.036 | 1.35*** (0.25) | 1.199 | 0.90*** (0.19) | 0.879 | 1.44** (0.29) | 0.93*** (0.19) |
| Blue Collar | -0.163 (0.18) | -0.040 | -0.47 (0.35) | -0.418 | -0.3 (0.26) | -0.296 | -0.43 (0.47) | -0.35 (0.32) |
| White Collar | -0.115 (0.16) | -0.027 | -0.41 (0.29) | -0.361 | 0.09 (0.20) | 0.089 | -0.38 (0.29) | 0.07 (0.29) |
| Other | -0.025 (0.37) | 0.006 | -0.29 (0.77) | -0.253 | 0.21 (0.60) | 0.206 | -0.28 (0.93) | 0.20 (0.60) |
| Retired | -.306* (0.18) | -0.075 | -0.30 (0.40) | -0.261 | -0.10 (0.27) | -0.097 | -0.29 (0.43) | -0.11 (0.31) |
| Not Working | -0.073 (0.20) | -0.017 | -0.63 (0.39) | -0.550 | -0.42 (0.31) | -0.413 | -0.75 (0.49) | -0.50 (0.31) |
| Not good health | -.241** (0.13) | -0.059 | -0.23 (0.29) | -0.200 | -0.38* (0.22) | -0.374 | -0.13 (0.31) | -0.38* (0.22) |
| Chronic disease | -0.149 (0.13) | -0.036 | -0.63** (0.32) | -0.546 | -.61*** (0.23) | -0.597 | -0.75** (0.31) | -0.56** (0.22) |
| Subscriber of a private health insurance | .313** (0.15) | 0.064 | 0.67*** (0.23) | 0.602 | -0.08 (0.18) | -0.075 | 0.73*** (0.36) | -0.07 (0.24) |
| State should pay basic LTC services to all | .374*** (0.13) | 0.084 | 0.93*** (0.31) | 0.828 | -0.02 (0.23) | -0.020 | 1.01*** (0.34) | -0.06 (0.23) |
| State should pay basic LTC services only to the poor | 0.219 (0.14) | 0.048 | 0.65* (0.34) | 0.581 | -0.42* (0.26) | -0.410 | 0.82* (0.35) | -0.44* (0.23) |
| Negative opinion of existing LTC services | .359*** (0.14) | 0.083 | | | | | | |
| Presence of a disable in the family | .232* (0.13) | 0.050 | | | | | | |
| Constant | 3.76** (1.60) | | -5.57 (2.33) | | -2.93* (1.70) | | -5.52 (4.14) | -2.72 (3.60) |
| Observations | | 1257 | | 1006 (724 uncensored) | | 1006 (849 uncensored) | | 1006 |
| <i>Diagnostic statistics and tests</i> | | | Log pseudo likelihood | -2086 | Log pseudo likelihood | -2082 | $\sigma_1=3.23$ (0.18) | $\sigma_2=2.29$ (0.08) |
| | | | Wald chi ² | 645.03 | Wald chi ² | 1321.92 | $\rho(1,2)=0.44$ (0.03) | |

*** 1% significance level

** 5% significance level

* 10% significance level

Material not intended for publication
Heckman selection Model –Two-step estimates

| | (1) Interest (Probit) | | (2a) WTP Private | | (2b) WTP Public | |
|--|------------------------------|--------|------------------------------|--------------|------------------------------|--------------|
| | Coeff. (<i>std err</i>) | t-stat | Coeff. (<i>std err</i>) | z-stat | Coeff. (<i>std err</i>) | z-stat |
| Age | -.002 (.006) | -0.28 | -.019** (.009) | -2.09 | .011 (.008) | 1.39 |
| Male | .020 (.112) | 0.18 | .174 (.166) | 1.05 | .416*** (.141) | 2.94 |
| University degree | .848** (.401) | 2.11 | 0.867 (0.681) | 1.27 | 1.117* (.579) | 1.93 |
| Secondary school | .520 (.372) | 1.40 | 0.975 (0.642) | 1.52 | 1.061* (.545) | 1.95 |
| Compulsory education | .404 (.359) | 1.13 | 0.884 (0.628) | 1.41 | 1.044* (.533) | 1.96 |
| Log of Income | -.156 (.122) | -1.28 | 0.982*** (.179) | 5.48 | .763*** (.152) | 5.02 |
| Blue Collar | -.163 (.179) | -0.91 | -.342 (.276) | -1.24 | -.241 (.234) | -1.03 |
| White Collar | -.115 (.163) | -0.71 | -.249 (.232) | -1.07 | .093 (.198) | 0.47 |
| Other | -.025 (.372) | -0.07 | -.271 (.551) | -0.49 | .128 (.468) | 0.27 |
| Retired | -.306* (.181) | -1.69 | -.251 (.286) | -0.88 | -.133 (.242) | -0.55 |
| Not Working | -.073 (.202) | -0.36 | -.426 (.289) | -1.47 | -.317 (.245) | -1.29 |
| Not good health | -.241** (.126) | -1.91 | -.161 (.218) | -0.74 | -.314* (.185) | -1.69 |
| Chronic disease | -.149 (.134) | -1.11 | -.444** (.216) | -2.06 | -.499*** (.183) | -2.72 |
| Subscriber of a private health insurance | .313** (.147) | 2.13 | .488** (.205) | 2.37 | -.054 (.174) | -0.31 |
| State should pay basic LTC services to all | .374*** (.131) | 2.86 | .677*** (.232) | 2.92 | -.011 | -0.06 |
| State should pay basic LTC services only to the poor | .219 (.139) | 1.57 | .479* (.236) | 2.03 | -.341* (.200) | -1.70 |
| Negative opinion of existing LTC services | .359*** (.139) | 2.58 | -.225 (.220) | -1.02 | -.225 (.187) | -1.20 |
| Presence of a disable in the family | .232* (.126) | 1.84 | .058 (.188) | 0.31 | -.025 (.161) | -0.15 |
| Constant | 3.756** (1.596) | 2.35 | 2.167 (3.617) | 0.60 | -3.580* (3.073) | -1.17 |
| Observations | 1257 | | 1257 (1006 uncensored) | | 1257 (1006 uncensored) | |
| <i>Diagnostic statistics and tests</i> | | | Wald chi ² | 2716.14 | Wald chi ² | 1321.92 |
| IMR – Lambda | | | -0.145 | -0.14 | -0.034 | -0.04 |
| <i>Standard Error (IMR)</i> | | | (1.02) | | (0.872) | |

The table above presents the results of a two-step Heckman estimation for the private and public solution. It shows that the IMR is not significant and this justifies the choice of separate estimations for the two hurdles (probit + tobit). It also shows that *opinion of existing LTC services* and the *presence of a disable in the family* are significant only in the first stage equation (interest) but not in the second stage ones. The results on the IMR are only slightly modified when the two abovementioned variables are excluded from the second stage. In particular the IMR (*St. Err.*) becomes -.077 (.821) for the private solution and 0.179 (.698) for the public solution. In neither case the IMR turns out to be significant.