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“Institutionalization Aversion” and the Willingness to Pay for Home Health Care

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Abstract

We examine the presence of a systematic preference for independent living at old age which we refer as "institutionalization aversion" (IA). Given that IA is not observable from revealed preferences, we draw on a survey experiment to elicit individuals' willingness to pay (WTP) to avoid institutionalization (e.g., in a nursing home), using a double-bounded referendum WTP format. Our results suggest robust evidence of IA and reveal a willingness to pay of up to 16% of respondent's (individuals over fifty-five years of age) average income. We find that estimates of the willingness to pay to avoid institutionalization (or €292 at the time of the study) exceed the amount respondents are willing to pay for home health care at old age in the event of a mild impairment (€222). WTP estimates vary with income, age and especially, respondents' housing conditions. Finally, we test the sensitivity of our estimates to anchoring effects and 'yea-saying' biases.

Keywords: institutionalisation aversion, state-dependent preferences, home health care, willingness to pay, caregiving, referendum format.

JEL: R21, I18.

1. INTRODUCTION

The development of housing alternatives to institutional care for old age individuals (such as nursing home and assisted living) is not solely driven by its monetary costs. Important non-monetary considerations underpin such housing choices. Some evidence suggests a preference for 'aging in place' (McGarry and Shoeni, 2000), especially in the event of moderate or mild impairment. Part of the such a preference rests in the lower probability of returning home after entry into institutional care (Chaplin, 2009)[1], as well as a behavioural primacy for 'known' environments (Kurnianingsih *et al*, 2015)[2]. However, in addition to future environmental and caregiving arrangements, we ascertain that housing choices at old age are determined by an additional behavioural explanation, namely: a generalized preference for independent/non-institutionalised living. A preference for independent living in turn motivates a higher demand of home health care (Engelhard and Greenhalgh-Stanley, 2010), and can ameliorate the probability of nursing home entry (Charles and Sevak, 2005)[3].

It is far from trivial how best to empirically estimate people's preference for independent living. Revealed preferences over housing choices do not typically deliver such evidence, unless a specific field experiment is purposefully defined. Evidence

[1] Community transitions from nursing home to the community decline with time in nursing home, especially among male and unmarried, and 90% of such transition takes place in the first 90 days (Chaplin, 2009). Furthermore, as many as 12% of elderly people in the US is a low need and could transition back home but do not (Borscia, 2010).

[2] Consistently, older property owners (which relative to renters, less uncertainty on future housing arrangements), exhibit higher housing satisfaction (Costa-Font, 2013).

[3] A similar logic is used by Pauly (1990) who argue that individuals preferring to receive care from their children will decline to purchase insurance (and by doing so they increase the likelihood of them being cared for by their children but it could well simply reflect a behavioural reaction to avoid entering a nursing home).

from studies studying the subjective wellbeing of different housing alternatives at old age is fairly mixed and inconclusive. Donnenwerth and Petersen (1992) report a negative effect of institutionalization on subjective well-being. In contrast, Böckerman et al. (2011) find a higher subjective well-being among institutionalized individuals (in Finland), and Godoy-Izquierdo et al., (2013) uncover no significant difference between institutionalized and non-institutionalised individuals in Spain (Godoy-Izquierdo et al., 2013). Nonetheless, those studies do not capture the potential constraints affecting peoples housing choices, and instead, they reveal peoples experienced utility of different housing alternatives (e.g., living in a nursing home). Hence, estimates should rely on alternative methodologies.

Choice experiments, and more specifically on contingent valuation techniques that estimate individual's willingness to pay, stands out as an alternative methodology to elicit the value of independent living at old age. WTP estimates can be elicited from a survey experiment following a referendum format that mimics a market mechanism ('take it or leave it'). That is, assuming that an individual's utility $u(y, I)$ increases in wealth (y) and decreases with institutionalisation (I), and that I is discrete so that it takes the value of 1 (if institutionalised) or 0 (otherwise), individuals maximum willingness to pay can be represented as the amount rendering the individual indifferent between being institutionalised or not, that is $u(y - WTP, 0) = u(y, 1)$. This is the methodology used in this study.

This paper examines the willingness to pay (WTP) to avoid institutionalization at old age (in the event of mild dependency), which we argue measures the individual specific value of 'institutionalisation aversion' (IA). Given that, as mentioned, IA is not just reflective of a preference to receive care at home, it cannot be inferred form housing

or caregiving choices, a choice experiment appears particularly adequate. Furthermore, it is likely that the magnitude of IA differs among all individuals.

In our experiment, WTP estimates are elicited from both a single (SBDC) and double-bounded discrete choice (DBDC) formats (Haneman *et al.*, 1991), and refer from a representative sample of Spanish urban population older over fifty-five. Although a double-bounded referendum format is recommended to mimic a market decision, it is not without its downsides, which include the presence of both anchoring (Herriges and Shogren, 1996), and 'yea-saying' effects, or a tendency of an individual to exhibit a lexicographic response to different bids (Holmes and Kraner, 1995). Alternative designs (such as payment cards) were deemed to be less realistic, and hence likely to bias the results. However, we devote a section to examine the presence of anchoring and other potential biases.

Secondly, we estimate the WTP for home health care (in the event of mild dependency), and compare the estimates with the WTP to avoid institutionalization. The intuition behind our reasoning is that of the existence of a utility gain from being at home at old age[4], which is dependent on an expectation of receiving care at home and in turn it is reflective of a more general preference for independent living[5]. Although we cannot test all of those connections, we attempt to contribute to shedding some light on estimating the value of independent living.

Finally, we examine the empirical determinants of WTP estimates, which include in addition to the effect of income a number of context specific controls that are

[4] This gain in part reflecting an individual preference for independent living which in other contexts is defined as a preference for an autonomous life (Frey and Stutzer, 2004), and here, would mainly refer to a preference for 'more independence' given the individual circumstances.

[5] Note that individual preferences may be state dependent. This is particularly the case when valuing care at old age because preferences may vary after health impairment. IA is hypothesized to vary systematically in different ways depending on the severity of an individual's health impairment because the degree of severity reduces the feasibly of home care. Thus, individuals would be expected to trade off their IA with the potential benefits from specialized nursing home care.

specific to the country where our survey experiment was conducted, namely in Spain. Evidence from Spain is important because it exhibits a higher than average preference for family caregiving and, at the time of the study, it offered limited public subsidization of long-term care services and supports (LTCSS)[6]. Furthermore, our sample refers to individuals over fifty-five years of age who have not been institutionalized[7]. Although our WTP estimates reveal ex-ante valuations before individuals face the choice of moving into institutional care, we can identify a number of potential determinants of institutionalization such as income, age, health status, housing quality and caregiving needs though there are important unobservable that are likely to drive individual preferences. In addition, we control for regional-specific effects which in turn controls for some potential contextual effects[8].

The remainder of this paper is organized as follows. Section 3 describes the data employed and the empirical specifications. Section 4 provides the results, and Section 5 concludes.

2. THEORETICAL BACKGROUND

This section offers a simple theoretical background on the question of individuals' willingness to pay to avoid institutionalization (or institutionalization aversion). That is, an individuals' IA can be elicited from the underlying maximum

[6] Prices of home care services vary by region and can range between 1300-1700€/month. Similarly, and home care costs vary between 10 and 14€/hour and individuals typically receive an average of 18 hours a month.

[7] The reasons for such an age cut off are to study potential behavioural variation across age groups that are considering old age needs, but that is not on the verge of immediate admission to an institution. For comparative purposes, we estimate individuals' WTP for home health care in the event of mild care impairment.

[8] In Spain, after 2007, a new long-term care bill expanded public provision of home health care for those in need and introduced a caregiving allowance. However, the data we employ here refer to 2006 data, before the new regulation was incepted.

amount an individual is willing to pay to avoid being institutionalized conditioned on other things being equal.

Let us define the state-dependent utility function $u^{dh}(.)$ as the utility when dependent outside an institution, and $u^{di}(.)$ as the utility when dependent in an institution. Let us assume that a shock can impair (mildly, or not severely) an individual to the extent that it could require institutionalisation is exogenous and measured by q (which refers to the probability of being impaired such that one can live at independently) and $(1-q)$ refers to the probability that an individual requires nursing home care. Finally, let's assume *w* to refer to individual's cumulative income. Then one can compute the expected utility of the two states of the world, and identify a value *d* (the maximum cumulative willingness to pay) to that will make individuals indifferent between living independently and in an institution as follows:

$$qu^{dh}(w) + (1-q)u^{di}(w) = u^{dh}(w-d) \qquad (1)$$

Notice, that d or the WTP to avoid institutionalisation is a payment is forgone (income sacrifice) which in our experiment we elicit in the form of a monthly amount (but that could be capitalized as a lump sum). That is, the cumulative amount the individual is indifferent between living in a nursing home but keep its income (*w*) if impaired with a probability q[9], and living independently with a probability *1-q* and a wealth of *w-d*. Hence, *d* can be labelled as the WTP to avoid institutionalization. By using first-order Taylor development around *w*, we have:

[9] For simplicity, we assume that q is exogenous and that individual's willingness to pay entails the price individuals are willing to pay to forgo the effects of q. One could assume q to vary by ill-health an endogenize q without a significant change in the equilibrium

$$d \cong (1-q)\frac{(u^{dh}(w)-u^{di}(w)}{\partial u^{dh}(w)/\partial w} \qquad (2)$$

That is, the WTP to avoid institutionalization (d) is positive, if $u^{dh}(w) - u^{di}(w) > 0$ which indicates a disutility from being institutionalized in the event of a moderate health impairment, assuming the marginal utility of income is positive. Furthermore, (2) reveals that the *WTP to avoid institutionalization (d) decreases with q and increases with wealth (w).* The empirical analysis reported below will attempt to estimate the utility gain of living to live independently at old age by the income sacrifice (d) individuals are willing to forgo to avoid institutionalization. Finally, we will examine the determinants of such WTP, and more specifically, the effects of income, housing quality, and caregiving to adjust for alternative explanations for individuals WTP estimates.

3. EMPIRICAL STRATEGY

Given that the private good nature of old age housing (and limited public subsidization) at the time of this study, we expect the WTP (d) in Equation (2) to reflect the value of independent living. Similarly, for comparative purposes, we aim to estimate the WTP for home health care, as it provides us with a magnitude with which to compare the value of IA. We model IA and estimate its magnitude by drawing upon a referendum WTP format. That is, the WTP to avoid institutionalization can be specified at the individual level as:

$$WTP_i = z_i\beta + \varepsilon_i \qquad (3)$$

where the dependent variable is the WTP_{ij} of the individual i, which varies with a set of characteristics z_i, which represents the vector of observed variables influencing

individual WTP in addition to a random term ε_i. One of the observed characteristics refers to the bid in a referendum format, and hence the coefficient of such bid allows us to estimate the WTP given a specific (average) value of the remaining covariates. Nonetheless, in estimating the WTP magnitude, two different approaches are followed: a single format dichotomous choice (SBDC) and a double (multiple) formats (DBDC).

2.1. Single-bounded dichotomous choice

An individual's *(i*) response to a contingent valuation question takes the form of a dichotomous choice – agreement or refusal to pay – for a given bid (t_i). Given that t_i varies randomly across individuals, a contingent demand curve can be estimated using SBDC as an individual will accept a bid $y_i = 1$ when $WTP_i > t_i$ so that:

$$\Pr(y_i = 1|z_i) = z_i\beta + \varepsilon_i > t_i = \Pr(\varepsilon_i > t_i - z_i\beta) \quad (4)$$

Assuming ε_i follows a normal distribution $N(0,\sigma^2)$ then it is possible to write Equation (4) as:

$$\Pr(y_i = 1|z_i) = \Phi(z_i\beta/\sigma - t_i/\sigma) \quad (5)$$

where $\Phi()$ is the standard cumulative normal distribution. If $\hat{\delta} = -1/\hat{\sigma}$ and $\hat{\eta} = \hat{\beta}/\hat{\sigma}$ then $E(WTP|\tilde{z},\beta) = = \tilde{z}'\left[-\hat{\eta}/\hat{\delta}\right]$, where $\tilde{z}$ is the vector of the average value of the characteristics of interest. The WTP becomes:

$$\hat{\mu} = \frac{-(\hat{\alpha} + \overline{X}\hat{\beta})}{\beta_0} \tag{6}$$

Where β_0 captures the coefficient on the bid amount.

2.2. Double-bounded dichotomous choice

Given that a dichotomous response offers limited precision in computing the average WTP, particularly in a small-scale sample (as ours), it is possible to estimate the magnitude for equation (2) by drawing on additional second dichotomous question to obtain additional information to improve the efficiency of the estimation, or double-bounded dichotomous choice (DBDC) (Hanemamn *et al.*, 1991). Similar strategies have been used in several previous studies (Clark, 2000; Liu *et al.*, 2000). That is, if the individual accepts the first bid, then a second question asks for the WTP for a higher bid. Similarly, if the respondents reject the first bid, the second question asks for the WTP for a lower amount. This implies that each individual *i* is asked two questions *j=1,2* which we identify in the superscript, and therefore the bid offered (t_i^j) will now produce two dichotomous responses t_i^1 and t_i^2. Thus,

$$\begin{aligned} &\Pr(y_i^1 = 1, y_i^2 = 1 | z_i) = \Pr(t^1 \le z_i\beta + \varepsilon_i^1, z_i\beta + \varepsilon_i^2 > t^2) = \Phi(z_i\beta/\sigma - t^1/\sigma) \\ &- \Phi(z_i\beta/\sigma - t^2/\sigma) \end{aligned} \tag{7}$$

whereas before $\Phi()$ is the joint bivariate normal distribution BVN (0,0,1,1, ρ) (7) can be expanded to incorporate all response combinations and can be estimated using a bivariate probit model where captures the correlation of the error terms of the two choice estimates (see Cameron and Quiggin, 1994 for further reference). Finally, upon acceptance or rejection, a final open-ended question was formulated. As is conventional

in this type of exercises, the survey contained an extra follow-up question whereby individuals could state the reasons for their specific response. In this way, it was possible to identify those who supplied a protest response and produce robustness estimates accordingly.

2.3. Choice characteristics

In addition to the experiment's bid, we consider a set of characteristics controlling for the individual's health and disability, housing characteristics, income, proxies for housing quality and family composition. Table A in the appendix provides a list of the set of independent variables considered and the expected effect. Among the different variables considered we include household income and proxies of housing quantity given that monetary equivalent measures of value are expected to vary with people's income and wealth. Similarly, given that caregiving can be informally provided within the household we condition our estimates on measures of family composition, and specifically the presence of children in the family. Furthermore, we are able to observe whether individuals co-reside with their spouse. Finally, we include a number of controls for housing quality which can affect WTP to be institutionalized such as housing satisfaction, the square meters of the dwelling and an attitudinal covariate capturing whether the individual willingness to change dwelling.

2.4. Anchoring effects

Given that previous research has found that a double-bounded WTP can produce inconsistencies between first and second responses, leading to a conservative bias in estimating WTP values (Banzhaf *et al.*, 2004; Watson and Ryan (2007), we examine further the presence of anchoring effects between the first and second bid. More

specifically, we regress the second WTP choice (bound) against the first one and the bid in the first bound to produce consistent estimates between the first and second bid as follows:

$$WTP_i^2 = (1-\gamma)\mathrm{WTP}_i^1 + \gamma t^1 \qquad (8)$$

if $\gamma = 0$ it would be suggestive of no bias. Estimates of γ that differ from zero would be suggestive of anchoring or 'yea-saying' effects. Anchoring effects result when the probability of accepting the second bind decreases with the acceptance of the first bid. Alternatively, if the probability of accepting the second bid if found to increase with the acceptance of the first bid, it would be suggestive of 'yea-saying' behavior. The parameters are estimated using a random effects probit model.

3. DATA AND METHODS

3.1 The data

The data employed in this study draws from an experimental survey developed after being piloted and pre-tested to identify potential inconsistencies (see for instance Johnston *et al*, 2016 for standard recommendations). The experiment was divided into two sections. The first section referred to general preferences for long-term care services and attitudes towards housing at old age. Then a second section conducted a contingent valuation exercise to elicit the individuals WTP to avoid institutionalization as well as their WTP for home health care in the event of a mild impairment. Most participants had limited direct experience in receiving care at the time of the survey. As

mentioned, the WTP design simulates a referendum (or market) choice scenario suitable to elicit preferences for privately purchased goods such as care for old age individuals. Referendum formats include either single- or multiple-bounded offers, and are deemed adequate to elicit preferences when revealed preferences are not directly observable from market transactions (e.g., as it's the case of institutionalisation aversion), but when a market environment is particularly suitable to the decision context (e.g., individuals are typically not used to pay for care), and hence elicitation mechanism is incentive compatible. Otherwise, one of the common problems with such a technique is the presence of hypothetical bias (values might not reflect those in an actual choice).

The original experiment involved 300 participants above 55 years of age who answered all WTP questions and is representative of Spanish cities with a population of over 30,000 inhabitants. The data was retrieved during 2004 but it was not made available for research and validation until a few years later in 2008. Interviewers were specifically trained for the type of questionnaire designed. Respondents were all over 55 years of age, and the survey responses were computerized and as expected in WTP studies, refer to consequential value questions that change a status quo (e.g., by reducing the risk of institutionalization in the event of a mild impairment). Although many WTP studies in the literature exhibit some level of non-response, our non-response rate in the WTP exercise was not a significant concern given that when an individual was not available, it would be randomly replaced. The questionnaire measures a number of covariates including household composition, demographics, household income, health status a number of questions on housing quality and characteristics following recommendations (e.g., Johnston et al, 2016). The

questionnaire was designed to warm up respondents with general attitudes to family and caregiving which allowed respondents to focus on the study context.

Old age individuals (those over 65 years of age) in Spain make up 17% of the total population and about 33% of the old age over 80 years of age reveal two or more ADLs. At the time of the study, 15.5% were receiving institutional care, and 60% of these were in privately funded nursing homes (IMSERSO, 2008). Caregiving subsidies were provided by local authorities on the basis of some form of means/needs test by using a regionally heterogeneous scale based on income and wealth (mainly housing assets), and objective personal assessments of individual needs. Furthermore, current income of elderly dependents such as respondents to our survey experiment exceeds the country average (IMSERSO, 2008).

Our survey experiment includes a section on attitude questions. Attitudes indicate that 49.8% of respondents prefer aging in their own place (having direct access to health care) in the event need; this percentage drops (increases) to 45% in the event of severe dependency. Similarly, when individuals were asked where they would want to live if they had some form of mild dependency; 96% answered at their own place, consistently with previous research documenting a preference for "aging in place" in Spain (Costa-Font *et al*, 2009). However, such percentage is lower (51%) under severe dependency. In such a scenario, 34% of respondents prefer to live in a nursing home. Other forms of housing at old age appear to such as adaptable housing are less common (less than 5% of the population).

3.2 Methods

To better describe the survey experiment, we describe below the exact questions used to elicit an individual's WTP to both avoid institutionalization and for home health care. The latter is particularly important for comparative purposes to estimate whether the demand for home health care captures the entire preference for not-being institutionalized. As described, we use both a single and a double bound referendum format, alongside a follow-up question as described below (assuming the costs to the individual remain unaltered by the institutionalization status):

a) WTP to avoid institutionalization (IA):

"In the event of suffering some form of mild impairment, would you be willing to pay ## (e.g., €60) monthly to avoid entering a nursing home if receiving equivalent care without being institutionalized (without an additional cost of care to you)? (* bids may be €60, €120, €300, or €600, and follow-up questions range from €30 to €1200)"*

b) WTP for home health care:

"In the event of suffering some form of mild impairment, would you be willing to pay ## (e.g., €60) monthly to receive help with your daily activities (e.g., bathing, cleaning, shopping, toileting, etc) at home.? (* bids may be €60, €120, €300, or €600, and follow-up questions range from €30 to €1200)"*

To gain further insights into the meaningfulness of the estimates, we included an auxiliary question requesting how much each respondent was willing to pay as an open-ended question. When the answer to the follow-up question was still nil, then the respondent was asked to state the reasons for not being willing to pay anything.

We estimate (1) using both a DBDC and SBDC. Our regression estimates include in a first instance a basic set of controls for demographics, income, household size alongside health-related needs, and after, they are expanded to include a larger number of controls for housing quality. One of the pitfalls of our survey design is that we cannot identify if the spouse of the respondent is institutionalized too. This is a limitation insofar as for those respondents, their WTP estimates are also affected institutionalization or disability. However, such an omission, if anything would bias downwards our individuals IA estimates. Furthermore, the bias is attenuated by the fact that the average respondent in our sample would not be at an age range individuals are typically institutionalized unless it refers to their spouse. Another concern is that a handful of respondents only report a measure of WTP for one of such WTP questions and not the others. Some (small) difference might emerge between samples sizes across them. Nonetheless, we further formally test whether non-respondents to some of the questions differ in any different in observed covariates to respondents, and we did not found evidence of a significant difference at 5% level.

4. RESULTS

We first report the summary statistics of the survey experiment as an additional form of quality assurance. Given its significance, we first examine the proportion of non-respondents as well as those unwilling to pay to avoid institutionalization alongside their reasons. On average, we find that only 30% would not be prepared to pay anything to avoid institutionalization, and conversely, at the opposite end, 7% would be prepared to pay up to €1200 monthly. Out of those not being prepared to pay anything, 21% would genuinely not want to pay anything whilst 38% stated that they could not afford it, and the remaining 38% provided a number of responses that including that

their children would take care of them, their children would move in with them (hence institutionalisation would be very unlikely), or it was too early for them to think about it, either suggestive of some level of risk denial, or a protest response. Thus, 70% of the population exhibited some degree of IA which is consistent with the hypothesis of the paper, namely that IA is not equally perceived by everyone. Next, we examine results of the WTP exercise.

Table 1 shows the descriptive statistics containing both responses to first and second bounds of the WTP contingent questions for both avoiding institutionalization as well as WTP estimates for home health care in the event of moderate health impairment. Consistently with DBDC experiment rationale, we find that the acceptance rates of second bids are lower than first bids for both questions.

[Insert Table 1 about here]

A significant aspect to check when using contingent valuation data is whether individuals should be sensitive to the bid amount. This is specifically important to validate whether IA is indeed a generalized feature, and how sensitive it is to potential trade-offs with income. More generally, if living independently is indeed a valued good dimension in itself, WTP estimates should be higher for those individuals who value independence more (conditioned on income). As expected, our estimates are suggestive of a declining WTP pattern for higher bids (prices). Table 2 summarises the responses of first and second bids for both WTP to avoid institutionalization (IA) and home health care

A priori expectations that probability bid acceptance would fall as the bid increased were confirmed for all bids. Indeed, for the first bound responses, we observed a monotonic decline in the number of those accepting the offered bid (which differed across individuals). As expected, changes in the bids close to the average WTP were small. In contrast, when the bids were far from the average WTP (e.g., €600), we find was a sharp decline in the number of bid acceptances in the following lower bid. However, even when we evaluate the WTP for high bids, almost one-quarter of the sample was still willing to pay the offered amount to obtain home health care in the event of a moderate impairment.

When we turn to examine second bounds (second discrete choices), we again are able to distinguish accepted and rejected bids. Rejected bids increased when the bid value increases, but unlike the first bound, they stagnated when a second bid dropped to €60, and after that, rejections did not increase. The latter suggests that the closer the bid becomes to nil, the more likely it is that the proportion of non-respondents reflects those who are insensitive to the bid[10]. Consistent with the first bid, when examining bid acceptance, we find that it declines when the bid exhibited a higher value. Thus, respondents, as expected, are sensitive to the magnitude of different bids and their responses are reflective a lexicographic order. Such a consistency is reflective of that fact that at the time of the survey, families of the respondents are likely to have some experience of similar services and are generally able to picture the utility gains of the defined scenarios.

[Insert Table 2 about here]

[10] Since numbers in each row adds to total in the last column, we can infer the numbers of the respondents accepting the bid for each value of bid from the column labelled " the second bid".

In the presence (absence) of some yea-saying, the expectation is that the WTP estimates elicited through DBDC should be higher (lower) than the SBDC WTP estimates. We find that estimates of an SBDC indicate larger WTP values[11].Importantly, in both probit model and a bivariate probit specifications, we obtain comparable estimates for both IA and WTP for home health care. The Rho (ρ) coefficient, which estimates the correlation terms between the error terms of the two probit specifications, suggests a negative correlation, which is confirmed by lower WTP, and likelihood ratio tests suggest that the unrestricted bivariate probit is preferable as restrictions of an alternative specification are rejected.

Estimates of the WTP to avoid institutionalization for the entire sample are reported in Tables 3a and 3b. We condition on bid amount (€), individual characteristics (health needs, respondents age, and gender of the respondent) and household variables (income and number of rooms) that may influence the results alongside measures of housing quality and probit and bivariate probit estimates are provided in Table 3a and Table 3b. The theoretical validity of the WTP estimates can be tested by checking whether regression coefficients report values that are consistent with the expected results as both the bid and respondent's income are significant determinants of WTP. We expect income to be positive and significant, the bid to exert a negative and significant effect, similarly, we expect a negative effect of the availability if substitutive care (e.g., informal care), and a positive effect of variables capturing the effect of needs (e.g., health status). Age does capture the effect of cohort effects, and we expect IA and

[11] When we test whether first and second bounds have similar means, by using a standard *t*-test, which confirms that we can reject the null hypothesis of equality at 5% significance level

the WTP for home health care to vary with age, health status and some measures of housing conditions.

When institutionalization estimates are compared across different specifications, we find evidence suggestive of no significant difference when employing probit and bivariate probit using information on the first bound. Indeed, probit estimates with controls provide an estimate of €292.3, and the average bivariate probit estimates are of €292.7. WTP is found to increase with age and it peaks at the ages of 70–79 years Finally, the number of rooms increase the WTP to avoid institutionalization. From marginal effect estimates, we can compute the average price and income elasticities for IA. More specifically, we estimate a price elasticity value of -0.412 (0.098) and an income elasticity estimates value of 0.65 (0.181). Thus, individuals' sensitivity to price seems reasonably small, and income elasticity estimates indicate that independent living or IA, rather than being a luxury good, appears to be a primary necessity.

[Insert Table 3a and 3b about here]

Table 4 reports the estimates of the WTP for home health care in the event of moderate health impairment. The implicit assumption respondents might make is that home care is the alternative to going to an institution. However, and consistently with the paper's hypothesis, WTP estimates are higher for *IA* than for home health care suggestive that the demand for home health care is one potential mechanism to avoid institutionalization but not the only one (e.g., informal care, tele care etc). Table 4 provides the estimates of the willingness to pay for both avoiding institutionalization (IA) and home health care under three specifications: first column (4.1) reports the

estimates SBDC specification without controls which suggests an estimate of the WTP of about 308 € for IA and 250 for home health care. When the willingness to pay is estimated using a bivariate probit we estimate a lower WTP, especially for home health care with and without controls. When WTP to avoid institutionalization, estimates are compared with individuals' income, we find that on average respondents are willing to give up 16% of their income to guarantee that they will not be institutionalized in the event of mild dependency.

[Insert Table 4 about here]

Finally, we examine the consistency of the first and second bound estimates, as well as the follow-up estimates alongside the reasons for potential corner solutions (e.g., protest responses). That is, we study how individuals respond to WTP questions, and specifically whether they anchor their second responses to their first and second bound in a simple way. This can be explored by regressing WTP in the first and second bound in addition to the first bid as in equation (8). A significant coefficient of the constant term indicates that individuals' responses differ across bounds, in the form of negative anchoring or the so-called 'yea-saying'. Importantly, Table 5 suggests evidence of some anchoring for IA estimates that might exert a moderate positive influence between bounds consistent with 'yea-saying'. However, the effect is only significant for IA and not for the WTP for home health care. Nonetheless, given the magnitude of the coefficient, we estimate a negligible bias in our estimates.

[Insert Table 5 about here]

5. CONCLUSION

This paper puts forward a behavioural explanation for the expansion of the demand for home health care at old age, namely a systematic preference for independent living which we conceptualize as 'institutionalisation aversion (IA)'. Given that IA at old age cannot be estimated from revealed preferences, we estimate the value of independent living by computing the individual willingness to pay (WTP) to both avoid institutionalization and for home health care using a survey experiment on individuals over 55 years of age. WTP is elicited from both a single and double bounded referendum format ('take it or leave it').

Our findings suggest consistent evidence of a preference for independent living at old age, or what we refer to as IA after a moderate health impairment. More specifically, we find that the WTP to avoid institutionalization is of a magnitude equivalent to 16% of respondent's average income (€292) which significantly exceeds the WTP for home health care (€222). Hence, we confirm that IA reflects more than just a preference for home health care. Although we find some evidence of 'yea-saying', our WTP estimates are consistent with the desirable properties of monetary equivalent preferences, namely, they increase with income and proxies of wealth (e.g., house size), and don't vary with health status and household size. Finally, given that our experiment took place in Spain before the introduction of universal caregiving supports and subsidies for long-term care in 2007, our WTP estimates are unlikely to be distorted by the introduction of subsidies.

An important finding to stress is that the quality of housing and home health care, are significantly associated with WTP estimates. Hence, it seems important to understand how IA vary across countries to evaluate the external validity of our

results[12]. All things considered, evidence of individuals' aversion to institutionalization (AI) helps to explain an underlying preference for 'aging in place' (Eurobarometer, 2007; Costa-Font et al, 2009), as well as the expansion of the demand for caregiving alternatives that allow an independent life at old age. Furthermore, our results provide a behavioural explanation for the deinstitutionalization process taking place in European societies (European Commission, 2015). Finally, evidence of a preference for independent living at old age, suggests that policy efforts should concentrate on ensuring the suitability of housing (such as an early adaptation of homes to the requirements of care and limited mobility) at an older age, as well as ensuring the availability and affordability of home health care.

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[12] For instance, it is possible if family caregiving duties are strong (such as in Spain), WTP estimates become 'conservative estimates'. In contrast, in countries, where caregiving duties are weak, one would expect WTP estimates are les likely to be biased by unobserved covariates.

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Table 1. Descriptive statistics – Variable name, definition, means and standard error

Variable	Definition	Mean (Std. Err)
Dependent variables		
res1ai	Acceptance of the first bid – WTP to avoid institutionalisation (IA)	0.51 (0.028)
res2ai	Acceptance of the second bid – WTP to avoid institutionalisation (IA)	0.34 (0.027)
res1sb	Acceptance of the first bid – WTP for home health care in event of mild impairment	0.44 (0.029)
res2sb	Acceptance of the second bid – WTP for home health care in event of mild impairment	0.29 (0.026)
Bid variables		
Bid1ai	Average first bid (€) to avoid institutionalisation (IA)	293.5 (11.68)
Bid2ai	Average second bid (€)to avoid institutionalisation (IA)	328.8 (17.02)
Bid1ss	Average first bid (€) to access home health care in event of mild impairment	227.19 (9.06)
Bid2ss	Average second bid (€) to access home health care in event of mild impairment	145.7 (7.03)
Control variables		
Income	Income (€) ('Capacity to pay control')	853.6 (46.78)
Married Co-res	Married co-resident respondent =1	0.653 (0.027)
Health	Self-assessed health (1-10) ('Care need proxy')	7.443 (0.102)
Age group	Age in year groups ('Demographic control')	2.87 (0.098)
Gender	Gender (2=Female) ('Demographic control')	1.638 (0.03)
Numb rooms	Number of rooms ('Housing quantity' /'wealth proxy')	3.406 (0.07)
Housing Statisfaction	Housing satisfaction (1-10) ('Housing quality proxy')	8.023 (0.092)
Change Dwelling	Would you like to change dwelling ('Housing quality proxy')	0.263 (0.025)
Square M	Square meters of the dwelling	103.03 (3.492)

Note: This tables provides the descriptive statistics of the variables employed in the analysis. It contains both the four dependent variables considered in the study alongside the four bids in (€) corresponding to

the respective regression exercises. Finally, we include in the regression a list of potentially relevant controls such as income (key to verify the validity of the WTP exercise), self-reported health (important in the event of state dependent preferences), age in year groups, gender and the number of rooms (to control for property characteristics and wealth effects). The table contains the survey names and definitions as well as the mean and sample standard error of each variable.

Table 2. Bid distribution of first and second bound referendum willingness to pay (WTP) to avoid institutionalisation and home health care in the event of mild dependency at old age

	WTP to avoid institutionalisation						
	Second Bid**(€)**						
First Bid**(€)**	30	60	180	360	600	1200	Total
60	23	0	54	0	0	0	77
180	0	36	0	42	0	0	78
360	0	0	42	0	32	0	74
600	0	0	0	49	0	22	71
Total	23	36	96	91	32	22	300
	WTP for home health care						
	Second Bid**(€)**						
First Bid**(€)**	30	60	180	360	600	1200	Total
60	25	0	52	0	0	0	77
180	0	37	0	41	0	0	78
360	0	0	50	0	24	0	74
600	0	0	0	55	0	16	71
Total	25	37	102	96	24	16	300

Note: The table shows the number of respondents accepting a bid to avoid institutionalisation at old age in the event of a mild health impairment. Results show the bid in € and the n numbers of the respondents given each bid (X) for both avoiding institutionalisation and home health care. We report the number of observations of each bid followed by the total per bid.

Table 3a. Willingness to Pay to Avoid Institutionalisation (IA)

	(3.1) Probit – SBDC	(3.2) Bivariate Probit- DBDC		(3.3) Probit – SBDC (extra controls)	(3.4) Bivariate Probit- DBDC (extra controls)	
Bid1ai	-0.0022***	-0.0027***	-	-0.0026***	-0.0027***	-
	(0.00043)	(0.00044)		(0.00053)	(0.0005)	
Bid2ai	-	-	-0.0019***	-	-	-0.0018***
			(0.00034)			(0.00048)
Income	4.08e-06***	4.36e-06***	2.58e-06***	3.69e-06***	3.90e-06***	1.91e-06***
	(7.24e-07)	(7.18e-07)	(6.18e-07)	(8.37e-07)	(8.44e-07)	(6.76e-07)
Gender	0.0208	0.0118	-0.0465	-0.000271	-0.00700	-0.0473
	(0.178)	(0.177)	(0.163)	(0.206)	(0.207)	(0.192)
Married	0.548*	0.553*	0.566*		0.564	0.343
	(0.328)	(0.314)	(0.306)		(0.357)	(0.362)
Age55-60	0.861**	0.813**	0.966***	0.493	1.048***	0.907**
	(0.349)	(0.334)	(0.321)	(0.310)	(0.395)	(0.387)
Age60-65	0.666**	0.580*	0.832***	0.111	0.645*	0.565
	(0.332)	(0.319)	(0.309)	(0.282)	(0.367)	(0.367)
Age65-70	0.374	0.350	0.604*	-0.119	0.452	0.459
	(0.384)	(0.371)	(0.352)	(0.363)	(0.438)	(0.434)
Age70-80	0.386	0.358	0.159	-0.226	0.331	0.0767
	(0.371)	(0.370)	(0.358)	(0.372)	(0.446)	(0.451)
Health	0.139***	0.148***	0.153***	0.120**	0.122**	0.130**
	(0.0476)	(0.0465)	(0.0435)	(0.0580)	(0.0575)	(0.0551)
Numb rooms	0.163**	0.178***	0.0529	0.432***	0.435***	0.0163
	(0.0691)	(0.0675)	(0.0681)	(0.144)	(0.143)	(0.118)
Square M	-	-	-	-3.33e-05	0.000308	0.000608
				(0.00277)	(0.00278)	(0.00235)
Change Dwelling	-	-	-	0.172	0.218	0.178
				(0.241)	(0.241)	(0.223)
Housing Statis	-	-	-	-0.0574	-0.0506	0.0148
				(0.0684)	(0.0686)	(0.0650)
Constant	-1.902**	-1.843**	-1.508**	3.525	3.592	-0.687
	(0.765)	(0.800)	(0.695)	(1.843)	(1.851)	(1.028)

Pseudo-R^2	0.2394			0.2897		
Observations	296	296	296	296	296	296

Note: This table provides both SBDC and DBDC estimates of the probability of accepting a referendum format WTP offer to avoid institutionalisation in event of mild dependency. Estimates are robust estimates and include regional fixed effects. *** Refers to at least 1% significance ** Refers to at least 5% significance, .* Refers to at least 1% significance We report model marginal effects, standard errors in parenthesis and t-values.

Table 3b. Willingness to Pay for home health care (HH)

	(3.5) Probit – SBDC	(3.6) Bivariate Probit- DBDC		(3.7) Bivariate Probit- DBDC (extra controls)	
Bid1sb	-0.00277***	-0.00274***	-	-0.0029***	-
	(0.000451)	(0.000455)		(0.000466)	
Bid2sb	-	-	-0.00105**		-0.0018***
			(0.000427)		(0.000455)
Income	3.76e-06***	3.77e-06***	2.03e-06***	3.80e-06***	2.79e-06***
	(7.11e-07)	(7.10e-07)	(6.05e-07)	(7.05e-07)	(6.38e-07)
Gender	0.166	0.173	-0.0697	0.199	-0.0651
	(0.180)	(0.180)	(0.178)	(0.180)	(0.176)
Married	0.161	0.147	0.615*	0.143	0.582
	(0.313)	(0.313)	(0.365)	(0.311)	(0.357)
Age55-60	0.191	0.192	0.612	0.186	0.665*
	(0.331)	(0.331)	(0.383)	(0.329)	(0.374)
Age60-65	-0.294	-0.287	0.851**	-0.284	0.759**
	(0.320)	(0.320)	(0.364)	(0.319)	(0.359)
Age65-70	-0.242	-0.233	0.628	-0.188	0.550
	(0.373)	(0.372)	(0.404)	(0.369)	(0.396)
Age70-80	0.0299	-0.000701	0.317	0.0278	0.290
	(0.360)	(0.363)	(0.414)	(0.361)	(0.404)
Health	0.105**	0.106**	0.0230	0.113**	0.0477
	(0.0474)	(0.0475)	(0.0457)	(0.0475)	(0.0455)
Numb rooms	0.231***	0.228***	0.100	0.231***	0.150**
	(0.0689)	(0.0689)	(0.0677)	(0.0680)	(0.0682)
Constant	-0.907	-0.934	-1.689**	-0.938	-1.551**
	(0.749)	(0.751)	(0.760)	(0.761)	(0.743)
Pseudo-R^2	0.2408				
Observations	296	293	293	293	293

Note: This table provides both SBDC and DBDC estimates of the probability of accepting a referendum format WTP for home health care (HH) in event of mild dependency. Estimates are robust estimates and include regional fixed effects. *** Refers to at least 1% significance ** Refers to at least 5% significance, .* Refers to at least 1% significance We report model marginal effects, standard errors in parenthesis and t-values.

Table 4. Willingness to pay (WTP) estimates (€) to AI and home health care (HH)

	(4.1) SBDC	(4.2) DBDC	(4.3) DBDC -Controls
WTP -IA	308.2	300.0	292.3
(s.e)	(40.8)	(50.5)	(41.2)
WTP -HH	250.0	213.3	222.2
s.e	(37.6)	(33.7)	(34.6)

Note: This table provide the estimates of the willingness to pay for both avoiding institutionalisation (IA) and home health care under three specifications: first column (4.1) reports the estimates of single bounded discrete choice (SBDC) specification, hence assuming there is only one bound form a probit model. The second column (4.2) reports the estimates of the first bound of a bivariate probit using a double bounded discrete choice (DBDC) framework. The third column (4.3) reports the estimates of the WTP adjusting for a number of controls included in Table 3a and Table3b.

Table 5. Anchoring effects for the second discrete choice (WTP^{1})

Institutionalization Aversion (IA)		
	marg eff	(s.e)
t_1	-0.0008**	(0.00018)
WTP^{1}	0.0003**	(0.0001)
Likelihood Ratio	20.7	
Pseudo R^2	0.05	
WTP for home health care (HH)		
t_1	-0.0004**	(0.0002)
WTP^{1}	0.00003	(0.0001)
Likelihood Ratio	8.16	
Pseudo R^2	0.02	

Note:

Appendix

Table A1. Expected coefficients

	Variable	Institutionalization Aversion /WTP home health care
Independent variables		
Demographics and Health Status	Health Status, Age, gender, current health impairment	+/-
Income	Self-reported income	+
Informal Caregiving Availability	Household members, cohabitation,	
Control variables		
House characteristics	Number of rooms, square meters, housing satisfaction, change dwelling, square meters	+