

Trade-off between formal and informal care in Spain[§]

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Abstract

The remarkable growth of older population has moved long term care to the front ranks of the social policy agenda. Understanding the factors that determine the type and amount of formal care is important for predicting use in the future and developing long-term policy. In this context we jointly analyze the choice of care (formal, informal, both together or none) as well as the number of hours of care received. Given that the number of hours of care is not independent of the type of care received, we estimate, for the first time in this area of research, a sample selection model with the particularity that the first step is a multinomial logit model.

With regard to the debate about complementarity or substitutability between formal and informal care, our results indicate that formal care acts as a reinforcement of the family care in certain cases: for very old care receivers, in those cases in which the individual has multiple disabilities, when many care hours are provided, and in case of mental illness and/or dementia. There exist substantial differences in long term care addressed to younger and older dependent people and dependent women are in risk of becoming more vulnerable to the shortage of informal caregivers in the future. Finally, we have documented that there are great disparities in the availability of public social care across regions.

JEL Codes: I1, J14.

Keywords: formal care, informal care, caregiver, dependent.

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1. Introduction

It is commonly accepted that family caregivers provide a vast quantity of long-term care to elderly dependent people. An important issue is the balance between what the family and state respectively are doing for old people and to what extent the responsibility for old people in need is a shared one.

The main purpose of this paper is to shed some light on the trade-off between formal and informal care of dependent people as well as to analyse the relationship between the choice of care and the number of hours of care provided. Formal care is defined as paid or free of charge attention provided by public or private institutions and non profit-making organizations, whereas informal care refers to the attention provided by family members, friends and neighbours. Some authors have considered that informal care is a source of better-quality care because of affective linkages and because it helps the patient to continue living in the community (Keating et al., 1997).

The growth of elder population cohorts during last decades has implied an increase in the proportion of people who suffer mental or physical disabilities for doing daily living activities in developed countries, and Spain constitutes a paramount example. Figure 1 represents the trend of the fraction of population older than 40 years in Spain. The fraction of population between 65-80 years has steadily grown since 1900, and in 2007 it represents 16.7 % of the total population¹. Likewise, the fraction of population +80 years has increased from 0.6 % in 1900 to 4.5 % in 2007. These facts are explained by the decrease in the mortality rate, both infant mortality and elderly (+70) population.

Figure 2 shows that the participation of age-related or *ageing* expenditures, health and social expenditures with respect to GDP has increased in recent years, especially since 1999. However, still ageing expenditure to GDP ratio is lower than the average EU-25 (see Table A.1 for a comparison). Spain is positioned in the group of countries with lower ageing expenditure (with Germany, France and Portugal, 0.3%; Ireland, 0.2%; Greece and Italy, 0.1%) and very far from Austria (0.7%), United Kingdom (1%), Denmark (1.1%) and Sweden (2.6%).

A line in the literature has analysed informal care from the perspective of public expenditure, that is, they have praised its advantages as a free of charge source of care. Nonetheless, they have ignored other type of costs associated with informal care, such as, psychological effects, loss of leisure time, decrease in labour supply and worsening of household finances (Fast et al., 1999; Van Exel et al., 2004; Hirst, 2005). In this line Zarit and Eggenbeen (1995) have suggested that it would be desirable to force back public health

¹Life expectancy at birth in 2005 was 83.5 (female) and 77.0 (male) with respect to 35.7 (female) and 33.9 (male) in 1900. Life expectancy after 65 years has increased from 15.3 (female) and 13.1 (male) in 1960 to 21.3 (female) and 17.3 (male) in 2005.

expenditure through a redirection of dependent long-term care from the public sphere to the family core. However, the family ability to carry most of the burden may be limited due to several sociodemographic changes, such as, smaller family size, increasing female participation in the labour market and higher divorce rates.² However, in future years, immigration may play an important role in the provision of formal care. In fact, between 1994 and 2004, (*Informal Support Survey; IMSERSO*) the percentage of private household employees has increased from 2,29% to 8,89%, from which 30,1% (in 2004) were immigrants.

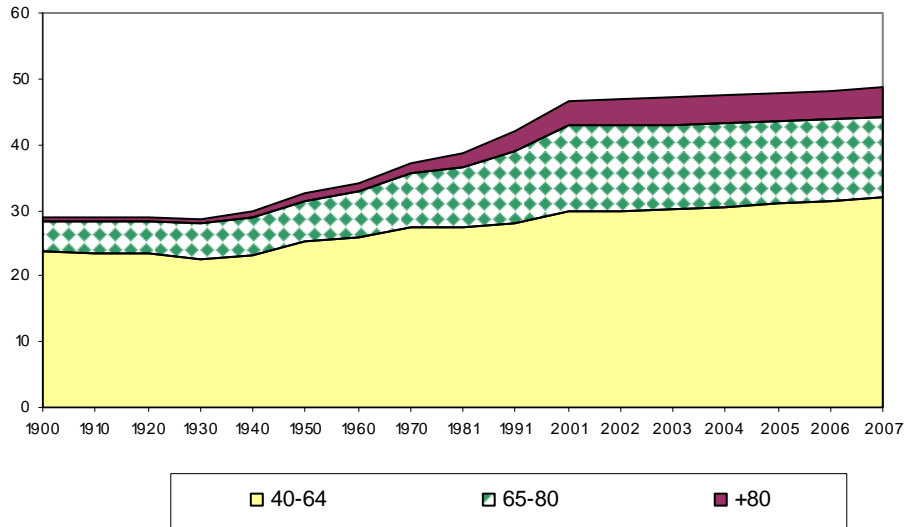


Figure 1: Trends of the Spanish Population aged +40. 1900-2007

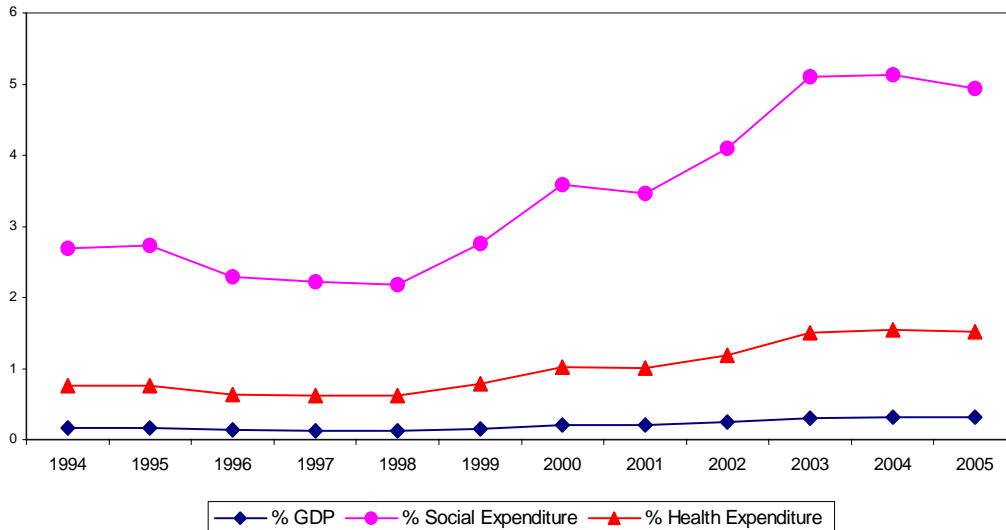


Figure 2. Trends of the ageing related expenditure in Spain

²All three indicators have suffered dramatic changes in recent decades: the birth rate (for 1000 inhabitants) have decreased from 18.8 in 1975 to 10 in 2006, with a minimum of 9.2 in 1998; female participation rate has increased from 28.8% in 1976 to 49.4% in the fourth quarter of 2007; finally, the divorce rate (for 100 marriages) has increased from 4.7 in 1980 to 44.9 in 2006.

However, the relatively modest figures for Spanish ageing expenditure may be related to “family ties”. There is solid evidence that supports the idea of strong family ties in Mediterranean countries and weak family ties in the Scandinavian ones (Bolin et al., 2007). Hence, it becomes more urgent to study the relationship between formal and informal care in Spain. If government trust in the ability of informal caregivers and not increases public ageing expenditure, then the characteristics and number of informal caregivers can affect the well-being of dependent people in Spain more than in other European countries.

Regarding the existent economic literature about care to dependent people, there is a vexing question of whether formal caregiving hours (provided by clinical staff, nurses, physiotherapists) compensate, substitute, complement or reinforce informal caregiving hours provided by family members, friends or neighbors (Glazer, 1990; Chappell and Blandford, 1991; Mayall, 1993; Bass and Noelker, 1994; Denton, 1997). Four models for the relation between formal and informal care may be distinguished: compensatory, substitution, task-specific and complementary.

The *compensatory model* (Cantor, 1979) postulates the substitution of one care system by the other, but following an order of preference. The dependent individual only resorts to the use of formal care (social care services or specialized private employees) when all sources of informal care have been exhausted. However, few empirical studies have confirmed this theory (Penning, 1990; Cantor, 1991; Chappell, 1991).

The *substitution model* (Greene, 1983), according to which as the patient receives formal care, the family decreases the amount of informal care provided. This argument is used by those economists who propose formal care rationing with the aim of controlling public health expenditure. But applied papers have found that, in most cases, family do not give up providing care when receive formal aid (Archbold, 1982; Christianson, 1988; Moscovice et al., 1988; Edelman and Hughes, 1990; Tennstedt et al., 1993). By contrast, Liu et al. (2000) and Langa et al. (2001) found that an increase in the reception of formal home care in the case of dependent who have already lived with adult children. Vittanen (2007) analyzed the relations between formal and informal care in 12 European countries and concluded that formal care substitutes for informal care supplied out of carereceiver’s household but does not substitute for informal care of dependent’s co-resident relatives.

The *task-specific model* was proposed by Litwak (1985). According to this model, formal and informal care are different but complements. It sustains that informal caregiver (a woman in most cases) is more suitable for day-to-day care (washing, dressing and undressing, eating and drinking) while formal care is set aside for more technological tasks. In contrast to the compensatory model, it is the nature of the task and not the will of the patient what determines who is the most appropriate for providing care (the family or the skilled

professional). Several papers, such as Penning and Chappell (1990) and Fisher and Eustis (1994) have upheld this model.

Finally, the *complementary model*, a combination of the compensatory and the substitution model, was proposed by Chappell and Blandford (1991). When dependent needs exceed informal care resources, formal care provides the necessary support (Bass and Noelker, 1989; Edelman and Hughes, 1990; Denton, 1997). This is for example the case when informal caregivers need to make use of respite services. Chappell and Blandford (1991) spelt out two circumstances in which formal care is used in conjunction with informal care: when medical requirements are very complex and when the family goes through a critical situation. In this manner, formal care becomes involved when informal care realizes that cannot deal with everything by itself.

The lack of a cohesive conclusion is due to the idiosyncrasy of informal and formal care. Both types of care may happen simultaneously or one before and the other afterwards. This fact remarks the need for using econometric techniques to deal with the endogeneity inherent in formal and informal care. Our study extends the previous literature by examining how the choice of type of care affects the number of informal caregiving hours provided. To this end we estimate a two equation simultaneous model for the decisions of type of care and number of informal caregiving hours. Given that different types of formal care may affect differently the supply of informal care, we control the selection bias estimating a multinomial logit model (Bourguignon et al., 2004) and use the estimated residuals to control for endogeneity in the second step hour regressions. The first stage multinomial is tested again various other alternative specifications.

As regard specification results we have tested and not rejected the first stage multinomial models against several other alternatives (bivariate probit - FC vs IC- and trivariate probit - FC vs IC vs FIC). We have also excluded the possibility of independence between the choice of care and the number of hours provided. In fact, estimation under independence implies important differences in the estimated coefficients of several key variables of the model.

Our detailed results do not provide support to a unique theory of care. We have found evidence in favour of the Compensatory Model when is more probable that the dependent individual receives care from family members (if he is married or when household size increases) or when he suffers mental illness, dementia or disabilities for relating, communicating. In this case, the presence of informal caregivers may be more intense because of surveillance tasks or because given the nature of the illness, the family feels some kind of stigma and decides to face the situation in solitude. In this context, the diffusion of information about certain illnesses or the affiliation to associations of dependent's relatives could help to complement informal care with formal one. It is quite worrying (and even inefficient) that

family members carry all the burden by themselves, because these disabilities usually present an unfavorable prognosis due to their association to degenerative diseases. Also, the Task Specific Model and the Complementary Model are supported in those circumstances when the degree of severity increases, when dependent has moved to receive a better medical treatment or has received a rehabilitation treatment. Then, the informal caregiver looks for formal care either to be helped with daily living activities or to alleviate the caregiver burden.

The rest of the paper goes as follows. In section 2 we describe the source of data and provide some descriptive statistics. In section 3 we propose a model of choice of care and caregiving hours, following Bourgingnon et al (2004), and validate it against other alternatives. In section 4, we estimate the model for the whole sample and four different subsamples (men, women, younger and older dependent people). And, finally, section 5 offers some concluding remarks.

2. Data

The dataset consists of information from the Disabilities, Deficiencies and Health Status Survey (DDHSS) drew up by the National Institute of Statistics in 1999, with the objective of estimating the amount of Spanish resident people who suffer any disability and identifying risk factors associated with health status.

To design the sample we have followed a two-step procedure. First, using the Disabilities and Deficiencies Questionnaire we select those individuals who answer in the affirmative to the question: “Do you suffer any kind of disability?,” understanding as disability “a limitation for performing daily living activities that is going to last more than one year”. Second, we focus on individuals older than 40 years old. Although many studies have focused on elder population (+65 years) (Ettner, 1996; Charmichael and Charles, 2003), we have observed that the amount of “young” people with disabilities is not negligible³. The final sample (+40 years with any disability) contains 17.442 observations.

We have defined three binary dependent variables: “informal care” (IC) that takes the value 1 if the individual only receives help from relatives (co-resident or not), friends or neighbors (6.216 observations); “formal care” (FC) if the individual only receives help from employees, public administration or private organizations⁴ (562 observations) and “formal-informal care” (FIC) if the individual receives help from both types of care (1.002

³There are 1.442 individuals (584 male, 838 female) aged between 40 and 64 years old, who need a caregiver for doing daily living activities. In fact, some previous evidence has suggested the earlier onset of some degenerative diseases. According to data from *Fundación Alzheimer España* and *Asociación Parkinson Madrid*, around 2.5% of Alzheimer patients are younger than 55 years old and approximately 20% of Parkinsonism cases are diagnosed before 50 years old.

⁴The survey indicates whether formal care provider belongs to public social services, has been hired from a private firm or is a household employee. In the last case, we do not know if the individual has any specific knowledge (nursery) or he is only entitled to the surveillance of the patient.

observations). This implies that there are 9.662 individuals who suffer a disability but do not need or receive any type of care.

Respondents who declare to suffer any disability are required to give more details. There is a list of 36 disabilities (see the Appendix for a description), which, for the purpose of this paper, have been categorized in personal or instrumental disabilities for daily living activities (PADL and IADL, respectively)⁵, following the recommendations of the *Federal Interagency Forum on Aging Related Statistics* (2000). In any case, the interviewed must indicate the degree of severity and the prognosis associated to each disability. Preliminary analysis suggests that there is not a linear relation between the number of disabilities and the number of caregiving hours [The results of this exploration are available on request]. For that reason, we have defined six binary variables (3 for PADL and 3 for IADL) that take the value 1 if the individual suffers two, three, or more than three disabilities.

Apart from information about disabilities, the survey contains a list of specific pathologies, from which we have selected mental illness⁶, arthritis, muscular, dystrophy, multiple sclerosis, stroke, cerebral palsy⁷, dementia and Parkinsonism, due to the important limitations they usually involve for doing daily living activities.

With respect to the sociodemographic characteristics of the carereceiver, we have considered those variables that may have an influence on the type of care received, either because they directly affect health status (age and sex) or because they have implications over the generation of informal networks (marital status, number of household adults). Given that some authors have documented a positive correlation between income and availability of formal care (Branch et al., 1981) we control for household income as well as for the level of education of the dependent.

From a theoretical point of view, when informal care is not available or is not enough, public social services behave as subsidiary responsible for the attention of the dependent. With the aim of taking into account geographical differences in the provision of formal care, and given that the DDHSS does not include information about the price of formal care received, we have defined a set of dummy variables to denote the place of residence and the size of the municipality.

⁵PADL include disabilities for getting up and down, standing up, moving inside home, washing oneself, controlling physical needs, dressing and undressing, eating and drinking. IADL include disabilities for carrying not heavy objects, using utensils and tools, clutching small things with hands and fingers, moving without way of transport, driving own vehicle, do the shopping, cooking, washing and ironing clothes, cleaning the house and looking after the well-being of the family.

⁶Mental illnesses refer to bipolar disorders, depression, anxiety, stress, schizophrenia, whereas dementia is related to all possible kinds of dementia (senile, Alzheimer, due to AIDS, brain tumour, brain damage).

⁷Brain-vascular diseases are the second cause of death for male and the first one for female, according to the *Fundación Española de Enfermedades Neurológicas*.

In Figure 3 we appreciate that as people get older the percentage of non-dependent decreases and at the same time, the fraction of people who need some type of care increases. The amount of individuals who, conditional on having a disability or a deficiency, receive IC raises from 24% at 40 years old to 70% at 90 years old. In the second place, FIC represents 12.5% at the age of 90. By contrast, the trend for FC is increasing from 60 to 80 years old (6%) and decreasing afterwards (1.8% for the interval 96-99 years).

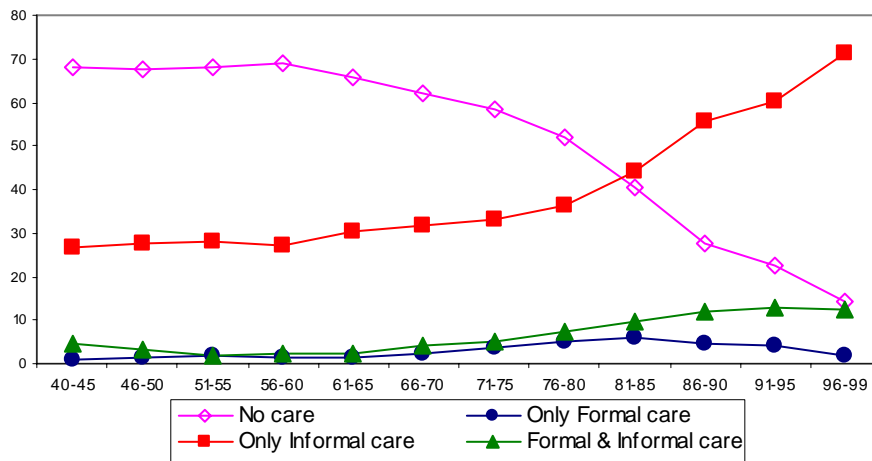
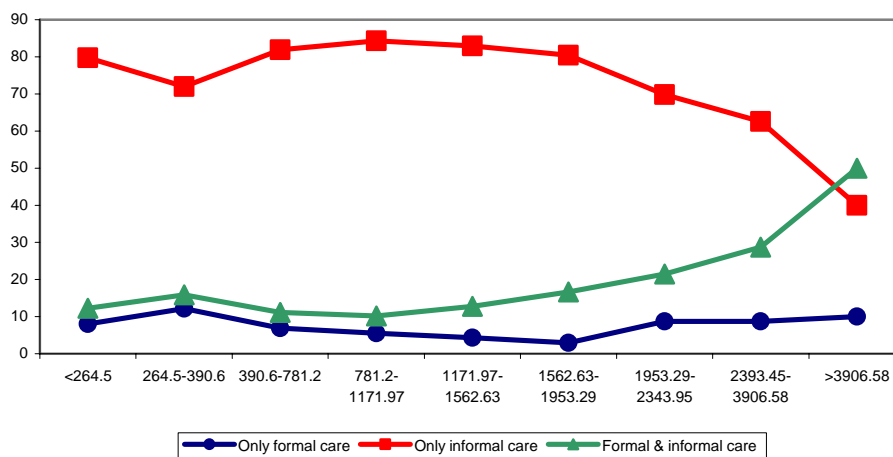


Figure 3. Distribution of the Population by type of care

The distribution of the type of care by level of household income (Figure 4) shows that for high income levels, IC decreases while FIC increases. In fact, for the intervals (2.343.9 € 3.906.6 €) and more than 3.906.6 € the percentage of FIC increases from 28.5% to 50%. On the other side, low-income households [264.5 € 390.6 €] attain the maximum level of FC. It is convenient to clarify that poorest and richest households do not use the same kind of FC. Wealthiest families prefer to hire household employees and private sector services⁸.



⁸As a matter of fact, the household's employees rate for the whole sample is 0.7% whereas it goes up to 20% for households with more than 2344 €/month.

Figure 4. Distribution of the type of care by brackets of monthly household income (€)

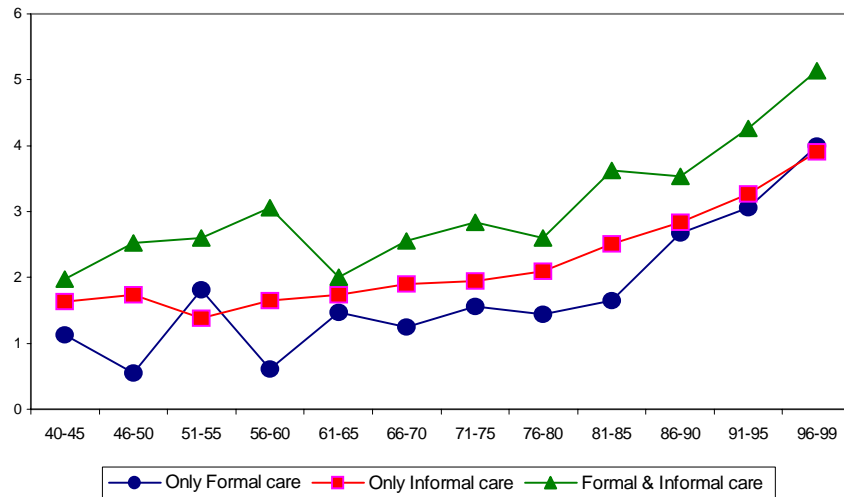


Figure 5. Number of personal disabilities for daily living (PADL) by age.

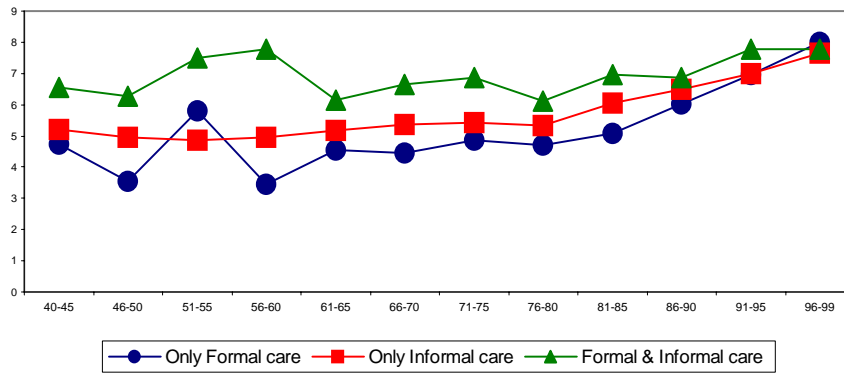


Figure 6. Number of instrumental disabilities for daily living (PADL) by age.

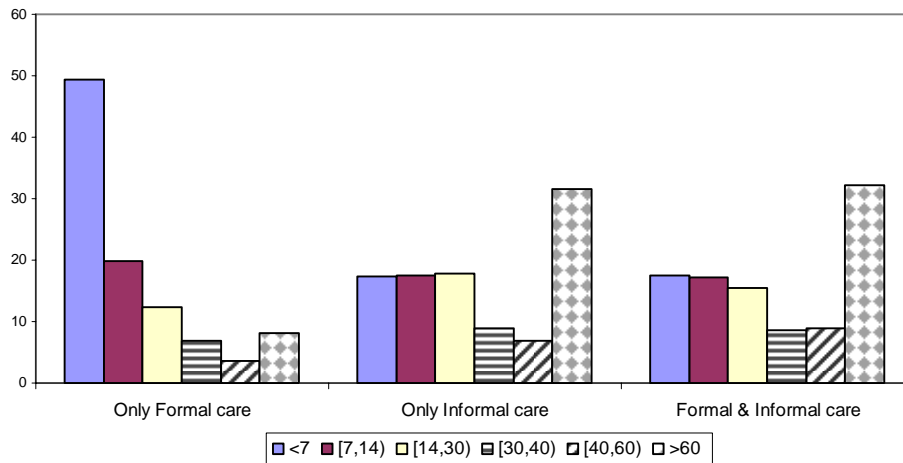


Figure 7. Distribution of the number of weekly caregiving hours by type of care.

The average number of disabilities either PADL or IADL (see figures 5 and 6, respectively) increases with age and is much higher for dependent people who receive FIC. In

Figure 6, we also observe that the distance among the three types of care decreases as the dependent becomes older. Finally, Figure 7 represents the distribution of caregiving hours by type of care⁹. The mode for those that only receive FC is 7 or less hours. Alternatively, the mode for those who receive IC or FIC is 60 hours or above.

2.1. Descriptive statistics

Tables 2 and 3 of the Appendix show detailed descriptive statistics for the explanatory variables. Very old dependent people (aged 80-89 or 90-99 years old) are more prone to receive FIC. Not married dependent people (single, widowed, separated/divorced) usually receive FC.

Education and income are key determinants of the type of care. Educated individuals tend to receive a higher fraction of formal care. Among those that receive IC, 59% have finished elementary education and only 1.5% of them have obtained a college degree. The same figures for dependent people with FC are 48.9% and 8.9% respectively. As we shall see later, this may be because either education is a proxy variable for the level of income, or because as people become more educated it turns out easier for them to access to the available information.

For the three types of care, more than 30% of dependent people are receiving a retirement benefit and those who receive IC show the highest concentration of disability benefits (both contributive and non-contributive). FIC is mainly devoted to dependent belonging to high-income households (more than 1562.6 €/month), while IC is concentrated among medium-low income households (390.7 € to 1562.6 €/per month). On the other hand, the highest fraction of FC appears in very low-income households (264.5 € to 390.7 €)¹⁰.

With respect to the size of municipality, the smaller the township size, the higher the percentage of dependent with IC. Moreover, families with children are more inclined to take care of a dependent relative. This fact may point to the existence of intergenerational caregiving networks (grandparents that live together with adults and children), and the substitution of FC by IC. However, as it will be exposed later, modern life characteristics may threaten the traditional family core around a dependent individual.

Regarding the list of pathologies considered, dependent without any type of care show the lowest percentages for all the illnesses. For the three types of care, stroke and arthritis have the highest incidence rate. Carereceivers with FIC show the highest percentage for mental illnesses (25.9%), head injury (12.2%), dementia (13.3%), change of house (12.2%, to receive better medical treatment or having an adapted dwelling) and rehabilitation treatment (23.7%).

⁹We do not know the distribution of care hours between formal and informal in those cases in which the individual receives formal and informal care. Furthermore, we do not know how many hours are devoted to each type of disability (PADL and IADL).

¹⁰This may be due to the fact that public social services for dependent people do not only take into account the severity of physical and mental disabilities, the availability of close relatives, and the living conditions but also personal financial resources.

We could consider that when family receives information/advice (from doctors, nurses or therapist) about the type of aids they may apply for (home centers, day centers, respite centers, adapted transport...) and method of financing (free of charge, combined payment) the probabilities of applying for one of these aids increase considerably.

As for disabilities, care receivers with IC suffer mainly disabilities for moving outside home (86%), doing housework (78%), maintaining body postures (51%) and taking care of oneself (46%). The incidence of disabilities for relating to people (30%) and communicating (30%) is much higher among those who receive FIC. Among those who receive FC, disability for doing housework is the most prevailing one (91%). This circumstance may be explained because in many regions, home care services¹¹ emphasize home help rather than personal care.

Dependent people with FIC suffer more PADL disabilities (3.1), followed by those with IC (2.2) and finally by those with FC (1.6). A similar ranking is obtained when looking at IADL disabilities (6.8, 5.61, 5.0, respectively).

With respect to the degree of severity, FIC care receivers exhibit disabilities with the highest degree of severity (98% are very severe, 95% can not do the activity), and for the three types of care, around 70% of care receivers suffer disabilities with unfavorable prognosis. On the other side, people who do not need a caregiver generally report the lowest percentage of disabilities with stable or unfavorable prognosis.

3. A model of choice of care and hours

3.1. The Bourguignon Model

The choice of the number of care hours (H) is not independent of the type of care (C). It is not a simple choice in which the dependent individual chooses the caregiver and the number of hours to be provided. Instead, it is more complex because there are several decision-makers involved. First, family members may or may not adjust their lifestyle to the dependent needs. Second, some private professionals may be hired by the family or by the patient, and finally, the Public Administration offers special services for non-institutionalized dependent people (home care, Telecare, day care centers and respite services). Because of these reasons, we have developed a two simultaneous equations model for estimating the decisions of type of care chosen and number of care hours received.

¹¹Home Care Service is a program for helping dependent people and their families, without substituting the role of the informal caregiver. It is divided into four different areas: home help (shopping, cleaning the house, washing the clothes), personal care, psychological attention (to improve self-esteem and lower dependency from others) and attention to family members (strengthen family cohesion). With the exception of País Vasco, Cataluña and Rioja, in the rest of Autonomous Communities, most of the time is devoted to home help rather than to personal care activities (*Observatorio de Personas Mayores*, 2000).

We define an “outcome equation” (1a) that indicates the number of caregiving hours received and a “selection equation” (1b) which identifies the type of care chosen. There is a categorical variable j which denotes the choice of the type of care among the set of alternatives {0= no care (omitted category), 1= formal care, 2= informal care, 3= formal & informal care}. In this way, each one of the outcome variables is only observed for a single value of the selection variable.

$$H_j = X\beta_j + \varepsilon_j \quad (1a)$$

$$C_j = Z\alpha_j + u_j \quad (1b) \quad \{j=0, 1, 2, 3\}$$

where ε_j verifies that $E[\varepsilon_j|X, Z]=0$ and $V[\varepsilon_j|X, Z]=\sigma^2$. The vector Z represents the set of explanatory variables for the care alternatives and the vector X contains the determinants for the number of hours¹².

Without loss of generality let us assume for the rest of the model that the observed outcome belongs to the first category ($C_1 > \max_{j \neq 1}(C_j)$). Thus we concentrate on the consistent estimator of β_1 . The problem that we face is the estimation of β_1 and (α_j) 's taking into account that the error term ε_1 may not be independent from all the errors in the model. This situation would induce correlation between the explanatory variables and the residual term in the outcome equation. For this reason, OLS applied to the selected sample can be inconsistent. As a consequence, we have a selection bias model as in Heckman (1979), with the difference that the selectivity criterion is given by a multinomial logit model rather than by a univariate probit.

Several alternatives have been put forward in the econometric literature to identify the parameters of this model. Lee (1983) proposed a generalization of Heckman (1979) method. His approach is quite simple and only requires the estimation of one parameter in the error correction term. However, it imposes very restrictive assumptions about the structure of the covariance between ε_1 and the error terms of the selection equation. To avoid this problem, Dubin and McFadden's (1984) introduced a method which does not require the imposition of any constraint between ε_1 and the error terms of the selection equation, but they restrict u_j to the family of Gumbell's distributions. More recently, Dahl (2002) has developed a semiparametric approach, but whose practical implementation is nearly computationally impossible as the number of alternatives to be estimated increases. Finally, Bourguignon et al. (2004) proposed a variation to Dubin and McFadden method. In this paper we follow the latter approach.

¹²We identify the model by imposing some exclusion restrictions, that is, variables in Z that are not in X . For example: the variables “education” and “relation with economic activity” are included in Z but not in X because it may gather the effect of available information about social services for dependent people..

Bourguignon et al. (2004) considered a variation of Dubin and McFadden's (1984) estimation method that allows ε_l to be a linear combination of normal distributions, and as a result, ε_l also follows a normal distribution.

$$u_j^* = \Phi^{-1}\left(G(u_j)\right) \quad j = 0, 1, 2, 3 \quad (2)$$

$$\varepsilon_l = \sigma_1 \sum_j \tilde{\rho}_j u_j^* + \eta_l \quad (3)$$

where Φ is the cumulative standard normal, G is the cumulative Gumbell distribution and $\tilde{\rho}_j$ is the correlation coefficient between ε_l and u_j^* . For each j , it is assumed that the expected value of ε_l and the error term u_j^* are linearly related¹³, where η_l denotes a residual term orthogonal to all (u_j^*) 's and such that $E[\eta_l]=0$. This implies that a crucial assumption in this specification is that the Independence of Irrelevant Alternatives hypothesis holds¹⁴. Substituting the error term of equation (1a) by its conditional expectation plus a residual term, we get the following expression:

$$H_l = X \beta_l + \sigma_1 \left[\tilde{\rho}_1 \delta(P_1) + \sum_{j>1} \tilde{\rho}_j \frac{P_j}{P_j - 1} \delta(P_j) \right] + v_l \quad (4)$$

$$\delta(P_j) = \int u_j^* g(u_j + \log P_j) du \quad j = 0, 1, 2, 3$$

$$P_j = \frac{\exp(Z_j \alpha_j)}{\sum_s \exp(Z_s \alpha_s)} \quad j = 0, 1, 2, 3$$

where g is the Gumbell density distribution, P_j is the probability that alternative j is chosen, and v_l has zero-mean and is orthogonal to all equation terms. Therefore, OLS may be applied in this equation to obtain a consistent estimation¹⁵ of β_l .

Consequently, we can consider the resulting model as a two-step process. In the first step, we estimate a multinomial logit model for care choice, using as explanatory variables (age, sex, marital status, main breadwinner, level of education, relation with economic activity, monthly household income, number of children, number of household adults, variables related to disabilities and illnesses, size of municipality and place of residence). Caregiving alternatives have been defined as a categorical variable (1 "only formal care", 2 "only informal care", 3 "both formal and informal care"). Not receiving any type of care is the reference group (0). Using the estimated coefficients ($\hat{\alpha}_j$) we obtain the predicted probabilities (\hat{P}_j). These estimated probabilities take on all the information gathered in the multinomial model. Thereby,

¹³The linear combination assumption is based on the fact that all u_j^* are independent among them.

¹⁴Smith et al. (2004) and Ewoudou and Vencatachellum (2006) provide an interesting discussion of the empirical advantages of the selectivity correction method proposed by Bourguignon et al. (2004) even when a non-linear specification is present in the model.

¹⁵See Bourguignon et al. (2004) for a detailed explanation.

$\delta(\hat{P}_j)$ provides a consistent estimation of the residual expected value in the outcome equation (1a). Its sign indicates the direction of the selection bias resulting from the selection of individuals in the modality of care from which the caregiving hours equation is estimated as opposed to all other types of care taken together.

Afterwards, a model for the number of caregiving hours is estimated by weighted least squares to consider the possibility of heteroskedasticity due to selectivity. For getting the standard errors, a bootstrap with 50 replications has been applied to take into account the two-step procedure. We have considered that the number of caregiving hours is explained by individual factors (age, sex, illnesses and other health variables, number, type and severity of disabilities), socio-economic (marital status, household income, number of children adult members) and geographical factors (size of municipality).

3.2. Alternatives to the Bourguignon Model

Before estimating the Bourguignon model we want to validate the suitability of the multinomial logit for the first step of the model. First, we have performed Hausman test¹⁶. Results indicate that we cannot reject the IIA hypothesis, thereby indicating that distinguishing between FC, IC and FIC is not only analytically, but also econometrically appropriate. Likewise an F test support the validity of the exclusion restrictions we have imposed (mean breadwinner, level of education, relation with economic activity and place of residence).

We also have performed other specification tests comparing the goodness of fit of the multinomial logit for the first step regression with a bivariate probit¹⁷ and a trivariate probit¹⁸. Results of the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) (see Table A below) show that the multinomial logit model reports the lowest values for the AIC although the bivariate probit reports a slightly lower BIC. If we repeat the same exercise for the different subsamples (men, women, young and old), we confirm that the AIC is always smaller for the multinomial model¹⁹

Table A. Comparison of goodness of fit statistics for the first step model

¹⁶ The null hypothesis says that the odd-ratios are independent of other alternatives, that is, if a subset of choices is irrelevant, their omission from the model will not change the estimations obtained with the remaining alternatives. But if the estimated coefficients are not independent from the omitted alternatives, the parameters estimated will be inconsistent.

¹⁷ We have defined two binary variables (FC and IC) if the individual receives formal or informal care. For those who do not receive any type of care, both variables take the value 0. For those who receive FIC, both variables take the value 1. Estimation results are available upon request.

¹⁸ We have defined three binary variables (FC, IC, FIC). For those who do not receive any type of care, the three of them take the value 0. Estimation results are available upon request.

¹⁹ AIC and BIC pursue different objectives. AIC tries to minimize the difference between the true distribution and that of a candidate, whereas BIC tries to maximize the posterior model probability. Yang (2003) has shown that is not possible to unit the rivalry between both criteria, that is, consistency and minimax rate cannot be shared.

ALL SAMPLE	AIC	BIC
Multinomial logit	22.313,67	24.131,063
Bivariate probit	22.558,278	23.777,639
Trivariate probit	24.497,788	26.338,481
MEN		
Multinomial logit	7.053,7266	8.341,7855
Bivariate probit	7.081,212	7.951,3369
WOMEN		
Multinomial logit	15.465,927	16837,145
Bivariate probit	15.589,413	16510,814
YOUNGER		
Multinomial logit	8.066,8873	9.307,4584
Bivariate probit	8.062,8585	8.896,798
OLDER		
Multinomial logit	14.615,409	15.916.269
Bivariate probit	14.731,322	15.605,789

4. Results

4.1. Trade-off between formal and informal

After estimating the multinomial logit for the choice of care, we have computed the predicted probabilities of receiving each type of care for a determined base case: male, age 80-89, married, with elementary education, household income between 390,6€ and 1.171,97€ per month, suffering one PADL and one IADL and living in Cataluña. Table 5 reports the predicted probabilities for the base case and the marginal effects. The probability of receiving IC for the base case is the highest (0.278) in comparison with the probabilities of receiving some kind of formal care combined or not with informal one (0,025 for FC and 0,014 for FIC). These probabilities provide evidence in favour of the *Compensatory model*, because the favourite source of care for the baseline is IC, which is consistent with Bolin et al. (2007) results in that family ties are stronger in Mediterranean countries

The higher the level of education achieved, the lower probability of receiving IC (-3.7% for high school and -10.5% for college degree). In this sense, education of the dependent individual (which is also related with the level of education of his environment) may act as a measure of the cost of applying for social services²⁰ for people with disabilities (Bass and Noelker, 1987). Or alternatively, more educated potential caregivers may have a higher opportunity cost.

²⁰For example, there is plenty of information about social services for dependent people available through Internet (*Imsero Mayores, Servicio de Información sobre Discapacidad, InfoElder,...*).

Married dependent people show lower probability of receiving only FC. Some studies (Chappell and Blandford, 1991) consider that having a couple guarantees the reception of informal care. However, IC may be offered by other members of the family, such as adult children (Stoller and Earl, 1983; Ettner, 1995). In fact, the estimated coefficients indicate that each adult member increase the probability of receiving IC by 2.32%. The net of informal caregivers may improve dependent's health by listening to medical instructions, transporting the patient to appointments and may lead to noticing health problems more quickly (*Task-specific model*).

If the dependent individual receives a non contributive permanent disability benefit, the probability of receiving IC increases by 6.1%. By contrast, contributive disability benefit is not significant for any type of care. Perhaps the reason is that to receive a non contributive disability benefit it is necessary a degree of disability greater than 65% and be lacking of enough income, but one might receive a contributive disability benefit with a degree of disability of at least 33%.

The probability of receiving FC decreases for the three lowest intervals (-1,5%). At the same time the probability of receiving FIC increases as household income increases (0,4% for 1.172€-1.953,3€ and 4,8% for more than 3.906,6€). It should be pointed that FC received by individuals at lower income intervals usually comes from public social services (day centers, home care service), whereas individuals in higher income intervals do not qualify for public FC and have to rely on private FC (which may or may not co-reside with the dependent).

People who have benefited from a rehabilitation treatment or have changed of house to receive a better medical treatment show a significant increase in the probability of receiving the three types of care, although the probability of receiving IC increases more (8,7% for change of house and 2,4% for rehabilitation treatment). This fact may indicate that without the emotional support of informal caregivers, the dependent does not dare to start a different therapy, and thus reinforces the *Complementary Model*.

4.2. Choice of care by age and gender

Figure 8 shows the choice of care by age and gender. The number of individuals is showed on the top of each column. As we can see, the percentage of IC is higher for men and young dependent although in absolute terms there are more women and old people. Comparing the probabilities for the base case²¹ we observe that the probability of receiving FC is higher for women than for men (0,15 against 0,014) and the probability of receiving IC is higher for old dependent (70-99 years) with respect to the youngest (40-69 years) (0,291 against 0,135). The lowest probability of receiving FIC goes with young dependent (0.00071) whereas women attain the highest one (0.034)

²¹ For men and women: individual aged 80-99, married, one PADL and one IADL, living in Cataluña. For young and old: man, married, one PADL and one IADL, living in Cataluña.

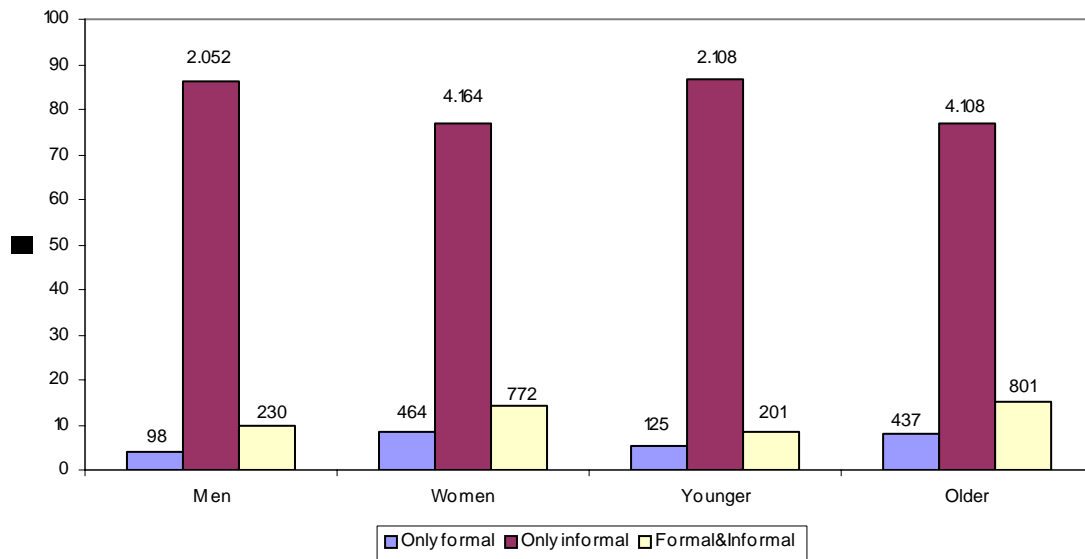


Figure 8. Choice of care by age and gender.

Comparison Men and Women

In Table 5 we present the results of the first stage multinomial model by gender. The probability of receiving FC decreases by 7% for married men and by 5% for married women. Being divorced decreases the probability of IC by 13% for men but it is not significant for women. On the other hand, the number of co-resident adults slightly decreases the probability of FC for men, but each additional adult increases the probability of IC for women by 4,5%. Two factors may explain why husbands of disabled women play a much lesser role than wives of disabled men. First, husbands of disabled women may be less able to provide care because they may be older²² and more disabled than wives of disabled men. Second, husbands may be less prepared to fulfill the social role of caregiver without the presence of disability (Lee et al, 1993).

Disabilities for seeing, hearing and communicating decrease the probability of FC for men and women. These disabilities may be offset, to a certain extent, with technical devices (hearing aid, special telephones, sound alarm systems), and with the appropriate use of these elements, dependent people do not need to be supervised permanently.

Suffering three or more IADL disabilities increase the probability of receiving FC by 3% for men and between 11 and 14% for women. Although we could think that gender differences related to IADL disabilities are connected to houseworking, support for grocery and preparing meals, we do not believe that this is the case because the gender difference is consistently observed across other IADL disabilities such as using public transport, moving around home and using utensils and tools. If the severity of the disability is recoverable, stable

²² In 2006, average marriage was 33.8 for men and 30.8 for women (27.4 and 24.5, respectively in 1975).

or can go worse, the probability of using IC increases for both genders, but the coefficients are more than twice for men than for women.

Comparison young and old

Tables 6 presents the results dividing the sample by age groups: young (50-69) and old (70+). Living in a municipality with less than 10.000 inhabitants increases (decreases) the probability of receiving IC for young (old) dependent individuals. For young carereceivers it may be easier to find a caregiver of the same generation (brothers, sisters), whereas for the case of old dependent people it is more difficult to find available caregivers because adult children could have migrated to another place looking for a job.

For the subsample of young dependent, we observe a negative sign for the marginal effect corresponding to disabilities for seeing, hearing, communicating, or having two or three PADL disabilities. Moreover, the highest marginal effect (in absolute value) corresponds to IC, which means that young dependants are less prone to use this type of care with respect to FC and FIC. However, for the old subsample, the probabilities of receiving the three types of care increases with the number of PADL or IADL disabilities. These differences may be explained because younger dependent people seek self-control and flexibility, emphasizing living as meaningfully and normally as possible. Many young dependent people perceive medication management, help with catheters and ostomies like an extension of daily living activities, which can be done without the supervision of a formal caregiver, once the patient has learnt to do everything by himself. By contrast, older dependent people have accepted that certain decisions are beyond their control (for example, home care is based on schedules, which means that bath time and bedtime may be different from their wishes).

With respect to cognitive impairments, the probability of using IC when suffering dementia or mental illness increases around 9% for young dependent, whereas it increases by 19% for old dependent. Moreover, suffering disability for remembering information or executing orders decreases the probability of IC for young dependent and diminishes the probability of FC for the old subsample. In this case, the difference in the social services approach between seniors with dementia and younger people with cognitive impairment suggests that ageism and not dementia is the root of the distinction. The Spanish Association of Mental Illness Relatives²³ claims that already exists a stigma associated to mental patients and their relatives, and call for an egalitarian treatment with the rest of dependent people,

If the severity of the disability is stable or can go worse the probability of receiving IC increases 5,2% and 6,4% respectively, for young, and 8,1% and 10,8% for old. The same effect

²³ <http://www.feafes.com/FEAFES/Noticias/Tratamiento+integral.htm>

is observed for the variable severity, 4,7% (13%) and 7% (12%) for moderate and very severe disabilities in the regression for young (old) dependent people.

Extremadura is the region with the higher probability of IC for young people and not for old, which may be explained because is the third region with more elder people living alone (21,3%). By contrast, Cantabria, Navarra and Ceuta show the highest probability for IC for old dependent. These results could be related to the characteristics of social services for dependent people in these Communities. Cantabria exhibits a very low coverage index for Telecare services²⁴ (0.2, opposite to 0.78 for Spain). In this case, the shortage of mechanical devices for watching the dependent people may act as reinforcement for family care. Navarra is the region where the Home Care is more expensive²⁵.

With respect to Ceuta, there are not any private or public day centers and shows the lowest coverage index for residential centers (1.46, in contrast with the Spanish average of 3.21²⁶). It could be argued that there are other regions where the coverage index for Home Care is lower, but 70% of the time is devoted to home help and consequently, the carereceiver does not perceive that aid as specialized or skilled. On the other hand, Ceuta is the region with the lowest percentage of elder people living alone (14%, opposite to 19.9% for Spain²⁷) which may justify the prevalence of IC over FC.

Finally, the probability of receiving FC for old dependent is greater in Cataluña. Although the coverage index is lower than the national average (1.2 opposite to 1.8), 85% of Home Care time is devoted to personal care and only 15% to home help. In this sense, estimated coefficients might reveal how useful is perceived each type of care by the carereceiver.

4.3. The hours equation

The estimation results for the regression of caregiving hours (second step of the Bourguignon model) are shown in Table 7. The variables M_k ($k=1,2,3$) are consistent estimators of the expected conditional residuals of the multinomial model. Each coefficient M_k represents the covariance between the residual of least squares regression and the corresponding residual from the multinomial logit regression. The variable σ_1 represents the standard deviation of the regression error term.²⁸

²⁴Home Care and Telecare services depend upon local administration. Comparing the characteristics of these services across regions, we detect large disparities in both eligibility and generosity.

²⁵The cost of Home Care service differs a lot across regions (the most expensive one is Navarra with 19.08 €/hour). Moreover, the co-payment percentage varies from 0% in Ceuta and Melilla (5% in Andalucía and Murcia, 10% in País Vasco,) to 20% in Rioja.

²⁶See Table G for coverage indexes of social services of dependent people.

²⁷Censo de Población y Vivienda (Population and Dwelling Census, INE, 2001).

²⁸We have also estimated the equation for the number of care hours by OLS, that is, without taking into account the correlation with the choice of the type of care [The results of these exercises are available upon request]. Comparing the results with those obtained in the bourginon model, we extract three important lessons. First, in the regression for FC, the number of caregiving years is not significant, but in

The significance of the selectivity correction terms indicates that the appropriate estimation method for the hour equations is the model proposed by Bourguignon et al. (2004) rather than OLS. The multinomial logit selection model allow us not only to identify the direction of the bias related to the choice of a certain type of care, but also which choice among any two types of care is the cause of the bias.

Children²⁹, in some sense, put pressure on caregivers, because dependent people who co-reside with them receive less IC hours. In fact, we are being witness to the so-called “sandwich generation”, that is, adult children who have to devote attention both to old parents and young children.

The sign of the estimated coefficients for the variable household income is quite interesting because the number of FC hours decreases for very low income and for the interval 1.953,29€-3.906,58€ Regarding the provision of social services, Regional Administration is responsible for both the supply of social services and the determination of what requirements are needed to apply for one place. These requirements usually include a valuation of the degree of disability, the availability of informal care and the financial situation of the applicant (Casado and López Casanovas, 2001; Casado, 2005). So high income households are, most likely, excluded from these services. But the only plausible explanation for low income households is information illiteracy about the offer of public services.

With respect to illnesses, we observe that mental illness, dementia, stroke and multiple sclerosis increase the number of IC hours. However, suffering arthritis decreases the number of IC. This may be because Alzheimer, multiple sclerosis and other types of dementia are degenerative and patients who have suffered a stroke need special care if they want to prevent a lethal repetition. But arthritis is a painful illness, that limits the ability for climbing stairs, maintaining body positions, walking, and do houseworking, but it does not provokes a shortfall of mental faculties.

the selection model there is an increase in the demand for FC hours during the first year of care and after the eighth year. It seems that at the onset of the disability or when the diagnosis is known, some people decide to look for FC. On the other side, for the case of chronic diseases, FC is requested to avoid institutionalisation. Second, some variables become insignificant when we do not control for selection bias. For example, in the regression for IC, this is the case of multiple sclerosis, disability for remembering/executing, number of PADL=2 and the coverage index for telecare services are significant. In the regression for FIC, this is also the case for the number of adults living in the household, the number of PADL=2 and the coverage index for private residential homes. Third, in the regression for FC and FIC without controlling selection bias, lower income households demand less caregiving hours. However, in the multinomial logit selection model lower income intervals are not significant. Actually, low household income is a significant variable in the logistic model for the choice of care. Then, when we do not control selection bias we misinterpret the effect of income. Low income households tend to choose IC instead of FC or FIC. But, once the selection has been made, this variable is irrelevant for the number of hours demanded.

²⁹This variable was not significant in the estimation of the hours equation by OLS (available upon request).

Table B synthesises the interpretation of the selection bias correction terms shown in Table 7 of the Appendix. The number of the selection bias term corresponds to the alternative of care (0= no care; 1 = FC; 2= IC; 3= FIC). We have found evidence in favour of the Complementary and Task Specific Model and against the Substitution Model. This conclusion should be taken with enthusiasm by policy makers because confirms that services for dependent people provided by the public sector are not going to substitute informal caregiver's support. Instead, formal care is going to share caregiving tasks with the family (Home Care, Day Centres), alleviate caregiver's burden (Respite services) or provide technological devices (Telecare).

Table B. Interpretation of the Bias Correction Terms of Bourguignon Model. All Sample

Equation	Interpretation	Evidence in favour/against
$M1 > 0$ in IC equation	Individuals with IC receive more caregiving hours compared to individuals taken at random, due to the allocation of people with less disabilities out of IC and into FC	Against Substitution Model
$M3 < 0$ in IC equation	Less caregiving hours of individuals with IC \Rightarrow people with more disabilities out of IC and into FIC	In favour of Complementary and Task Specific Model
$M0 > 0$, $M1 > 0$ and $M2 > 0$ in FIC equation	More caregiving hours of individuals with FIC \Rightarrow people with less disabilities out of FIC and into No Care, FC, IC.	In favour of Complementary and Task Specific Model

4.4. Hours equation by age and gender

Figure 9 shows the distribution of the number of caregiving hours by age and gender. Men subsample attains the highest percentage for more than 60 hours per week, followed by the sample of older individuals. By contrast, young people and women show the highest frequency for less than 7 hours per week. For the four subsamples, the intervals 30-40 and 40-60 hours per week show a deep decrease, which denotes not a monotone progression in the number of caregiving hours.

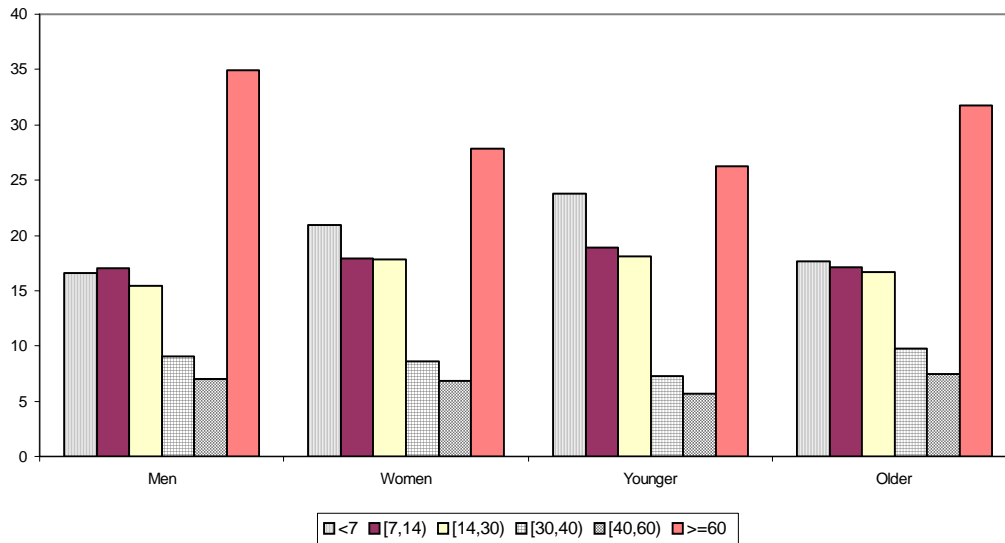


Figure 9. Distribution of the number of weekly caregiving hours by age and gender.

Comparison Men and Women

Table 8 shows the results for the second step hour regressions by gender. First of all, none of the selectivity terms (M_k , $k=1,2,3$) are significant in the male regressions for FC and FIC. It appears that in these cases the choice of the type of care and the number of caregiving hours are independent variables. In fact, the goodness of fit for the male FC regression is very poor because from the sample of 562 observations who receive FC, only 98 are male.

As stated, Table 8 also reports the estimation of the second step of the Bourguignon model for women. Neither of the M_k terms is significant for the FC hours equation, which means that the choice of formal care and the number of caregiving hours are independent decisions and therefore OLS estimation performs better.

We observe that age is not significant in the regression of IC for the subsample of men (whereas it is significant for the whole sample and the subsample of women). That is, for male, it is easier to receive IC independently of the age of the carereceiver. By contrast, for women, oldest age intervals are significant. On the other hand, widowed or divorced males tend to receive less IC hours, while only divorced women receive less IC hours (with a smaller coefficient compared to men). This indicates that having a couple practically guarantees the reception of IC hours, but dependent wives do not trust on their husbands as primary caregivers. Moreover, the number of co-resident adults is not significant for male but it is very significant for women (mainly daughters or daughters-in-law who behave as caregivers).

Suffering dementia, mental illness or having stayed at hospital increases the number of IC hours for both genders, although coefficients are always higher for men.

Comparison young and old

Table 9 shows the estimation of the second step (hours equation) of the Bourguignon model by age groups: young dependent (40-69) and older dependent (70+). For young dependent, we find that for each equation at least one term M_k is significant which indicates that the estimations by OLS are biased (Available upon request). In fact, if we compare the coefficients estimated for the FC hours equation by the BM and by OLS, there exist great disparities. We observe that suffering mental illness or muscular sclerosis decrease the number of FC hours and at the same time increase the number of FIC and IC hours (*Compensatory or Complementary Model*).

Having changed house, suffering muscular dystrophy or cerebral palsy increases the number of FC hours and having an impairment certificate increases both the number of FC and FIC hours. For muscular diseases, the availability of wheelchairs, crutches, kitchen accessories, devices for climbing stairs or bath adaptations combined with the surveillance of an employee or informal caregiver (in cases of very severe disabilities) may lengthen the independence of the individual.

With respect to the estimation of the hours equation for the subsample of old dependent people (70-99 years) (also reported in Table 9) we appreciate that none of the variables M_k is significant for the FC hours equation, that is, in this case the estimation by least squares is preferred to the Bourguignon model.

As we have commented before, caregiver's sex is a capital question when determining the propensity to receive informal care. The estimations confirm that old-male dependent people also tend to receive more IC hours independently of marital status.

Suffering arthritis decreases the number of IC hours. This fact could seem surprising at first sight, because according to official statistics, arthritis is much more prevalent among women, but as we have seen previously women live longer and more women live alone³⁰, and if they are married, as disability increases among married men, wives largely assume the increased care needs even when these women were themselves disabled.

If we compare the results for the subsample of young and old dependent people, we observe that the number of days stayed at hospital increases the number of IC hours for the subsample of old dependent, but it also decreases the number of FC hours for the subsample of young dependent. Sometimes, an acute event, that entails a hospital stay and gathering of relatives, implies the urgency of deciding the type of care. The initial decision may set up the course for subsequent care. Deciding which type of care is better requires knowing the benefits, risks and costs of the alternatives.

³⁰ From the sample of 7780 dependants, there are 1195 individuals who live alone (84% women and 16% men). For the subsample of FC receivers, 251 individuals live alone (85.3% women and 14.6% men).

Having received a rehabilitation treatment has a different impact over younger and older dependent, because for the former, we observe that the number of FC and IC hours decreases, whereas for the latter ones this variable is not significant. This result may reflect that the possibilities of recovering are higher for younger people, and consequently if they experience an improvement in the ability for doing daily living activities, the demand of caregiving hours is reduced.

It is evident that the size of the municipality is related to the availability of social services for dependent people, but we observe that living in a municipality with 10.000-50.000 inhabitants increase the number of FC hours for young and decreases the number of FC hours for older people. The difference nature of the services demanded may be the answer to this disparity. Young people may be interested in rehabilitation treatment, whereas older ones may prefer day centres or home care.

With respect to the degree of severity, very severe disabilities increase the number of FC hours for young and the number of FIC hours for older dependent³¹. As we have commented before, young people prefer to maintain their autonomy and do not depend on relatives (perhaps because they do not want to disturb them or because their priority is to protect their intimacy).

Finally, for both subsamples the number of co-resident adults increase the number of FC, IC and FIC hours, indicating that the family may decide to provide more or less support to the dependent. Anyway, the highest coefficient corresponds to FC, so we could state that in most cases there is strong evidence against the *Substitution Model*.

Table C summarizes the interpretation of the selection bias terms for the four models we have estimated. Most cases point to the *Complementary* and *Task-Specific Model*, that is, IC does not decrease when dependent people start receiving FC, and at the same time, when caregiving demands go beyond IC abilities, more complex tasks are developed by formal caregivers. For the male subsample, as we have commented before the mainstream trend is to rely on IC, but in our opinion there may be an inefficient allocation of resources, that is, the carereceiver would be better receiving formal care alone or combined with informal one.

Table C. Interpretation of the Bias Correction Terms of Bourguignon Model.

Equation	Interpretation	Evidence in favour/against
MEN SUBSAMPLE		
M2<0 in IC equation	Inefficient allocation of resources, because although some male dependent people would have been better with FC or FIC, remained receiving only IC.	Inefficient allocation of resources

³¹ These variables were not significant in the estimation by OLS of the hours equation (See Table 16 for old subsample and estimations are available upon request for young subsample).

WOMEN SUBSAMPLE		
M1>0 in IC equation	More caregiving hours of individuals with IC \Rightarrow people with less disabilities out of IC and into FC	Against Substitution Model
M3<0 in IC equation	Less caregiving hours of individuals with IC \Rightarrow people with more disabilities out of IC and into FIC	In favour of Complementary and Task Specific Model
M0>0 and M1>0 in FIC eq.	More caregiving hours of individuals with FIC \Rightarrow people with less disabilities out of FIC and into No care or FC.	In favour of Complementary and Task Specific Model
YOUNG SUBSAMPLE		
M2>0 in FC equation	More caregiving hours of individuals with FC \Rightarrow people with less disabilities out of FC and into IC	In favour of Substitution Model
M1<0 in IC equation	Less caregiving hours individuals with IC \Rightarrow people with more disabilities out of IC and into FC.	In favour of Substitution Model
M1<0 in FIC equation	Less caregiving hours individuals with FIC \Rightarrow people with more disabilities out of FIC and into FC.	In favour of Substitution Model
OLD SUBSAMPLE		
M1>0 in IC equation	More caregiving hours of individual with IC \Rightarrow people with less disabilities out of IC and into FC.	Against Substitution Model
M3<0 in IC equation	Less caregiving hours of individual with IC \Rightarrow people with more disabilities out of IC and into FIC	In favour of Complementary and Task Specific Model
M0>0, M1>0 and M2>0 in FIC equation	More caregiving hours of individuals with FIC \Rightarrow people with less disabilities out of FIC and into No care, FC, IC.	In favour of Complementary and Task Specific Model

5. Conclusions

One of the most important health policy issues that we face now is how to provide support to people with disabilities living in the community. Because of projected demographic shifts, families and policy makers will be confronted with an increase in the number of people who must cope with disabilities due to ageing or chronic disease.

Searching for a central tendency in long term care preferences is a worthwhile prelude to serious consideration of how to reshape policies and practices for dependent people. However, results from the multinomial logit for the choice of care point to the existence of differences by age and gender. Younger dependent seek care that let them to develop a life with enough degree of autonomy. By contrast, older dependent see their life as coming to a conclusion and try to keep enough resources for the end of their lives or for their families. Perhaps is a societal problem, but the consequence could be that old dependent might be cut off from the insights of younger people of disabilities because do not know how to use the system of social protections.

With respect to gender, it is worth to mention three relevant facts. First, women make up a greater number of dependent people because they tend to live longer than men. Second, disabled women may be more vulnerable to unmet needs because many of them live alone with limited resources³². Third, even married women may be more vulnerable because they tend to take care of their husbands even when they are partially disabled. In consequence, married women with disabilities may be more prone to unmet needs because of limited caregiving from their husbands and because they themselves must often remain as central caregiver in the family. On the grounds that many disabled women rely on children from support, (especially female children or daughters-in-law), the family burden and stress associated with caregiving for a disabled women should be the subject of a future study.

Regarding the provision of social services, the estimation results reveal large disparities among regions. In first place, the probability of receiving FC is lower in some communities. Second, the distribution of weights between home help and personal care in home care service is not homogeneous across regions. To our knowledge, if home care increased the fraction of time devoted to personal care, the service would be more efficient and would also generate a demand of skilled professionals (medical practitioners, nurses, physiotherapists, psychologists)³³. The results of the analysis suggest the need to expand publicly funded home and community-based services, provide greater support for unpaid informal caregivers and more financing options for long-term services.

The Law of Personal Autonomy and Attention to Dependent People outlines a new dependency sector in which local authorities, regions and the state will have their own separate task identity. The state set ups the overall framework whereas local authorities will handle tasks directly targeted at the citizen. The Dependency Law provides a better basis for ensuring cohesive patient treatment across administrative borders as well as easy and simplified access to prevention, examination treatment and care of a high professional quality.

The Law reinforces the idea of prevention. This service is not only health check, but also an opportunity to meet individual needs that may be of importance for older people to stay independent. Prevention must comprise all aspects of an individual's well-being (functional ability, life content, possibilities of self-determination...). Research has documented the best functioning of the older population who receives preventive attention (Kendrick et al., 2001; Stuck et al., 2002). Moreover, older people visited by preventive staff are gaining confidence in public sector's ability to assist if specific needs should later arise, and thus it creates a sense of security in daily life.

³² 72,90% of individuals with less than 390,6€ per month are women.

³³ According to “*Libro Blanco de la Dependencia*” and Herce et al. (2006), by 2010, the National Dependency System may generate as much as 262735 new jobs.

From our point of view, more resources should be devoted to information. This approach requires the collection of standardized data to provide consumers with better information. Data on various types of long term care alternatives should be arrayed to show measures of quality (of care and of life), staffing qualifications and consumer satisfaction. Information could be provided through web sites, hospitals, outpatient clinics, health care practitioners, health departments...

Finally, the next step would be to develop a quality model for the National Dependency System in order to look for continuous clinical, professional and organizational quality improvements of patient treatment. Some quality standards should be defined in terms of what kind of help citizens are entitled if they need personal or practical help, rehabilitation or physical maintenance training. For each patient, it should be detailed the content, scope and rendering of the help, and set quality targets that could be used to assess efforts at least once a year.

References

1. Archbold, P., 1982. All consuming activity: the family as caregiver. *Generations* 7, 12-13.
2. Bass, D. M., Noelker L. S., 1987. The influence of family caregivers on elder's use of in-home services: and expanded conceptual framework. *Journal of Health and Social Behavior* 28, 184-196.
3. Bass, D., Noelker, L., 1989. Home care for elderly persons: linkages between formal and informal caregivers. *Journal of Gerontology* 44, S63-S70.
4. Bass, D., Noelker, L., 1994. Relationships between the frail elderly's informal and formal helpers. En E. Khana, D. Biegel, M. L. Wykle (eds.), *Family caregiving across lifespan*, 356-381. Albany, NY: State University of New York Press.
5. Bolin, K., B. Lindgren, P. Lundborg, 2008. Informal and Formal Care among single-living elderly in Europe. *Health Economics* 17, 393-409.
6. Bourguignon, F., Fournier, M., Gurgand, M., 2004. Selection bias corrections based on the multinomial logit model: Monte-Carlo comparisons. Department et Laboratoire d'Economie Théorique et Appliquée, Working Paper N. 2004-20.
7. Branch, L., Jette, A., Evashiwick, C., Polansky, M., Rowe, G., Diehr, P., 1981. Toward understanding elder's health service utilization. *Journal of Community Health* 7, 80-92.
8. Cantor, M., 1979. Neighbors and friends: and overlooked resource in the informal support system. *Research on Aging* 1, 434-463.
9. Cantor, M., 1991. Family and the community: changing roles in an aging society. *The Gerontologist* 31, 337-346.
10. Carmichael, F., Charles, S., 2003. Benefit payments, informal care and female labour supply. *Applied Economic Letters* 10, 411-415.
11. Casado, D., 2005. Envejecimiento y dependencia: un análisis económico de sus efectos sobre las finanzas públicas. Ph.D. Dissertation. Universitat Pompeu Fabra (mimeo).
12. Casado, D., López Casanovas, G., 2001. Vejez, dependencia y cuidados de larga duración: situación actual y perspectivas de futuro. Barcelona. Fundación "La Caixa".
13. Censo de Población y Hogares. INE, 2001.
14. Chappell, N., 1991. In-group differences among elders living with friends and family other than spouse. *Journal of Aging Studies* 5, 61-76.
15. Chappell, N. L., Blandford, A., 1991. Informal and formal care: exploring the complementarity. *Ageing and Society* 11, 299-315.
16. Chi, P. S., Hsin, P. L., 1999. Medical utilization and health expenditures of the elderly in Taiwan. *Journal of Family and Economic Issues* 20, 251-270.
17. Christianson, J. B., 1988. The evaluation of the national long-term demonstration: the effect of channeling on informal caregiving. *Health Services Research* 23, 99-117.
18. Dahl, G. V., 2002. Mobility and the returns to education: testing a Roy model with multiple markets. *Econometrica* 70, 2367-2420.
19. Denton, M., 1997. The linkages between informal and formal care in the elderly. *Canadian Journal on Aging* 16, 30-50.
20. Dubin, J. A., McFadden, D. L., 1984. An econometric analysis of residential electric appliance holdings and consumption. *Econometrica* 52, 345-362.
21. Edelman, P., Hughes, S., 1990. The impact of community care on provision of informal care to homebound elderly persons. *Journal of Gerontology* 45, 74-84.
22. Elkan, R., Kendrick, D., Dewey, A., Hewitt, M., Robison, J., Blair, M., Williams, D., Brummell, K., 2001. Effectiveness of home based support for older people: systematic review and meta-analysis. *British Medical Journal* 323, 1-8.
23. Ettner, S. L., 1995. The impact of parent care on female labor supply decisions. *Demography* 32, 63-80.
24. Ettner, S. L., 1996. The opportunity costs of elder care. *The Journal of Human Resources* 31, 189-205.
25. Fast, J. E., Williamson, D. L., Keating, N. C., 1999. The hidden costs of informal elder care. *Journal of Family and Economic Issues* 20, 301-326.
26. Federal Interagency Forum on Aging Related Statistics, 2000. Older Americans 2000: key indicators of well-being. Retrieved September 14, 2006. <http://www.agingstats.gov>

27. Fischer, L. R., Eustis, N. N., 1994. Care at home: family caregivers and home care workers. En E. Khana, D. Biegel, M. Wykle (eds.), *Family caregiving across lifespan*, 108-131. Albany, NY: State University of New York Press.
28. Glazer, N., 1990. The home as workshop: women as amateur nurses and medical care providers. *Gender and Society* 4, 479-499.
29. Greene, V., 1983. Substitution between formally and informally provided care for the impaired elderly in the community. *Medical Care* 21, 609-619.
30. Heckman, J., 1979. Sample selection bias as a specification error. *Econometrica* 47, 153-161.
31. Hirst, M. Carer distress: a prospective, population-based study. *Social Science Medicine* 61, 697-708.
32. Herce, J. A., Labeaga, J. M., Sosvilla Rivero, S., Ortega, C., 2006. Sistema Nacional de Dependencia. Evaluación de sus efectos sobre el empleo. IMSERSO.
33. Jiménez-Martín, S., Vilaplana, C., 2008. La calidad de los cuidadores en España. En S. Jiménez-Martín (Ed.), *Aspectos económicos de la dependencia y del cuidado informal en España*. Fundación Astrazeneca.
34. Keating, N. C., Fast, J. E., Connidis, I. A., Penning, M., Keefe, J., 1997. Bridging policy and research in eldercare. Special joint issue, *Canadian Journal on Aging and Canadian Public Policy*, 22-41.
35. Kemper, P., 1992. The use of formal and informal home care by the disabled elderly. *Health Services Research* 27, 421-454.
36. Langa, K. M., Chernew, M. E., Kabeto, M. U., Katz, S. J., 2001. The explosion in paid home care in 1990s: who received the additional services? *Medical Care* 39, 147-157.
37. Lee, L., 1983. Generalized econometric models with selectivity. *Econometrica* 51, 507-512.
38. Lee, G. R., Dwyer, J. W., Coward, R. T., 1993. Gender differences in parent care: demographic factors and same-gender preferences. *Journal of Gerontology* 48, S9-S16.
39. Libro Blanco de la Dependencia, 2004. Imsero
40. Litwak, E., 1985. Helping the elderly: the complementarity roles of informal networks and formal systems. New York: Guildford Press.
41. Liu, K., Manton, K. G., Aragon, C., 2000. Changes in home care use by disabled elderly persons: 1982-1984. *Journal of Gerontology B: Psychological Sciences Social Sciences* 55, S245-S253.
42. Mayall, B., 1993. Keeping children healthy; the intermediate domain. *Social Science and Medicine* 36, 77-83.
43. Moscovice, I., Davidson, G., McCaffrey, D., 1988. Substitution of formal and informal care for the community-based elderly. *Medical Care* 26, 971-981.
44. Norton, E. C., 2000. Long-term care. In A. J. Culyer, J. P. Newhouse (Eds.), *Handbook of health economics*. Vol 1B. Amsterdam: Elsevier Science.
45. Observatorio de personas mayores. Las personas mayores en España. IMSERSO, 2000.
46. Penning, M. J., Chappell, N. L., 1990. Self-care in relation to informal and formal care. *Ageing and Society* 10, 41-59.
47. Picone, G., Wilson, R. M., 1999. Medicare home health agency utilization, 1984-1994. *Inquiry* 36, 291-303.
48. Silverstain, M., Litwak, E., 1993. A task-specific typology of intergenerational family structure in later life. *The Gerontologist* 33, 258-264.
49. Stoller, E. P., 1989. Formal services and informal gerontology: the myth of service substitution. *Journal of Applied Gerontology* 8, 37-52.
50. Stoller, E. P., Earl, L. L., 1983. Help with activities of everyday life: sources of support for the noninstitutionalized elderly. *The Gerontologist* 23, 64-70.
51. Stoller, E. P., Pugliesi, K. L., 1991. Size and effectiveness of informal helping networks: a panel study of older people in the community. *Journal of Health and Social Behavior* 32, 180-191.
52. Stuck A. E., Egger, M., Hammer, A., Minder, C. E., Bek, J. C., 2002. Home visits to prevent nursing home admission and functional decline in elderly people. Systematic review and meta-regression. *Journal of American Medical Association* 287, 1022-1028.
53. Tennstedt, S. L., Crawford, S., L., McKinlay, J., 1993. Is family care on decline? A longitudinal investigation of the substitution of formal long-term care services for informal care. *The Milbank Quarterly* 71, 601-625.
54. Tennstedt, S. L., McKinlay, J., Crawford, S. L., 1994. Unmet need among disabled elders: A problem in access to community long care? *Social Science Medicine* 38, 915-924.

55. Van Exel, N., van den Bos, G., van den Berg, B., Koopmanschap, M., 2004. What really matters: an inquiry into the relative importance of dimensions of care giving burden. *Clinical Rehabilitation* 18, 693-693.
56. Van Houtven, C. H., Norton, E. C., 2004. Informal care and health care use of older adults. *Journal of Health Economics* 23, 1159-1180.
57. Vittanen, T. K., 2007. Informal and formal care in Europe. Institute for the Study of Labor. IZA DP No. 2648.
58. Yang, Y., 2003. Can the strengths of AIC and BIC be shared? Department of Statistics. Iowa State University. <http://www.stat.iastate.edu/preprint/articles/2003-10.pdf>
59. White-Means, S., 1997. The demands of persons with disabilities for home health care and the economic consequences for informal caregivers. *Social Science Quarterly* 78, 955-972.
60. Zarit, S. H., Eggenbeen, D. J., 1995. Parent-child relationships in adulthood and old age. In M. H. Bornstein (Ed.), *Handbook of parenting*, Vol 1. Children and parenting. Mahwah, NJ: Erlbaum.

Appendix. Description of variables

A. Sociodemographic variables

- Male : 1 if interviewed is male
- Age: five binary variables for the following intervals (40-49, 50-59, 60-69, 70-79, 80-89 and 90-99)
- Marital status: binary variables for “married/cohabiting”, “single”, “divorced/separated” and “widow”
- Number of adult household members
- Number of children: “less than 4 years old”, “between 5 and 12 years” and “between 13 and 17 years”
- Level of education: binary variables for the categories “no studies”, “elementary”, “high school” and “college”.
- Relation with economic activity: binary variables for “working”, “unemployed”, “retired”, “receiving a contributive disability benefit”, “non contributive disability benefit” and “houseworking”.
- Monthly household-income: binary variables for nine intervals (<264.5; [264.5 – 390.6); [390.6 – 781.2); [781.2 – 1172); [1172 - 1562.6); [1562.6 – 1953.3); [1953.3 – 2344); [2344 – 3906.6); > 3906.5. There are 7.8% of the observations for which household income is missing.
- Size of municipality: binary variables for four population intervals (<10.000 inhabitants, 10.000-50.000, 50.000-500.000, >500.000).
- Autonomous Community: binary variable for each one of the Spanish Autonomous Communities.

B. Health related variables

- Illnesses and chronic pathologies: binary variables for the following diseases “mental illness”, “muscular dystrophy”, “multiple sclerosis”, “stroke”, “cerebral palsy”, “dementia”, “arthritis” and “Parkinsonism”.
- Change of house: 1 if the interviewed has changed of house because of a disability or deficiency (with the objective of living in an adapted household or receiving better medical attention)
- Rehabilitation treatment: 1 if the individual has already finished a rehabilitation treatment.
- Number of days stayed at hospital during last year.

C. Disabilities

- Seeing: receiving any image, global visual tasks, detailed visual tasks and other visual disabilities.
- Hearing: hearing any sound, hearing strong sounds and listening the speech.
- Communicating: communicating through speech, through alternative languages, through not sealed gestures and through conventional reading/writing.
- Executing/Remembering: recognizing people/objects, being orientated in space and time, remembering information and past episodes, dealing or executing simple orders or doing simple tasks, dealing or executing simple orders or doing complex tasks.
- Maintaining body postures: getting up and down, standing up and moving inside home.
- Using arms and hands: moving/transporting not very heavy objects, using utensils and tools, manipulating small objects with hands and fingers.
- Taking care of oneself: washing oneself, controlling physical needs, dressing and undressing, eating and drinking.
- Do houseworking: do the shopping, washing and ironing clothes, cleaning the house, looking after the well-being of the family.
- Relating: supporting relations of fondness with friends and relatives, meeting new friends, relations with workmates, employer and employees.
- Impairment certificate: this certificate is awarded to people with at least a 33% reduction in the ability for performing daily living activities.
- Classification of the variable severity: without any difficulty, with moderate difficulty, with serious difficulty, cannot do the activity.
- Classification of the variable forecast: recoverable, recoverable with restrictions, stable without perspectives of improvement, can go worse, it is not possible to determine.

Table 1. Public expenditure in ageing and long term care.

	Ageing and long term care expenditure (2004)			Dependency rate 2007
	% GDP	% Health expenditure	% Social Expenditure	
Austria	0.956	13.46	3.32	25.0
Belgium	0.051	0.66	0.17	25.9
Denmark	1.731	28.38	5.75	23.2
Finland	0.679	10.13	2.54	24.8
France	0.324	3.68	1.03	24.9
Germany	0.344	4.41	1.17	29.9
Greece	0.097	1.49	0.40	27.6
Ireland	0.225	3.26	1.24	16.2
Italy	0.118	1.74	0.45	30.2
Luxembourg	-	-	-	20.7
Netherlands	0.874	10.79	3.10	21.5
Portugal	0.253	1.29	2.82	25.6
Spain	0.316	4.94	1.52	24.2
Sweeden	2.492	33.23	7.79	26.4
United Kingdom	1.046	12.91	3.90	24.1
EU-15	0.545	7.08	1.96	-
Bulgaria	0.035	0.78	0.22	24.9
Cyprus	0.002	0.04	0.01	17.6
Czech Republic	0.33	5.08	1.73	20.2
Estonia	0.083	2.13	0.66	25.1
Hungary	0.381	5.95	1.74	23.2
Latvia	0.144	3.68	0.92	24.8
Lithuania	0.149	3.82	1.13	22.7
Malta	0.585	12.19	3.20	19.8
Poland	0.313	8.24	1.60	19.0
Romania	0.012	0.24	0.08	21.3
Slovakia	0.204	4.25	1.21	16.5
Slovenia	0.186	2.51	0.79	22.7
UE-25	0.533	7.11	1.95	25.3
UE-27	0.528	7.04	1.94	25.2

Source: Eurostat (Population and Social Conditions. Data for Portugal corresponds to 2004..

Dependency ratio: number of people 65 and older divided by total active population (15-64 years old)

Table 2. Descriptive Statistics by type of care received

	No care	Receives some type of care		
		Only informal	Only formal	Formal and informal
Male	0.4765	0.3301	0.1743	0.2295
Age				
40-49	0.0990	0.0606	0.0249	0.0579
50-59	0.1609	0.1008	0.0765	0.0489
60-69	0.2728	0.2036	0.1352	0.1217
70-79	0.3122	0.2911	0.3701	0.3073
80-89	0.1393	0.2707	0.3416	0.3662
90-99	0.0156	0.0728	0.0516	0.0968
Marital Status				
Married / Cohabiting	0.6662	0.5180	0.3345	0.4421
Single	0.0910	0.1061	0.1797	0.1347
Divorced / Separated	0.2239	0.3637	0.4555	0.4051
Widow	0.0187	0.0119	0.0302	0.0169
Main breadwinner	0.6068	0.4306	0.6387	0.4331
Level of education				
No studies	0.4655	0.5945	0.4893	0.5129
Elementary	0.3945	0.3351	0.3327	0.3582
High School	0.0995	0.0555	0.0889	0.0808
College	0.0403	0.0148	0.0889	0.0479
Relation with economic activity				
Working	0.1088	0.0249	0.0124	0.0139
Unemployed	0.0237	0.0074	0.0017	0.0039
Retired	0.3647	0.3381	0.3274	0.3632
Contributive disability benefit	0.1721	0.1933	0.1797	0.1347
Non contributive disab. benefit	0.0530	0.1151	0.0693	0.1067
Houseworking	0.2118	0.1452	0.2206	0.1287
Monthly household income				

< 264,5 €	0.0195	0.0209	0.0231	0.0199
264,5 – 390,6 €	0.1503	0.1349	0.2526	0.1846
390,6 – 781,2 €	0.4032	0.3938	0.3683	0.3323
781,2 – 1.171,97 €	0.1929	0.2054	0.1476	0.1536
1.171,97 – 1.562,63 €	0.0863	0.0982	0.0569	0.0938
1.562,63 – 1.953,29 €	0.0359	0.0442	0.0177	0.0568
1.953,29 – 2.343,95 €	0.0169	0.0141	0.0195	0.0269
2.343,95 – 3.906,58 €	0.0137	0.0115	0.0177	0.0329
> 3.906,58 €	0.0024	0.0012	0.0035	0.0099
Number of adults	2.7460	3.0518	1.8576	2.4351
Number of children				
Less than 4 years	0.0223	0.0247	0.0017	0.0109
Between 5 and 12 years	0.0752	0.0841	0.0160	0.0349
Between 13 and 17 years	0.1055	0.1113	0.0160	0.0658
Size of municipality				
< 10.000 inhabitants	0.3057	0.3230	0.2758	0.2395
10.000 – 50.000	0.2233	0.2549	0.2046	0.2035
50.000 – 500.000	0.3672	0.3342	0.3914	0.4371
> 500.000	0.1037	0.0876	0.1281	0.1197
Illnesses				
Mental illness	0.0216	0.0559	0.0320	0.2588
Arthritis	0.2170	0.3021	0.3576	0.2854
Muscular dystrophy	0.0284	0.0611	0.0658	0.0188
Multiple sclerosis	0.0122	0.0199	0.0195	0.0289
Stroke	0.0737	0.1077	0.0943	0.1087
Cerebral palsy	0.0276	0.0900	0.0516	0.1217
Dementia	0.0104	0.0822	0.0516	0.1327
Parkinsonism	0.0146	0.0398	0.0355	0.0658
Change of house due to disability	0.0259	0.1077	0.0818	0.1217
Rehabilitation treatment	0.1184	0.1819	0.2241	0.2365
Impairment certificate	0.1617	0.1933	0.1743	0.2125
Number days at hospital last year	1.4904	3.7968	3.7419	5.4371
Number of disabilities	3.1469	9.6819	8.3505	12.6147

Table 3. Descriptive Statistics (continuation)

	No care	Receives some type of care		
		Only informal	Only formal	Formal and informal
Disability for:				
Seeing	0.3169	0.2712	0.2971	0.3013
Hearing	0.3634	0.1985	0.1975	0.2195
Communicating	0.0577	0.1970	0.1281	0.2964
Executing / Remembering	0.0692	0.2240	0.1850	0.3043
Maintaining body postures	0.2432	0.5183	0.4911	0.6357
Using hands and fingers	0.2106	0.4567	0.3932	0.5562
Moving outside home	0.4051	0.8605	0.7722	0.8952
Taking care of oneself	0.0417	0.4644	0.2829	0.5908
Houseworking	0.1677	0.7881	0.9181	0.9381
Relating to other people	0.0733	0.2268	0.1957	0.3043
Number of disabilities for PADL	0.5040	2.1476	1.6423	3.0708
PADL = 2	0.0768	0.1359	0.1227	0.1037
PADL = 3	0.0432	0.1219	0.1032	0.1217
PADL >= 4	0.0182	0.2446	0.1690	0.4071
Number of disabilities for IADL	1.4346	5.6134	4.9750	6.7754
IADL = 2	0.1481	0.1048	0.1120	0.0528
IADL = 3	0.1057	0.1140	0.1476	0.0708
IADL >= 4	0.1155	0.7089	0.6476	0.8522
Degree of severity				
No severe	0.0287	0.0476	0.0569	0.0469
Moderate severity	0.8751	0.9895	0.9786	0.9940
Very severe	0.5791	0.9565	0.9306	0.9860
Can not do the activity	0.3638	0.8812	0.8185	0.9510
Prognosis				
Recoverable	0.0722	0.0157	0.0088	0.0139
Recoverable with restrictions	0.0509	0.0553	0.0747	0.0508
Stable	0.4399	0.4803	0.4466	0.4990
Can go worse	0.5291	0.7102	0.7117	0.7425
Do not know	0.0829	0.0928	0.0943	0.0998
N	9662	6216	562	1002

Table 4. Bourguignon Model. First step multinomial model. All sample. Marginal effects

	Formal Care		Informal Care		Formal & Informal	
	dy/dx	p-value	dy/dx	p-value	dy/dx	p-value
Base Case	0.02460		0.27816		0.01389	
Male	-0.03232	***	-0.01564	**	-0.00874	***
50-59	0.02041	**	0.00796		-0.00602	**
60-69	0.01396	*	0.03303	*	-0.00345	
70-79	0.04272	***	0.07696	***	0.00592	***
80-99	0.02078	***	0.13711	***	0.00896	***
Married	-0.02403	***	-0.00460		-0.00251	
Widowed	-0.01171	***	0.03443		-0.00433	**
Divorced	0.00093		-0.03851		-0.00033	
Main Breadwinner	0.00198		-0.06441	***	-0.00804	***
Level of education						
Elementary	0.00377		0.00383		0.00220	**
High School	0.01939	***	-0.03758	*	0.00511	
College	0.07376	***	-0.10577	***	0.00948	**
Relation with economic activity						
Retired	-0.00559		-0.01606		-0.00100	
Contributive disability benefit	0.00507		0.01339		-0.00192	
Non contrib. disability benefit	0.00099		0.06129	***	0.00023	
Houseworking	0.00980	**	-0.02746	*	-0.00214	
Number of children 13-17 years	-0.00489		-0.00598		0.00563	**
Monthly household income						
< 390,6 €	-0.01526	***	0.00758		-0.00383	
390,6 €- 1.171,97 €	-0.01412	**	0.02198		-0.00658	**
1.171,97 €- 1.953,29 €	-0.00906		0.03840	*	0.00406	*
1.953,29 €- 3.906,58 €	0.02302	*	-0.06662	*	0.01531	***
> 3.906,58 €	0.04914		-0.15790		0.04800	**
Number household adults	-0.01621	***	0.02327	***	-0.00682	***
Size of municipality						
< 10.000	0.00091		-0.01386		-0.00647	***
10.000-50.000	0.00028		0.01137		-0.00469	**
50.000-500.000	0.00354		-0.01097		-0.00148	
Illnesses						
Mental illness	-0.00372		0.12048	***	0.00668	***
Arthritis	0.00365	*	0.02438	**	-0.00062	
Muscular dystrophy	0.00818		-0.00326		-0.00306	
Multiple sclerosis	-0.00429		-0.02800		0.00014	
Stroke	0.00222		0.03993	***	0.00306	**
Cerebral palsy	-0.00324		0.09157	***	0.00567	***
Dementia	-0.00161		0.16347	***	0.00776	***
Parkinsonism	0.00213		-0.01665		0.00366	
Change of house	0.01142	***	0.08710	***	0.00478	***
Rehabilitation treatment	0.01016	***	0.02409	**	0.00810	***
Impairment certificate	-0.00086		-0.01603		-0.00002	
Number of days at hospital	0.00014	**	0.00105	***	0.00010	***
Number of disabilities	0.00339		-0.02724	***	-0.00031	
Disabilities for:						
Seeing	-0.01034	***	-0.01520		-0.00241	**
Hearing	-0.01467	***	-0.05147	***	-0.00368	***
Communicating	-0.00906		0.09105	***	0.00580	***
Remembering/Executing	-0.01140	**	-0.06560	**	-0.00396	*
Relating	-0.00342		0.00308		-0.00393	
Number of PADL	-0.00476		0.03826	***	0.00253	***
PADL = 2	-0.00279		-0.01047		-0.00342	*
PADL = 3	-0.00371		-0.04156		-0.00400	*
PADL >= 4	0.01326		0.05381		0.00099	
Number of IADL	0.00129	***	0.09022	***	0.00392	***
IADL = 2	0.01416	***	0.11086	***	0.01265	***
IADL =3	0.03254	***	0.10445	***	0.01759	***
IADL >=4	0.03547	***	0.16339	***	0.02358	***
Severity						
No severe Moderate severe	-0.00654		0.11521	***	-0.00543	
Very severe	0.00356		0.12108	***	0.00656	**
Can not do the activity	-0.00460		0.04962	***	0.00427	*
Forecast						

Recoverable (with restrict)	0.01267 ***	0.07372 ***	0.00369 **
Stable	0.00736 ***	0.07778 ***	0.00492 ***
Can go worse	0.00910 ***	0.10059 ***	0.00637 ***
Do not know	0.00645 *	0.03984 **	0.00276 *
Autonomous Communities			
Andalucia	-0.00665	0.09909 *	-0.00456
Aragón	-0.00097	0.06374	-0.00107
Asturias	-0.00525	0.07508	-0.00766
Baleares	-0.00260	0.02472	-0.00141
Canarias	-0.01513 *	-0.05280	-0.00571
Cantabria	-0.01338	0.14669 **	-0.00538
Catilla La Mancha	-0.00862	0.04985	-0.00498
Castilla León	-0.00763	0.08569	-0.00373
Cataluña	0.00355	0.04099	-0.00729
Extremadura	0.00071	0.08560	0.00769
Galicia	-0.01086	0.01240	-0.00878 **
Madrid	-0.00732	-0.04091	-0.00902 **
Murcia	-0.00838	0.08330	-0.00649
Navarra	-0.01171	0.19032 **	0.00769 *
Rioja	-0.01367	-0.03557	-0.00467
País Vasco	-0.01039	0.03156	-0.00647
C. Valenciana	-0.01422	0.10208	-0.00527
Ceuta	-0.00940	-0.03046	0.00256
N	562	6.216	1.002
R ²		0.3542	
Log Likelihood		-10922.835	

Omitted category: No care. Omitted variables: age 40-49, no studies, active, missing value for household income, number of children less than 13 years old, single, size of municipality >500.000 inhabitants and Melilla. (* p<0.10; ** p<0.05; *** p<0.01). dy/dx= variation with respect to the base case.

Base Case: men, age 80-99, married, elementary education, retired, household income between 390,6 € and 1.171,97 €/per month, one PADL and one IADL disabilities, living in Cataluña.

Table 5. Bourguignon Model. First step multinomial model by gender. Marginal effects

	MALE			FEMALE		
	FORMAL dy/dx	INFORMAL dy/dx	F&I dy/dx	FORMAL dy/dx	INFORMAL dy/dx	F&I dy/dx
Base Case	0.01378	0.20847	0.00274	0.14389	0.21074	0.03469
Age						
50-59	0.01485	-0.01158	-0.00095	0.08001	0.01095	-0.02003 **
60-69	0.00447	0.03706	-0.00125	0.03970	0.02505	-0.01511 *
70-79	0.04595 ***	0.05866 ***	0.00185 **	0.12888 ***	0.04217 ***	0.00112
80-99	0.01279 ***	0.10625 ***	0.00213 ***	0.10743 ***	0.10087 ***	0.01709 ***
Marital status						
Married	-0.07039 ***	0.00071	-0.00330 ***	-0.05619 **	-0.00084	0.00330
Widowed	-0.01058 ***	0.01475	-0.00083	-0.05420 ***	0.01500	-0.00935 **
Divorced	0.00146	-0.13191 ***	-0.00081	-0.01442	-0.00061	-0.00235
Number household adults	-0.00850 ***	0.01054	-0.00063 ***	-0.07102 ***	0.04533 ***	-0.00667 ***
Size of municipality						
< 10.000	-0.00245	0.01966	-0.00182 ***	-0.03191	-0.00311	-0.01691 ***
10.000-50.000	-0.00394	0.01298	-0.00138 **	-0.02022	0.02892	-0.01210 **
50.000-500.000	-0.00062	-0.01039	-0.00087	0.00552	-0.00611	-0.00268
Illnesses						
Mental illness	0.00159	0.14023 ***	0.00285 ***	-0.03339	0.09922 ***	0.00957
Arthritis	0.01050 **	0.00983	0.00059	0.00510	0.02339 **	-0.00427
Muscular dystrophy	0.01019	-0.00850	-0.00115	0.02192	-0.00805	-0.00538
Multiple sclerosis	-0.00969	-0.01355	-0.00075	-0.00561	-0.04033	0.00351
Stroke	0.00590	0.04277 **	0.00090	0.00023	0.02897	0.00537
Cerebral palsy	-0.00974	0.05482 *	0.00174 **	0.02584	0.07315 ***	0.01385 ***
Dementia	0.00317	0.15519 ***	0.00310 ***	-0.00059	0.12285 ***	0.02063 ***
Parkinsonism	0.00054	-0.04039	0.00005	0.01235	-0.00573	0.01329
Change of house	0.01030 *	0.06698 **	0.00140 *	0.04618 **	0.07295 ***	0.01530 ***
Rehabilitation treatment	0.00202	0.01620	-0.00023	0.07446 ***	0.00041 **	0.02470 ***
Impairment certificate	0.00615	-0.00729	0.00021	0.00261	0.00750	0.00282
Number of days at hospital	0.00012 *	0.00088 *	0.00003 ***	0.00065 *	0.00074	0.00021 **
Number of disabilities	0.00477 ***	-0.03231 ***	-0.00020	0.01040	-0.01584 **	-0.00052
Disabilities for:						
Seeing	-0.00547	0.00329	-0.00030	-0.05262 ***	-0.01088	-0.00599 **

Hearing	-0.01198 ***	-0.06109 ***	-0.00047	-0.07002 ***	-0.02125 ***	-0.00793 ***
Communicating	-0.01303 **	0.14880 ***	0.00283 ***	-0.02719	0.03464	0.00913
Remembering/Executing	-0.01320 **	-0.04692	-0.00133 *	-0.02020	-0.02378	-0.00354
Relating	0.00348	0.05286	0.00219 *	-0.05304	-0.03936 *	-0.01965 ***
Number of PADL	-0.00360	0.08137 ***	0.00112 ***	-0.02227	0.00714	0.00487
PADL = 2	-0.00022	0.00006	-0.00152 *	-0.01780	-0.00839	-0.00748
PADL = 3	-0.00553	-0.08829 **	-0.00114	-0.01868	0.00053	-0.00995
PADL >= 4	0.00742	0.00213	0.00005	0.02409	0.02361	-0.00469
Number of IADL	-0.00256	0.08094 ***	0.00079 ***	0.01817 ***	0.06658 ***	0.01039 ***
IADL = 2	0.01013	0.05248 **	0.00564 **	0.05691 **	0.09940 ***	0.01783 **
IADL =3	0.03403 **	0.03279	0.00584 **	0.11925 ***	0.07512 ***	0.03161 ***
IADL >=4	0.03030 **	0.11467 ***	0.00679 ***	0.14140 ***	0.10403 ***	0.04615 ***
Severity						
No severe/ Moderate						
severe	-0.00489	0.10787 ***	0.00971 ***	-0.03947	0.07896 **	-0.02677
Very severe	0.01791	0.10673 ***	0.00249	0.00004	0.08323 ***	0.01035
Can not do the activity	0.01027 *	0.07912 ***	0.00122	-0.04082	0.02144	0.00704
Forecast						
Recoverable (with restrict)	-0.00150	0.08224 ***	0.00057	0.07974 ***	0.02702 ***	0.00786 **
Stable	0.00047	0.06090 ***	0.00096 **	0.04487 ***	0.05908 ***	0.01376 ***
Can go worse	-0.00047	0.08748 ***	0.00060	0.05535 ***	0.06918 ***	0.01745 ***
Do not know	-0.00499	-0.00346	0.00025	0.05372 ***	0.03434 ***	0.00831 **
Autonomous Communities						
Andalucía	-0.00490	0.03929	-0.00240	0.06404	-0.01087	-0.00388
Aragón	-0.00472	-0.00139	-0.00091	0.15090	-0.05083	0.00341
Asturias	0.00824	0.05555	-0.00098	0.04176	-0.04910	-0.01813
Baleares	-0.00263	0.08341	-0.00086	0.06893	-0.10176	-0.00170
Canarias	-0.00991	0.01090	-0.00101	-0.03288	-0.12236 ***	-0.01772
Cantabria	-0.00170	0.08637	-0.00229	-0.01818	0.01722	0.00019
Catilla La Mancha	-0.00831	-0.03201	-0.00204	0.06016	-0.03072	-0.00463
Castilla León	-0.00566	-0.00016	-0.00144	0.08666	-0.02505	-0.00164
Cataluña	-0.00322	0.02286	-0.00254	0.08163	-0.07718	-0.00866
Extremadura	0.00352	0.05381	0.00114	0.09106	-0.04862	0.01973
Galicia	-0.00378	-0.01489	-0.00248 *	0.00969	-0.06857	-0.01738
Madrid	0.00120	0.02896	-0.00108	0.02248	-0.12115 ***	-0.02285 **
Murcia	-0.00128	0.09891	-0.00140	0.00189	-0.04036	-0.01616
Navarra	-0.00645	0.12595	0.00229	0.06074	0.02353	0.04057
Rioja	-0.00428	-0.07313	-0.00138	0.13269	-0.06432	0.01510
País Vasco	-0.00826	-0.03963	-0.00116	0.00972	-0.10404 **	-0.00709
C. Valenciana	-0.00564	-0.03236	-0.00189	0.01683	-0.04441	-0.01157
Ceuta	-0.01569	0.01323	-0.00313	0.00476	-0.10399	0.01033
N	98	2.052	230	464	4.164	772
R ²		0.4075			0.3121	
Log Likelihood		-3338.8633			-7543.9634	

Omitted category: No care. Omitted variables: age 40-49, single, size of municipality >500.000 inhabitants and Melilla. (* p<0.10; ** p<0.05; *** p<0.01). Base Case: age 80-99, married, one PADL and one IADL disabilities, living in Cataluña. dy/dx= variation with respect to the base case.

Table 6. Bourguignon Model. First step multinomial model by age group. Marginal effects

	YOUNG(40-69)			OLDER (70+)		
	FORMAL	INFORMAL	F&I	INFORMAL	FORMAL	F&I
	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
Base Case	0.00262	0.13512	0.00071	0.04121	0.29101	0.01651
Male	-0.00660 ***	-0.06300 ***	-0.00267 ***	-0.03696 ***	-0.02914 ***	-0.01164 ***
Marital status						
Married	-0.00426 ***	-0.01015	-0.00039 *	-0.04526 ***	-0.00312	-0.00144
Widowed	-0.00119 *	-0.02431	-0.00059 ***	-0.02243 ***	0.03768	-0.00240
Divorced	0.00021	-0.02690	-0.00022	-0.01233	-0.15457 **	-0.00188
Number household adults	-0.00094 ***	0.00911 ***	-0.00015 ***	-0.02711 ***	0.04130 ***	-0.00387 ***
Size of municipality						
< 10.000	-0.00055	0.03626 *	-0.00012	-0.01016	-0.04377 **	-0.01029 ***
10.000-50.000	-0.00099	0.03467 *	0.00001	-0.00492	-0.00350	-0.00816 ***
50.000-500.000	0.00058	0.01965	0.00035	-0.00222	-0.03775	-0.00443 **
Illnesses						
Mental illness	0.00063	0.09547 ***	0.00056 **	-0.00551	0.06594	0.00078
Arthritis	-0.00015	-0.00352	-0.00021	0.00768 **	0.04632 ***	0.00060

Muscular dystrophy	0.00081	-0.01669	-0.00006	0.01126	0.03133	-0.00359
Multiple sclerosis	0.00128	-0.01705	0.00014	-0.01916	-0.03823	0.00055
Stroke	-0.00018	0.03246 **	0.00023	0.00411	0.04016 **	0.00276
Cerebral palsy	-0.00081	0.01413	0.00030	-0.00102	0.13494 ***	0.00790 ***
Dementia	0.00970 **	0.08990 *	0.00075	-0.00605	0.19275 ***	0.01448 ***
Parkinsonism	-0.00122	0.07390 *	0.00100 **	0.00358	-0.05018	0.00180
Change of house	0.00471 ***	0.05517 ***	0.00024	0.01104 **	0.10886 ***	0.00929 ***
Rehabilitation treatment	0.00219 ***	0.03219 ***	0.00034 **	0.01142 *	-0.01793	0.00917 ***
Impairment certificate	-0.00033	0.00890	0.00018	0.00420	-0.04329 **	-0.00263 *
Number of days at hospital	0.00002	0.00083 **	0.00001 ***	0.00016	0.00057	0.00009 *
Number of disabilities	0.00066	-0.00588	-0.00002	0.00510	-0.02957 ***	-0.00019
Disabilities for:						
Seeing	-0.00151 **	-0.04042 ***	-0.00043 ***	-0.01366 **	0.01335	-0.00072
Hearing	-0.00153 **	-0.05571 ***	-0.00045 ***	-0.02302 ***	-0.02844 **	-0.00254 *
Communicating	-0.00224 *	0.06029 **	0.00097 ***	-0.01126	0.07989 **	0.00320
Remembering/Executing	0.00029	-0.05308 ***	-0.00018	-0.02424 **	-0.00584	-0.00405
Relating	-0.00272 **	-0.00225	-0.00019	0.00680	-0.06217	-0.00614
Number of PADL	-0.00037	0.04329 ***	0.00040 ***	-0.00919	0.02322	0.00225
PADL = 2	-0.00095	-0.06284 ***	-0.00058 ***	-0.00059	0.04489	-0.00264
PADL = 3	-0.00173	-0.08432 ***	-0.00064 ***	0.00071	0.01191	-0.00239
PADL >= 4	-0.00040	-0.05396	-0.00064	0.03162 *	0.13315 **	0.00568
Number of IADL	0.00027	0.04870 ***	0.00035 ***	0.00103 **	0.09254 ***	0.00345 ***
IADL = 2	0.00458 ***	0.07634 ***	0.00030	0.01559 **	0.11944 ***	0.02318 ***
IADL =3	0.00288	0.02847	-0.00011	0.05804 ***	0.13884 ***	0.03861 ***
IADL >=4	0.00484 **	0.09908 ***	0.00022	0.05569 ***	0.16894 ***	0.04039 ***
Severity						
No severe/ Moderate						
severe	-0.00365	0.04748 **	-0.00054	0.00039	0.13372 ***	-0.00338
Very severe	-0.00114	0.07047 ***	0.00069 *	0.01459 **	0.12808 ***	0.00452
Can not do the						
activity	-0.00113	0.00618	0.00025	-0.00581	0.07745 ***	0.00378
Forecast						
Recoverable (with						
restrict)	0.00105	0.08309 ***	0.00015	0.01841 **	0.01875	0.00269
Stable	0.00053	0.05248 ***	0.00030 **	0.01300 ***	0.08167 ***	0.00611 ***
Can go worse	0.00098	0.06402 ***	0.00036 ***	0.01332 ***	0.10820 ***	0.00774 ***
Do not know	0.00125	0.02521	0.00003	0.00891	0.04114	0.00413 *
Autonomous Communities						
Andalucía	-0.00021	0.09699	-0.00052	0.02612	0.20844 **	-0.01047
Aragón	0.00128	0.10168	-0.00043	0.06066	0.15998 **	-0.00471
Asturias	0.00248	0.11893	-0.00029	0.01573	0.17076 *	-0.01240 *
Balears	0.00145	0.04913	-0.00018	0.02813	0.14065	-0.00636
Canarias	-0.00196	-0.02436	-0.00054 *	0.01269	0.10489	-0.00879
Cantabria	-0.00483	0.11329	-0.00027	0.01817	0.28805 ***	-0.01030
Catilla La Mancha	-0.00057	0.03490	-0.00050	0.02223	0.18433 **	-0.00950
Castilla León	-0.00039	0.09607	-0.00044	0.03637	0.19065 **	-0.00757
Cataluña	0.00093	0.04925	-0.00050	0.02789 *	0.12654 *	-0.01484
Extremadura	0.00180	0.12079 *	0.00030	0.04358	0.16979 **	-0.00242
Galicia	-0.00073	0.01937	-0.00058 *	0.01698	0.13898	-0.01307 *
Madrid	-0.00166	0.03145	-0.00038	0.04002	0.01111	-0.01354 **
Murcia	-0.00021	0.09130	-0.00065 **	0.01170	0.20924 **	-0.01013
Navarra	-0.00104	0.12821	0.00070	0.02104	0.34316 ***	0.00200
Rioja	-0.00156	-0.00800	-0.00051	0.07434	0.12745	-0.00543
País Vasco	-0.00012	0.01792	-0.00059 **	0.02318	0.09353	-0.00614
C. Valenciana	0.00067	0.08485	-0.00041	0.00918	0.17874 *	-0.00988
Ceuta	0.00032	0.04962	-0.00028	-0.04721	0.30329 **	-0.00960
N	133	2.270	229	429	3.496	773
R ²		0.3370			0.3358	
Log Likelihood		-3853.4436			-7127.7043	

Omitted category: No care. Omitted variables: single, size of municipality >500.000 and Melilla. (* p<0.10; ** p<0.05; *** p<0.01). Base Case: man, married, one PADL and one IADL disabilities, living in Cataluña. dy/dx= variation with respect to the base case.

Table 7. Bourguignon Model. Second Step hours equations. All Sample

	Formal Care		Informal Care		Formal & Informal	
	Coef.	p-value	Coef.	p-value	Coef	p-value
Male	0.0156		0.2363***		0.1372	
Age						
50-59	-0.2063		0.0749		0.2715	
60-69	0.4105		0.1125		0.0877	
70-79	0.3300		0.2055		0.3502	
80-99	0.9303*		0.3031*		0.3202	
Marital status						
Married	-0.0177		-0.1440		0.1851	
Widowed	0.0858		-0.1295		0.0487	
Divorced	0.2200		-0.4956**		-0.6160	
Number of children 13-17 years	0.2923		-0.1119**		-0.1668	
Monthly household income						
< 390,6 €	-0.4642*		-0.0124		-0.5683***	
390,6 €- 1.171,97 €	-0.5057*		0.1441*		-0.1674	
1.171,97 €- 1.953,29 €	-0.1552		-0.0841		-0.3136	
1.953,29 €- 3.906,58 €	-1.8793***		-0.1186		-0.3517	
> 3.906,58 €	-1.8579		-0.5108		0.2611	
Number household adults	0.4778***		0.0939***		0.0746	
Size of municipality						
< 10.000	-0.5725***		-0.4337***		-0.5868***	
10.000-50.000	-0.7358***		-0.4183***		-0.5905***	
50.000-500.000	-0.3925**		-0.3240***		-0.2725	
Illnesses						
Mental illness	0.2077		0.3310***		0.0626	
Arthritis	-0.1852		-0.1048**		-0.1937	
Muscular dystrophy	-0.0100		-0.0386		0.0685	
Multiple sclerosis	-0.0235		0.2390*		0.0674	
Stroke	0.1722		0.1509**		-0.1538	
Cerebral palsy	0.5123		-0.0842		-0.1030	
Dementia	0.5859		0.3721***		0.2455	
Parkinsonism	0.1306		0.0614		-0.1374	
Change of house	0.1283		0.2130***		0.1801	
Rehabilitation treatment	-0.1957		-0.1590**		-0.2076*	
Impairment certificate	-0.0717		0.0825		0.4072**	
Number of days at hospital	-0.0020		0.0060***		-0.0005	
Number of disabilities	-0.0600		0.0398		-0.0367	
Disabilities for:						
Seeing	0.0148		0.0524		0.2500**	
Hearing	0.0170		0.0018		0.1182	
Communicating	0.6253		0.1529		0.0806	
Remembering/Executing	-0.7409		-0.2084		-0.0767	
Relating	0.7063		0.2731*		0.4757*	
Number of PADL	0.1050		0.0138		0.0501	
PADL = 2	-0.1783		0.1540**		0.4354**	
PADL = 3	-0.0396		0.0455		0.4654	
PADL >= 4	0.0690		0.3743**		0.6463	
Number of IADL	0.2697**		0.0721**		0.1314	
IADL = 2	-0.0062		0.0383		0.0998	
IADL =3	-0.4309		-0.0213		0.0666	
IADL >=4	-0.2877		-0.0573		0.0029	
Severity						
No severe/ Moderate severe	0.3290		-0.6577**		-0.8707	
Very severe	0.4280		0.2057		0.0308	
Can not do the activity	0.0323		0.0926		0.3018	
Forecast						
Recoverable (with restrict)	-0.2136		-0.1672		-0.6355***	
Stable	-0.0039		-0.1752***		-0.1568	
Can go worse	-0.2250		-0.2242***		-0.2233*	
Do not know	-0.0828		0.0898		-0.0849	
M0	1.6593		0.1196		2.4962*	
M1	-0.0716		1.5327**		2.5480**	
M2	2.6405**		-0.2527		1.4934**	
M3	0.7403		-1.4936***		-0.0629	
Constant	2.5144		3.1846***		5.2245***	
N	562		6.216		1.002	
σ	1.1802		1.6559		1.5374	

Omitted variables: age 40-49, single, missing household income, number of children less 13 years old, size of municipality >500.000 inhabitants. (* p<0.10; ** p<0.05; *** p<0.01)

Table 8. Bourguignon Model by gender. Second Step hours equations.

	MALE			FEMALE		
	FORMAL	INFORMAL	F&I	FORMAL	INFORMAL	F&I
	coef	coef	coef	coef	coef	coef
Age						
50-59	-2.9373	0.1768	-0.0608	0.3335	0.0820	0.8144
60-69	-1.4133	-0.0147	-0.9486	0.5534	0.2288	0.6386
70-79	0.0427	0.1842	-0.5608	0.8463	0.2496 *	0.5045
80-99	0.9182	0.2723	-0.7933	1.4643**	0.3396**	0.4459
Marital status						
Married	-0.8848	-0.2407	0.6276	-0.4648*	-0.1456	0.1833
Widowed	-0.2861	-0.4495***	0.0173	-0.2171	-0.0788	0.2680
Divorced	1.8218	-0.7500*	-1.3157	0.2209	-0.4071*	-0.2915
Number household adults	0.8305	-0.0192	0.0681	0.2230	0.1234***	0.2305
Size of municipality						
< 10.000	-1.4948	-0.7745***	-0.8901*	-0.6409**	-0.2913**	-0.2527
10.000-50.000	-2.2071	-0.7388***	-0.5635	-0.5948	-0.2681**	-0.3790*
50.000-500.000	-1.8260	-0.5934***	-0.3301	-0.3147	-0.2578**	-0.1940
Illnesses						
Mental illness	1.3990	0.3808	0.5890	0.5363	0.3333***	-0.1060
Arthritis	-0.2506	-0.2078**	0.0928	-0.1789	-0.0514	-0.1033
Muscular dystrophy	1.1947	0.0872	-0.6482	0.0634	-0.0985	-0.1043
Multiple sclerosis	1.5419	0.3503	-1.9274	-0.0978	0.1256	0.0827
Stroke	0.0332	0.1998*	-0.3956	0.1317	0.1513*	-0.2436
Cerebral palsy	0.0000	-0.1327	-0.0719	0.5954**	-0.0216	0.0240
Dementia	1.1510	0.4544**	0.2760	0.2765	0.3967***	0.2859
Parkinsonism	0.0774	0.1820	-0.1885	0.0874	-0.0871	-0.4393
Change of house	1.3829	0.2902	0.0239	0.2317	0.1632	0.0981
Rehabilitation treatment	-0.7847	-0.2287**	0.1476	0.0545	-0.1454	-0.5239**
Impairment certificate	0.0727	0.0181	0.1676	-0.2134	0.1141	0.5179***
Number of days at hospital	-0.1440	0.0099**	-0.0003	0.0013	0.0039***	-0.0044
Number of disabilities	0.1157	0.0549	-0.0535	-0.0750	0.0212	-0.0592
Disabilities for:						
Seeing	0.1371	0.1687	0.2501	0.0190	0.0298	0.4595**
Hearing	-0.8831	-0.0645	-0.1396	-0.0680	0.0601	0.1678
Communicating	0.4602	0.0050	0.4393	0.3873	0.2653**	-0.0772
Remembering/Executing	-1.6268	-0.1841	-0.0896	-0.8142	-0.2460*	-0.5145
Relating	-1.0161	0.4249**	-0.2957	0.9508	0.2568	1.3728***
Number of PADL	-0.2062	0.0358	0.0445	0.1406	0.0246	0.0335
PADL = 2	0.6559	0.1882	0.4499	-0.2786	0.1450	0.6845**
PADL = 3	2.0003	-0.0605	0.7031	-0.2560	0.0932	0.5911
PADL >= 4	1.5722	0.3710	1.1609	0.0050	0.3614	0.5951
Number of IADL	0.1873	0.0920	0.0638	0.3034**	0.0716	0.1195
IADL = 2	2.0658	-0.0120	-0.1142	-0.0973	0.1255	0.2153
IADL =3	2.5385	0.0604	-0.5312	-0.3497	-0.0420	0.2833
IADL >=4	4.1343	-0.0704	0.0497	0.0137	-0.0479	-0.3884
Severity						
No severe/ Moderate severe	-1.0563	-1.8155***	-	0.2441	-0.1415	-1.4401*
Very severe	-	0.1765	0.0542	0.4651	0.2504	-0.4437
Can not do the activity	0.7842	-0.1067	0.6060	-0.1902	0.1611	0.4053
Forecast						
Recoverable (with restrict)	1.4926	-0.2449	-0.5119	-0.1336	-0.1607*	-0.4689*
Stable	0.2471	-0.2836***	-0.1729	0.1342	-0.1315*	-0.2190*
Can go worse	0.2251	-0.2224**	0.2269	-0.1842	-0.2411***	-0.4140***
Do not know	-2.3218	-0.0483	0.3054	0.0075	0.1318	-0.3301
M0	-2.7132	-0.8195	1.7240	-0.1733	0.7931	3.2119*
M1	-0.1422	1.4500	0.8488	0.7399	1.3849**	3.0070**
M2	6.8068	-0.6626**	1.5505	0.5136	0.1297	2.3479
M3	4.2927	-0.8150	-0.2497	0.1427	-1.6555*	-0.8997
Constant	0.3996	5.3269***	4.9881	-0.9701	2.4456**	7.6958***
N	98	2.052	230	464	4.164	772
σ	0.7948	1.6475	1.4616	1.2286	1.6490	1.5236

Omitted variables: age 40-49, single, size of municipality >500.000 inhabitants. (* p<0.10; ** p<0.05; *** p<0.01)

Table 9. Bourguignon Model by age group. Second Step hours equation.

	YOUNG (40-69)			OLDER (70+)		
	FORMAL	INFORMAL	F&I	FORMAL	INFORMAL	F&I
	coef	coef	coef	coef	coef	coef
Male	0.7713	0.2843 **	0.1184	-0.1988	0.1981 **	-0.0099
Marital status						
Married	2.2579 ***	-0.1828	0.5560	-0.6378 *	-0.0512	0.6249 **
Widowed	1.1755 **	-0.5046 ***	-0.0242	-0.2439	0.0111	0.5759 **
Divorced	2.1806 ***	-0.8318 **	0.3516	0.4411	-0.2453	-2.8014 ***
Number household adults	1.0444 ***	0.0880 ***	0.4039 **	0.3341 *	0.0569	-0.0559
Size of municipality						
< 10.000	-0.7377	-0.5491 ***	-0.5452	-0.6886 **	-0.3579 ***	-0.6181 **
10.000-50.000	1.6968 **	-0.4592 ***	0.0125	-0.7449 ***	-0.3593 ***	-0.7468 ***
50.000-500.000	-0.8837 *	-0.3292 **	-0.4195	-0.4419	-0.4037 ***	-0.5056 **
Illnesses						
Mental illness	-3.2445 *	0.3960 **	1.0059 **	0.0235	0.2334	-0.6003 **
Arthritis	-0.4779	-0.1043	-0.8415 **	-0.2524 *	-0.0800	-0.0797
Muscular dystrophy	1.1411 *	-0.1459	-0.9070	-0.0837	0.0475	0.2744
Multiple sclerosis	-3.7390 ***	0.5654 **	-0.9079	-1.1191 **	-0.1814	-0.2142
Stroke	-2.5499 ***	0.1026	0.8133	0.0225	0.2115 **	-0.2700
Cerebral palsy	3.9375 **	0.1197	0.1881	0.5711 *	-0.0985	-0.0188
Dementia	4.0134	0.4554	0.7625	0.6186	0.3964 ***	0.2787
Parkinsonism	0.0000	0.1934	0.0383	0.1308	0.0866	-0.2352
Change of house	1.5357 *	0.3808 **	-0.8973	0.1481	0.1466	0.1366
Rehabilitation treatment	-1.0281 ***	-0.2298 **	-0.4385	-0.0438	-0.1445	-0.1669
Impairment certificate	1.7036 ***	0.0778	0.9354 ***	-0.0741	0.0354	0.6186 ***
Number of days at hospital	-0.0442 ***	0.0048	-0.0013	-0.0043	0.0087 ***	0.0031
Number of disabilities	0.7753	0.0653	-0.1960	0.0152	0.0259	-0.0574
Disabilities for:						
Seeing	-1.0670	0.1384	0.0685	-0.1038	0.0209	0.3100 **
Hearing	-1.3048	-0.0842	0.3071	-0.1637	0.0253	0.0342
Communicating	1.5405	0.1821	0.5882	0.0294	0.1346	0.0702
Remembering/Executing	0.0000	-0.2371	0.5021	-0.8268	-0.2574	-0.4007
Relating	-0.0723	0.3343 *	0.3651	0.6941	0.3368 *	0.8518
Number of PADL	0.0977	0.0442	0.3768	0.0895	0.0136	-0.0142
PADL = 2	-0.4495	0.0050	-0.2775	-0.4601	0.2365 *	1.0748 ***
PADL = 3	2.8539 *	-0.1229	0.4535	-0.1450	0.1377	0.9993 ***
PADL >= 4	-7.9436 ***	0.1892	0.3250	-0.0789	0.4520 **	1.0766 ***
Number of IADL	-0.2644	0.0699	0.3204	0.2500 **	0.0932 *	0.1799 **
IADL = 2	-1.3803	-0.1710	-0.3841	-0.4937	0.2307	0.6155
IADL =3	-2.1676 *	-0.0288	0.5249	-0.5943	0.0790	0.4626
IADL >=4	-1.3702	-0.3175	1.4799	-0.2718	0.2388	0.3288
Severity						
No severe/ Moderate severe	2.3763	-0.5885	-1.5650	0.4456	-0.7864 **	0.1144
Very severe	1.5913 *	0.1852	-0.9219	0.4320	0.3356 *	1.2828 ***
Can not do the activity	1.4326 *	0.1266	0.9806	-0.1127	0.1710	0.1936
Forecast						
Recoverable (with restrict)	-2.7347 ***	-0.1341	-0.5966	-0.1005	-0.1425	-0.4122 *
Stable	2.2253 ***	-0.1848	-0.1492	0.1476	-0.1547 *	-0.2490
Can go worse	1.1387 *	-0.1786	-0.1512	-0.1398	-0.2088 **	-0.0646
Do not know	1.5184 *	0.0183	-0.3088	-0.1224	0.1152	-0.2580
M0	-0.0442	-0.9889	2.2449	-1.9220	0.2754	3.0815 *
M1	-2.8507 ***	-1.8022 **	-13.7903 ***	0.1752	2.6197 ***	10.7230 ***
M2	12.9739 ***	-0.5491	4.4584	-1.0964	0.1231	4.4098 ***
M3	-37.4485 ***	-1.4251	0.8080	-1.5872	-1.5344 *	-0.2507
Constant	0.8523	2.9044 ***	2.4887	-0.8396	3.0676 ***	5.4622 **
N	133	2.270	229	429	3.496	773
σ	0.8661	1.6894	1.5211	1.2702	1.6274	1.5002

Omitted variables: single, size of municipality >500.000 inhabitants. (* p<0.10; ** p<0.05; *** p<0.01)

Table 10. Coverage Index of Social Services for Dependent People. 1999

	Home Care	Tele Care	Day Centers	Public Residential Homes	Private Residential Homes
Andalucía	2.04	1.55	0.02	1.10	1.44
Aragón	2.44	1.67	0.09	0.89	3.22
Asturias	1.79	0.89	0.12	1.16	2.23
Baleares	2.78	0.72	0.07	0.70	1.08
Canarias	1.88	0.22	0.22	2.39	-
Cantabria	1.55	0.26	0.23	0.94	2.97
C. León	2.48	1.61	0.17	1.83	3.39
C. Mancha	2.55	1.85	0.11	1.62	2.38
Cataluña	1.30	0.57	0.24	1.52	2.40
C. Valenciana	2.16	1.99	0.04	1.15	1.00
Extremadura	4.86	0.66	0.32	1.28	1.65
Galicia	1.35	0.29	0.02	0.65	1.28
Madrid	1.89	1.01	0.14	1.55	1.38
Murcia	1.64	1.16	0.16	0.90	0.91
Navarra	3.02	3.55	0.12	1.29	3.56
País Vasco	2.85	1.16	0.28	1.77	2.48
La Rioja	2.84	0.82	0.16	1.52	3.78
Ceuta	1.76	1.43	-	1.34	-
Melilla	3.04	2.04	-	1.41	2.19
España	2.07	1.07	0.13	1.33	1.86

Source: Observatorio de Personas Mayores (Imsero, 2000).

Coverage Index = (Number of users / Population ≥ 65 years) *100.