

### **Abstract**

In this paper, we explore the impact of different intra-family transfers on the well-being of the eldest. We use data for Spain from the Survey of Health, Ageing and Retirement in Europe (SHARE). Most of previous research over the well-being of the eldest have modelled well-being in terms of health status. However, we propose a multidimensional study. We use life satisfaction (a subjective indicator) and CASP12 (a social functional variable). Moreover, we model the interdependency of that people in terms of the transfers of the resources of time and money that the eldest do to and receive from other members of the family.

*JEL codes: D13, I3, J14.*

# The impact of different types of resource transfers on individual well-being\*

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## 1 Introduction.

Life expectancy has extended, so the ageing process demands new needs for long-term care in order to guarantee living conditions of an increasing group of the population, and any policy targeted at increasing the well-being of the eldest has to take into account several special features. Let us focus on two of them: the heterogeneity of that demographic group and the relevance of interdependence between different generations of a family. The purpose of this paper is to determine the effect of familiar intergenerational transfers over the quality of life of old people. We will explore the characteristics of intergenerational transfers of time and money by using data for Spain derived from the *Survey of Health, Ageing, Retirement in Europe* (SHARE)

The first special feature that any analysis or policy should take into account regards the characteristics of the old people, an increasing and changing group of population. Life expectancy is increasing around Europe, and so is the heterogeneity of this population group, making specially challenging for the researchers to analyze the determinants of that quality of life and for policy makers to promote their quality of life. Many people on that group enjoy a reasonable good health status (both physical and psychological), and are active transferrers of time and money to other members of their families. Many others suffer severe health conditions and are net demanders of special care. We can

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\*We would like to acknowledge the invaluable research assistance of Clara Velásquez and the financial support of Ministerio de Trabajo y Asuntos Sociales (IMSERSO) and Ministerio de Ciencia y Tecnología "SEJ 2006/10827", and the Basque Government "IT241-07". All errors are solely ours. This paper uses data from SHARE Wave 1 Release 2.0.1. SHARE data collection in 2004-2007 was primarily funded by the European Commission through its 5th and 6th framework programmes (project numbers QLK6-CT-2001- 00360; RII-CT- 2006-062193; CIT5-CT-2005-028857). Additional funding by the US National Institute on Aging (grant numbers U01 AG09740-13S2; P01 AG005842; P01 AG08291; P30 AG12815; Y1-AG-4553-01; OGHA 04-064; R21 AG025169) as well as by various national sources is gratefully acknowledged.

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characterize that particular life span as an stage in life defined by critic changes: transition from labor activity into retirement, possibilities of a greater personal freedom and new opportunities for social participation, as well as physical decay and loss of autonomy. Many unobserved sources of heterogeneity may determine that some of the determinants of the quality of life among old people operate in different direction and have a different magnitude depending on different conditions.

The second one involves the possible relationship between publicly provided care and familiar care. We need to take into account the relevance of social relationships on well-being, specifically, of intrafamiliar transfers of time and money in order to explain quality of life. Those transfers can either be studied by using an unidirectional approach (upstream, i.e. from children to parents, or downstream, i.e. from parents to children), or a bidirectional one (for instance, considering the net result of the transfers done in each direction). Given that long term care expenditure is forecasted to increase dramatically (around 149% in Spain between 2000 and 2050 in some projections), intrafamiliar-intergenerational decisions have a great influence on public finances.

We take benefit of the information recorded in the *Survey of Health, Ageing, Retirement in Europe* (SHARE), to undertake an exploratory analysis to describe the intrafamiliar structures of transfers and the effect of interdependence on the quality of life of the old people. It seems to us a suitable tool, since the Survey identifies determinants of well-being that are specific to this age group. We perform the analysis for the Spanish subsample of release 2.0.1 of the survey.

There are several analytical tools to determine what quality of life consists on as well as which are the determinants of high living standards. Actually, quality of life and well-being turn out to be complex concepts, built up upon several aspects of a very different nature. They incorporate objective and subjective aspects, as well as societal arrangements and individual characteristics. Overall, we can consider that there is not a clear consensus about which approach is the most suitable one to study quality of life and well-being. Moreover, researchers that have focused on the particular social group defined by the eldest, have highlighted the changing characteristics of the people included in the "third age" group. We use a standard subjective measure of quality of life, reported life satisfaction, as well as a functional indicator of quality of life, the CASP-12, a gerontological measure.

We model the interdependency of that people in terms of the transfers of the resources of time and money that the eldest do to and receive from other members of the family. In order to do so, we focus on the different time and money transfers that the individual receives and provides with to other members of the family. We propose the concept of an eldest person that is "net donor" or "net recipient" of both types of transfers, based on the fact of receiving or giving some transfer to a particular number of people.

The structure of the paper goes as follows. We survey some of the relevant results, most of them descriptive, obtained from the SHARE survey. Then, we

present the descriptive analysis of our dependent variables for the European sample and for the Spanish subsample. Later, we discuss the empirical specification and present the results of an exploratory analysis that models well-being by estimating ordered probit models. We confront those results with the ones obtained from a finite mixture model that allows for unobserved heterogeneity. We conclude by discussing the main results.

## **2 Literature review and the alternative approaches to the measurement of well-being.**

For this work, we consider two main and complementary approximations to well-being: hedonic and eudaemonic measures [7]. While the first type captures the achievement of pleasure and enjoyable experiences, the second type focuses on the development of human potential, and captures elements such as control, social relationships and self-perceptions.

Economic literature has paid increasing attention to subjective well-being (or happiness, or life satisfaction), and has mostly used hedonic measures to characterize the determinant of individual quality of life (either by asking the subject to evaluate her life as a whole, or to evaluate some particular domain of her life). The fact that we can relate closely that approximation to welfare with the economic concept of utility explains partially this blooming literature. Many of those contributions have tried to explain the impact that several socioeconomic factors have over the individual life satisfaction, or over the satisfaction with some life "domain" or even some "subdomain" (financial satisfaction, job satisfaction, satisfaction with job flexibility, and so on). The big socioeconomic surveys on living conditions, such as the European Community Household Panel (ECHP), the British Household Panel Survey (BHPS), or the German Socio-Economic Panel (GSOEP), use hedonic measures to characterize individual quality of life.

Eudaemonic measures has been mostly used in other Social disciplines. Eudaemonic well-being is typically measured by means of questions regarding autonomy, determination, interest and fulfillment sense. The Sociological literature, for instance, assess that eudaemonic captures functional dimensions of welfare, so it plays a complement role -but different- with respect to the hedonic component of welfare (which is happiness or life satisfaction). The Round 3 of the European Social Survey included measures of how people feel (in terms of happiness, satisfaction, pleasure) and included measures of how well that people function [15].

When focusing into the social group that is the object of our analysis, Walter proposes up to eight models of quality of life that he finds particularly suitable to explain the eldest's quality of life [21]. These are the following: (1) objective social indicators on quality of life (mostly referred to income, health, mortality and morbidity); (2) human needs fulfillment, (measured as individual subjective

satisfaction with the degree of accomplishment of those needs); (3) subjective social indicators as life satisfaction, psychological well-being, and happiness; (4) Social capital in terms of personal resources, social networks, support, participation in activities, and integration in the community; (5) resources of the environment through crime incidence, public services. . . ; (6) health and functionality, specially the physical ability or disability, or the wider approaches to health status; (7) psychological models of cognitive competence and autonomy, control and adaptation; and (8) hermeneutics approximations that highlight the values, the interpretation and perceptions of the individual.

One of the clear benefits of using the SHARE is that it makes available a wide battery of measurements of well-being that relies on many of those different perspectives and approximations. Some of those measures, such as the individual's self-reported health status, rely on directly measured individual assessments and have already been widely used in the Social Sciences literature. However, some others are well-being measures that have been particularly developed for the eldest and that have to be constructed by means of synthetic indexes that get information from different questions of the survey. As indicated in [14], we can consider broadly two families of domains and models of quality of life: subjective social indicators of life satisfaction and psychological well-being, and health and functioning models. Most of the discussion that follows presents the advantages of using that second type of measures, some of them not incorporated yet to the economic approximation of well-being.

We perform the analysis over both types of measures in an attempt to study the effect of the interdependency relationships over those two quality of life dimensions or models. In the table below, we present the variables that are going to be the two alternative measures to be analyzed in this work. The variables are either self-reported variables from the survey or constructed indexes. Let us identify the measures and report the correspondence with the taxonomy by Walter [21] as presented above.

ALTERNATIVE MEASURES OF WELL-BEING		
<i>measures</i>	<i>type</i>	<i>variable construction</i>
<i>CASP-12</i>	<i>7</i>	<i>index build by the authors</i>
<i>life satisfaction</i>	<i>3</i>	<i>self-reported</i>

Some of the previous studies have tried to explain the individual health status by using the subjective self-assessed health status of the individual as an approximation to his/her well-being, whereas some others have used subjective health status as one of the main predictors of quality of life. Gwozdz and Sousa-Poza [14] focus on the people over 75 and combine evidence from the GSOEP and from SHARE. They conclude that "objective" health status measures, such as objective impeding conditions, do not have a great impact on subjective well-being of that group of population, whereas "subjective" health condition, i.e. self-assessed, is significant in determining well-being. They provide several explanations for this puzzle, relying on previous gerontological findings: either

(i) those objective health measures could only influence social participation with some lag, so they do not influence straightforward subjective well-being, or (ii) as a matter of low expectations for this age group, defined as the survivors of a group defined by high morbidity and dependency.

For some authors, such as Wiggins, [22], that variable has several drawbacks: since it is subjective and self-assessed, it can be, at most, consider a "proxy" for the real quality of life. The main argument relies on the impossibility of being at the same time both the explanation and the definition of quality of life. For those authors, CASP index has a solid theoretical construction and respects the property by which any measurement of quality of life must be clearly different from the factors that determine quality of life itself. In [22], the authors find out that good predictors of the quality of life of old people are: the quality and density of their social networks, the loss of dearest ones, the lack of retirement benefits that determine a bad financial situation, and living in a degraded neighborhood.

As a first approach, Knesebeck, Hyde, Higgs, Kupfer and Siegrist in [6], chose an eudaemonic index to model the quality of life of our focus group: the CASP-19. They assume that the degree in which each old person can fulfil his/her needs is a measure of his/her quality of life. By using the CASP-19, they take into account that it is specially relevant the degree of fulfilment in the following domains: control (i.e., the capability to have an active performance in the environment), autonomy (i.e., the right to be free of non-desired interferences), self-fulfilment, and pleasure. However, SHARE proposes that those four domains should be treated equally (without hierarchies), the information is provided in order to build a reduced version of the index that accounts for 12 ordered variables. The CASP-12 index is therefore build using the information to 12 questions measured in Likert ascending scales, each of which measures the following theoretical dimensions of quality of life: control, autonomy, self-realization and pleasure. We will report below the values for each of the 4 theoretical dimensions of the CASP-12 in the sample that we are going to use for our analysis.

Some previous studies on quality of life have used data derived from the SHARE to construct the CASP index (Knesebeck et al. in [6]). Several geographical patterns have been described, determined by a North-South gradient. There are significant differences between the low levels of Mediterranean countries (Greece, Italy and Spain), and the higher levels recorded for Northern countries (Netherlands and Denmark, notably). That pattern also applies for the study of each of the four different dimensions that are measured in this index.

According to those previous studies, although there are negligible and non significant gender differences, there are generational differences. Those differences between the quality of life of the younger and the eldest in this analysis are broader for European Southern countries. It means, thus, that the negative impact of age is more prevalent in Southern Europe. The interpretation pro-

vided by the authors may shed some light over those conclusions and may help us understand a little bit better the CASP measure.

Wahrendorf et al. [20], use the SHARE data to determine the positive effects of social productivity over the well-being of the eldest. Those authors define social productivity in terms of any activity previously agreed and continuous over the time that generate goods or services that are, either socially or economically, valuable to the recipients, even if they are not provided over a formal contract. They consider the relevance of time transfers, just as we do, but in a broader sense. Actually, they consider the possibility of transferring time by means of charity or volunteering activities. Thus, they consider up to 3 types of time-transfers involving activities: (1) voluntary of charity work, (2) care of ill or hampered adults and, (3) the provision of informal help to the family, friends or neighbors. To measure the well-being of the eldest, they use 2 indicators using the dataset: CASP-12 and CES-D. This last measure captures the depressive condition that reflects the reduction over emotional well-being. The authors use some other alternative measures to check the consistency of those measures (for instance, they use the self assessed health status). They do not only investigate the determinants of giving time transfers, since they control for those received by the eldest. The objective of their work is to test the hypothesis of the positive effect of "reciprocity" over well-being. This implies lower levels of well-being for those people whose social interaction is determined by non-reciprocal exchange, with respect to the people that enjoys a more equilibrated situation between efforts and rewards. They conclude that the "quality" of the interchange is the key variable for well-being. In that way, the relationship between social productivity and well-being is modulated by the reciprocity of the interchange.

Also by using this same database, Von dem Knesebeck, Wahrendorf, Hyde and Siegrist [19] analyze the association between the quality of life of the European old people and a battery of socio-economic status indicators for different European countries. Their aim is to determine if the relative importance of socio-economic status changes with age. By using the reduced version of CASP (CASP-12), they study the correlation between this eudaemonic measure and five measures of relative position that determine socio-economic status: income, education, household tenure status, net wealth and ownership of a car. By multivariate analysis they estimate some models and conclude that even if there are positive correlations, the results vary by country. They also find that the impacts of those factors are different before and after retirement. Overall, the house tenure regime is the one with the less relationship with quality of life.

With English data from the English Longitudinal Study of Aging (ELSA), Nevuteli, Wiggings, Lidon, Montgomery and Blane [18] determine that quality of life is reduced by depression, by the perception of an ill financial situation, by limitations in mobility, in undertaking daily activities, and by impeding chronic diseases. On the other hand, quality of life increases with confidence relations in the family and friends network, with frequent contacts with friends, with living in a good neighborhood and with holding more material properties. They only

find slight differences by age groups and by gender. Based on those results, they conclude that any policy aimed to increase the quality of life of the eldest should be targeted to alleviate financial difficulties and the limiting health conditions, and to improve the conditions of aged neighborhoods and to improve the density of the social relationships of the old people.

Another interesting source of information for the measurement and analysis of well-being is the Gallup World Poll, since it contains data for 132 countries. Deaton [11] uses data from the 2006 survey to analyze the relationship between financial situation, ageing, health and well-being (this last is measured as happiness or life satisfaction and as health satisfaction). Average happiness is related with national per-capita income. This effect holds for every society analyzed, and it is an interesting new finding. Improvements in life expectancy determine that a person has more probability of being happy, but they measure if life expectancy has no effect by itself. Age does not determine a clear and common pattern around the world. For rich countries, it seems that the typical U shape fits; for the old subsamples, there is a positive relation between age and happiness reported. However, for poor countries, there seems to be evidence supporting the opposite.

There is enough evidence in the literature about intergenerational transfers of income and wealth (see [1], [2] and [17], for instance). Less attention has been paid to the transfer of time from one generation to another. Time transfers may have also a big impact over the well-being of the involved agents. They imply that some commodities can be produced inside the family, without having to buy some services in the market. For instance, some generations of European women take care of their grandchildren and/or their parents (for this last case, see for instance the analysis by Crespo [10]). Bonsang [5] considers the family as the traditional source of provision of care for the frail older individuals. This author states that informal intergenerational care will only lessen long-term expenditure if the informal care provided is an effective substitute for formal care. He concludes that it is indeed a substitute only if the needs of the elderly are low and require unskilled type of care.

Overall, we have found little pieces of research that have considered the effect of interdependence on the well-being of the oldest members of population. Even if Bonsang states that given that transfers between children and parents are important, and they should be considered when evaluating population welfare, very few studies have addressed that question. Katz [16], uses data for people 75+ in 5 countries to determine the effect of different family relations (solidarity, conflict and ambivalence) on three alternative measures of individual well-being (life satisfaction, positive affects and negative affect). This author finds a distinct impact over the three dependent variables, concluding the pertinence of using multiple measures for the outcome variable. All in all, among that scarce literature, there is a common assessment of two facts: (i) the need of longitudinal data in order to fully characterize the impact of any change on the interdependence variables over the evolution of the individual conditions (since



by using cross-sectional data, only static situations can be evaluated), and (ii) the relevance of social participation on well-being. Regarding the first aspect, if longitudinal data were available, it would be possible to keep track of all the ageing process of the individual.

### 3 Data description

We use the first release of the Survey of Health, Ageing and Retirement in Europe, SHARE, in its 2.0.1 version as coordinated by the Mannheim Research Institute for the Economics of Aging. It is a multidisciplinary dataset that provides detailed information on health conditions, socio-economic status and social and familiar networks of people that are above 50. These data were collected in 2004 for 11 countries. In 2004, information was collected for 11 countries in Europe by regions: Scandinavia (Denmark and Sweden), Central Europe (Austria, France, Germany, Switzerland, Belgium and the Netherlands); and Mediterranean countries (Spain, Italy and Greece). This 2.0.1. version merges the data collected for Israel in 2005 and 2006.

The data include health variables (for instance, self assessed health status in the European version of the scale, as well as objective gerontological measures of health conditions), psychological variables (such as psychological health, life satisfaction), economic variables (as labor status, characteristics of the job, job opportunities after retirement, sources and amount of current income, wealth and consumption), social variables (education and housing conditions) and social support variables (such as family support, transfers of income and assets, social networks, charity activities). As well as the variables directly recorded in the survey, the SHARE dataset includes the variables and indicators generated by AMANDA-IDT in the 5th F.P of the European Union. Those variables and indicators include recoded variables, as well as harmonizations (for instance, into EURO by using exchange rate and parities for the year 2004) that enable for international comparisons.

All this information is provided under 19 modules. Some of those collect information of the household and of the family, and are completed by the individual that is determined to be the reference person of the family. People over 50 are interviewed, as well as their partners (when living together, even if they are under 50), parents or parents in law, children and familiars, as well as siblings and other people in the household (if they life in the same house and are over 50)

We will use the data for Spain and, for comparison purposes, we include several other countries in the descriptive part of the study. Given that the availability of some information is not good enough for some variables in some countries, we decided to present only some of them. Our selection has kept representative countries for different welfare regimes around Europe [12]. Sweden represents the Scandinavian welfare regime; Austria, France, Germany, Netherlands and Switzerland have Continental welfare regimes; as well as Spain, Italy

and Greece, although these countries have been traditionally considered the representatives of Mediterranean welfare regimes, a subgroup from the Continental one which has, in the opinion of some authors, some specificities [3].

Sample distribution by country, gender and age							
Country	Total	Male	Female	< 50	50 - 64	65-74	> 75
Sweden	3.052	1.413	1.639	55	1.589	816	592
		46	54	1,8	52,06	26,74	19,4
Austria	1.888	782	1.106	39	949	544	356
		41,42	58,58	2,07	50,26	28,81	18,86
France	3.176	1.385	1.791	124	1.627	768	657
		43,61	56,39	3,9	51,23	24,18	20,69
Germany	2.995	1.377	1.618	54	1.569	886	486
		45,98	54,02	1,8	52,39	30	16,23
Netherlands	2.963	1.362	1.601	98	1.693	713	459
		45,97	54,03	3,31	57,14	24,06	15,49
Switzerland	995	459	536	35	505	251	204
		46,13	53,87	3,52	50,75	25,23	20,5
Spain	2.393	993	1400	40	1.079	701	573
		41,5	58,5	1,67	45,09	29	23,94
Italy	2.557	1.132	1.425	49	1.342	785	381
		44,27	56	1,92	52,48	30,7	14,9
Greece	2.898	1.244	1.654	218	1.450	714	516
		43	57	7,52	50,03	24,64	17,81
Total	22.917	10.147	12.770	712	11.803	6.178	4.224
		44,28	55,72	3,11	51,50	26,96	18,43

Source: SHARE 2004, Release 2.0.1.

As we have indicated, there is not a clear consensus on the most suitable measure of well-being and of quality of life. For this work, we have chosen two variables from the bundle of variables that are offered in the SHARE survey: CASP-12 and life satisfaction.<sup>1</sup> The first variable is considered an objective variable, whereas the latter one is subjective. The subjective variables are the ones that have been most widely used in the literature. It could be useful to

<sup>1</sup>A previous version of the paper undertook an exploratory analysis by using also EURO-D (a psychometric scale that measures the degree of depression of people) and SPHEU (the very widely used self reported measure of health status by using the European scale, 1 to 5). Due to problems of endogeneity of some of the explanatory variables, we decided to eliminate those from the analysis. Moreover, regarding SPHEU, we encountered the conceptual problem defined in [22]: such a concept cannot be at the same time definition of quality of life and explanatory variable.

consider each of this measure in the analytical framework defined by Walter [21], as we have done in the previous section.

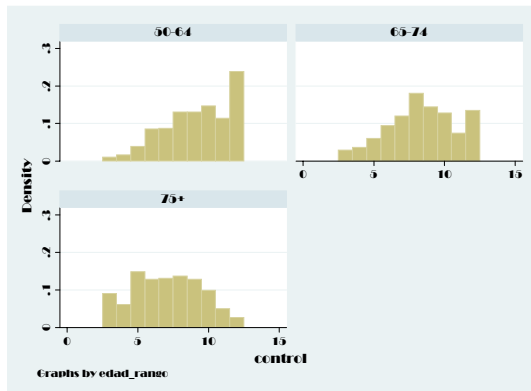
### **3.1 CASP-12**

CASP-12 measures the degree in which the old person has his/her needs covered. This degree is measured over 4 dimensions: control, autonomy, self-realization and pleasure. For each of the dimensions, three questions are asked, and each of those 12 questions are responded by ascending 1 to 4 scales. Thus, the total value of the indicator takes values on a range 12 to 48 points. A higher value is related to better quality of life. SHARE reports the values recorded for each of those dimensions [6]. Average values by country goes from 33.32 in Greece, to 40.48 in Switzerland. When considering gender subsamples, women get systematically lower values than men: average value for women in Greece is 32.33 and in Switzerland 40.37 points; men in Greece get 34.50 and 40.62 in Switzerland.

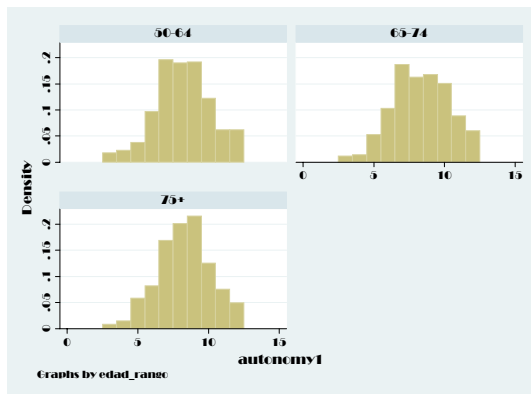
Quality of life by country. CASP-12 average values						
(standard error in brackets)						
Country	control	autonomy	self-realization	pleasure	CASP12	obs.
Sweden	8,64 (1,89)	9,27 (1,64)	11,15 (1,26)	9,74 (1,99)	38,80 (4,93)	1.984
Denmark	8,85 (1,99)	9,56 (1,56)	11,25 (1,24)	10,17 (1,83)	39,84 (4,94)	1.088
Austria	8,98 (2,29)	8,98 (1,81)	10,87 (1,66)	9,42 (2,20)	38,25 (6,30)	1.568
Germany	9,06 (2,21)	9,02 (1,85)	10,56 (1,68)	9,03 (2,20)	37,68 (6,10)	1.757
France	8,65 (2,13)	8,69 (1,72)	9,34 (1,88)	9,39 (2,05)	36,06 (5,79)	1.029
Netherlands	9,28 (1,87)	9,18 (1,80)	10,83 (1,65)	9,80 (2,09)	39,09 (5,46)	1.879
Switzerland	9,50 (1,86)	9,40 (1,69)	11,21 (1,23)	10,36 (1,75)	40,48 (4,86)	632
Belgium	8,78 (2,10)	8,84 (1,83)	10,21 (1,88)	9,59 (2,00)	37,42 (5,79)	2.200
Spain	8,61 (2,51)	8,38 (1,92)	10,06 (2,03)	8,69 (2,30)	35,73 (6,72)	1.457
Italy	8,33 (2,37)	7,81 (2,05)	9,33 (1,76)	8,57 (2,35)	34,04 (6,40)	1.329
Grece	7,74 (2,27)	7,75 (1,87)	9,48 (1,75)	8,35 (2,22)	33,32 (5,97)	1.758
Total	8,74 (2,27)	8,63 (1,94)	10,14 (1,86)	9,06 (2,25)	36,58 (6,37)	16.681

Source: SHARE 2004, Release 2.0.1.

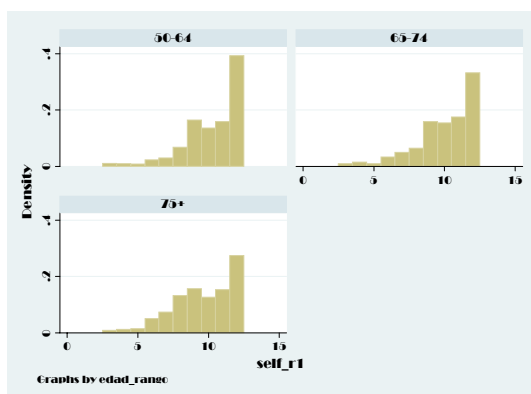
Please note that there are only 1457 valid observations for CASP12 in the Spanish subsample. Now, we can see the values of each of the four theoretical dimensions of CASP12 with respect to the three main age categories. The next first 4 graphs represent the histograms for the scores obtained in control, autonomy, self-realization and pleasure. Since we have added the scores obtained in each of the 3 questions over each domain, the variables take values between 3 and 12 (lowest to higher). The last figure plots the histogram of the overall CASP12 score (taking values from 12 to 48).



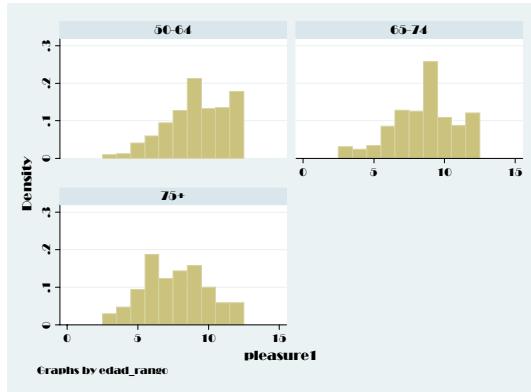
Control dimension by age groups. Spain.



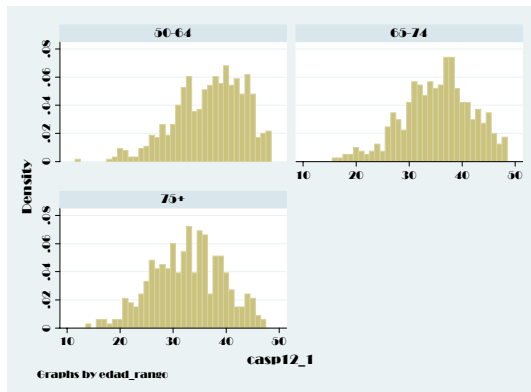
Autonomy dimension by age groups. Spain.



Self-realization by age groups. Spain.



Pleasure by age groups. Spain.



CASP12 by age group. Spain.

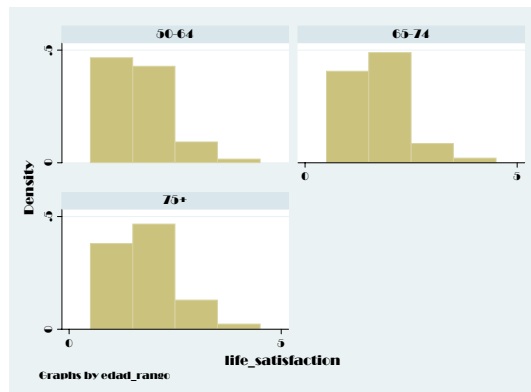
### 3.2 Life satisfaction

Life satisfaction is reported in a descending 1 to 4 Likert scale. The higher the declared level, the lower the person subjective well-being assessment will be. Average values by country range from 1.36 in Denmark to 2.01 in Italy. By gender, nearly the same order prevails by country. In the following Table, we present the percentage of individuals that report each of the four possible values by country. For the Spanish subsample, we retain only 1422 observations.

Quality of life by country. Life satisfaction				
(proportions)				
Country	very satisfied	satisfied	insatisfied	very insatisfied
Sweden	34,56	61,2	3,5	0,73
Denmark	67,16	30	2,54	0,3
Austria	32,92	59,74	6,58	0,76
Germany	29,11	59,77	9,8	1,32
France	16,33	72,14	9,77	1,76
Netherland	57,77	38,95	2,39	0,89
Switzerland	48,27	47,31	4,01	0,41
Belgium	37,55	56,91	4,59	0,95
<b>Spain</b>	<b>41,84</b>	<b>46,34</b>	<b>10,36</b>	<b>1,46</b>
Italy	16,64	68,62	12,13	2,6
Grece	35,29	52,5	9,34	2,87
Total	30,94	58,42	9,06	1,58

Source: SHARE 2004, Release 2.0.1.

Life satisfaction reported by age groups in Spain is reported in the next graph:



Life satisfaction by age group. Spain.

When observing the distribution of life satisfaction across the main age categories, we can find evidence of what authors have claimed to be the "satisfaction paradox" of old age [6]. Even if material living and health conditions deteriorate, one may see that the subjective valuation distribution remains quite stable. Some authors explain the paradox in terms of habituation effects, attempts to

keep up positive self-perceptions, and adaptive (downward) regulation of goals and yardsticks for comparison. After 75, in developed countries, typically people over that threshold have survived, so there could be big differences in the way they assess their well-being in subjective terms.

However, when we look for the correlation between the two measures of quality of life to be analyzed in this study, for Spain, we find that the rank correlation coefficients are such that we can reject the hypothesis that CASP-12 and life satisfaction are independent (Spearman  $\rho = -0.5634$ , Kendall  $\tau = -0.3538$ ; recall that CASP-12 is constructed so higher values correspond to better quality of life, whereas life satisfaction is so higher values correspond to less satisfaction).

### 3.3 Description of interdependence: time and money transfers

Since we are particularly interested in determining the effect of intrahousehold transfers over the welfare of the old person, we consider the frequency of contacts of the person with her family, the distance from where the family lives and build up some indexes to measure the time and money transfers.

We define that a person can be in nine different situations regarding either the transfer of time or of money at a intrafamiliar level. All this information is transformed from the original database. We introduce the potential influence by means of a set of dummy variables.

Regarding time, it can be the case that the person neither transfers to, nor receives from others time (NGNR variable), this will be a baseline category in our regressions. It can also be the case that this person do not transfer time to anyone, but he/she receives time help (NGYR). The opposite can happen, not receiving but giving time transfers (YGNR). For the case in which the person not only gives to but receives time from others, we can define three alternative situations in terms of the balance of those transfers: being a net donor (YGYR\_D, since the number of helps given exceeds the number of helps received), a net recipient (YGYR\_R) and holding a balanced situation (YGYR\_B, the number of helps given balances the number of helps received<sup>2</sup>).

For money, the reference category for our analysis will be the person that neither gives money, nor receives it (NO variable). An alternative one captures the situation in which the old person gives more money that he/she receives (DONOR). The third category includes people that receive more money that what they get (RECIPIENT).

A description of the transfers regime for our Spanish subsample by agegroup is represented in the following table.

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<sup>2</sup>Remember the finding of the need of reciprocity in order to perceive that the interaction has been profitable as we have discussed in the literature section.



		50-64	65-74	75+	OBS
TIME	NGNR	562	291	245	1098
	NGYR	50	55	142	247
	YGNR	339	261	103	703
	YGYR_D	11	3	3	17
	YGYR_R	10	11	16	37
	YGYR_B	45	29	28	102
MONEY	NO	818	563	470	1851
	DONOR	133	59	33	225
	RECIPIENT	33	15	27	75

Other explanatory variables are described in the following table

VARIABLE	MEAN (%)	SD	MIN	MAX
GENDER (MALE)	41.73	.4932962	0	1
AGE	66.1343	10.43425	50	99
YEARS EDU	5.470951	4.076605	0	17.5
LOG HHLD INC	9.700183	1.662189	0	15.48931
PARTNER	75.31	.4313727	0	1
HHLD SIZE	2.727669	1.264703	1	9
GALI	44.44	.4970845	0	1

## 4 Methods

Since the SHARE provides us with different measures, we use two of them as dependent variables. CASP12, whose total value lies in a range from 12 to 48 points, is constructed such that a higher value is related to better quality of life. When interpreting the coefficients, a positive sign will be identifying a positive partial effect over the dependent variable. Life satisfaction is measured in a 1 to 4 Likert scale, with higher values corresponding to lower life satisfaction.

We will explore two distinct estimation methods, an ordered probit and a finite mixture regression model. The first one is the standard approach, previous results rely on this type of empirical specification. Each variable is an ordered outcome, so if estimated an ordered probit, the process will rely on the parallel regression assumption. For the finite mixture model, a model increasingly used in Health Economics, we deal with heavy unobserved heterogeneity, under the assumption that there are unobserved subpopulations, each of them with different behavior. We will try to capture in our estimations the existence of different categories, each of them having a different valuation function of their quality of life.

### 4.1 First estimation method: ordered probit models

The estimation method that we chose is determined by the fact that the two dependent variables are discrete ordered variables. We use therefore an ordered

probit model. We cannot observe the true quality of life that a particular individual has reached under her surveyed conditions, which would depend on objective characteristics and on personal characteristics, capturing objective and subjective heterogeneity (some of which are observable and some of which are completely unobservable, such as ambitions or aspiration levels). However we can get a measure of her subjective condition or of her valuation in each of the 3 dimension of the 4 theoretical dimensions of CASP12. This is done by asking individuals how they feel about a particular item. We assume that such an answers are meaningful and comparable between individuals, providing interesting and plausible results.

Since life satisfaction  $LS_i$  (the elicited variable) is an ordered categorical variable, we will estimate an *ordered probit model*. Let us assume that there exists a latent variable (utility, quality of life) linear on the explanatory variables and on the error term, which is  $\epsilon_i \sim N(0, 1)$ . The real axis is split in 4 intervals,  $(-\infty, \mu_1], \dots, (\mu_3, \infty)$ , so  $LS = k$  if the latent variable is such that  $QOL \in (\mu_k, \mu_{k+1}]$ . When crossing a threshold level  $\mu_k$ , the observed category of  $LS$  changes (caveat, recall that lower values correspond with higher life satisfaction). In this way, the relation between the surveyed variable and the latent one is determined by

$$LS_i = \begin{cases} 1 \text{ (very satisfied) if } -\infty < QOL_i < \mu_1 \\ 2 \text{ (satisfied) if } \mu_1 < QOL_i < \mu_2 \\ 3 \text{ (unsatisfied) if } \mu_2 < QOL_i < \mu_3 \\ 4 \text{ (very unsatisfied) if } \mu_3 < QOL_i < \infty \end{cases}$$

Since  $\epsilon$  follows a normal distribution, we get the following probabilities

$$\begin{cases} \Pr(LS_i = 1) = \Phi(-\beta X) \\ \Pr(LS_i = 2) = \Phi(\mu_1 - \beta X) - \Phi(-\beta X) \\ \Pr(LS_i = 3) = \Phi(\mu_2 - \beta X) - \Phi(\mu_1 - \beta X) \\ \Pr(LS_i = 4) = 1 - \Phi(\mu_3 - \beta X) \end{cases}$$

Note that the highly restrictive parallel regression assumption has to be met. To contrast it, we use the Brant test for ordered probit models.<sup>3</sup>

## 4.2 Second estimation method: finite mixture model

The standard model assumes that all individuals come from the same population and assume a common residual error. Finite Mixture Models (FMM) allow people's underlying behavior be different, in the sense that there is a mixing process that determines that the observed behavior is determined by the existence of a finite number of distinct subpopulations. In this way, we let the effect of the explanatory variables differ for each of the empirically optimally determined number of subgroups.

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<sup>3</sup>The same procedure applies for CASP12 as the elicited variable that is related to latent (thus, unobservable) quality of life. However, see below for the treatment that we apply to that 36 ordered categorical variable.

FMM allows the researcher to use the whole sample to study the determinants of quality of life taking into account the unobserved heterogeneity among the eldest dividing the sample among two or more types of respondents. This is done by distinguishing between distinct classes of individuals (reporters): taking into account different behavior underlying their reported quality of life measure (heterogeneity).

One of the best examples of this approach to the study of the determinants of subjective well-being is the study of financial satisfaction in the paper of Clark *et. al* [8]. Evidence shows that the FMM has superior ability to predict the actual distributions of the endogenous variable.

## **5 Results**

### **5.1 Well-being measured by CASP-12**

In this case the indicator takes values from 12 to 48 and a higher value is related to better quality of life. Therefore, when interpreting the estimated coefficients, a positive value means that the explanatory variable has a positive effect on the wellbeing of the individual.

	OLS ESTIMATION		FMM ESTIMATION				ORDERED PROBIT	
	coef	se	component1		component2		coef	se
			coef	se	coef	se		
SEX	0,026	0,414	-0,321	0,491	0,531	0,787	-0,006	0,072
AGE	0,010	0,195	-0,133	0,238	0,241	0,388	0,003	0,034
AGE^2	-0,001	0,001	0,001	0,002	-0,002	0,003	-0,000	0,000
YEARS EDUCATION	0,178***	0,051	0,130**	0,062	0,366***	0,113	0,033***	0,009
YEARS EDUCATION^2	-0,002***	0,001	-0,001	0,001	-0,004***	0,001	-0,000***	0,000
NGYR	-2,868***	0,570	1,130	1,119	-15,012***	1,434	-0,483***	0,100
YGNR	-1,058***	0,367	-1,284***	0,466	-0,201	0,632	-0,189***	0,064
YGYR'D	-0,742	1,624	0,765	2,220	-5,621*	3,150	-0,180	0,283
YGYR'B	-2,053**	0,810	-0,404	1,075	-7,190***	1,699	-0,371***	0,141
YGYR'R	-1,374	1,304	-1,917	1,645	3,011	2,933	-0,229	0,228
DONOR	0,341	0,511	1,087*	0,644	-0,395	1,095	0,078	0,089
RECIPIENT	0,337	0,889	0,352	0,990	2,046	1,813	0,095	0,155
WORKING	0,202	0,556	1,174*	0,683	-3,257***	1,235	0,018	0,097
UNEMPLOYED	-1,971**	0,945	-1,441	1,104	-4,079**	1,637	-0,374**	0,165
HANDICAPED	-2,403***	0,831	-3,375***	0,954	2,184*	1,251	-0,404***	0,145
HOUSEWORK	-1,677***	0,493	-1,823***	0,617	-1,601*	0,936	-0,297***	0,086
LOGINCOME	0,470***	0,114	0,433***	0,137	0,500***	0,175	0,084***	0,020
WITH_PARTNER	0,673*	0,389	1,336***	0,490	-1,332*	0,786	0,109	0,068
HOUSEHOLD_SIZE	0,108	0,145	0,122	0,173	0,043	0,241	0,019	0,025
GALI_LIMITATION ACTIVITIES	-4,027***	0,353	-4,561***	0,446	-2,504***	0,632	-0,686***	0,063
_cons	34,224***	6,873	37,106***	8,262	32,561**	13,287	2,733**	1,204
/imlogitpi1			1,022***	0,294				
/lnsigma1			1,634***	0,038				
/lnsigma2			1,120***	0,122				
PI1			0,735***	.0572656				
PI2			0,265***					
AIC	8.573,205		8.530,782				8496,37	
BIC	8.682,570		8.765,136				8772,39	

note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

#### Estimation results for CASP

As usual, results derived from ordered probit models and from OLS regression are of the same nature<sup>4</sup>. Actually, we report OLS estimation results in order to make them comparable with the latent classes model estimation. In this last one, we assume that the density function for each of the subpopulation is a normal distribution. Regarding which method leads to better results, we find evidence for rejecting the parallel regression assumption, thus finding evidence of unobserved heterogeneity.

We will compare the results reported in the first 6 columns. When choosing in terms of information criteria, the comparison between the Akaike Information Criteria and the Bayesian one does not provide conclusive evidence. That is why we will offer a brief presentation of both type of results.

When estimating a unique model for the whole sample by OLS, it turns out that years of education (0 to 17,5 for our sample) have an increasing, concave effect. No significant age or gender effects are found.

<sup>4</sup>Moreover, given that the dependent variable takes values between 12 and 48, as the result of the integration of 12 ascending scales (one for each of the questions regarding the 4 domains), we believe that it is quite an inoquous assumption.

Regarding the time transfers regime, with respect to the baseline category (no give, no receive), those who only give and those who only receive tend to achieve lower levels of CASP12. Those who both give and receive the same amount of time transfers are also strictly worse off. Even if the first finding could support the reciprocity hypothesis, the last finding provides us evidence against it, so by means of our estimation, we cannot reach supportive evidence for reciprocity. No statistically significant effects are found for the effect of money transfers on quality of life.

Some interesting results arise regarding the labor status of the individual. With respect to the basic category of being retired, unemployed people, handicapped and housewives have a lower quality of life when measured by the score of CASP12.

There is a positive effect of household income over our dependent variable. Also living with a partner has a positive effect, although weakly significant. However, health status dramatically determined quality of life in the sense that having limitation activities decreases CASP. The magnitude of this effect is the highest one.

We can now compare those results with the ones obtained from the estimation of the finite mixture model. We estimate a two classes model with a normal density for each of those subpopulations. Our estimation of a two classes mixture model determines that 73.5% of the population is classified in the first component and 26.5% of the population in the second. The explanatory variables operate in a different way in each of the components of the model as reported in the table above.

Let us describe the main findings. For the first estimated component, we find a positive effect of the years of education, but the magnitude of this effect for the second component is higher. Regarding the transfer regime, only for the first subpopulation does it have a positive effect being a money donor. However, when focusing on time transfers, for the first category, we find a negative effect of giving but not receiving, and for the first category, a negative huge effect if not giving but receiving, as well as having a balanced relation. For the first subgroup, workers are strictly better off, whereas being handicapped and doing housework reduced the CASP12 score. The second subgroup of the population is such that workers, unemployed and houseworkers are strictly worse off.

The positive effect of household income is of a greater magnitude for the second component (both positive effects). While having a partner in the first component has a positive effect, in the second component has a negative one of about the same magnitude. Finally, the effect of having a bad health condition (as measured by GALI in a dichotomous dummy variable) leads to a negative impact over the quality of life for both subpopulations, being it higher for people in the first component.

## 5.2 Well-being and life satisfaction

This variable takes values from 1 to 4, 1 meaning very satisfied and 4 very unsatisfied. Therefore, as we have presented in the descriptive results, lower values are associated to a higher well-being and quality as self-assessed. Since a lower value is associated with a higher level of well-being or better quality of life, a positive estimated coefficient will imply that the corresponding variable has a negative effect over the well-being of the individual.

	OLS		FMM ESTIMATION				ORDERED PROBIT	
	coef	se	component1		component2		life_oprobit	
SEX	-0,072	0,048	-0,060	0,049	0,107	0,264	-0,130	0,083
AGE	0,017	0,023	0,016	0,022	-0,053	0,091	0,024	0,039
AGE^2	-0,000	0,000	-0,000	0,000	0,000	0,001	-0,000	0,000
YEARS EDUCATION	-0,024***	0,006	-0,020***	0,006	-0,080***	0,030	-0,043***	0,011
YEARS EDUCATION^2	0,000***	0,000	0,000***	0,000	0,001**	0,000	0,000***	0,000
NGYR	0,149**	0,066	0,154**	0,063	0,250	0,314	0,250**	0,112
YGNR	0,021	0,043	0,053	0,046	-0,167	0,215	0,045	0,074
YGYR'D	-0,126	0,187	-0,170	0,176	0,004	0,706	-0,210	0,331
YGYR'B	0,143	0,095	0,108	0,093	0,145	0,293	0,268*	0,160
YGYR'R	-0,106	0,153	-0,083	0,171	-0,941*	0,480	-0,180	0,260
DONOR	0,025	0,059	0,084	0,063	-0,288	0,405	0,033	0,104
RECIPIENT	0,166	0,103	0,116	0,104	0,946**	0,423	0,230	0,173
WORKING	-0,019	0,065	-0,035	0,062	0,146	0,291	-0,060	0,113
UNEMPLOYED	0,103	0,109	0,044	0,107	0,475	0,396	0,146	0,187
HANDICAPED	0,065	0,096	-0,017	0,097	0,646	0,399	0,089	0,162
HOUSEWORK	0,047	0,057	-0,032	0,058	0,702***	0,260	0,066	0,098
LOGINCOME	-0,031**	0,013	-0,032**	0,013	-0,014	0,061	-0,054**	0,023
WITH_PARTNER	-0,197***	0,045	-0,251***	0,052	0,162	0,248	-0,340***	0,077
HOUSEHOLD_SIZE	-0,012	0,017	-0,023	0,017	0,031	0,099	-0,025	0,029
GALI_LIMITATION ACTIVITIES	0,282***	0,041	0,270***	0,041	0,325**	0,156	0,481***	0,071
_cons	1,809**	0,800	1,784**	0,758	4,543	3,261		
/imlogitpi1			1,879***	0,333			-0,647	$\mu_1$
/lnsigma1			-0,626***	0,038			0,897	$\mu_2$
/lnsigma2			-0,566***	0,151			1,978	$\mu_3$
PI1			0,868***	0,038				
PI2			0,134***					
AIC	2.687,889		2.625,318				2.558,162	
BIC	2.796,846		2.858,797				2.677,496	

note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Estimation results for life satisfaction.*

We proceed in a similar way as above, first discussing the OLS results (instead of the ordered probit ones) and then moving to the characterization of the two behaviors determined by the two classes of the FMM estimation.

No evidence of age and gender effects is found in our estimations. As before, there is a positive effect of the number of years of education over the quality of life of the individual (recall that a negative sign is due to the descending order of the scale in which life satisfaction is measured). The only transfer structure that has an statistically significant effect over life satisfaction is not

giving but receiving time transfers when we estimate a model for the whole Spanish sample of 50+ individuals, and this effect is negative. There is, as we found for the alternative measure of quality of life (CASP12), a positive effect of household income over the well-being of the individual. The same happens with the fact of living with a partner. Regarding the health condition, as before, the fact of having a bad condition such that limits activities, has a negative and huge impact over the quality of life of the individual as reported with life satisfaction.

The behavioral pattern described for the two classes finite mixture is somehow different. First, our model classifies 86, 8% of the population in the first component and 13,4% of it in the second one. The first category is defined by a monotone increasing (in the sense of better quality-life satisfaction) effect of the number of years of education. The positive effect of not giving but receiving time transfers arises from this component. The positive effect of income over life satisfaction also holds for first component behavior, as well as the one for living with a partner. Finally, the negative effect of the GALI indicator is not so big in this component as it will appear in a while for the second one.

For the second component (13,4% of the population is classified here), being a giver and receiver of time transfers and holding a positive balance (more helps received than given) has a positive effect over life satisfaction. However, being a money receiver has a negative effect over life satisfaction of about the same magnitude. It is interesting to point out that household income has no statistically significant effect for this second subpopulation. Regarding labour status, for this group, housework has an statistically significant negative impact over well-being. The impact of GALI is bigger in this component.

## 6 Overall conclusions.

In this paper we have undertaken an analysis of the effect of different transfer regimes over the quality of life of the Spanish subsample of 50+ contained in the first wave of the SHARE study. We have characterized an individual in terms of the situation of interdependence from other generations of the same family. In this sense, we have provided a classification in 6 categories regarding time transfers (helps from and to outside the household) and 3 for money transfers. We have also performed the estimation of a model to study the determinants of well-being in several dimensions: two alternative ways of capturing quality of life are introduced in our model: life satisfaction and CASP12. Each of them is representative of an alternative construction of quality of life (hedonic or subjective well-being and eudaemonic or functional). We propose two alternative estimation methods: the first one is a traditional ordered approximation, the second one allows for high unobserved heterogeneity and tries to capture the underlying behavior of a finite number of distinct subpopulations

Still, we need to address methodological questions regarding the estimation method and would like to propose alternative characterizations of the transfer

regimes in terms of the intensity: frequency and amount. This last matter is a challenging one, given the low response rate of some of the quantification of time or money transfers provided by the subjects in the sample.

With respect to the incidence of the transfers we think that the decision of transferring money and time may be simultaneous so, in a companion paper [4] that is also in progress, we have studied the determinants of money and time transfers taking into account this potential simultaneousness by estimating a bivariate probit for both transfers from parents to children and from children to parents. Our results show that gender, education, family size and labour market situation play a significant role and that money and time transfers are complex. We are also interested in studying if the money and time transfers are substitute or complement. Our results show that for high educated children money and time transfers are complement goods. With respect to the intensity of these transfers we have estimated the determinants of the intensity of the transfers accounting for potential selection problems. Our results suggests that there are significant differences by country, education and gender.

We believe that the contributions from both papers complement one another. First, we will be able to understand, among others, the household production technology for intrafamily care. Second, one that we have a clear picture of how intrafamily solidarity happens, we will be able to perform a much more accurate analysis of the determinants of the veterans' quality of life.

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