

# Parental Caregiving and Employment Status of European Mid-Life Women

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Preliminary Version

## Abstract

In this paper we analyse the potential relationship between labour market participation decisions and caregiving activities to elderly parents for women approaching to retirement in the European context. We use two different but comparable samples drawn from the Survey of Health, Ageing and Retirement in Europe (SHARE) that provide us complementary detailed information about daughters and parents. We provide evidence about this question for two groups of European countries that strongly differ in terms of informal caregiving intensity within the immediate family: the northern countries (Sweden, Denmark and The Netherlands), and the southern countries (Spain, Italy and Greece). Given the potential simultaneity of both kinds of decisions, a joint bivariate Probit model is estimated. The results show that the

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estimated effect of intensive informal caregiving on the probability of labour participation is highly significant and substantially larger for both groups of countries when this variable is treated as endogenous.

Keywords: Binary choice, labour participation decisions, parental informal caregiving, endogenous variables, simultaneous estimation.

JEL: J2, C3, D1

## 1 Introduction

Nowadays, population ageing is one of the most important demographic changes and challenges in all European countries. As a result of the significant increase in life expectancy in the past fifty years together with the low birth rates exhibited by most of the modern societies, European population has been ageing progressively. Furthermore, since this trend is expected to continue, the number of elderly people will rise very intensively over the next decades. In particular, one projection is that the number of people aged 65 and over in EU15 will increase from 61 millions (16.1 percent of the total population) in 2000 to 103 millions (27.5 percent) in 2050. For those aged 80 and over the increase is projected to be from almost 14 millions (3.6 percent) in 2000 to some 38 millions (10 percent) in 2050 (Economic Policy Committee (2001)). Therefore, one of the most relevant effects of population ageing will be the increase in the caregiving demand by elders and retired people. Even though this is a common phenomenon in all European countries, there are important differences among them in terms of the implementation of public policies that deal with this issue. In particular, the results provided by the Economic Policy Committee (2001) shows that long-term care<sup>1</sup> expenditure levels per head differ considerably between Member States. This reflects different traditions in the provision of care for the elderly. For example, in some Member States, mostly northern countries, care for the elderly is

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<sup>1</sup>As the EPSCO/ECOFIN (2003) states, "...Long-term care consists of assistance to persons who are unable to live autonomously and are therefore dependent on the help of others in their every day lives. Their needs for assistance can range from facilitating mobility, shopping, preparing meals and other household tasks to washing and feeding in the most extreme cases..."

mainly formal, with a large share of formal care provided by institutional means. The opposite extreme case is represented by the southern countries where the informal provision of care is the most important and is left to family members. Indeed, they are usually middle-aged women (spouses or daughters), who become the main providers of long-term care in the family. However, it could be argued that assuming such responsibilities could imply very high economic and non-economic costs. An illustration of this is given by the preliminary statistics from the survey "Cuidados en la familia de personas mayores en situación de dependencia 2004" ("Caregiving in families with elderly dependents 2004") in Spain.<sup>2</sup> Specifically, they show that 62 percent of women with informal caregiving responsibilities admit that these responsibilities significantly reduce their leisure time or strongly affect their professional careers, that, in some cases, are even interrupted. However, the continuous increase in the female labour force participation and in population ageing, together with the changes in the family structure, raises some doubts about the future viability of this pattern of social support. As a result, policy makers are interested in evaluating the opportunity costs associated with informal eldercare. This is crucial to develop the optimal structure of long-term care benefits in southern European countries and to reinforce and improve the existing one in continental and northern states.

Even though the relevance of this question in Europe, most of the studies analysing the potential relationship between caregiving to elderly parents and labour supply decisions for women only refers to the US (i.e. Ettner (1995, 1996), Johnson and Lo Sasso (2000), Lang and Brody (1983), Pezzin and Schone (1999), Stoller (1983), Wolf and Soldo (1994)). However, the evidence about this question provided by these studies is mixed. On the one hand, some of them conclude that there exists a negative correlation between caregiving and labour supply decisions. For example, Lang and Brody (1983) examine the relationship between selected characteristics of a sample of middle-aged daughters<sup>3</sup> and the nature and amount of help that they provided to their elderly mothers. Their results suggest that being employed operates to make daughters somewhat less available as care providers and reduces slightly the amount of help given. However, as the authors remark, this finding can not be generalised to the total of the population because of the

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<sup>2</sup>This survey was recently released by IMSERSO (Spanish Ministry of Employment and Social Affairs).

<sup>3</sup>Specifically, the data are based on interviews with the middle generation of women in a three generation study, "The Dependent Elderly and Women's Changing Roles".

nature of the sample (small, urban, and non-representative). In a more sophisticated analysis, Ettner (1995) analyses the impact of parental care on the women labour supply using data from the Survey of Income and Program Participation (SIPP) for the period from 1986 to 1988. Applying an instrumental variable (IV) technique to control for a potential endogeneity of caregiving, the results show that living with a dependent parent has a significant negative effect on female labour supply. In a more recent paper, Ettner (1996) performs a similar analysis using data from the National Survey of Families and Households (NSFH) for the year 1987 and obtains that caregiving activities do not have a significant negative effect in male labour supply whereas female labour supply is only significantly negative affected by the caregiving activities of parent not living at home. Similarly taking into account the potential endogeneity of caregiving, Johnson and Lo Sasso (2000) explore time transfers to elderly parents and their impact on labour supply for men and women at mid-life. They estimate a simultaneous panel data model of annual hours of paid work and the provision of time assistance to parents using a sample of men and women aged from 53 to 65 from the Health and Retirement Study. Their results suggest that time devoted to parental caregiving significant and substantially reduces labour supply for both women and men. On the other hand, there are other researchers that do not find any statistically significant relationships between caregiving and labour supply. For example, Stoller (1983) explores the impact of employment and other competing familiar responsibilities on the level of assistance provided to elderly parents by adult children. She uses data collected through personal interviews with a probability sample of non-institutionalised elderly persons and their informal helpers, and she restricts the analysis to informal helpers who are sons or daughters of the older respondent. Her results suggest that being employed did not have a significant impact on the hours of assistance provided by daughters. However, similarly to the paper by Lang and Brody (1983), these conclusions should be interpreted with caution since the sample used comes from a very particular region of northeastern New York, and the potential endogeneity between caregiving and labour supply decisions is not taken into account. Wolf and Soldo (1994) estimate a simultaneous equations model of employment, hours of work, and the provision of care to an elder parent. They use data drawn from the National Survey of Families and Households (NSFH) and focus their analysis on married women "at risk"<sup>4</sup> of providing

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<sup>4</sup>They define married women "at risk" of providing care as married women with one or more living

care to an elder parent or parent-in-law. They find no evidence of reduced propensity to be employed or reduced conditional hours of work due to the provision of care to frail parents. Pezzin and Schone (1999) estimate a simultaneous, multi-equation, endogenous switching model of informal care, coresidence, and female labour supply using data from the 1986-1987 matched Hebrew Rehabilitation Center for the Aged (HRCA) Survey of the Elderly in Massachusetts and HRCA-NBER Child Survey. They find that the correlation between informal care and labour force participation was negative but small and conclude that the trade-offs between labour supply and parental caregiving decisions are modest for adult daughters. However, the possibility of extending their findings is limited since their data consist of only 424 parent-daughter pairs from a single state. Therefore, considering all these findings, it seems that the different results and conclusions could potentially be due to data limitations or econometric problems such as sample selection, endogeneity and unobserved heterogeneity issues.

To the best of my knowledge, Spiess and Schneider (2002) is the only study that addresses the relationship between informal caregiving and employment for mid-life women from Europe. Using data drawn from the European Community Household Panel for 12 EU-countries and they find a negative association between starting or increasing informal caregiving and the change in weekly work hours but with differences across countries. However, they do not take into account the potential simultaneity of these two decision variables what could lead to important biases in the estimates.

Given the scarce and weak evidence about this issue in Europe, the purpose of the present research is to analyse the potential relationship between labour market participation decisions and caregiving to elderly parents for women approaching to retirement (i.e. aged between 50 and 60 years old) in the European context. Specifically, we develop an empirical specification that allows to quantify the impact of the provision of informal care to elderly parents on labour market participation accounting for the potential simultaneity of both decisions. We use data drawn from the Survey of Health, Ageing and Retirement in Europe (SHARE) because of its appealing features<sup>5</sup>. First, the multi-disciplinarity of  

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parent, parent-in-law or step-parent aged 65 or older.

<sup>5</sup>This paper uses data from the early release 1 of SHARE 2004. This release is preliminary and may contain errors that will be corrected in later releases. The SHARE data collection has been primarily funded by the European Commission through the 5<sup>th</sup> framework programme (project QLK6-CT-2001-00360 in the thematic programme Quality of Life). Additional funding came from the US National Institute on

the data makes available detailed and specific information about women in their middle-age and their elderly parents. This allows to control for three important aspects that could influence the different patterns of family caregiving: the rates of cohabitation and residence closeness between the elderly parents and the adult daughters, the labour market participation of the daughters, and the capacity of the elderly parents to have access to formal care services. Specifically, we use variables from the Demographic, Health Care, Employment and Pensions, Children and Social Support modules, and some generated variables (education, income and health status) for the corresponding generation. Second, SHARE allows to perform the analysis using the information about the daughters and parents obtained from two different points of view. First of all, it is possible to draw a sample of middle-aged women (aged between 50 and 60) directly from the respondents of the survey. Therefore, in this case, daughters will report the information about their own individual characteristics and some information about their living elderly parents. Secondly, it is possible to draw a comparable and analogous sample of middle-aged women considering that their parents are the respondents of the survey, given that there are very detailed information about children in the data. The advantage of using both samples is twofold. First of all, their comparison allows us to check whether the dimension and the importance of time transfers from children to parents are viewed and considered in the same way by mid-life women and their parents. It is well-documented in the economic literature about intra-family transfers that parents perceive or think that time transfers received from their children are much weaker than what their children report. Secondly, we can check the robustness of our results and conclusions by performing the analysis using each of them. Finally, the cross-country comparability of the data makes possible to perform a comparative analysis about the question of interest between northern and southern countries in Europe. The comparison of this two areas is of relevance because they present the two polar cases in terms of informal caregiving intensity within the immediate family (Attias-Donfut, Ogg and Wolff (2005)). On the one hand, we consider

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Ageing (U01AG09740-13S2, P01 AG005842, P01 AG08291, P30 AG12815, Y1-A G-4553-01 and OGHA 04-064). Data collection in Austria (through the Austrian Science Foundation, FWF), Belgium (through the Belgian Science Policy Administration) and Switzerland (through BBW/OFES/UFES) was nationally funded. The SHARE data set is introduced in Börsch-Supan et al. (2005); methodological details are contained in Börsch-Supan and Jürges (2005).

Sweden, Denmark and the Netherlands for the northern pattern, and on the other hand, we consider Spain, Italy and Greece as representatives of the southern pattern.

The results obtained in this study will be somewhat comparable to the ones provided by Johnson and Lo Sasso (2000), although they analyse the intensive margin in the labour responses and we exclusively focus on the extensive margin. They use a similar approach and data for middle-aged men and women from the second and third waves of the Health and Retirement Study (HRS). Furthermore, the fact that this survey has been used as a role model for SHARE, facilitates the comparison with this study. In addition to this, it allows for considering the US case as a reference since many policies related to long-term care have been already implemented in this country.

This paper proceeds as follows. In section 2, we present the description of the data and a deep descriptive analysis of the daughters' characteristics related to labour participation and parental caregiving for the two samples and groups of countries. Section 3 contains the empirical specification and the econometric methodology. In Section 4, we provide the estimation results and we conclude.

## 2 Data and Descriptive Analysis

### 2.1 Data

The data used in this analysis comes from SHARE Release 1,<sup>6</sup> which has been designed and developed by the SHARE project<sup>7</sup> for several countries in Europe. Its main purpose is to provide detailed and specific information about the living conditions of people aged 50 and older. As a result, SHARE allows for improving our understanding on one of the most important phenomenon that Europe will face in next years, the population ageing. The main innovation in SHARE relies on three important and appealing features of the data: multidisciplinary, longitudinality and cross-country comparability. Regarding multidisciplinary, SHARE collects information on demographics, employment and retirement, physical and mental health, social support and networks, housing, income and consumption, both at household and individual level. This gives the possibility to

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<sup>6</sup>The data in Release 1 were collected by interviews in 2004.

<sup>7</sup>For more specific information on the SHARE project, see [www.share-project.org](http://www.share-project.org).

analyse a wide variety of questions related to population ageing and the quality of life of the elderly. In particular, it is specially suitable for the study of time allocation between market work and parental caregiving activities. The objective of SHARE is to provide longitudinal information, necessary to study these issues in a dynamic setting, to identify and isolate age and cohorts effects in social and economic trends, and to control for unobserved heterogeneity. However, so far there is only one release available and, therefore, only cross-sectional data can be used. Finally, SHARE allows to make cross-country comparisons since data have been collected for several European countries: Austria, Belgium, Denmark, France, Germany, Greece, Italy, Spain, Sweden, Switzerland and The Netherlands. In addition to this, the survey also makes possible comparisons with UK and US since the English Longitudinal Survey on Ageing (ELSA) and the Health and Retirement Survey (HRS) have been considered as role models for SHARE. All of these features make this survey a unique dataset to analyse questions related to elderly people in Europe.

## 2.2 Sample Selection

The population of interest in this study is the group of middle-aged women that are "at risk" of providing care to their elderly parents. Therefore, we will focus on women aged between 50 and 60 with at least one living parent at the moment of the interview. Furthermore, we perform this selection for two groups of countries that strongly differ in family support patterns, social norms and institutional arrangements: the group of northern countries (NC hereafter), that is, Sweden, Denmark, and The Netherlands, and the group of southern countries (SC hereafter), composed by Spain, Italy, and Greece.

In addition to this, we perform the selection from two different perspectives. First of all, we select a sample of women in this range of age with at least one living parent directly from the age-eligible respondents of the survey. In this case, we can exploit all the information provided by SHARE given by the daughters about themselves and their households. At the same time, they also report some specific information about their natural parents such as their age, last occupation, health status, and residence closeness. The second sample is built from the respondents with at least one daughter aged between 50 and 60. This can be identified using the Children module, that provides the number

of living children<sup>8</sup> and some basic information about all of them (gender, age and residence closeness).<sup>9</sup> However, more detailed information (type of children, marital status, frequency of contact, occupation status, education and number of children) is only asked to at most four children. When there are more than four children, the four ones are not selected randomly but following a set of criteria.<sup>10</sup> As a result, even though this second sample of daughters is comparable to the first sample since their observations belong to the same generation and population, it presents some problems. First, it is not a random sample because of the way of selecting the children. Second, we can not make the sample nationally representative since individual weights for these observations are not available (since these women are not respondents of the survey).<sup>11</sup> Finally, the observations belonging to the same family or household will not be cross-sectional independent.<sup>12</sup> However, it presents a very important advantage with respect to the first sample. Specifically, it provides a great and rich variety of information about other characteristics of the parents (the respondents of the survey in this case) that are directly related to their need of informal care such as physical and mental health status, income, and different sources of care and support.

Table A1 in the Data Appendix presents the size of both samples for each of these countries after dropping out observations with missing data, "extreme" responses<sup>13</sup> and inconsistencies in the variables considered in the analysis.

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<sup>8</sup>It includes natural children, stepchildren, adopted or fostered children. In the case of couples, this information is reported by only one respondent in the couple, the "family respondent", and this number includes all these types of children of either or both members. For couples, a natural child is defined as a child of both members.

<sup>9</sup>As Martínez-Granado and Mira (2005) state, it is important to collect information on all types of living children given that we are interested in social relationships and in sources of support of elderly people.

<sup>10</sup>In particular, the program selects the four children as follows. First, it sorts children in ascending order by minor, proximity, and birth year, where minor is defined as 0 for all children aged 18 and over and 1 for all others. Second, it picks the first four. When all sorting variables are equal, the program chooses a child randomly.

<sup>11</sup>Given that we do not have individual weights for the second sample, we will perform the descriptive analysis using the unweighted observations for both samples.

<sup>12</sup>The cluster structure of this sample will have to be taken into account when choosing the estimation procedure.

<sup>13</sup>The "extreme" responses are "Don't Know" and "Refusal".

As we can see, the total sample obtained from the first selection procedure (Sample (I) hereafter) is somewhat larger than the second one (Sample (II) hereafter). Since the sample sizes for each country are not very large, we will perform the empirical analysis "pooling" the samples for all the countries in the same group and controlling for potential unobserved heterogeneity using country dummies.

Given the objective of the study, we have to define the variables used to measure the individuals' decisions about market work and caregiving activities. Regarding participation decisions, SHARE respondents are asked about their current job situation. Even though those who are working are also asked about the number of contracted and usual weekly hours of work and the number of months worked in all jobs,<sup>14</sup> we will only focus on the labour force participation decision. The reason for that is twofold. First, we think that it is more realistic to consider that individuals' jobs are composed by fixed wage-hours packages. In this case, as Arellano and Meguir (1992) note, observed or reported hours are not desired hours and therefore, the individual's choice is restricted to the decision of participating or not. Second, for sample (II), we only have available information about the daughters' occupation status but not about the number of hours of work. As a result, we will only analyse the labour market participation decision to be able to compare the results obtained from both samples. To do that, we define a reduced-form participation indicator function, *Labour Participant*. For sample (I), this function is equal to one if the daughter reported a positive number of weekly hours of work at the moment of the interview and zero otherwise. For the case of sample (II), the function is equal to one if the family respondent reported that the daughter was working at the moment of the interview as a full-time employed, part-time employed, self-employed or working for own business, and zero otherwise.

Regarding caregiving responsibilities, SHARE respondents are asked about any help (i.e. personal care, practical household help, and help with paperwork) given to or received from a person inside or outside the household during the last twelve months prior to the interview and the identity of this person. However, questions of help received by members of a couple from people not living in the household are only asked to the family respondent.

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<sup>14</sup>These questions are also asked to individuals that report to be temporarily away from work, or that even though they are not working in the moment of the interview, they have done some paid work during the last four weeks.

From this information, we can identify for sample (I) if each daughter provided care to an elderly parent during the last twelve months. Furthermore, respondents who report to have provided care to a person from outside the household are then asked about the frequency of the care provided to each recipient (i.e. almost daily, almost every week, almost every month, and less often). Since the question about the help given to a person within the household refers to care or assistance provided regularly (i.e. daily or almost daily during at least three months), we will assume that daughters that reported providing this type of help did it in a daily basis. For sample (II), we can identify if each selected daughter gave care to an elderly parent during the last twelve months prior to the interview from outside or inside the household. To do this, we use the information reported by parents about the four selected children in the Children module and we combine it with the Social Support module. However, since the question of help received by members of a couple from people not living in the household is only asked to the family respondent, we can not exactly identify which member was taken care of in this case. As previously, for daughters providing care to elderly parents from outside the household, we can measure the frequency of the help (i.e. almost daily, almost every week, almost every month, and less often). For daughters providing care to an elderly parent from inside the household, we will assume that this help has been given in a daily basis. As we did for the participation decisions, we define a reduced-form caregiving indicator function, *caregiver*, to analyse parental caregiving activities. For sample (I), this indicator is equal to one if the daughter reported to have taken care of an elderly parent in the last twelve months and zero otherwise. For sample (II), it is equal to one if at least one parent reported to have been taken care of by the corresponding selected daughter and zero otherwise.

Apart from the potential simultaneous relationship between the daughters' decisions about labour market participation and caregiving activities, both kind of decisions are functions of variables that account for preferences, other daughters' characteristics and parents' characteristics. However, regarding these factors, we have different detailed information available about daughters and their parents depending on the sample that we use. In particular, for sample (I), we observe information on the daughter's age, education, current marital status, health, income, living children and siblings. With respect to the information of natural parents' characteristics given by the daughters, we observe each parent's age, residence closeness, and health status. However, there is not available infor-

mation about parents' income<sup>15</sup> or the potential use of different sources of formal care, that could definitely influence the provision of care by the daughters. On the contrary, extremely detailed information about these issues and, in general, about all parental characteristics can be derived from the sample where the parents are the respondents (sample (II)). In particular, we observe each parent's age, health status, income and information about the potential access to different sources of formal care.<sup>16</sup> Besides, regarding daughters' characteristics, we have information given by their parents on the selected daughters' age, education, current marital status, children, siblings and residence closeness. However, we can not measure their health status or financial situation.

More specific details about these variables are provided in the Data Appendix for each sample.

## 2.3 Descriptive Analysis

Table A2 and Table A3 in the Data Appendix present the mean of the variables used in the analysis at group and country level for the two samples. These results allow us to draw a first picture about the characteristics of women aged between 50 and 60 throughout the countries of interest and from the two different samples. Even though most of these characteristics are rather well-known, we focus on the most remarkable differences between the North and the South. The results for sample (I) presented in Table A2 show that northern middle-aged women participate, on average, much more in the labour market (77.5 percent) than southern middle-aged woman (40.9 percent), they are more highly educated (whereas in the northern area the percentage of women with an education level lower than the first stage of secondary and the percentage of the highest educated women are 7.38 and 40.3, respectively, in the southern area these percentages are 39.9 and 16.2),<sup>17</sup> and earn higher non-wage income. In addition to this, we can see

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<sup>15</sup>To have a proxy of the parents' financial situation, we plan to include also a variable indicating parents' last occupation when the ISCO standardised occupation variables appear in SHARE Release 2.

<sup>16</sup>Theoretically, both members of a couple should be interviewed even though both of them are not 50 or older. However, in practice, it could be the case that one member has not been interviewed and, therefore, there is not information about this parent.

<sup>17</sup>Notice that the percentage of Greek middle-aged women that has completed the first stage of secondary education is surprisingly low compared to the percentage of women that has completed the second stage. Given the characteristics of the sample, we would expect a higher percentage of middle-aged women

that even though women in the southern countries live, on average, much closer (less than 5 kilometers away) to an elderly parent, a substantially lower percentage reports to have taken care of an elderly parent during the last twelve months. This last finding seems very surprising since Spain, Italy and Greece are countries where family ties are traditionally stronger than in the northern countries in this respect since formal care services tend to be rather scarce and very expensive. However, we can not infer from this result that the probability of providing parental care regularly at mid-life is larger for northern women than for southern women since our definition of caregiver is rather weak<sup>18</sup>. Therefore, a specific measure of the intensity or frequency of this care will be necessary in our analysis.

The results for sample (II) presented in Table A3 are quite similar to the results for sample (I). In particular, they show that northern women at mid-life participate in the labour market, on average, much more than southern females, they are more highly educated and live further away from their elderly parents.<sup>19</sup> The most remarkable difference between the two samples refers to the percentages of caregivers.<sup>20</sup> For the southern countries, these percentages are rather similar in both samples. However, this is not the case for northern countries. In particular, we can see that the percentage of caregivers is substantially lower for all them in sample (II) (16 percent in the northern pool) than in sample (I) (45.2 percent). Therefore, this descriptive result confirms our initial hypothesis about the different appreciation of informal care by parents and offspring for northern countries. Specifically, the results suggest that parents are more strict or rigorous when they think about informal care and that, consequently, they feel that they receive much

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in the first stage similarly to the cases of Spain and Italy. So far, we did not find any reasonable explanation for this result although we think that it is likely that there is a mistake in the data.

<sup>18</sup>Remember that in our analysis a daughter is a caregiver in sample (I) if she reported to have taken care of at least one living parent during the last twelve months and we do not impose any condition of the intensity or frequency of this care.

<sup>19</sup>Notice that from the information about Greek daughters' education given by their parents, we also obtain that the percentage of daughters that has completed the first stage of secondary education is considerably lower than the percentage of women that has completed the second stage. As we noted before, we think that there has been a mistake in the standardisation of the education variables according to the ISCED classification.

<sup>20</sup>Remember that, in sample (I), a daughter is a caregiver if she reports to have taken care of at least one living parent during the last twelve months. For sample (II), a daughter is a caregiver if at least one parent reports to have been taken care by her during the last twelve months.

less help than what their daughters report. In addition to this interesting finding, we can also observe that for northern countries, daughters and elderly parents show different perceptions about parents' health status. Specifically, whereas the percentage of daughters with at least one elderly parent in a good health status is considerably higher in sample (II), the percentage of daughters with at least one living parent in a bad health status is lower in this sample. This result could be reflecting, therefore, that elderly parents feel themselves healthier and better than what their daughters think they are.<sup>21</sup> Apart from these findings, we can also notice that elderly parents in northern countries have, on average, a higher gross annual household income and that they receive more formal care than elderly parents in southern countries.

So far, we have analysed the characteristics of middle-aged women from both samples. However, given that the purpose of the present paper, we will compare next the labour market status and other individual characteristics of the sub-samples of caregivers and non-caregivers drawn from sample (I) and sample (II). Through this descriptive comparison we might have a first insight about what are the main factors that could influence women's decisions about the provision of informal care to their elderly parents. Caregivers and non-caregivers' characteristics are shown in Table 1 and Table 2, respectively, for sample (I), and Table 4 and Table 5, respectively, for sample (II) in the Appendix.

For sample (I), the comparison between results provided by Table 1 and Table 2 allows to get interesting findings regarding some specific variables. However, for certain variables in some countries, the results do not seem either reasonable or intuitive, and we could not find a consistent story or explanation for them. With respect to this, it is important to keep in mind that all of these results are descriptive. Furthermore, our samples are considerably small, specially for some countries, which could affect the representativeness of the results. This drawback represents the main reason why we will compare the pools of northern and southern countries even though we are aware of the potential heterogeneity

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<sup>21</sup>We should note that this finding may be interpreted with caution since in the case of couples with only one member interviewed, we only observe the health status of this respondent. It could happen that the member of the couple that has not been interviewed exhibits a worst health status than the respondent and we will be, therefore, underestimating the health status of the parents in sample (II). To try to check this hypothesis, we count the number of respondent parents with spouse or partner not interviewed, and that take care of this spouse or partner. This could be signalling that the non-interviewed spouse exhibits a worst health status. However, we obtained that these observations were very few.

within each group.

From Table 1, we can see that in the northern countries almost all carers are from outside the household. For the Mediterranean countries, Italy and Greece show slightly higher percentages of carers from inside the household. However, Spain represents the most remarkable case with 31.25 percent of caregiver daughters that provides care to an elderly parent living in the same household. This important difference between Spain and the rest of countries (including Italy and Greece) could be explained by two factors. First, the fact that in this country the rate of cohabitation and residence closeness is considerably higher, as it can be seen by the values of the variables *Resident1* and *Resident2* in Table A2. Second, the fact that children within the household are very involved in elder parental care. Actually, as Attias-Donfut, Ogg and Wolff (2005) state, in the Mediterranean countries the expectations placed on co-resident daughters to provide personal care to an elderly parent may be even higher than the expectations placed on spouses. In the southern countries, the relationship between living arrangements and patterns of family caregiving is clearly reflected by the differences in the percentages of daughters living in the same household or living less than 5 kilometers away from an elderly parent between carers and non-carers (*Resident1* and *Resident2*, respectively). In particular, these percentages are higher for the sample of caregivers than for the sample of non-caregivers, specially in Spain where 31.25 of caregivers co-resides with an elderly parent and only 4.7 percent of non-caregivers does.

As we saw above, given our definition of caregiver, northern countries present higher rates of caregiving daughters. However, when the frequency of this informal care is considered, a different story emerges. Table 1 provides the percentages of carers that reported to have taken care during the last twelve months of at least one elder parent in a daily basis (*Daily*) and the percentage of carers that have done it in a daily or weekly basis (*Daily/Weekly*). From these results, it can be seen that there is a clearly substantial difference between the two groups of countries. Specifically, the gradient from low to high percentages of daily and daily/weekly elder parental care runs from the northern to the southern countries. Among caregiving daughters, Spanish daughters are more than ten times as likely to be involved in elder parental care in a daily basis than Danish daughters. However, we should point out the existence of considerable within-group country differences. Whereas Sweden and Denmark show similar percentages for both frequency

indicators, the proportion of caregiving daughters daily or weekly involved in these responsibilities in The Netherlands is considerably larger. Furthermore, it is similar to the percentage exhibited by the pool of southern countries, and even larger than in Greece. In fact, this percentage is rather low in Greece compared to Spain and Italy but, as we remarked before, the size of the samples can definitely explain the low power of some results.

Next, we focus on the potential relationship between other daughters' responsibilities and their elderly parental caregiving activities. From Table 1 and Table 2 we can see that there is not a clear pattern in the difference in the proportion of labour market participants between carers and non-carers along countries. In particular, only in The Netherlands and Spain, the percentage of working daughters is considerably higher for non-carers than for carers suggesting that care could negatively affect labour market participation decisions. Regarding marital status, the proportion of daughters married or engaged in registered partnership is higher in the sample of carers than in the non-carers in each of the northern countries. However, whereas in Italy this proportion is very similar in both sub-samples, it is much higher for non-carers in Spain and Greece. To analyse the potential relationship between fertility variables and informal caregiving activities, we look at the variable *DChildren16* that indicates if the daughter has children aged 16 years old or younger living in the same household. Specifically, the results show that this percentage is higher for non-caregivers than for caregivers only in Spain and Italy. One again, the country where this difference is remarkable is Spain and it could indicate the complexity of being involved simultaneously in both child and elderly parental care.

In addition to these alternative time uses, we can compare other daughters' characteristics that are potentially related to their decisions of caregiving. With respect to the level of education, there is not a clear pattern in the difference between the samples of carers and non-carers. On the one hand, it seems that the proportion of daughters that completed the highest level is higher in the sample of non-caregivers for Sweden, Denmark and Spain. On the other hand, this proportion is considerably higher in the sample of caregivers for Italy and Greece, and slightly higher for The Netherlands. We could find one reasonable explanation to each of these opposite cases. First, we could think that for more highly educated women, caregiving activities represent a highest opportunity cost in terms of salary. Second, it could be that more highly educated women, that probably

received financial support from their parents to face such studies, feel themselves more responsible for their parents well-being and are more willing to assume this role. In the same direction of this last hypothesis, we could think that highly educated women are more likely to be married to highly educated men with high salaries. As a result, they do not face a very costly trade-off between labour market participation and caregiving responsibilities and they could be more willing to provide help to elderly parents. A similar ambiguous result is found for the health status. The proportion of daughters that reported to have a very bad or bad health is lower in the sample of caregivers surprisingly only for Sweden and Spain.

Regarding variables reflecting parental needs such as parent's health status, it can be clearly seen that the proportion of daughters with at least one elderly parent in a bad or very bad health is much higher in the sample of carers than in the sample of non-carers for all the countries with the exception of Greece. One again, this puzzling result for Greece could be due to the small sample of caregivers.

Finally, we should analyse the variables referring to alternative sources of parental care. These are measured by the variable *Both (Living parents)*, that indicates if both natural parents are alive, and the variables *DBrothers* and *DSisters*, that indicate if the respondent has any brother or sister, respectively. In general, it seems that the proportion of daughters with both living parents is lower in the sample of carers. This suggests that daughters tend more to take care of an elderly parent if the spouse is not alive.<sup>22</sup> With respect to the potential relationship between the number of brothers and sisters and parental caregiving activities, it is evident that sisters are better substitutes than brothers since the percentage of daughters with sisters is lower for the sample of caregivers in all the countries. However, we do not find any apparent result for daughters with brothers.

As we stated above, our definition of caregiver is considerably weak and includes individuals that have provided help to an elder parent less often than monthly. In this case, it is very likely that elder parental caregiving responsibilities do not represent a competing demand on these respondents' time since they are hardly time consuming. Therefore, we will perform the same descriptive analysis comparing the sample of the

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<sup>22</sup>However, this result is somewhat limited given that both natural parents do not have to be necessarily living together. Furthermore, we do not observe their corresponding marital status in order to know if they have a spouse or a partner.

most "intensive" caregivers, that is, the daughters that have taken care of at least one elder parent during the last twelve months in a daily or a weekly basis, with the sample of non-caregivers. This comparison will allow us to have a more precise insight about the factors that could affect informal caregiving decisions by daughters at mid-life. However, given the extremely small size of this new sub-sample, we will only focus on the two pools of countries and we will not perform the analysis at the country level. Table 3 provides the sample characteristics of the "intensive" caregivers. The most significant difference between the two sub-samples for both country groups concerns the residence closeness or proximity. In particular, we can see that "intensive" caregiver daughters live much closer to their elderly parents. Specifically, in the northern group, this type of daughters are more than twice as likely to live less than 5 kilometers away from an elderly parent. In southern countries, the percentages of daughters living so close to an elderly parent are 83 percent for "intensive" caregivers and 50.6 percent for non-caregivers. As we explained before, the cohabitation rate and the fact of taking care of an elderly parent from inside the household are strongly related. In fact, we can clearly see that the percentage of daughters living with at least one elderly parent is much higher for the sample of "intensive" caregivers specially in the southern group, where the rate of "intensive" caregivers providing help to at least one elderly parent from inside the household is higher.

Considering the percentage of working women in both samples, we can see that this is lower in the sample of "intensive" caregivers than in the sample of non-caregivers, specially in the northern group. Once again, for northern countries, marriage or living with a partner does not seem to represent a competing demand of time. However, this is not the case for southern countries where the proportion of daughters married or engaged in a registered partnership is substantially lower in the sample of "intensive" caregivers. The other potential competing demand of time, children care, is measured by the existence of children aged less or equal than 16 and living in the household. With respect to this variable, the percentage of daughters that have to take care of children is lower in the sample of "intensive" caregivers only for southern countries.

Regarding the level of education, it is remarkable the important difference between the percentages of daughters with the highest level of education, specially in the northern group. Whereas 30.15 percent of the "intensive" caregivers has completed the highest level of education, this percentage is 42 percent in the sample of non-caregivers. This

suggests that in northern countries, middle-aged daughters that frequently take care of their elder parents are not so highly educated. Looking at the parents' health status, there is a substantial higher percentage of daughters with at least one parent with bad or very bad health status in the sample of "intensive" caregivers in both country groups. This indicates that the likelihood of providing informal care to elderly parents increases as parental health status worsens off.

Finally, the percentages obtained in both sub-samples for the variables that measure the existence of siblings (*DBrothers* and *DSisters*) suggest that, for both country groups, sisters are closer substitutes in the provision of parental care than brothers.

These are the main differences between caregivers and non-caregivers that we obtained from sample (I). Next, we focus on the same analysis for sample (II). First, we should mention that since the percentage of caregiver daughters obtained from the information given by their parents is considerably low for northern countries, we will only perform this descriptive comparison for the country pools. In this case, we can see from Table 1 and Table 4 that for northern countries, the percentage of daily/weekly caregivers is lower for sample (II) than for sample (I). On the contrary, in southern countries elderly parents tend to report that they receive help from their daughters more frequently than what the daughters report. This finding, together with the difference in the caregiver rate between both samples for northern countries, seems to reflect that northern mid-life daughters and their elderly parents have different conceptions about informal care. Apart from that, the descriptive evidence shown by sample (II) indicates that most of the caregiver daughters provides help from outside the household even though in southern countries there is a substantial percentage (23.6 percent) that takes care within the household. As we mentioned before, this pattern is extremely related with the co-residence rate as it is shown in the high percentage of caregiver daughters than lives together with at least one elderly parent in the Mediterranean countries. Furthermore, comparing results in Table 4 and Table 5, we can see that caregiver daughters live closer to their parents than non-caregiver daughters, and that this difference is more important in the southern area. Regarding the employment status, we should notice that there is hardly difference in the percentage of daughters that participate in the labour market between the sample of caregivers and the sample of non-caregivers in the northern group. This percentage is somewhat lower for caregivers in the pool of southern countries. If we consider the

other competing time uses, we observe that the rate of women married or engaged in a partnership is considerably lower in the sample of caregivers for the northern group. In addition to this, the percentage of daughters with at least one children aged less than 16 and living in the same household is also lower in the sample of caregivers for both groups of countries although the difference is rather substantial only for the northern area. With respect to parents' characteristics, it is clear that whereas the percentage of women with both living parents <sup>23</sup> is lower for the sample of caregivers in both groups of countries, the percentage with only one mother<sup>24</sup> is consequently higher among carers. Another interesting finding that relates the parental caregiving responsibilities of mid-life women with their parents' health status is the fact that the percentage of daughters with one living parent in a very good/good health status is considerably lower in the sample of caregivers and for both groups of countries. This is consistent with the higher percentage of women with a living parent in a bad/very bad health status in this sample. Regarding the alternative sources of caregiving, we stated above that one of the advantages of sample (II) is the possibility of observing if elderly parents receive formal care. In fact, it seems evident from the descriptive results that the percentage of elderly parents that has received formal care during the last twelve months is higher in the sample of carers than in the sample of non-caregivers. This is the case for both groups of countries although this percentage is considerably higher in the northern area. However, from this result we can not draw really any conclusion about the complementarity/substitutability degree between informal and formal care since we do not know if they are perceived simultaneously. With respect the measures of siblings, it seems that in the northern area the percentage of daughters with at least one sister is lower in the sample of caregivers. This result suggests that in this region, sisters could be viewed as close substitute providers of informal care to elderly parents.

As we did for sample (I), it is interesting to analyse the sample characteristics of "in-

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<sup>23</sup>Notice that for sample (II), we do not refer to natural parents. See the Data Appendix for more details about this variable.

<sup>24</sup>It is important to note that in sample (II) the variables *Only Mother* and *Only Father* are defined such that they are equal to one if there is only a female respondent or a male respondent, respectively, that reports not to have a spouse or partner. Therefore, if both parents are alive but divorced, we will be considering that only one parent is alive since we do not have information about the other. See the Data Appendix for more details about these variables.

tensive" caregivers since this is the group with potentially more difficulties of undertaking market-work activities and caregiving responsibilities at the same time. In fact, this is reflected by some interesting results. Nevertheless, these results have to be considered with caution, specially for the northern group, given the few observations available in the sample of "intensive" caregivers. The results contained in Table 4 and Table 6 show that the percentage of daughters that takes care of at least one living parent within the household is higher in the sample of "intensive" caregiver than in the sample of caregivers, specially in the Mediterranean region. Besides, they also live, on average, closer to their parents, participate less in the labour market and have less young children. Concerning parents' characteristics, we should say that the percentage of daughters with parents in a very good or good health status is lower in the sample of "intensive" caregivers for the northern countries and that the percentage of daughters with parents in a bad or very bad health status is higher in this sub-sample in southern countries. Finally, we can see that the results also suggest that parents that have received help in a weekly/daily basis during the last twelve months, reported to have received formal care in a higher proportion.

To conclude this section, we should remark that the descriptive evidence shown by both samples seems rather consistent and robust. Furthermore, it reflects most of the well-known and established differences in patterns and behaviour between the North and the South of Europe regarding the variables of interest. Nevertheless, the most interesting and remarkable findings drawn from the descriptive comparison between caregivers and non-caregivers for both samples suggest the following trends. First, it could exist a negative relationship between labour market participation and elder parental caregiving activities. Second, northern mid-life women and their elderly parents have a different perception about the informal care. In particular, it seems that parents think that the help and assistance received from their daughters is much weaker than what daughters report because parents have a more precise and rigorous conception of this kind of help.

However, it is also very important to keep in mind that these results are descriptive and, therefore, merely indicative. Besides, some of them, specially those ones that do not look like very intuitive or clarifying, could be affected by the non-representativeness of the samples due to their extremely small sizes. To study the issue of interest from a more serious and rigorous statistical perspective, we perform in the next section the empirical analysis where we explain the potential econometric problems that may arise,

the empirical model and the estimation methodology.

### 3 Empirical Analysis

As we pointed out above, the goal of the present paper is to estimate the effect of providing parental care on labour force participation behaviour for middle-aged women. Therefore, our empirical model has to be based on a structural model that reflects the relationship between labour market decisions and caregiving activities. The simplest but less realistic option is to treat parental caregiving responsibilities as exogenously predetermined. This is the case if we impose a set of assumptions. First, the intrafamily allocation of the parental help does not depend on endogenous characteristics or decision variables of the children as the employment status or childcare. Second, there are not alternative sources of help like market-based care services or, at least, these are not substitutes of informal care. Third, parental needs can not be left unfulfilled. As a result, the children would take the parental demand of help as given and the division of this task among them would only depend on exogenous characteristics of the siblings such as sex, marital status, education, age, and health status. Therefore, in the empirical model consistent with this framework the caregiving indicator would enter the participation equation directly as an exogenous variable.

However, all of these assumptions are very extreme and likely to fail. In fact, it seems more realistic and appropriate to consider that both children's decision variables, employment and the provision of care, are simultaneously determined.<sup>25</sup> Therefore, our

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<sup>25</sup>Notice that we assume that other sources of help provision (from the spouse, siblings or by the purchase of market-based services) are given exogenously to the daughter. However, it would be very interesting to formally place the decision regarding the care of older parents in a family-network context. This will imply to use a multi-person household model in which several decision makers (parents and children) with potential different preferences interact among each other when making decisions. However, this introduces an important complexity in the model and requires very detailed information about the characteristics of all participants. In particular, Pezzin and Schone (1999) develop and estimate a bargaining model of intergenerational living and care arrangements for pairs composed by a daughter and her parent using detailed information of both individuals' socioeconomic situation. Regarding the purchase of formal care services, it would be interesting to consider the possibility that daughter chooses a certain level of cash transfers to the parent at the same time as or instead of directly providing care. However, so far, we ruled out the consideration of financial transfers to parents as an additional decision

empirical problem is to estimate jointly the combination of labour force participation and informal care resulting from the daughter's decision making. These two binary outcomes give rise to four possible choice combinations or states. The advantage of this joint estimation is that we explicitly consider the simultaneity or interdependency of these two decision variables by allowing for the correlation of the error terms. Our empirical analysis will be based on the following standard bivariate Probit model of labour market participation and informal caregiving decisions that allows to deal with the presence of endogenous regressors:

$$LP_i^* = \alpha_1 IC_i + \beta_1' X_{1i} + \varepsilon_{1i}, \quad (1a)$$

$$IC_i^* = \beta_2' X_{2i} + \varepsilon_{2i}, \quad (1b)$$

where  $i$  indexes daughters,  $LP_i^*$  is the daughter's propensity to work in the market,  $IC_i^*$  is the daughter's propensity to provide informal care in a weekly or daily basis,<sup>26</sup>  $X_{1i}$  and  $X_{2i}$  are the vectors of exogenous observable variables that potentially affect each decision variable, and  $(\varepsilon_{1i}, \varepsilon_{2i})'$  is the vector of unobservable characteristics of the daughters or parents that could also potentially influence them. Notice that  $\alpha_1$  measures the effect of having been taking care of one elderly parent intensively on the labour participation decision. Therefore, the complete empirical specification is given by the following system for  $i = 1, \dots, N$ :

$$\begin{aligned} LP_i^* &= \alpha_1 IC_i + \beta_1' X_{1i} + \varepsilon_{1i} \\ LP_i &= I(LP_i^* > 0), \\ IC_i^* &= \beta_2' X_{2i} + \varepsilon_{2i} \\ IC_i &= I(IC_i^* > 0). \end{aligned} \quad (2)$$

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variable for the daughter since we can not identify from SHARE data if these financial transfers are provided to purchase formal care.

<sup>26</sup>We will consider in our estimations as caregivers only those daughters that provide help to an elder parent in a weekly or daily basis. As we have seen in the empirical analysis, they are the ones that have more difficulties to be involved in labour market and caregiving activities simultaneously.

where  $LP_i$  and  $IC_i$  are the observed variables of labour market participation and "intensive" caregiving decisions, respectively. These are defined by the indicator function  $I(\cdot)$ , that is equal to one if the condition in parenthesis holds and zero otherwise. The error terms  $(\varepsilon_{1i}, \varepsilon_{2i})'$   $i = 1, \dots, N$  are assumed to be *iid* and follow a bivariate normal distribution with mean  $(0, 0)'$ , and covariance matrix  $\Sigma$ <sup>27</sup>

$$\Sigma = \begin{pmatrix} 1 & \rho_{12} \\ \rho_{12} & 1 \end{pmatrix}$$

As Manski et al. (1992) state identification is guaranteed by the non-linearity of equations and the normality assumptions. However, the presence of exclusion restrictions could improve identification of the parameters of the model. In this sense,  $X_2$  includes covariates that are not included in the labour participation equation such as the variables referring to parents' characteristics, siblings and the existence of both parents. For each of the four different choices for each daughter,  $D_{i(LP,IC)}$ , there is a corresponding probability,  $P_{i(LP,IC)}$ , that the daughter is in this particular state. Therefore, the log-likelihood function is given by:

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<sup>27</sup>This specification is a restricted version of the one used by Manski et al. (1992), Carrasco (2001) and Ariza et al. (2005) in different contexts. In particular, all of them propose a Switching Probit Model. In the present context, this more general specification would allow for the possibility that a mid-life woman would participate in the case of taking care intensively of an elderly parent but not participate while not having to do it. However, this is not a very plausible situation. In fact, we reject this general specification for both samples and both groups of countries by performing a LM test. This suggests that women in these samples do not have such behaviour.

$$\ln L = \sum_{i=1}^N D_{i(LP,IC)} \ln P_{i(LP,IC)} \quad (3)$$

where the corresponding probabilities for each state have the following form:

$$\begin{aligned} P_{(0,0)} &= \Pr(LP_i = 0, IC_i = 0) = \Phi(-\beta'_1 X_{1i}, -\beta'_2 X_{2i}; \rho_{12}) \\ P_{(0,1)} &= \Pr(LP_i = 0, IC_i = 1) = \Phi(-\alpha_1 - \beta'_1 X_{1i}) - \Phi(-\alpha_1 - \beta'_1 X_{1i}, -\beta'_2 X_{2i}; \rho_{12}) \\ P_{(1,0)} &= \Pr(LP_i = 1, IC_i = 0) = \Phi(-\beta'_2 X_{2i}) - P_{(0,0)} \\ P_{(1,1)} &= \Pr(LP_i = 1, IC_i = 1) = 1 - P_{(0,0)} - P_{(0,1)} - P_{(1,0)} \end{aligned}$$

where  $\Phi(\cdot, \cdot, \Sigma)$  is the cumulative distribution function of a bivariate normal with vector of means  $(0, 0)'$ , and variance-covariance matrix  $\Sigma$ . We estimate the model for each of our samples using Full Information Maximum Likelihood (FIML) techniques.<sup>28</sup>

As a first step, previous to the estimation of the joint model, we perform regressions of the participation equation under the assumption that intensive caregiving is exogenous. Therefore, we just estimate the corresponding univariate probit of the labour market participation decision for both samples and for both pools of countries. Table 7 in the Appendix presents the estimation results. First of all, we focus on the main parameter estimate we are interested in, that is, the parameter that measures the effect of "intensive" elder parental caregiving activities on the labour market participation decisions. In particular, we can see that, for all the regressions, this parameter estimate is negative. This shows that the variable (*Caregiver (Daily/Weekly)*) negatively affects the probability of participating in the labour market. However, this effect is only significant for the northern group in sample (I), and for the southern group in sample (II). Regarding other daughters' characteristics that could influence their labour participation decisions, we obtain that, for sample (I), the set of dummies that measures the self-perception of health is very significant in both groups of countries. Furthermore, their coefficients exhibit the expected sign and size since both are positive and show that daughters in the

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<sup>28</sup>We should remark that the assumption of independence of the observations is not appropriate for sample (II) since, due to its selection process, it is composed by daughters that, in some cases, are siblings. Therefore, it is evident that in these situations there will be a correlation in their decisions about parental caregiving. As a result, we will have to modify our empirical model and estimation methodology to control for the cluster structure of the data.

best health situation are more likely to participate in the labour market. With respect to the education level, both the secondary education and graduate studies dummy variables are highly significant for almost all the cases with positive sign. This means that higher educated daughters are more likely to perform labour market activities. Non-wage income appears to have a significant and negative effect only for the northern group and in sample (I). Regarding other competing time uses, to be married or engaged in a partnership only affects significant and negatively labour participation in southern countries and for sample (I). In addition, having children aged 16 years old and younger does not have a significant impact on labour market participation decisions of mid-life daughters. This result seems very reasonable since very few of them have children in this age. Finally, we can see that country dummies are significant and positive in the northern group for both samples showing that mid-life daughters are more likely to participate in the labour market in Sweden and Denmark compared to The Netherlands. For southern countries, we obtain that only the dummy that corresponds to Spain is significant with positive sign for sample (I).

Next, we will perform the joint estimation of our empirical model given by (2) and we will compare these results with the previous ones obtained under the assumption of strict exogeneity of caregiving. Table 8 and Table 9 in Appendix summarize the results obtained from the model that treats intensive care-giving as endogenous for sample (I) and sample (II), respectively. First of all, these results reproduce the same evidence as before that assuming "intensive" caregiving responsibilities to elderly parents reduces the probability of participating in the labour market. For both samples, we can see that this effect is negative in both groups of countries. Furthermore, when endogeneity is taken into account, the effect of "intensive" caregiving becomes more negative and highly significant in all cases. Table 10 provides the estimated marginal effect of this variable on the probability of participation in the labour market for the average individual. The results show that for sample (I) considering "intensive" caregiving as exogenous reduces the probability of participating by 7 percent for northern countries and 4 percent for southern countries (although this reduction is not significant). However, when endogeneity is accounted for, the reduction is highly significant and much larger for both groups of countries, 35 percent for the northern group and 32 percent for the southern group. In the case of sample (II), the same type of qualitative results is obtained. This important dif-

ference suggests that labour participation and "intensive" caregiving decisions are jointly determined. Therefore, if endogeneity is not accounted for, the estimates of the effect of "intensive" caregiving on daughters' labour market decisions will be biased and useless for policy recommendations. A more rigorous check of this hypothesis is given by the fact that the correlation coefficient  $\rho_{12}$  is highly significantly different from zero in all the cases except for southern countries in sample (II). However, the change in the marginal effect of "intensive" caregiving also suggests that the simultaneity of both decisions should be considered in this last case.

With respect to the rest of the covariates,<sup>29</sup> we obtain the following results. First, we focus on the labour participation equation. Table 8 shows that, for sample (I), the set of dummies that measures the self-perception of health is again very significant in both groups of countries with the expected sign and size. Education coefficients are of the expected positive sign and indicate that both the secondary education and graduate studies significantly increase the probability of working in both groups of countries. Non-wage income influences negative and significantly only northern countries. To be married or engages in a partnership only appears to be significant and negative for the southern group. Regarding country dummies, we can see again that they are significant and positive in the northern group. This indicates that mid-life daughters are more likely to participate in the labour market in Sweden and Denmark than in The Netherlands. At the same time, for southern countries, we also obtain that only the dummy that corresponds to Spain is significant and with positive sign. Comparing Table 7 and Table 8 for the labour market participation equation estimates in the case of sample (I), we can see that the unique important difference is given by the impact of the "intensive" caregiving variable. From Table 9, we can see that results for the rest of covariates for sample (II) are very similar qualitatively to the results obtained under the exogeneity assumption on caregiving

Regarding the "intensive" caregiving equation, we obtain the following results. In the case of sample (I), results in Table 8 show that mid-life women with the highest level of education are significantly less likely to have been taken care intensively of an elderly parent in northern countries. With respect to other competing time uses, having children

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<sup>29</sup>We have also computed the marginal effects of each of the covariates in the regressions on the estimated probability of a woman being working and having been intensively caring to an elderly parent. Even though they are not included in the paper, they are available upon request.

less than 16 years old surprisingly has a positive effect on the probability of "intensive" caregiving in these countries and being married or engaged negatively affects this probability in southern countries. In addition to this, it is important to analyse the effect of parents' characteristics. In particular, we can see that the age of the parent has a significant positive effect whereas the set of dummies that measures parent's health status affects negative and significantly the probability of "intensive" caregiving. Furthermore, these variables have a higher magnitude in absolute value for the *Very Good/Good* category which shows that daughters with elderly parents in good health are less likely to be involved frequently in parental care activities. With respect to other sources of care, we should remark that for northern countries only sisters seem to be close substitutes for the daughters in the provision of parental care. However, for the southern group, both the dummy for the existence of brothers and the dummy for the existence of sisters are highly significant and with negative sign. This result could suggest that not only daughters but also daughters-in-law assume these parental caregiving responsibilities which is a very usual phenomenon in southern countries. Apart from that, we can see that the dummy variable that indicates if both parents are alive (*BothParents*) has a non-significant effect on the probability of having been taken care intensively of an elderly parent. Nevertheless, this result is not completely informative and should be taken with caution since we do not observe if both parents are living together. Finally, country dummies are only significant and negative in the northern group. This shows that mid-life women are less likely to take care intensively to an elderly parent in Sweden and Denmark than in The Netherlands. For sample (II), the most significant results in Table 9 show that mid-life women from both groups of countries are more likely to take care intensively of their elderly parents as the parents become older and their health status worsens off. In this case, the fact of having sisters is not significant for either group of countries and having brothers significantly reduces the probability of being caregiver in southern countries. With respect of other sources of help, we can see that daughters are significantly less likely to be involved intensively in parental caregiving when both parents are living together for both groups of countries.<sup>30</sup> In addition to this, it is possible to analyse the effect of having at least

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<sup>30</sup>Remember that for sample (II), the variable *BothParents* is equal to one if both parents are interviewed or if there is only one respondent, he/she reports to be married or have a partner. The important point is that the corresponding parent is not living alone.

one elderly parent that has receiving formal care in the last twelve months. Specifically, this variable is significant and with positive sign for northern and southern countries. However, it is not possible to infer from this result if formal care represents a substitute or a complement source of care given that we do not observe whether it has been received simultaneously to the potential informal care provided by daughters. Regarding country dummies, we obtain that in Italian middle-aged daughters tend to take care significantly less elderly parents in a weekly basis than in Spain and Greece. However, this evidence is not found for Sample (I).

## 4 Conclusions

The purpose of this paper is to analyse the potential relationship between labour participation decisions and informal caregiving to elderly parents for European women approaching to retirement. Specifically, we focus on two groups of countries: the northern countries (Sweden, Denmark, and The Netherlands), and the southern countries (Spain, Italy, and Greece). This comparison is of interest because they strongly differ in family support, social norms and institutional arrangements. In particular, they represent the two polar or extreme cases in Europe regarding the strength of family ties, the provision of formal care by public means, and the availability of part-time work. It is clear that the lack of public policies dealing with this issues may force middle-aged women with elderly parents to face a trade-off between labour participation and parental caregiving in southern countries. Even though the empirical evidence for Europe is scarce, this question is nowadays one of the most relevant topics of policy makers' agendas given the ongoing demographic and economic trends. In fact, the concerns about the burden associated with combining the provision of care to an elderly parent and paid employment has motivated new legislation in Spain. <sup>31</sup>.

The results of this paper provides empirical evidence that supports this hypothesis. We specify a reduced form model where labour participation and "intensive" informal caregiving to elderly parents decisions that are estimated simultaneously. This model

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<sup>31</sup>In particular, the Spanish Government has just approved the preliminary project about the so-called "Law about Dependence". This law will manage the first long-term care benefits national system, which is considered the fourth pillar of the welfare state system.

allows us to measure the impact of having been frequently assuming parental caregiving responsibilities on the probability of working accounting for the endogeneity of this variable. We estimate this model separately for both groups of countries using data from SHARE Release 1. The rich and detailed information on daughters and their elderly parents provided by this survey makes possible to control for a large variety of factors that could affect daughters' working and caregiving decisions. In addition to this, we perform this analysis for both different samples that give us information about daughters and parents from two different perspectives. While in sample (I), the information is reported by the middle-aged daughters, in sample (II) the elderly parents are the respondents. This comparison allows to check the robustness of the results and whether the magnitude and the intensity of the caregiving activities from daughters to elderly parents are perceived differently by them.

Results from the descriptive comparison of both samples show that northern mid-life women and their elderly parents have a different perception about this kind of time transfers. It seems that parents have a more precise and rigorous conception of this kind of help since they feel that they receive much less help and less intensively than what daughters report. This evidence is in line with the hypothesis raised in the economic literature about intra-family transfers stating that parents think that they receive less help than what their offspring consider.

Results from the estimation of our model show that assuming "intensive" caregiving responsibilities to an elderly parent affects labour participation negatively in both groups of countries. Furthermore, this evidence is obtained from both samples, what documents the robustness of this result. With respect to this, we find that the probability of participating decreases substantially more in the model that accounts for endogenous "intensive" caregiving than in the model where this variable is assumed exogenous. This finding is line with the results provided by Carrasco (2001) for the context of fertility and participation. In particular, she states that this downward bias in the estimated effect is induced by the exogeneity assumption that introduces a spurious positive correlation between both decision variables.

Therefore, this paper shows that not only in European southern countries but also in northern countries middle-aged women face a trade-off between labour participation and parental caregiving. The policy implications of our results are crucial given the

current interest in this issue. Specifically, it suggests that public policies should point to the development of optimal long-term care benefit systems in southern countries and to improve the existing ones in northern countries.

## DATA APPENDIX

Table A1. Middle-Aged Women with Living Parents<sup>(1)</sup>

Sample sizes		
<i>Country</i>	(I)	(II)
Sweden	331	226
The Netherlands	276	156
Denmark	165	161
<i>Northern Countries</i>	772	543
Spain	197	177
Italy	218	136
Greece	164	159
<i>Southern Countries</i>	579	472

Note: (1) Women aged between 50 and 60 with at least one living parent and available information for all the variables considered in the analysis. (I) refers to the sample obtained selecting women directly from the respondents of the survey. (II) refers to the sample of women obtained from the information in the CHILDREN module given by their parents, that are in this case the respondents of the survey.

*SAMPLE (I)*: Women aged between 50 and 60, respondents of the survey, and with at least one living parent in the year of the interview.

*Variables*:

1. *Daughters' characteristics*: The variables *labour participant* and *caregiver* indicate if the daughter reported a positive number of weekly hours of work at the moment of the interview and if the daughter reported that she has taken care of an elderly parent in the last twelve months, respectively. We also use information on the daughter's age, current marital status, education, health, income, children, living parents and siblings. The dummy variable *Married/Partnership* is equal to one if the woman is married or engaged in a registered partnership. We measure education by four dummy variables (*Educ1*, *Educ2*, *Educ3*, and *Educ4*) generated from the highest level of education completed according to the ISCED-97 code.<sup>32</sup> The first dummy corresponds to none schooling, still in school or

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<sup>32</sup>ISCED stands for International Standard Classification of Education.

primary education (ISCED-97 code 1), the second one refers to the lower secondary education (ISCED-97 code 2), the third corresponds to (upper) secondary education (ISCED-97 code 3) and, the last one reflects graduate, undergraduate or second level of professional studies (post-secondary, non-tertiary, first stage of tertiary and second stage of tertiary. ISCED-97 code 4-6). We measure health by the respondent's self-perceived health status according to the European version and we generate one dummy variable for each of the categories (*Very Good, Good, Fair, Bad, and Very Bad*). We measure non-wage income (*Non-wage Income*) as the difference between the gross annual total household income and the gross annual individual income derived from employment and self-employment, expressed in thousands of 2003 ppp-adjusted euros.<sup>33</sup> We also consider in the analysis variables reflecting other family responsibilities as the number of children aged less or equal than 16 and living in the household (*Children16*),<sup>34</sup> and alternative sources of informal caring for elderly parents as the number of the respondent's siblings (*Brothers, Sisters*) and the fact that only one or both parents are alive (*Living Parents: Both, Only Mother, Only Father*).<sup>35</sup>

2. *Parents' characteristics*: With respect to the information of natural parents' characteristics given by the daughters, we observe each parent's age, health status, and residence closeness. Specifically, when both natural parents are alive, we will measure parental age by the age of the oldest parent (*AgeParent*), and we will consider the health of the parent that exhibits the worst health status (*HealthParent*). The residence closeness is measured by two dummies (*Resident1, Resident2*) that state if the woman has at least one parent living in the same household, and if she has at least one parent living less than 5 kilometers away (that includes the same household), respectively.

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<sup>33</sup>The amounts of euros have been corrected for PPP to control for the differences in the price levels among countries.

<sup>34</sup>It is important to remark that these children could be natural, fostered, adopted or stepchildren. For couples, they could be from one member of the couple or from both of them.

<sup>35</sup>For sample (I), this sequence has been computed from the information given by each woman about the living status of her parents. The dummy variable *Both* indicates that both parents are alive but we do not observe whether both of them are living together. The variables *Only Mother* and *Only Father* indicate if only the mother and the father is alive, respectively, but we do not observe the marital status of them.

*SAMPLE (II)*: Women aged between 50 and 60 with at least one living parent in the year of the interview. This sample has been built from an initial sample of individuals with at least one daughter aged between 50 and 60 using the information about up to four selected children given by the family respondent in the Children module. Therefore, the elder parents are the respondents of the survey in this case.

*Variables:*

1. *Daughters' characteristics*: It is important to remark that the information about daughters has been provided by the family respondent. The variable *labour participant* indicates if the family respondent reported that the daughter was working at the moment of the interview as a full-time employed, part-time employed, self-employed or working for own business. The variable *caregiver* indicates if the selected daughter has taken care of at least one parent during the last twelve months. This indicator has been computed using the information given by the family respondent about the help received from a person living outside the household and the information given by every respondent about the help received from a person living inside the household.<sup>36</sup> We also use information given by each family respondent about each selected daughter's age, current marital status, education, children, living parents and siblings. However, there is not information about daughters' health status and income. The dummy variable *Married/Partnership* is equal to one if the daughter is married or engaged in a registered partnership. We measure education by four dummy variables (*Educ1*, *Educ2*, *Educ3*, and *Educ4*) generated from the highest level of education completed according to the ISCED-97 code. As for sample (I), the first dummy corresponds to none schooling, still in school or primary education (ISCED-97 code 1), the second one refers to the lower secondary education (ISCED-97 code 2), the third corresponds to (upper) secondary education (ISCED-97 code 3) and, the last one reflects graduate, undergraduate or second level of professional studies (post-secondary, non-tertiary, first stage of tertiary and second stage of tertiary. ISCED-97 code 4-6). The residence closeness is measured by two dummies (*Resident1*, *Resident2*)

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<sup>36</sup>The sequence of variables used to identify if each of the selected daughters has provided help to their parents from inside the household is sp021d01-sp021d33. Since the sequence provided by SHARE Release 1 has been incorrectly computed, we use the corrected sequence that has been fixed on the basis of the raw data. This information has been kindly provided by the CentERData and it will be included in SHARE Release 2.

that state if the daughter lives in the same household as the parents, and if she lives less than 5 kilometers away (that includes the same household), respectively. As indicators of other family responsibilities and the existence of alternative sources of informal caring for elderly parents, we use the number of children (*Children*),<sup>37</sup> and the number of siblings (*Brothers, Sisters*),<sup>38</sup> respectively. In addition to this, we also consider the fact that only one or both parents are alive (*Living Parents: Both, Only Mother, Only Father*).<sup>39</sup>

2. *Parents' characteristics*: With respect to the information about elder parents' characteristics, that in this case are given by themselves, we observe each parent's age, health status, income, and formal care received in the last twelve months. Specifically, when both parents are interviewed,<sup>40</sup> we will measure parental age by the age of the oldest parent (*AgeParent*), and we will consider the health of the parent that exhibits the worst health status (*HealthParent*). Parents' income (*IncomeParent*) is measured by the gross annual household income expressed in thousands of 2003 ppp-adjusted euros. Finally, the variable *FormalcareParent* indicates if at least one parent has been in a nursing home<sup>41</sup> overnight or has received home care<sup>42</sup> in the last twelve months prior to the interview.

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<sup>37</sup>For sample (II), we can only compute from the Children module the total number of children (natural, fostered, adopted and stepchildren, including those of spouse or partner) of each daughter since there is not information about their ages. However, we can compute a dummy variable that indicates if each of them has at least one children aged less than 16 since there is information about the year of birth of the youngest child.

<sup>38</sup>In these variables, we are also including siblings that may be non-biological. In addition to this, we can not know if the daughter has other natural brothers or sisters in the case that their parents are not living together.

<sup>39</sup>Specifically, in sample (II), the dummy variable *Both* is equal to one if both parents (that could be natural or not) are interviewed or if there is only one respondent but reports to be married or have a partner. The dummy variables *Only Mother*, and *Only Father* are equal to one if there is only a female respondent or a male respondent, respectively, that reports not to have a spouse or partner.

<sup>40</sup>We should note that, in sample (II), the variables *AgeParent*, *HealthParent*, and *FormalcareParent* present some limitations. In particular, it is possible that only one member of the couple has been interviewed. In this case, we do not have information about the age, health status, and formal care received of the other member. Therefore, in these cases, these variables reflect the age, the health status and the potential receipt of formal care of the interviewed parent.

<sup>41</sup>A "nursing home" is defined in SHARE as an institution sheltering older persons who need assistance in activities of daily living, in an environment where they can receive nursing care, for short or long stays.

<sup>42</sup>This is professional or paid nursing or personal care, professional or paid home help for domestic tasks that the individual could not perform himself due to health problems, and meals-on-wheels.

Table A2. Descriptive Statistics for Sample (I)<sup>(1)</sup>

	<i>NC</i>	Sweden	Denmark	Netherlands	<i>SC</i>	Spain	Italy	Greece
Labour Participant	0.775	0.855	0.836	0.641	0.409	0.457	0.362	0.415
Caregiver	0.444	0.432	0.430	0.467	0.256	0.244	0.257	0.268
Age	54.483 (3.031)	54.810 (3.118)	54.491 (3.103)	54.087 (2.840)	54.209 (3.042)	54.142 (3.042)	54.523 (2.984)	53.872 (3.096)
Married/Partnership	0.786	0.764	0.673	0.880	0.822	0.832	0.894	0.713
Education								
Educ1	0.074	0.130	0	0.051	0.399	0.457	0.376	0.360
Educ2	0.271	0.211	0.127	0.427	0.228	0.304	0.271	0.079
Educ3	0.252	0.226	0.339	0.232	0.211	0.122	0.202	0.329
Educ4	0.403	0.432	0.533	0.290	0.162	0.117	0.151	0.232
Health								
Very Good	0.338	0.414	0.345	0.243	0.193	0.188	0.105	0.317
Good	0.449	0.320	0.479	0.587	0.511	0.513	0.537	0.476
Fair	0.176	0.208	0.139	0.159	0.238	0.244	0.289	0.165
Bad	0.028	0.0483	0.018	0.011	0.053	0.056	0.060	0.043
Very Bad	0.008	0.009	0.018	0	0.003	0	0.009	0
Non-wage Income <sup>(2)</sup>	32.760 (31.284)	27.178 (25.645)	30.304 (28.180)	40.923 (37.056)	21.494 (19.548)	17.294 (16.491)	25.777 (21.170)	20.845 (19.626)
Children16	0.105 (0.365)	0.133 (0.412)	0.066 (0.273)	0.094 (0.349)	0.097 (0.334)	0.112 (0.375)	0.115 (0.360)	0.055 (0.228)
Living Parents								
Both	0.249	0.269	0.194	0.257	0.275	0.259	0.284	0.280
Only Mother	0.615	0.607	0.673	0.590	0.625	0.645	0.596	0.640
Only Father	0.136	0.124	0.133	0.152	0.100	0.096	0.119	0.079
AgeParent	81.857 (5.146)	81.873 (5.617)	81.261 (4.771)	82.196 (4.740)	82.185 (5.215)	82.107 (5.115)	82.105 (5.035)	82.384 (5.584)
HealthParent								
Very Good	0.113	0.151	0.115	0.065	0.074	0.081	0.064	0.079
Good	0.225	0.178	0.273	0.254	0.288	0.350	0.202	0.329
Fair	0.404	0.372	0.351	0.475	0.368	0.315	0.381	0.415
Bad	0.210	0.260	0.164	0.177	0.193	0.188	0.248	0.128
Very bad	0.048	0.039	0.097	0.029	0.074	0.066	0.101	0.049
Residence								
Resident1	0.006	0.006	0.006	0.007	0.052	0.112	0.018	0.024
Resident2	0.316	0.263	0.370	0.348	0.559	0.655	0.541	0.469
Brothers	1.161 (0.961)	1.009 (0.889)	1.030 (0.865)	1.420 (1.043)	1.190 (0.997)	1.391 (1.012)	1.170 (1.008)	0.976 (0.920)
Sisters	1.183 (1.047)	0.997 (0.986)	0.976 (0.930)	1.529 (1.097)	1.197 (1.022)	1.381 (1.051)	1.156 (1.031)	1.030 (0.943)
Sample Size	772	331	165	276	579	197	218	164

Note: (1) Means of the variables considered in the analysis for sample (I) and standard deviations in parentheses. (2) Non-wage income is expressed in thousands of 2003 gross ppp-adjusted euros.

Table A3. Descriptive Statistics for Sample (II)<sup>(1)</sup>

	<i>NC</i>	Sweden	Denmark	Netherlands	<i>SC</i>	Spain	Italy	Greece
Labour Participant	0.788	0.885	0.838	0.596	0.424	0.412	0.463	0.402
Caregiver	0.160	0.203	0.137	0.122	0.269	0.288	0.154	0.346
Age	53.961 (2.996)	54.208 (3.103)	53.596 (2.880)	53.981 (2.935)	53.881 (3.019)	54.215 (3.022)	53.62 (2.944)	53.729 (3.064)
Married/Partnership	0.757	0.765	0.720	0.782	0.824	0.768	0.875	0.843
Education								
Educ1	0.059	0.093	0.006	0.064	0.371	0.373	0.316	0.415
Educ2	0.243	0.203	0.149	0.397	0.265	0.328	0.331	0.138
Educ3	0.284	0.226	0.335	0.314	0.227	0.164	0.220	0.302
Educ4	0.414	0.478	0.509	0.224	0.138	0.135	0.132	0.145
Children	1.941 (1.097)	1.903 (1.131)	1.969 (0.996)	1.968 (1.149)	1.949 (1.075)	2.034 (1.296)	1.823 (1.088)	1.962 (0.737)
Living Parents								
Both	0.411	0.469	0.317	0.423	0.369	0.446	0.412	0.245
Only Mother	0.446	0.403	0.484	0.468	0.555	0.491	0.5	0.673
Only Father	0.144	0.128	0.199	0.109	0.076	0.062	0.088	0.082
AgeParent	80.858 (5.349)	80.982 (5.674)	79.739 (5.379)	81.833 (4.600)	81.144 (5.779)	81.774 (5.883)	80.610 (5.164)	80.899 (6.120)
HealthParent								
Very Good	0.109	0.102	0.168	0.058	0.021	0.022	0.007	0.031
Good	0.330	0.314	0.335	0.346	0.233	0.220	0.228	0.251
Fair	0.416	0.416	0.373	0.461	0.464	0.469	0.441	0.478
Bad	0.110	0.119	0.086	0.122	0.229	0.226	0.250	0.214
Very bad	0.035	0.049	0.037	0.013	0.053	0.062	0.073	0.025
IncomeParent	57.876 (419.552)	30.952 (36.265)	98.518 (760.180)	54.937 (119.626)	24.690 (61.683)	33.207 (94.128)	26.342 (34.337)	13.796 (16.200)
FormalcareParent	0.341	0.230	0.391	0.449	0.106	0.186	0.118	0.006
Residence								
Resident1	0.007	0.013	0.006	0	0.135	0.265	0.095	0.025
Resident2	0.293	0.257	0.242	0.397	0.646	0.729	0.625	0.572
Brothers	0.983 (0.942)	0.867 (0.822)	0.901 (0.937)	1.237 (1.060)	1.131 (1.138)	1.248 (1.208)	1.162 (1.200)	0.975 (0.980)
Sisters	1.112 (1.184)	1.026 (1.254)	1.031 (0.904)	1.320 (1.310)	1.036 (1.067)	1.124 (1.136)	1.037 (1.138)	0.937 (0.912)
Sample Size	543	226	161	156	472	177	136	159

Note: (1) Means of the variables considered in the analysis for sample (II) and standard deviations in parentheses. (2) IncomeParent is expressed in thousands of 2003 gross ppp-adjusted euros.

## APPENDIX

Table 1. Sample Characteristics of Caregiver<sup>(1)</sup> Daughters. Sample (I)

Percentages	<i>NC</i>	Sweden	Denmark	Netherlands	<i>SC</i>	Spain	Italy	Greece
Inside Household	0.583	0.699	0	0.775	12.838	31.250	3.571	4.545
Outside Household	99.417	99.301	100	99.225	87.838	68.750	98.214	95.454
Caregiving Frequency								
Daily	9.621	7.692	5.634	13.953	47.297	60.417	42.857	38.636
Daily/Weekly	56.851	48.951	49.296	69.767	70.270	77.083	69.643	63.636
Labour Participant	77.259	89.510	84.507	59.690	39.865	35.417	35.714	50
Age								
50-55	58.892	48.951	57.746	70.543	63.513	58.333	58.928	75
56-60	41.108	51.049	42.253	29.457	36.486	41.667	41.071	25
Married/Partnership	80.758	77.622	71.831	89.147	79.054	77.083	91.071	65.909
Education								
Educ1	7.872	15.385	0	3.876	35.135	45.833	30.357	29.545
Educ2	25.364	20.979	5.634	41.085	18.919	29.167	21.428	4.545
Educ3	28.863	25.874	42.253	24.806	24.324	14.583	25	34.091
Educ4	37.901	37.762	52.113	30.232	21.622	10.417	23.214	31.818
Health								
Very Good	37.318	47.552	40.845	24.031	17.567	22.917	7.143	25
Good	45.189	33.566	40.845	60.465	51.351	47.917	53.571	52.273
Fair	14.869	16.783	12.676	13.953	26.351	27.083	32.143	18.182
Bad	1.749	2.098	1.408	1.550	4.730	2.083	7.143	4.545
Very Bad	0.875	0	4.225	0	0	0	0	0
DCchildren16	9.621	11.888	8.451	7.752	8.784	6.250	8.928	11.364
Living parents								
Both	22.449	23.776	16.901	24.031	29.054	25	33.928	27.273
Only Mother	64.723	65.035	71.831	60.465	61.486	62.500	58.928	63.636
Only Father	12.828	11.189	11.268	15.504	9.459	12.500	7.143	9.091
Health of Parent								
Very Good	9.038	13.287	7.042	5.426	4.054	4.167	0	9.091
Good	19.242	15.385	23.944	20.930	25	29.167	25	20.454
Fair	42.274	38.461	36.620	49.612	35.811	27.083	25	59.091
Bad	23.615	27.273	21.127	20.930	25	22.917	37.500	11.364
Very bad	5.831	5.594	11.268	3.101	10.135	16.667	12.500	0
Residence								
Resident1	0.875	0.699	0	1.550	12.162	31.250	1.786	4.545
Resident2	43.440	41.259	45.070	44.961	71.622	83.333	69.643	61.364
DBrothers	73.469	70.629	74.648	75.969	69.594	77.083	71.428	59.091
DSisters	63.557	59.440	52.113	74.419	60.811	75	53.571	54.545
Sample Size	343	143	71	129	148	48	56	44

Note: (1) We define caregiver as the individual that reports to have provided help to an elderly parent during the last twelve months in personal care, practical household help, and help with paperwork.

Table 2. Sample Characteristics of Non-Caregiver Daughters. Sample (I)

Percentages	<i>NC</i>	Sweden	Denmark	Netherlands	<i>SC</i>	Spain	Italy	Greece
Labour Participant	77.622	82.447	82.979	68.027	41.299	48.993	36.420	38.333
Age								
50-55	62.238	62.234	61.702	62.585	64.733	67.114	59.876	68.333
56-60	37.762	37.766	38.298	37.415	35.267	32.886	40.123	31.667
Married/Partnership	76.923	75.532	63.830	87.075	83.295	85.235	88.889	73.333
Education								
Educ1	6.993	11.170	0	6.122	41.531	45.637	40.123	38.333
Educ2	28.438	21.277	18.085	44.218	24.130	30.872	29.012	9.167
Educ3	22.378	20.213	27.659	21.769	19.954	11.409	18.518	32.500
Educ4	42.191	47.340	54.255	27.891	14.385	12.080	12.346	20
Health								
Very Good	31.002	36.702	29.787	24.490	19.954	17.450	11.728	34.167
Good	44.755	30.851	53.191	57.143	51.044	52.349	53.704	45.833
Fair	19.813	23.936	14.894	17.687	22.970	23.490	27.778	15.833
Bad	3.730	6.915	2.128	0.680	5.568	6.711	5.555	4.167
Very Bad	0.699	1.596	0	0	0.464	0	1.234	0
DChildren16	7.692	9.574	4.255	7.483	8.585	10.738	10.494	3.333
Living parents								
Both	26.806	29.255	21.277	27.211	26.914	26.174	26.543	28.333
Only Mother	58.974	57.447	63.830	57.823	62.877	65.101	59.876	64.167
Only Father	14.219	13.298	14.894	14.966	10.209	8.725	13.580	7.500
Health of Parent								
Very Good	13.054	16.489	14.894	7.483	8.585	9.396	8.642	7.500
Good	25.175	19.681	29.787	29.252	30.162	36.913	18.518	37.500
Fair	38.928	36.170	34.042	45.578	37.123	32.886	42.592	35
Bad	18.881	25	12.766	14.966	17.401	17.450	20.370	13.333
Very bad	3.963	2.659	8.511	2.721	6.496	3.356	9.259	6.667
Residence								
Resident1	0.466	0.532	1.064	0	2.784	4.698	1.852	1.667
Resident2	22.144	14.894	30.851	25.850	50.580	59.731	48.765	41.667
DBrothers	71.795	67.553	65.957	80.952	72.158	77.852	69.753	68.333
DSisters	71.562	63.298	72.340	81.633	73.086	76.510	71.605	70.833
Sample Size	429	188	94	147	431	149	162	120

Table 3. Sample Characteristics of Intensive<sup>(1)</sup> Caregiver Daughters

Sample (I)		
Percentages	Northern Countries	Southern Countries
Inside Household	1.026	18.269
Outside Household	98.974	82.692
Labour Participant	69.743	38.461
Age		
50-55	54.872	57.692
56-60	45.128	42.308
Married/Partnership	81.026	75.961
Education		
Educ1	9.743	38.461
Educ2	30.256	20.192
Educ3	29.743	25
Educ4	30.256	16.346
Health		
Very Good	32.820	17.308
Good	48.718	49.038
Fair	15.897	27.885
Bad	1.538	5.769
Very Bad	1.026	0
DChildren16	10.256	7.692
Living parents		
Both	22.564	27.885
Only Mother	63.590	64.423
Only Father	13.846	7.692
Health of Parent		
Very Good	8.718	5.769
Good	19.487	19.231
Fair	40.513	34.615
Bad	24.615	28.846
Very bad	6.667	11.538
Residence		
Resident1	1.538	17.308
Resident2	54.872	83.654
DBrothers	74.359	65.385
DSisters	63.590	59.615
Sample Size	195	104

Note: (1) We define "intensive" caregiver as the individual that has taken care of an elderly parent during the last twelve months in a daily or weekly basis.

Table 4. Sample Characteristics of Caregiver<sup>(1)</sup> Daughters.

Sample (II)		
Percentages	Northern Countries	Southern Countries
Inside Household	2.299	23.622
Outside Household	97.701	76.378
Caregiving Frequency		
Daily	10.345	56.693
Daily/Weekly	47.126	80.315
Labour Participant	80.460	37.795
Age		
50-55	42.529	64.567
56-60	57.471	35.433
Married/Partnership	67.816	80.315
Education		
Educ1	9.195	40.945
Educ2	20.690	20.472
Educ3	31.034	23.622
Educ4	39.080	14.961
DChildren16	2.299	7.087
Living parents		
Both	27.586	23.622
Only Mother	62.069	66.142
Only Father	10.345	10.236
Health of Parent		
Very Good	3.448	0.787
Good	18.391	18.110
Fair	49.425	38.583
Bad	21.839	32.283
Very bad	6.896	10.236
FormalcareParent	57.471	18.898
Residence		
Resident1	2.299	24.409
Resident2	44.827	81.890
DBrothers	64.368	62.205
DSisters	48.276	62.992
Sample Size	87	127

Note: (1) We define caregiver as the individual that reports to have provided help to an elderly parent during the last twelve months in personal care, practical household help, and help with paperwork.

Table 5. Sample Characteristics of Non-Caregiver Daughters.

Sample (II)		
Percentages	Northern Countries	Southern Countries
Labour Participant	78.509	44.058
Age		
50-55	72.807	69.855
56-60	27.193	30.145
Married/Partnership	77.193	83.188
Education		
Educ1	5.263	35.652
Educ2	25	28.696
Educ3	27.851	22.319
Educ4	41.886	13.333
DChildren16	13.816	8.985
Living parents		
Both	43.640	41.739
Only Mother	41.228	51.594
Only Father	15.131	6.667
Health of Parent		
Very Good	12.281	2.609
Good	35.746	25.217
Fair	40.131	49.275
Bad	8.991	19.420
Very bad	2.851	3.478
FormalcareParent	29.605	7.536
Residence		
Resident1	0.439	9.565
Resident2	26.316	58.261
DBrothers	66.009	68.406
DSisters	66.447	66.377
Sample Size	456	345

Table 6. Sample Characteristics of Intensive<sup>(1)</sup> Caregiver Daughters

Sample (II)		
Percentages	Northern Countries	Southern Countries
Inside Household	4.878	29.412
Outside Household	95.122	71.569
Labour Participant	70.732	31.372
Age		
50-55	36.585	60.784
56-60	63.415	39.215
Married/Partnership	65.854	77.451
Education		
Educ1	9.756	46.078
Educ2	21.951	20.588
Educ3	29.268	19.608
Educ4	39.024	13.725
DChildren16	0	3.921
Living parents		
Both	14.634	22.549
Only Mother	78.049	66.667
Only Father	7.317	10.784
Health of Parent		
Very Good	2.439	0
Good	12.195	18.627
Fair	58.536	35.294
Bad	24.390	35.294
Very bad	2.439	10.784
FormalcareParent	73.171	20.588
Residence		
Resident1	4.878	28.431
Resident2	68.293	86.274
DBrothers	53.658	61.765
DSisters	48.780	61.765
Sample Size	41	102

Note: (1) We define "intensive" caregiver as the individual that has taken care of an elderly parent during the last twelve months in a daily or weekly basis.

Table 7. Univariate Probit Model of Labour Participation<sup>(1)</sup>

	Sample (I)		Sample (II)	
	Northern Countries	Southern Countries	Northern Countries	Southern Countries
Constant	-33.566*	-4.191	-26.301	-5.572
	(19.025)	(19.020)	(22.000)	(21.518)
Caregiver (Daily/Weekly)	-0.243**	-0.104	-0.101	-0.361**
	(0.122)	(0.150)	(0.236)	(0.155)
Health				
Very Good/Good <sup>(2)</sup>	1.719**	0.787**	-	-
	(0.309)	(0.293)	-	-
Fair	1.449**	0.625**	-	-
	(0.325)	(0.307)	-	-
Educ2	0.386*	0.212	0.015	-0.143
	(0.209)	(0.150)	(0.281)	(0.157)
Educ3	0.755**	0.656**	0.438	0.345**
	(0.218)	(0.157)	(0.279)	(0.161)
Educ4	0.925**	1.178**	0.599**	1.124**
	(0.216)	(0.181)	(0.276)	(0.202)
Age	12.127*	1.703	10.297	2.175
	(6.954)	(6.981)	(8.091)	(7.917)
Age <sup>2</sup>	-1.144*	-0.212	-1.005	-0.223
	(0.635)	(0.638)	(0.742)	(0.727)
Non-wage Income	-0.003*	-0.005*	-	-
	(0.002)	(.003)	-	-
DChildren16	-0.183	0.123	-0.295	0.153
	(0.197)	(0.207)	(0.205)	(0.220)
Married/Partnership	-0.129	-0.254*	0.134	-0.107
	(0.161)	(0.150)	(0.154)	(0.160)
Sweden	0.832**	-	0.955**	-
	(0.136)	-	(0.161)	-
Denmark	.4709521**	-	0.601**	-
	(0.153)	-	(0.166)	-
Spain	-	0.406**	-	0.119
	-	(0.154)	-	(0.148)
Italy	-	0.119	-	0.192
	-	(0.147)	-	(0.156)
Pseudo-R <sup>2</sup>	0.172	0.136	0.134	0.088
Sample Size	772	579	543	472

Note: Standard errors robust to heteroskedasticity in parentheses. (\*) Significant at 10%. (\*\*) Significant at 5%. Age has been divided by 10. Non-wage income is expressed in thousands of 2003 gross ppp-adjusted euros. The default dummies are Educ1 for the highest education level completed, the Bad/Very Bad category for health status, and The Netherlands and Greece for the northern and southern countries, respectively. (1) Assuming exogeneity of the "intensive" caregiving decision. (2) The Very Good and Good categories in health status have been pooled together.

Table 8. Simultaneous Bivariate Probit Model<sup>(1)</sup>

	Sample (I)			
	Northern Countries		Southern Countries	
	Labour Participant	"Intensive" Caregiver	Labour Participant	"Intensive" Caregiver
Constant	-34.514*	-3.708**	-1.203	-3.726**
	(18.985)	(1.207)	(20.292)	(1.437)
Caregiver (Daily/Weekly)	-1.075**	-	-0.975**	-
	(0.455)	-	(0.399)	-
Health				
Very Good/Good <sup>(2)</sup>	1.686**	0.436	0.706**	0.012
	(0.233)	(0.355)	(0.333)	(0.326)
Fair	1.401**	0.241	0.598*	0.052
	(0.248)	(0.369)	(0.335)	(0.328)
Educ2	0.291	-0.250	0.190	-0.032
	(0.209)	(0.227)	(0.151)	(0.181)
Educ3	0.669**	-0.185	0.665**	0.228
	(0.221)	(0.226)	(0.156)	(0.188)
Educ4	0.745**	-0.557**	1.130**	0.178
	(0.230)	(0.223)	(0.180)	(0.208)
Age	12.478*	0.256	0.602	-0.019
	(6.941)	(0.197)	(7.465)	(0.251)
Age <sup>2</sup>	-1.163*	-	-0.102	-
	(0.633)	-	(0.685)	-
Non-wage Income	-0.004**	-0.003	-0.005	0.001
	(0.002)	(0.002)	(0.003)	(0.004)
DChildren16	-0.080	0.414**	0.106	-0.068
	(0.222)	(0.192)	(0.196)	(0.260)
Married/Partnership	-0.110	0.038	-0.308*	-0.350**
	(0.146)	(0.138)	(0.170)	(0.172)
AgeParent	-	0.294**	-	0.448**
	-	(0.116)	-	(0.140)
HealthParent <sup>(2)</sup>				
Very Good/Good	-	-0.429**	-	-0.560**
	-	(0.135)	-	(0.163)
Fair	-	-0.370**	-	-0.289*
	-	(0.132)	-	(0.166)

(Continued)

(Continued)

Table 8. Simultaneous Bivariate Probit Model<sup>(1)</sup>

	Sample (I)			
	Northern Countries		Southern Countries	
	Labour Participant	"Intensive" Caregiver	Labour Participant	"Intensive" Caregiver
DBrothers	-	-0.034	-	-0.318**
	-	(0.116)	-	(0.140)
DSisters	-	-0.280**	-	-0.302**
	-	(0.114)	-	(0.143)
BothParents	-	-0.124	-	-0.101
	-	(0.121)	-	(0.139)
Sweden	0.685**	-0.498**	-	-
	(0.166)	(0.131)	-	-
Denmark	0.360**	-0.365**	-	-
	(0.182)	(0.163)	-	-
Spain	-	-	0.420**	0.241
	-	-	(0.146)	(0.188)
Italy	-	-	0.137	0.083
	-	-	(0.149)	(0.182)
$\rho_{12}$	0.504*		0.539*	
	(0.258)		(0.250)	
Pseudo-R <sup>2</sup>				
Sample Size	772		579	

Note: Standard errors non-robust to heteroskedasticity in parentheses. (\*) Significant at 10%. (\*\*) Significant at 5%. Age has been divided by 10. Non-wage income is expressed in thousands of 2003 gross ppp-adjusted euros. The default dummies are Educ1 for the highest education level completed, the Bad/Very Bad category for health status and health status of the parent, and The Netherlands and Greece for the northern and southern countries, respectively. (1) We treat the caregiving decision as endogenous. (2) The Very Good and Good categories in health status and health status of the parent have been pooled together.

Table 9. Simultaneous Bivariate Probit Model<sup>(1)</sup>

	Sample (II)			
	Northern Countries		Southern Countries	
	Labour Participant	"Intensive" Caregiver	Labour Participant	"Intensive" Caregiver
Constant	-18.130 (24.096)	-8.296** (2.351)	-3.351 (21.197)	-1.906 (1.588)
Caregiver (Daily/Weekly)	-1.502** (0.340)	- -	-0.851** (0.350)	- -
Educ2	-0.030 (0.261)	-0.348 (0.513)	-0.181 (0.164)	-0.354* (0.198)
Educ3	0.379 (0.277)	0.224 (0.493)	0.302** (0.165)	-0.215 (0.206)
Educ4	0.500** (0.258)	0.044 (0.489)	1.085** (0.218)	-0.076 (0.275)
Age	7.181 (8.821)	0.703 (0.450)	1.368 (7.801)	-0.193 (0.284)
Age <sup>2</sup>	-0.702 (0.805)	- -	-0.144 (0.717)	- -
DChildren16 <sup>(2)</sup>	-0.280 (0.202)	- -	0.102 (0.248)	-0.503 (0.366)
Married/Partnership	0.084 (0.150)	-0.130 (0.226)	-0.128 (0.168)	-0.217 (0.191)
AgeParent	- -	0.460** (0.211)	- -	0.429** (0.143)
IncomeParent	- -	-0.001 (0.003)	- -	-0.0005 (0.003)
HealthParent <sup>(3)</sup>				
Very Good/Good	- -	-0.993** (0.378)	- -	-0.700** (0.201)
Fair	- -	-0.129 (0.249)	- -	-0.716** (0.178)

(Continued)

(Continued)

Table 9. Simultaneous Bivariate Probit Model<sup>(1)</sup>

	Sample (II)			
	Northern Countries		Southern Countries	
	Labour Participant	"Intensive" Caregiver	Labour Participant	"Intensive" Caregiver
DBrothers	-	-0.143	-	-0.332**
	-	(0.256)	-	(0.159)
DSisters	-	-0.387???	-	-0.118
	-	(0.240)	-	(0.154)
BothParents	-	-0.614*???	-	-0.505**
	-	(0.345)	-	(0.172)
FormalCare	-	0.533*???	-	0.528**
	-	(0.275)	-	(0.230)
Sweden	0.890**	-0.131	-	-
	(0.159)	(0.305)	-	-
Denmark	0.543**	-0.113	-	-
	(0.172)	(0.315)	-	-
Spain	-	-	0.130	0.027
	-	-	(0.150)	(0.189)
Italy	-	-	0.131	-0.575**
	-	-	(0.164)	(0.215)
$\rho_{12}$	0.854**		0.337	
	(0.194)		(0.234)	
Pseudo-R <sup>2</sup>				
Sample Size	543		472	

Note: Standard errors non-robust to heteroskedasticity in parentheses. (\*) Significant at 10%. (\*\*) Significant at 5%. Age has been divided by 10. Non-wage income is expressed in thousands of 2003 gross ppp-adjusted euros. The default dummies are Educl for the highest education level completed, the Bad/Very Bad category for health status and health status of the parent, and The Netherlands and Greece for the northern and southern countries, respectively. (1) We treat the caregiving decision as endogenous. (2) We do not include the regressor DChildren16 in the informal caregiving equation for northern countries in sample (II) since there is perfectly prediction of caregiver equals to zero when DChildren16 equals to one. (3) The Very Good and Good categories in health status of the parent have been pooled together.

Table 10. Marginal Effect of "Intensive" Caregiver on the Probability of Participating (Probit Models)

Average Individual		
	Exogenous "Intensive" Caregiver	Endogenous "Intensive" Caregiver
Sample (I)		
Northern Countries	-0.069	-0.353
p-value	(0.047)	(0.038)
Southern Countries	-0.040	-0.323
p-value	(0.489)	(0.002)
Sample (II)		
Northern Countries	-0.027	-0.537
p-value	(0.670)	0.000
Southern Countries	-0.137	-0.302
p-value	(0.020)	0.005

Note: The marginal effect is computed as  $\Phi(\widehat{\alpha} + \widehat{\beta}'_1 \bar{x}_1) - \Phi(\widehat{\beta}'_1 \bar{x}_1)$  where  $\bar{x}_1$  is the average mean of the vector  $x_1$ .

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