

Caring for Parents and Employment Status of European Mid-Life Women*

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Abstract

In this paper I estimate the causal effect of providing intensive informal care to elderly parents on labour market participation decisions for European women who are themselves approaching retirement. In particular, intensive care refers to help provided in a daily or weekly basis. I use data drawn from the Survey of Health, Ageing and Retirement in Europe (SHARE) and I focus on two groups of European countries that strongly differ in terms of the availability of public formal care services and the intensity of informal caregiving by the immediate family: the northern countries (Sweden, Denmark and The Netherlands), and the southern countries (Spain, Italy and Greece). Given the potential endogeneity of caregiving, I use an instrumental variables strategy based on information about parents' characteristics and the existence of alternative sources of care. The results show that the estimated effect of providing intensive informal care to elderly parents on the probability of labour participation is negative and large for both groups of countries. Furthermore, a substantially stronger effect is found when the intensive caregiving variable is treated as endogenous in the labour participation equation. This shows that the potential opportunity costs in terms of (reduced) employment associated with the provision of informal care by women are seriously underestimated under the exogeneity assumption of the caregiving regressor.

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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 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, according to the projections provided by the Economic Policy Committee (2001), the number of people aged 65 and over in EU15 will increase from 61 million (16.1 percent of the total population) in 2000 to 103 million (27.5 percent) in 2050. For those aged 80 and over, the increase is projected to be from almost 14 million (3.6 percent) in 2000 to some 38 million (10 percent) in 2050.

One of the most relevant effects of population ageing will be the increase in the demand for caregiving by the elderly. However, 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 care¹ expenditure levels per head differ considerably between Member States. This reflects different traditions in the means of providing care for the elderly. On the one hand, in some Member States, mostly northern countries, care for the elderly is mainly formal,² with a large share of formal care provided by institutional means. On the other hand, the opposite extreme case is represented by the southern countries, where the informal care is the most important source of help to elderly 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. Table 1 (Jacobzone (1999)) illustrates this interesting difference. In particular, it can be seen that the level of home care services provided to elderly people and the percentage of institutionalized elders are substantially higher in nordic countries and The Netherlands than in Mediterranean countries like Italy and Spain.

Regarding informal caregiving, it could be argued that assuming such responsibilities could imply increasing economic and non-economic costs for these women in terms of their health, leisure or professional careers that could be even interrupted. Therefore,

¹As 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...".

²In this paper, formal care refers to paid or professional care (either provided in facilities or home-based) and informal care refers to non-institutional, unpaid care arrangements.

it is of interest to policy makers to evaluate the potential opportunity costs in terms of (reduced) employment associated with informal eldercare faced by families. It is evident that any policy recommendation about to what extent public authorities should provide or finance formal care to elderly people or implement support programs to informal caregivers should account for this potential trade-off. In this respect, the comparison of countries that strongly differ in the patterns of female labour force participation and social support provided to elderly, could shed some light on this important question.

In spite of the relevance of this issue in Europe, most of the studies in the literature analysing the effect of informal caregiving to elderly parents on employment status for women refers to the US (i.e. Ettner (1995, 1996), Johnson and Lo Sasso (2000), Pezzin and Schone (1999), Wolf and Soldo (1994)). Furthermore, the evidence 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, Ettner (1995) analyses the impact of parental care on the labour supply of women 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 the potential endogeneity of caregiving, the results show that living with a dependent parent has a significantly negative effect on female labour supply. Ettner (1996) performs a similar analysis for men and women using data from the National Survey of Families and Households (NSFH) for the year 1987. She distinguishes between care provided to coresidential and non-coresidential parents. Her results show 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 to parents not living at home. Similarly, 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. This model allows them to account not only for the potential simultaneity of these two decision variables but also for unobserved heterogeneity. They use a sample of men and women aged from 53 to 65 drawn from the second and third waves of the Health and Retirement Study (HRS). Their results suggest that time devoted to parent 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 effect of caregiving on labour supply. For example, Wolf and Soldo (1994) adopt a similar approach to Ettner (1996) and estimate a simultaneous equations model of employment, hours of work, and the provision of care to an elderly parent. They also use data drawn from the 1987-88 National Survey of Families and Households (NSFH) but they focus on a sample of married women. Even though labour supply behaviour of married women is usually more elastic, 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. Finally, Pezzin and Schone (1999) estimate a simultaneous, multi-equation, endogenous switching model of informal care to elderly parents, 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, which reflects a modest trade-off between both variables for adult daughters. However, the possibility of extending their results is limited since their data consist of a small sample of parent-daughter pairs from a single state. Therefore, from all these findings, it seems that the empirical evidence obtained for the US about this issue is inconclusive.

To the best of my knowledge, very little work has been conducted about this question in Europe. For example, Madden and Walker (1999) estimate a model of hours of work and hours of caring using a sample of married couples aged less than 65 years old from the Family Resources Survey 1995 in UK. Using similar approaches to Wolf and Soldo (1994) and Ettner (1995), they find that caring for others has a significantly negative effect on hours of work for women. However, their work suffers from some limitations since they lack of data on relevant determinants of caregiving decisions such as siblings, or the financial or marital status of care recipients. Heitmueller and Michaud (2006) develop a multivariate dynamic panel data model to identify the causal link from informal care to employment for men who are aged 16 to 64 and women who are aged 16 to 59 in England. Using data from the British Household Panel Study (BHPS) from 1991 to 2003 they find that caring only reduces employment probabilities by up to 6 percentage points for individuals caring within their own homes and no significant effect is found for the extra-residential carers. These small effects could be driven by the fact that no information about the intensity of the care is considered in the analysis. Therefore, they may be including caregiving activities that are not very time consuming and do not represent a significant competing time use for caregivers. Finally, Casanova (2001) does not find any evidence that caregiving affects the labour supply decisions of Spanish women aged between 35 and 64 who coreside with at least one of their parents or parents-in-law. However, her measure of caregiving to elderly parents is not really precise given that even though she observes whether these women coreside with a parent or parent-in-law, she can not observe the person they take care of.

Given the scarce evidence for Europe, the aim of the present paper is to determine empirically whether mid-life women face a significant opportunity cost in terms of (reduced) employment of providing intensive informal care to elderly parents in two groups of European countries: the northern countries (Denmark, The Netherlands and Sweden) and the Mediterranean countries (Greece, Italy and Spain). The comparison of these two areas is of relevance because they represent the two polar or extreme cases in Europe in terms of female labour force participation rates, the availability and access to public formal care, and the informal caregiving intensity within the immediate family (Attias-Donfut, Ogg and Wolf (2005)).

For this analysis, I use data from SHARE,³ a longitudinal and multidisciplinary survey

³This 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 5th framework programme (project QLK6-CT-2001-00360 in the thematic programme Quality of Life). Additional funding came from the US National Institute on 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

with a truly cross-national design. These data are very suitable for this comparison since they provide very detailed information on the variables of interest and have been collected following simultaneous and armonized procedures across the participant countries. The comparability of the data makes possible to use the same definition and measure for the intensive informal caregiving across countries. Regarding this decision, I define a discrete variable that accounts for the intensity or frequency of this care. In particular, I focus on informal care provided to elderly parents in a daily or weekly basis since this help is much more likely to represent a significant burden and a competing time use for these women. This is an advantage of the present paper with respect to other analysis that do not consider this relevant dimension of the decision (Casanova (2001), Ettner (1996), Heitmueller and Michaud (2006), Wolf and Soldo (1994)).

In the estimation of the causal effect of providing intensive informal care to elderly parents on labour market participation the main concern is to account for the potential simultaneity of both binary decisions. In particular, I perform the estimation under two different assumptions about the nature of the relationship between these two variables. First, parent caregiving responsibilities are assumed to be taken as given by the daughter and therefore the caregiving status is treated as exogenous in the labour force participation equation. Second, I consider that both variables could be the result of a common decision process assuming that the caregiving indicator is a potential endogenous regressor. In this context, this potential endogeneity is accounted for using an instrumental variables strategy based on information on some parents' characteristics (age and health status) and the existence of alternative sources of care (siblings and the presence of both parents). From the comparison of these alternative sets of results it is possible to evaluate the potential bias induced by the endogeneity of the informal caregiving variable when I do not control for it.

Finally, I perform these estimations for two different but comparable samples of middle-aged women with living parents. In the first sample, all the information about daughters' and parents' characteristics is provided by the daughters and in the second sample similar information is provided by the parents. The comparison of these two samples is of interest to check whether similar results are obtained using information provided from these two perspectives.

The results of this paper show two interesting findings. First, the provision of intensive informal care to elderly parents reduces the probability of labour market participation in both groups of countries. Second, this negative effect is much stronger when the potential endogeneity of the caregiving indicator in the labour force participation equation is taken into account. This shows that the endogeneity bias is positive and that the effect of interest is substantially underestimated under the exogeneity assumption. Specifically, I obtain that the decrease in the probability of labour force participation is on average of 30 percent for the southern countries and from 30 to 40 percent for northern countries

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). For more specific information on this survey, see www.share-project.org.

when I control for endogeneity.

2 Data and Descriptive Analysis

2.1 Data

The data used in this analysis comes from SHARE Release 1, that was collected by personal interviews in 2004. The main purpose of this survey is to provide detailed and specific information about the living conditions of people aged 50 and older for several countries in Europe.⁴ 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 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 population of interest in this study is the group of women that are more likely to be "at risk" of dealing with the burden associated with combining the provision of care to elderly parents and paid employment. Therefore, I focus on women aged between 50 and 60 with at least one living parent at the moment of the interview. Women in this range of age are the most likely to have parents needing assistance or care and, at the same time, they can be still part of the labour force. I consider the maximum age restriction in 60 years old to minimize issues related to retirement decisions.⁵

The focus of this paper is on two European groups of countries that strongly differ in the patterns of social support to elderly people: 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. These two groups of SHARE countries are of special relevance because they represent the two polar cases in Europe in terms of female labour force participation and long-term care systems. First of all, there are remarkable institutional differences between these two areas regarding the provision of formal long-term care to elderly. On the one hand, Denmark, Sweden and The Netherlands have developed extremely generous and universal health care and social assistance systems and present the highest percentages of people at nursing homes and receiving home care services. On the other hand, the Mediterranean countries are characterized by scarce and expensive formal care means provided by mixed social assistance systems. In fact, they have traditionally relied on the family as the main source of care

⁴Wave 1 is available for Austria, Belgium, Denmark, France, Germany, Greece, Italy, Spain, Sweden, Switzerland and The Netherlands. Data have been also collected in Israel in 2005-06. In addition, two EU member states-the Czech Republic and Poland- as well as Ireland have joined SHARE in 2006 and have participated in the second wave of data collection.

⁵In SHARE, both members of the couple provide information about their living parents. However, in this analysis I do not consider caregiving to parents-in-law given that a substantial percentage of spouses/partners did not complete the interview in countries like Italy and Spain.

to elderly and dependent people.⁶ Secondly, differences in patterns in the provision of informal care to elderly people could be reflecting additionally significant differences in people's preferences, culture, and traditions. In particular, Bonsang (2005) shows using data from SHARE that there exists a remarkable gradient from North to South regarding the opinion on "who" should be the main provider of support to elderly: whereas in the northern countries (Sweden, Denmark, and The Netherlands) the State is expected to assume this role, in the Mediterranean countries (Spain, Italy and Greece) people prefer the family to be in charge of these responsibilities.

In this analysis, I exploit two different possibilities of using the information provided by SHARE on daughters and parents characteristics. The first possibility is to draw a sample of women directly from the age-eligible respondents of the survey (the "daughters-sample"), which provide some information on their living natural parents, such as their age, health status, and residence closeness. The second possibility is to draw a sample of women from the respondents with at least one daughter aged between 50 and 60 (the "parents-sample"). Therefore, in this case, the respondents are the elderly parents. This sample can be identified since each respondent at the couple level provides some information about their living children (gender, age and residence closeness, type of children, marital status, frequency of contact, occupation status, education and number of children).⁷ Both samples are potentially useful for analysing the question at hand since they are composed by women from the same cohort and population. However, the variables available in each case are not exactly the same. Therefore, I perform the analysis for each of them separately. This comparison allows me to check the robustness of the results obtained using information provided from these two perspectives.

Given the purpose of the paper, the main variables of interest are those that measure the daughters' 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 or have been doing so during the last four weeks are also asked about the number of contracted and usual weekly hours of work in all jobs, I will only focus on the labour force participation decision. The main reason for this is that changes or adjustments induced by caregiving responsibilities may be more observed and important in the extensive margin of the labour supply decision rather than in its intensive margin. This is specially the case for the Mediterranean countries given the prevalence of full-time jobs with fixed working-schedules and the difficulties to access to part-time positions. In this situation, as Arellano and Meghir (1992) note, observed or reported hours are not desired hours and therefore, the individual's choice is restricted to the decision of whether to participate. Then, the extensive margin becomes the relevant

⁶For a deeper discussion on long-term care systems across European countries, see Bonsang (2005).

⁷The information about type of children, marital status, frequency of contact, occupation status, education and number of children is only asked about up to four children. When there are more than four children, the selection is not random but follows a set of criteria. First, children are sorted 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, the first four are picked. When all sorting variables are equal, a child is selected randomly.

dimension to analyse.⁸ The labour market participation decision is defined by a reduced-form participation indicator function, *Labour Participant*. For the daughters-sample, this function is equal to one if the daughter reports a positive number of weekly hours of work at the moment of the interview and zero otherwise. For the parents-sample, the function is equal to one if the family respondent reports 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 from inside or outside the household during the last twelve months prior to the interview and the identity of this person. Based on this information, I define a reduced-form caregiving indicator function, *Caregiver*, to analyse parental caregiving activities. For the daughters-sample, this indicator is equal to one if the daughter reports to have taken care of an elderly parent in the last twelve months and zero otherwise. For the parents-sample, it is equal to one if at least one parent reports to have been taken care of by the corresponding selected daughter and zero otherwise.

However, one may argue that this definition of caregiver is rather weak and may include individuals that have provided help to an elder parent less often than monthly. To have a more precise idea about to what extent these activities represent a competing demand on daughters' time, the intensity or frequency of this care should be accounted for and become the relevant concept in the analysis. Regarding this, respondents who report to have provided care to or received care from a person from outside the household are then asked about the frequency of this care (i.e. almost daily, almost every week, almost every month, and less often). Since the question about the help given to or received from a person within the household refers directly to care or assistance provided regularly (i.e. daily or almost daily during at least three months), I assume that daughters that provided this type of help did it in a daily or almost daily basis. Based on this information, I define a binary indicator, *Intensive Caregiver*, that indicates whether the daughter has provided informal care to an elderly parent in a daily or weekly basis. Hours of help are not considered in this analysis since this information is not available for care given to or received from a person living in the same household (given the difficulties to measure correctly hours of caring in this situation).

Apart from the potential simultaneous relationship between labour force participation and caregiving activities, both kind of decisions are functions of variables that account for preferences, other daughters' characteristics and parents' characteristics. However, as I pointed out above, the daughters-sample and the parents-sample do not provide exactly the same information regarding these factors. In particular, for the daughters-sample, I observe information on the daughter's age, education, current marital status, self-perceived health, income, living children and siblings. With respect to the information about natural parents' characteristics reported by the daughters, I observe each parent's

⁸A second reason for not considering the intensive margin of labour supply is that for parents-sample I only have available information about the daughters' employment status but not about the number of hours of work.

age, residence closeness, and health status.⁹ However, there is not available information on parents' income or the potential use of different sources of formal care, that could definitely influence the provision of care by the daughters. On the contrary, more detailed information about these issues can be derived from the parents-sample. In particular, I observe each parent's age, health status, income and information about the potential access to different sources of formal care. Besides, we have information given by the parents on the selected daughters' age, education, current marital status, children, siblings and residence closeness. However, daughters' health status or financial situation can not be measured.

Definitions and more specific details about these variables for each sample are provided in the Data Appendix.

2.2 Descriptive Analysis

Table 2 and Table 3 present the mean of the variables used in the analysis.¹⁰ Since the sample sizes for each country are small, I analyse the results at group (NC and SC) and country level for the two samples. These results show the most remarkable differences between the North and the South with respect to the characteristics of women in their middle-aged. The results for the daughters-sample presented in Table 2 show that northern middle-aged women participate, on average, much more in the labour market (77.7 percent) than southern middle-aged woman (40.9 percent), are more educated (the percentage of women with the lowest level of education is 7.4 in the northern area and 39.7 in the southern area whereas the percentage of the highest educated women is 40.2 in the northern area and 16.3 in the southern area),¹¹ and have higher non-wage income. However, women in the southern countries live, on average, much closer (less than 5 kilometers away) to an elderly parent. For the parents-sample, Table 3 shows very similar trends in these variables. Additionally it can be seen that the 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 the southern countries.

With respect to the provision of informal care, results in Table 2 and Table 3 show that the percentage of women that reports to have taken care of an elderly parent during the last twelve months is rather similar for southern countries in both samples. However,

⁹In this paper only subjective measures of health status are used even though SHARE also provides objective measures of the respondent's physical and mental health (e.g. number of chronic diseases, ADLs, IADLs, body mass index, depression,...). However, I do not use these objective measures because these are only available for the respondents and not for parents' respondents in daughters-sample or for daughters' respondents in parents-sample. For more details on these variables, see the Data Appendix.

¹⁰Given that no individual weights are available for the second sample (since these women are not the respondents of the survey), I will perform the descriptive analysis using the unweighted observations for both samples.

¹¹Notice 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, I would expect a higher percentage of middle-aged women in the first stage, similarly to the cases of Spain and Italy. So far, I did not find any reasonable explanation for this result although I think that it is likely that there is a codification mistake in the data.

this is not the case for northern countries, which present much lower percentages in the parents-sample (16 percent) than in the daughters-sample (44.8 percent). This descriptive difference for northern countries may suggest that parents are more strict or rigorous when they think about informal care and that, consequently, they feel that they receive much less help than what their daughters report. In fact, the comparison between northern and southern countries for the daughters-sample seems to suggest that in the former, middle-aged women are more likely to provide care to an elderly parent. This finding is very surprising since Spain, Italy and Greece are countries where family ties in this sense are traditionally stronger than in the northern countries given that formal care services tend to be rather scarce and very expensive.

However, as it was discussed previously, information on the intensity or the frequency of the provision of informal care may be crucial in this analysis to be focused on those caregiving activities that are more likely to represent a significant burden for these women. In particular, Table 4 provides the percentages of intensive caregivers, that is, those women that reported to have taken care of at least one elderly parent during the last twelve months prior to the interview in a daily or weekly basis. From these results, it can be seen that when the frequency of this informal care is considered, a different story emerges. Specifically, the gradient from low to high percentages of daily and daily/weekly elder parental care runs clearly from the northern to the southern countries in both samples. This suggests that middle-aged women in the southern countries are much more likely to be involved in intensive caregiving activities. Therefore, the intensive caregiving should become the relevant concept in the analysis. This represents an advantage of this paper with respect to Casanova (2001), Ettner (1996), Heitmueller and Michaud (2006), and Wolf and Soldo (1994) where the caregiving measure does not contain any information about the frequency or intensity of the care.

Next, I compare the labour market status and other individual characteristics between the sub-samples of intensive caregivers and non-intensive caregivers drawn from the daughters-sample (Table 5) and the parents-sample (Table 6). This descriptive comparison may provide a first insight about what are the main factors that could influence women's decisions about the provision of intensive informal care to their elderly parents. Since the samples are considerably small, I perform the comparisons at group level even though I am aware of the potential heterogeneity within each group.

Table 5 shows that for the daughters-sample, the most remarkable differences between these two sub-samples for both groups of countries is that intensive caregivers daughters live much closer to their elderly parents. This is specially the case in the southern countries where a 17.47 percent of these caregivers co-resides with an elderly parent whereas only 2.5 percent of non-intensive caregivers does. This shows that children within the household are more involved in elder parental care. In fact, 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. Other interesting results show that intensive caregivers are less likely to be at work than non-caregivers, specially in northern countries (70 percent of intensive caregivers are in paid employment whereas this rate increases to near 80 percent among

non-intensive caregivers). They are also more likely to have parents in a poorer health status, which indicates that the likelihood of providing informal care to elderly parents increases as parental health status worsens off. The availability of alternative sources of parental care are measured by the variable *Both (living parents)*, that indicates if both natural parents are alive, and the variables *DBrothers* and *DSisters*, that indicate whether the respondent has any brother or sister, respectively. In the daughters-sample it seems that the proportion of women with both living parents is lower for intensive caregivers in northern countries. This suggests that daughters are more likely to take care of an elderly parent if the spouse is not alive.¹² In addition to this, it is evident that sisters are close substitutes since the percentage of daughters with sisters is substantially lower for the sample of intensive caregivers in both groups of countries. The same result is obtained for the existence of brothers but only for southern countries.

Next, I focus on the same analysis for the parents-sample. The results provided in Table 6 show very similar differences between both sub-samples to those shown by the daughters-sample regarding employment status, residence closeness, health status of the parent and alternative caregiving sources. With respect to this last issue, it is also possible to observe for the parents-sample that intensive caregivers are less likely to have brothers than non-intensive caregivers also in northern countries. In addition, the percentage of women with at least one parent that has received formal care during the last twelve months is much higher in the sample of intensive carers than in the sample of non-intensive caregivers. This is the case for both groups of countries although this percentage is considerably higher in the northern area. However, no conclusion can be drawn from this result about the complementarity/substitutability between informal and formal care since I do not observe whether they are perceived simultaneously.

To conclude this section, I should remark that the descriptive evidence shown by both samples seems rather consistent and robust. In particular, it reflects most of the well-known and established differences in middle-aged women's characteristics between the North and the South of Europe regarding the variables of interest. Additionally, the descriptive comparison between intensive caregivers and non-intensive caregivers for both samples shows that it could exist a negative relationship between labour market participation and elder parental caregiving activities.

Finally, it is also very important to keep in mind that these results are descriptive and, therefore, merely indicative.¹³ In the next section, I adopt a more serious and rigorous statistical perspective, and I explain the empirical strategy and methods implemented to identify and estimate the effect of interest.

¹²However, this result is somewhat limited given that both natural parents do not have to be necessarily living together. Furthermore, I do not observe their corresponding marital status in order to know if they have a spouse or a partner. In addition to this, it should be mentioned that the variable *Both(living parents)* refers to the moment of the interview whereas the variable *Caregiver* refers to the twelve months prior to the interview.

¹³Besides, some of them could be affected by the extremely small sizes of some samples.

3 Empirical Strategy and Results

3.1 Empirical Strategy

As it was pointed out above, the goal of the present paper is to estimate the causal effect of providing intensive care to elderly parents on labour force participation behaviour for middle-aged women. Therefore, the empirical model has to be based on a structural framework that characterizes the nature of the relationship between caregiving of elderly parents and labour market participation decisions. As Ettner (1996) states, the simplest but less realistic option would be to treat these caregiving responsibilities as exogenously predetermined with respect to the woman's labour force participation decision. This is the case if the following assumptions are imposed. First, the intrafamily allocation of the parental help does not depend on other decision variables of the children as the employment status or time devoted to 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 labour force participation equation directly as an exogenous variable.

However, all of these assumptions are very extreme and likely to fail and it seems more realistic and appropriate to consider that both children's decision variables, employment and the provision of care, could be the result of the same decision process. In this situation, both variables would be simultaneously determined within the model.¹⁴ If this is the case, the exogeneity assumption on the caregiving indicator would bias the estimated effect of caregiving on labour force participation. The direction this bias is a priori difficult to predict. There could be unobservable factors related to stronger preferences for working as opposed to care for elderly parents that generate a negative correlation between the caregiving indicator and the error term. On the contrary, it could be also that components of the error term reflect high propensities of women to both work and provide parent care (very active women) inducing a positive correlation. In addition, the existence of measurement errors in the caregiving indicator could also influence the direction of the bias.

¹⁴In this paper other sources of help provision (from the spouse, siblings or by the purchase of market-based services) are assumed to be given exogenously to the daughter. For papers that model the decision of providing informal and formal care to elderly parents in a family-network context, see Pezzin and Schone (1999), Engers and Stern (2002) and Byrne, Goeree, Hiederman and Stern (2006). However, given that the purpose of this paper is to estimate the causal effect of informal caregiving to parents on labour participation of daughters and I am not particularly interested in how children interact among each other to decide about parent care, the development of a structural model of these characteristics is beyond the scope of this analysis. In addition, I rule out the consideration of financial transfers to parents as an additional decision variable for the daughter because of the low relevance of this kind of transfers shown in SHARE data (see Bonsang (2005) for a quantitative analysis of this information).

Therefore, to account for this potential endogeneity the empirical problem is to estimate jointly the combination of labour force participation and informal care resulting from the daughter's decision making. The advantage of this joint estimation is that the simultaneity or interdependency of these two decision variables is explicitly considered. Thus, the empirical analysis will be based on the following bivariate Probit model of labour market participation and informal caregiving decisions that allows us to deal with the presence of endogenous binary regressors:

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

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 intensive informal care to an elderly parent in a weekly or daily basis, and LP_i and IC_i are the corresponding observed variables of labour market participation and intensive caregiving decisions. The latter are defined by the indicator function $I(\cdot)$, that is equal to one if the condition in parenthesis holds and zero otherwise. Specifically, they are given by the indicator functions *Labour Participant* and *Intensive Caregiver (Daily/Weekly)*, respectively, that I defined for each sample. As it was discussed above, the intensive caregiving should be the relevant concept in this analysis. The vectors X_{1i} and X_{2i} contain the exogenous observable variables that potentially affect each decision variable, and $(\varepsilon_i, \nu_i)'$ is the vector of unobservable characteristics of the daughters or parents that could also potentially influence them. These error terms are assumed to be *iid* and follow a bivariate normal distribution with mean $(0, 0)'$, and covariance matrix Σ

$$\Sigma = \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix}$$

where ρ is the correlation of the errors and the variances are normalized to 1.¹⁵

A crucial issue that arises in this context is the identification of a causal link running from the provision of informal care to the participation in the labour market. Notice that in our specification, this effect is based on the parameter α_1 . As Manski et al. (1992) state, identification of the parameters of the model is guaranteed by the non-linearity of equations and the normality assumptions. However, this identification is reinforced by the presence of exclusion restrictions or variables that are assumed to be correlated with the intensive caregiving decision but not to have a direct effect on the labour force participation decision. Specifically, these are variables that are assumed to affect LP^* only through their effect on IC . In this sense, X_2 should include covariates with a

¹⁵See Manski et al. (1992) and Carrasco (2001) for a further discussion on estimation of a probit model with an endogenous dummy explanatory variable.

high explanatory power of the intensive caregiving indicator but that could be excluded from the labour force participation equation. In particular, results from the previous descriptive comparison between intensive caregivers and non-caregivers clearly document the relationship of parents' health status, the existence of both parents and siblings and the use of formal care with daughters' caregiving activities: intensive caregiver daughters are more likely to have parents in a worst health status and receiving formal care but less likely to have sisters and both living parents. Thus, for the daughters-sample I use as instruments for the intensive caregiving indicator the age of the oldest parent, the dummies for the health status of the parent that is in the worst health status, the dummies for the existence of sisters and brothers and the dummy for both living parents. For the parents-sample, I use additionally the income of parents.¹⁶

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:

$$\ln L = \sum_{i=1}^N D_{i(LP,IC)} \ln P_{i(LP,IC)} \quad (2)$$

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

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

where $\Phi(.,., \Sigma)$ is the cumulative distribution function of a bivariate normal with vector of means $(0,0)'$, and variance-covariance matrix Σ . The model is estimated for each sample using Full Information Maximum Likelihood (FIML) techniques.¹⁷ Results from the estimation of this model for both samples are provided in the following section.

¹⁶Even though the relationship between residence closeness and informal caregiving responsibilities was also well-documented in the descriptive analysis, I decided not to include this variable as an instrument because of its potential endogeneity in the caregiving equation. In fact, results considerably change when estimating the bivariate Probit model using the variable *Lessthan5* as an instrument, which points to a potential endogeneity problem. The same could be argued for the dummy variable *Formalcare* in parents-sample, which was not included in the analysis either.

¹⁷The assumption of independence of the observations is not appropriate for parents-sample since, due to its selection process, it could contain siblings. In this situation there will be a correlation in their decisions about caring for parents. Therefore, for this sample, I assume that the observations are independent across families (clusters), but not necessarily within families. As a result, I use in the estimation a robust variance matrix to account for any within-cluster correlation due, say, to unobserved cluster effects.

3.2 Estimation Results

Based on the previous discussion about the nature of the relationship between labour force participation and informal caregiving decisions, I estimate the effect of the provision of intensive informal care on the probability of paid employment under the two different assumptions on the caregiving indicator. First, I consider that caregiving responsibilities are taken as given and I estimate a standard probit model of labour force participation where the caregiving regressor is assumed exogenous. However, if this assumption did not hold, the estimates would suffer from an endogeneity bias that would depend on the sign of the correlation between the unobservables in the labour force participation equation and the caregiving variable and the potential existence of measurement errors. Second, I estimate the bivariate probit model that accounts for the endogeneity of this decision variable. The comparison of both alternative sets of results will shed some light on the importance and the direction of the endogeneity bias.

Similarly to the descriptive analysis and due to the small sample sizes at the country level, I perform these estimations "pooling" the samples for all countries in the same group and controlling for potential unobserved heterogeneity using country dummies. The use of country dummies instead of other country-specific factors or indicators (i.e., female unemployment rates or public expenditure on long-term care) allows us to control completely for all kinds of institutional differences among countries in the same pool.

Table 7 presents the estimation results under the exogeneity assumption for both samples and for both pools of countries. First of all, I focus on the parameter α_1 . In particular, it can be seen that, for all the regressions, this parameter estimate is negative. This shows that the variable (*Intensive Caregiver (Daily/Weekly)*) negatively affects the probability of participating in the labour market. However, this effect is only significant for the northern group in the daughters-sample, and for the southern group in the parents-sample. Regarding other daughters' characteristics that could influence their labour force participation decisions, I obtain that, for the daughters-sample, 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 best health situation are more likely to participate in the labour market. With respect to the education level, both the secondary and tertiary education 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 for both groups of countries in the daughters-sample. Regarding other competing time uses, to be married or engaged in a partnership only affects significant and negatively labour force participation in southern countries and for the daughters-sample. In addition to this, 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 in this particular case since very few of them have children in this age. Besides, almost all the children aged less than 16 of these women are in schooling. Finally, 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, only the dummy that corresponds to Spain is significant with positive sign for the daughters-sample.

Table 8 and Table 9 summarize for the daughters-sample and the parents-sample respectively the results obtained from the estimation of the bivariate model. In particular, they show that assuming intensive caregiving responsibilities to elderly parents significantly reduces the probability of participating in the labour market for both groups of countries. Furthermore, even though this was also the case when the caregiving variable was treated as exogenous, this negative effect is much stronger when endogeneity is taken into account. Specifically, the effect of intensive caregiving becomes more negative and highly significant in all cases. Table 10 provides the sample mean and median of the estimated marginal effect of this variable on the probability of participation in the labour market under these two assumptions. In particular, this average effect is defined as the mean of $E(LP_{i1} - LP_{i0}) = \Phi(\alpha_1 + \beta_1' X_{1i}) - \Phi(\beta_1' X_{1i})$ where LP_{i1} indicates the outcome if woman i has taken care of at least one parent and LP_{i0} indicates the outcome if the woman has not provided care. This expression represents the policy effect of interest since it measures the effect on labour force participation of changing from not having provided parental care to having provided care for a particular woman i with observables X_{1i} and unobservables ε_i . This causal effect is estimated by the sample mean or median of $\Phi(\hat{\alpha}_1 + \hat{\beta}_1' X_{1i}) - \Phi(\hat{\beta}_1' X_{1i})$ across individuals.

The results show that for the daughters-sample considering intensive caregiving as exogenous reduces on average the probability of participating in the labour market by about 6 percent for northern countries and 4 percent for southern countries. However, when endogeneity is accounted for, this reduction is substantially much larger for both groups of countries. In particular, the probability of participating in the labour market decreases around 28 percent for the northern group and 32 percent for the southern group. For the parents-sample, the same type of qualitative results are obtained. They show that when accounting for endogeneity, intensive caregiving causes a 42-32 percent reduction in daughters' probability of labour force participation for northern countries and for the southern group, respectively. Therefore, the difference between the estimates obtained under these two different assumptions suggests the existence of a positive endogeneity bias that induces to underestimate the effect of interest under the exogeneity assumption. This reflects the existence of a positive correlation between the unobservables in the error term of the labour force equation and the caregiving regressor. This positive correlation that generates a downward bias in the estimated negative effect may be also induced by the presence of measurement errors in the caregiving indicator. An additional check of this hypothesis is given by the fact that the correlation coefficient between the error terms in both equations ρ is positive and even very significantly different from zero in some cases.

The fact that the negative effect of caregiving on employment status is stronger when accounting for the endogeneity is in line with the evidence shown by Ettner (1996) and Madden and Walker (1999). Specifically, they use data from the US and UK, respectively, and analyse the variation in weekly hours of work due to caring activities. Ettner (1996)

obtains under the exogeneity assumption a non-significant reduction of 2.14 weekly hours of work due to caring for a non-coresidential parent for the US. However, when accounting for the endogeneity, this reduction is of 12.6 hours of work and very significant. For the UK, Madden and Walker (1999) obtains that the decrease in weekly hours of work due to informal caregiving to adults is of 0.589 hours under the exogeneity assumption and of 3.2 hours when controlling for endogeneity.

However, the large and significant effects of parent care on labour force participation for both groups of countries obtained in this paper substantially differ from those shown by Wolf and Soldo (1994) and Casanova (2001) for the US and Spain, respectively. One of the main reasons for this could be the fact that they do not account for the intensity of caregiving. Therefore, they do not have an adequate measure of to what extent these responsibilities are more likely to represent a competing demand on women's time. This could become a relevant issue as long as a large proportion of women in the sample reports to be caregiver but does not face an important burden due to this activity. In this case, the problem of combining paid employment and parent care might be insignificant. In fact, this is the case for northern countries when I perform the same analysis using the first measure of caregiving decisions (*Caregiver*). Specifically, ignoring the intensity of parental care, I do not find evidence that caregiving to elderly parents reduces significantly the probability of labour force participation even when accounting for endogeneity in the daughters-sample. For the parents-sample, the estimated negative effect is significant but substantially smaller. However, for the southern countries, I still find a significant and similar effect given that, as it was remarked in the descriptive analysis, a substantially larger proportion of caregivers provide care in a daily or weekly basis. These results show the importance of using a measure that incorporates the intensity of care.¹⁸

With respect to the rest of the covariates in the labour force participation equation, I obtain very similar results to those shown under the exogeneity assumption for both samples. Regarding the first-stage or the intensive caregiving equation, I obtain the following. In the case of the daughters-sample, results in Table 8 show that mid-life women with the highest level of education are significantly less likely to take care intensively of an elderly parent in northern countries. However, this is not the case in southern countries. With respect to other competing time uses, having children less than 16 years old has a positive effect on the probability of intensive caregiving in these countries whereas being married or engaged in a partnership negatively affects this probability in southern countries. In addition to this, it is important to analyse the effect of the variables that define the exclusion restrictions and that reinforce the identification of the causal relationship. As it can be seen, most of them are very significant and with a very high explanatory power of the intensive caregiving indicator. In particular, the age of the parent always has a significant and positive effect whereas the dummies that measure the health status of the parent that is less healthy, have a significant and negative effect. Furthermore, this effect is larger 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

¹⁸Results of these estimations are available upon request.

activities. With respect to other sources of care, it should be remarked that, for northern countries, only sisters seem to be close substitutes for the daughters in the provision of parental care. This is consistent with the evidence in Wolf, Freedman and Soldo (1997) that show that the higher the number of sisters of a potential caregiver, the less likely this caregiver is to undertake parent care. However, they do not find a similar effect for the number of brothers. 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 this area. Apart from that, the dummy variable that indicates if both parents are alive (*BothParents*) has a non-significant effect on the probability of taking care intensively of an elderly parent. Nevertheless, this result is not completely informative and should be taken with caution since I do not observe if both parents are living together. Finally, country dummies are only significant and with a negative sign 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 the parents-sample, 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 these parents become older and their health status worsens off. In this case, the fact of having sisters is only significant for the northern group whereas having brothers significantly reduces the probability of being caregiver only in southern countries. For both groups of countries daughters are significantly less likely to be involved in intensive parent caregiving when both parents are living together.¹⁹ Regarding country dummies, I also obtain that Italian middle-aged daughters tend to take care of elderly parents significantly less in a daily/weekly basis than in Spain and Greece. However, this evidence was not found for the daughters-sample.

3.3 Robustness Checks

In this section, I analyse the validity of the instruments used for caregiving and the robustness of the results to alternative sets of exclusion restrictions. The validity of the instruments is shown by the fulfilment of two requirements. On the one hand, it can be seen from the first-stage equation estimates in Table 8 and Table 9 that most of the variables used as instruments have a strong explanatory power of the intensive caregiving decision. In particular, parent's age and health status are always very significant and seem very good predictors of this decision variable for both groups of countries in both samples. On the other hand, I should provide some evidence that confirms that these variables can be excluded from the structural equation of our model. Specifically, this has been checked by altering the set of exclusion restrictions that has been used in the previous analysis and by including alternative subsets in the main equation. In addition

¹⁹Remember that for parents-sample, the variable *BothParents* is equal to one if both parents are interviewed, or if there is only one respondent and he/she reports to be married or have a partner. The important point is that the corresponding parent is not living alone.

to test whether the exclusion restrictions are satisfied, I can evaluate the sensitivity of the estimation results to the choice of the instruments.

Table 11 shows this robustness analysis for our parameter of interest, the estimated causal effect of providing intensive care to at least one elderly parent on labour force participation. In particular, three different specifications of the labour participation equation are analysed and compared to results presented in Table 10: Specification (1), where no exclusion restrictions are defined and the identification of the parameters of the model relies just on the non-linearity of the equations; Specification (2), where I exclude from the instrument set the variables related to the potential access by parents to other sources of care like *DBrothers*, *DSisters* and *BothParents*, and also *IncomeParent* for the parents-sample; and Specification (3), where I exclude from the instrument vector the variables that refer to the age and the health status of the elderly parents, *AgeParent* and *HealthParent* (*Very Good/Good* and *Fair*). First of all, it should be emphasized that any of these variables appear to have a significant economic direct effect on labour participation decisions under any of these alternative specifications. Besides, the estimation results for the rest of regressors remained almost unchanged.²⁰ In addition to this, the comparison between results in Table 10 and results obtained without exclusion restrictions (Specification (1) in Table 11) allows us to determine whether the full set of exclusion restrictions improve the identification of the causal effect. It can be seen that even though for the northern countries, the estimated marginal effect does not considerably change, the difference is substantial for the group of southern countries, specially when using the daughters-sample.²¹ These results suggest that the variables used as exclusion restrictions reinforce the identification of the causal effect of interest specially in the southern countries. Using the reduced instrument sets (Specification (2) and Specification (3)), it should be noticed that there are also important differences with respect to the results in Table 10 where we use the full set of instruments. In particular, for northern countries I obtain substantially smaller effects when no variables related to the potential access to other sources of care are used (Specification (2)) as instruments for caregiving.²² For southern countries, results differ mostly when I do not include in the instrument set the variables that measure the age and the health status of the elderly parents (Specification (3)).²³ Therefore, the results seem to be relatively sensitive to the exclusion restrictions defined to identify the parameters of the model. The strong explanatory power shown by these variables in the intensive caregiving equation (Table 9 and Table 10) and the fact that they do not have a direct economic impact on the labour force participation decisions suggests that the full set of instruments should be used to identify the parameter of interest.²⁴

²⁰Results from these estimations are available upon request.

²¹Furthermore, the intensive caregiving indicator is not statistically significant anymore for northern countries when using daughters-sample and for southern countries in either sample.

²²Moreover, the intensive caregiving indicator is not significant under Specification (2) for either sample.

²³In this case, the intensive caregiving indicator is not significant anymore under Specification (3) for daughters-sample.

²⁴Even the variable *IncomeParent*, that measures the economic status of elderly parents, does not have a significant direct impact on the labour force participation decisions of daughters. In fact, results are

4 Conclusions

The purpose of this paper is to estimate the causal effect of the provision of "intensive" informal care to elderly parents on labour force participation status for mid-life women in northern and southern European countries. Given the ongoing demographic and economic trends such as the continuous increase in female labour force participation and population ageing, policy makers are particularly concerned about the potential burden associated with combining these two activities. In particular, this question is of interest because the potential opportunity costs in terms of (reduced) employment associated with informal care faced by these women should be taken into account in the design of public policies dealing with the assistance to elderly people. However, the empirical evidence about this issue based on cross-country comparisons for Europe is really scarce.

Therefore, this paper tries to shed some light on this important question by focusing on two groups of European countries that strongly differ in female participation rates, the availability and use of public formal care and the role of the family as the main provider of informal care: the northern countries (Denmark, The Netherlands and Sweden) and the southern countries (Greece, Italy and Spain). Specifically, I perform the analysis for two different but comparable samples of middle-aged women with living parents drawn from SHARE. In the daughters-sample, all the information about daughters' and parents' characteristics is provided by the daughters and in the parents-sample, similar information is provided by the parents.

Results from the estimation of our model show several interesting findings. First, I obtain that assuming intensive caregiving responsibilities to an elderly parent decreases the probability of participating in the labour market in both groups of countries. Furthermore, this evidence is obtained from both samples, which documents the robustness of this result. The second remarkable finding shows that the effect of intensive informal caregiving on labour force participation is significant and much stronger when the endogeneity of the intensive caregiving regressor is accounted for. This suggests that the exogeneity assumption induces a downward bias in absolute value in this estimated negative effect. In particular, the results show that under the non-exogeneity assumption, caring for parents in an intensive basis causes a 30 percent reduction in daughters' probability of labour force participation for southern countries in both samples whereas in the northern area this probability reduces by around 30 and 40 percent for the daughters-sample and the parents-sample, respectively.

With respect to the empirical evidence provided by earlier studies, these two findings are somehow in line with the evidence shown in Ettner (1996) for US and Madden and Walker (1999) for UK, although they analyse the variation in weekly hours of work due to caring activities. However, they differ from other studies that do not find a significant effect of informal caregiving to parents on labour force participation decisions. One of the reasons for this may be the fact that they do not account for the intensity of caregiving. This information is crucial to be focused on caregiving responsibilities that are really

not very sensitive to the omission or inclusion of this variable in the instrument set given that it does not significantly affect the caregiving indicator either.

likely to represent a competing demand on women's time. In particular, this point seems to be specially relevant for northern countries where a substantial percentage of women in both samples reports to provide informal care to elderly parent but not in a daily or weekly basis.

Therefore, this paper confirms and quantifies the existence of a large trade-off between labour force participation and intensive caregiving to parents for middle-aged women not only in southern but also in northern European countries. This result is of interest in any policy debate about who and how should care for elderly people in European societies.

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TABLES

Table 1. Formal Care System Indicators
Percentage of population aged 65 and over

	In institutions	Receiving formal help at home
Sweden	8.7	11.2
Denmark	7	20.3
Finland	5.3 to 7.6	14
Norway	6.6	17
The Netherlands	8.8	12
Spain	2.9	1.6
Italy	3.9	2.8

Source: Jacobzone (1999).

Table 2. Descriptive Statistics for the Daughters-Sample⁽¹⁾

	<i>NC</i>	Sweden	Denmark	Netherlands	<i>SC</i>	Spain	Italy	Greece
Labour Participant	0.777	0.857	0.836	0.645	0.410	0.454	0.364	0.417
Caregiver	0.448	0.436	0.430	0.472	0.257	0.245	0.258	0.270
Age	54.475 (3.034)	54.802 (3.117)	54.491 (3.103)	54.073 (2.849)	54.224 (3.040)	54.163 (3.035)	54.543 (2.975)	53.871 (3.105)
Married/Partnership	0.784	0.762	0.673	0.879	0.821	0.832	0.894	0.712
Education								
Educ1	0.074	0.131	0	0.051	0.397	0.454	0.378	0.356
Educ2	0.270	0.213	0.127	0.425	0.227	0.306	0.267	0.080
Educ3	0.253	0.229	0.339	0.231	0.212	0.122	0.203	0.331
Educ4	0.402	0.427	0.533	0.293	0.163	0.117	0.152	0.233
Health								
Very Good	0.339	0.415	0.345	0.245	0.194	0.189	0.106	0.319
Good	0.450	0.323	0.479	0.586	0.512	0.510	0.539	0.478
Fair	0.174	0.204	0.139	0.157	0.238	0.245	0.286	0.166
Bad	0.029	0.049	0.018	0.011	0.052	0.056	0.060	0.037
Very Bad	0.008	0.009	0.018	0	0.003	0	0.009	0
Non-wage Income ⁽²⁾	32.831 (31.299)	27.306 (25.711)	30.304 (28.180)	40.997 (37.070)	21.564 (19.568)	17.382 (16.486)	25.818 (21.210)	20.930 (19.656)
Children16	0.106 (0.366)	0.134 (0.414)	0.066 (0.273)	0.095 (0.351)	0.097 (0.335)	0.112 (0.376)	0.115 (0.361)	0.055 (0.229)
Living Parents								
Both	0.251	0.271	0.194	0.260	0.276	0.260	0.286	0.282
Only Mother	0.617	0.610	0.673	0.593	0.625	0.643	0.599	0.638
Only Father	0.132	0.119	0.133	0.146	0.099	0.097	0.115	0.079
AgeParent	81.864 (5.141)	81.908 (5.594)	81.261 (4.771)	82.176 (4.759)	82.196 (5.221)	82.117 (5.126)	82.134 (5.029)	82.374 (5.600)
HealthParent								
Very Good	0.113	0.152	0.115	0.066	0.075	0.082	0.064	0.080
Good	0.227	0.180	0.273	0.256	0.286	0.347	0.203	0.325
Fair	0.403	0.375	0.351	0.469	0.370	0.316	0.382	0.417
Bad	0.207	0.253	0.164	0.179	0.194	0.189	0.249	0.129
Very bad	0.048	0.040	0.097	0.029	0.075	0.066	0.101	0.049
Residence								
InsideHH	0.006	0.006	0.006	0.007	0.052	0.112	0.018	0.024
Lessthan5	0.316	0.262	0.370	0.348	0.559	0.653	0.544	0.466
Brothers	1.158 (0.960)	1.009 (0.890)	1.030 (0.865)	1.414 (1.043)	1.187 (0.995)	1.388 (1.014)	1.161 (1.003)	0.981 (0.919)
Sisters	1.185 (1.048)	1 (0.986)	0.976 (0.930)	1.535 (1.098)	1.200 (1.023)	1.388 (1.049)	1.157 (1.033)	1.031 (0.945)
Sample Size	766	328	165	273	576	196	217	163

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

Table 3. Descriptive Statistics for the Parents-Sample⁽¹⁾

	<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								
InsideHH	0.007	0.013	0.006	0	0.135	0.265	0.095	0.025
Lessthan5	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 the parents-sample and standard deviations in parentheses. (2) IncomeParent is expressed in thousands of 2003 gross ppp-adjusted euros.

Table 4. Sample Characteristics of Caregiver⁽¹⁾ Daughters

Percentages	<i>Daughters-Sample</i>		<i>Parents-Sample</i>	
	<i>NC</i>	<i>SC</i>	<i>NC</i>	<i>SC</i>
Inside Household	0.583	12.838	2.999	23.622
Outside Household	99.417	87.838	97.701	76.378
Caregiving Frequency				
Intensive (Daily/Weekly)	53.936	69.594	47.126	80.315
Sample Size	343	148	87	127

Note: (1) Caregiver refers to an 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 Intensive and Non-Intensive Caregivers. Daughters-Sample

Percentages	Intensive Caregivers		Non-Intensive Caregivers	
	<i>Northern Countries</i>	<i>Southern Countries</i>	<i>Northern Countries</i>	<i>Southern Countries</i>
Labour Participant	69.730	37.864	80.206	41.649
Age				
50-55	55.676	58.252	62.306	65.539
56-60	44.324	41.747	37.694	34.461
Married/Partnership	81.622	75.728	77.453	83.509
Education				
Educ1	9.189	37.864	6.885	40.169
Educ2	31.351	20.388	25.645	23.256
Educ3	30.270	25.243	23.752	20.296
Educ4	29.189	16.505	43.718	16.279
Health				
Very Good	31.351	16.505	34.768	20.084
Good	49.730	49.514	43.546	51.586
Fair	16.216	28.155	17.728	22.833
Bad	1.621	5.825	3.270	5.074
Very Bad	1.081	0	0.688	0.423
DChildren16	10.811	7.767	7.917	8.879
Living parents				
Both	22.703	28.155	25.817	27.484
Only Mother	63.243	64.078	61.274	62.156
Only Father	14.054	7.767	12.909	10.359
Health of Parent				
Very Good	7.567	5.825	12.564	7.822
Good	19.459	19.417	23.752	30.655
Fair	42.162	34.951	39.759	37.421
Bad	24.324	28.155	19.621	17.547
Very bad	6.486	11.650	4.303	6.554
Residence				
InsideHH	1.621	17.475	0.344	2.537
Lessthan5	55.676	83.495	23.924	49.894
DBrothers	74.054	65.048	71.945	72.939
DSisters	63.784	60.194	69.535	72.093
Sample Size	185	103	581	473

Note: (1) Intensive caregiver refers to the individual that has taken care of an elderly parent during the last twelve months in a daily or weekly basis.

Table 6. Sample Characteristics of Intensive and Non-Intensive Caregivers. Parents-Sample

Percentages	Intensive Caregivers		Non-Intensive Caregivers	
	<i>Northern Countries</i>	<i>Southern Countries</i>	<i>Northern Countries</i>	<i>Southern Countries</i>
Labour Participant	70.732	31.372	79.482	45.405
Age				
50-55	36.585	60.784	70.518	70.540
56-60	63.415	39.215	29.482	29.459
Married/Partnership	65.854	77.451		83.784
Education				
Educ1	9.756	46.078	5.578	34.594
Educ2	21.951	20.588	24.502	28.108
Educ3	29.268	19.608	28.287	23.513
Educ4	39.024	13.725	41.633	13.784
DChildren16	0	3.921	12.948	9.730
Living parents				
Both	14.634	22.549	43.227	40.811
Only Mother	78.049	66.667	41.833	52.432
Only Father	7.317	10.784	14.940	6.757
Health of Parent				
Very Good	2.439	0	11.554	2.703
Good	12.195	18.627	34.661	24.594
Fair	58.536	35.294	40.239	49.459
Bad	24.390	35.294	9.960	19.459
Very bad	2.439	10.784	3.586	3.784
FormalcareParent	73.171	20.588	30.876	7.838
Residence				
InsideHH	4.878	28.431	0.398	9.459
Lessthan5	68.293	86.274	26.096	58.649
DBrothers	53.658	61.765	66.733	68.108
DSisters	48.780	61.765	64.741	66.486
Sample Size	41	102	502	370

Note: (1) Intensive caregiver refers to 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⁽¹⁾

	Daughters-Sample		Parents-Sample	
	<i>Northern Countries</i>	<i>Southern Countries</i>	<i>Northern Countries</i>	<i>Southern Countries</i>
Constant	-36.833*	-4.746	-26.301	-5.572
	(19.244)	(19.145)	(22.625)	(21.186)
Intensive Caregiver (Daily/Weekly)	-0.241*	-0.133	-0.101	-0.361**
	(0.125)	(0.150)	(0.237)	(0.154)
Health				
Very Good/Good ⁽²⁾	1.725**	0.763**	-	-
	(0.310)	(0.296)	-	-
Fair	1.473**	0.614**	-	-
	(0.326)	(0.310)	-	-
Educ2	0.414**	0.228	0.015	-0.143
	(0.209)	(0.150)	(0.283)	(0.156)
Educ3	0.759**	0.664**	0.438	0.345**
	(0.218)	(0.158)	(0.288)	(0.163)
Educ4	0.950**	1.186**	0.599**	1.124**
	(0.217)	(0.181)	(0.281)	(0.198)
Age	13.331*	1.912	10.297	2.175
	(7.035)	(7.026)	(8.315)	(7.807)
Age ²	-1.256*	-0.230	-1.005	-0.223
	(0.642)	(0.642)	(0.762)	(0.718)
Non-wage Income	-0.003*	-0.005*	-	-
	(0.002)	(0.003)	-	-
DChildren16	-0.194	0.126	-0.295	0.153
	(0.198)	(0.207)	(0.210)	(0.231)
Married/Partnership	-0.119	-0.258*	0.134	-0.107
	(0.161)	(0.150)	(0.154)	(0.161)
Sweden	0.848**	-	0.955**	-
	(0.138)	-	(0.166)	-
Denmark	0.468**	-	0.601**	-
	(0.153)	-	(0.171)	-
Spain	-	0.395**	-	0.119
	-	(0.154)	-	(0.155)
Italy	-	0.118	-	0.192
	-	(0.148)	-	(0.160)
Pseudo-R ²	0.1741	0.135	0.134	0.088
Sample Size	766	576	543	472

Note: Standard errors robust to heteroskedasticity and within-family correlation 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⁽¹⁾

Daughters-Sample					
	<i>Northern Countries</i>		<i>Southern Countries</i>		
	Labour Participant	Intensive Caregiver	Labour Participant	Intensive Caregiver	
Constant	-37.194** (18.468)	-3.431** (1.151)	-1.494 (17.661)	-3.416* (1.434)	
Intensive Caregiver (Daily/Weekly)	-0.970* (0.527)	-	-1.070** (0.400)	-	
Health					
Very Good/Good ⁽²⁾	1.692** (0.325)	0.341 (0.311)	0.663** (0.301)	-0.032 (0.277)	
Fair	1.433** (0.337)	0.193 (0.320)	0.578* (0.311)	0.036 (0.289)	
Educ2	0.358 (0.220)	-0.161 (0.214)	0.207 (0.147)	-0.010 (0.175)	
Educ3	0.711** (0.231)	-0.110 (0.217)	0.672** (0.154)	0.238 (0.181)	
Educ4	0.814** (0.249)	-0.512** (0.218)	1.130** (0.190)	0.189 (0.201)	
Age	13.471** (6.753)	0.186 (0.203)	0.728 (6.472)	-0.051 (0.220)	
Age ²	-1.259** (0.615)	-	-0.113 (0.591)	-	
Non-wage Income	-0.0036* (0.0019)	-0.0027 (0.0018)	-0.004 (0.003)	0.001 (0.003)	
DChildren16	-0.098 (0.211)	0.435** (0.185)	0.106 (0.203)	-0.070 (0.233)	
Married/Partnership	-0.098 (0.158)	0.066 (0.140)	-0.316** (0.140)	-0.356* (0.167)	
AgeParent	-	0.300** (0.117)	-	0.431** (0.123)	
HealthParent ⁽²⁾					
Very Good/Good	-	-0.454** (0.137)	-	-0.523** (0.173)	
Fair	-	-0.322** (0.128)	-	-0.267* (0.151)	

(Continued)

(Continued)
Table 8. Simultaneous Bivariate Probit Model⁽¹⁾

	Daughters-Sample			
	<i>Northern Countries</i>		<i>Southern Countries</i>	
	Labour Participant	Intensive Caregiver	Labour Participant	Intensive Caregiver
DBrothers	-	-0.042	-	-0.315**
		(0.115)		(0.129)
DSisters	-	-0.269**	-	-0.278**
		(0.109)		(0.134)
BothParents	-	-0.126	-	-0.097
		(0.123)		(0.144)
Sweden	0.721**	-0.501**	-	-
	(0.175)	(0.126)		
Denmark	0.373**	-0.363**	-	-
	(0.166)	(0.145)		
Spain	-	-	0.403**	0.216
			(0.150)	(0.166)
Italy	-	-	0.137	0.088
			(0.143)	(0.165)
ρ	0.438		0.579**	
	(0.308)		(0.237)	
Log-likelihood	-729.303		-586.813	
Sample Size	766		576	

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 Educl for the highest education level completed, the Bad/Very Bad pooled category for health status and health status of the parent, and The Netherlands and Greece for the northern and southern countries, respectively. (1) The caregiving decision as treated 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⁽¹⁾

Parents-Sample					
	<i>Northern Countries</i>		<i>Southern Countries</i>		
	Labour Participant	Intensive Caregiver	Labour Participant	Intensive Caregiver	
Constant	-21.641 (22.462)	-8.049** (2.337)	-3.810 (20.365)	-2.283 (1.694)	
Intensive Caregiver (Daily/Weekly)	-1.310** (0.499)	-	-0.981** (0.417)	-	
Educ2	-0.012 (0.280)	-0.425 (0.374)	-0.192 (0.154)	-0.308 (0.191)	
Educ3	0.406 (0.284)	0.083 (0.359)	0.287* (0.168)	-0.200 (0.198)	
Educ4	0.536* (0.276)	-0.048 (0.337)	1.066** (0.204)	-0.049 (0.219)	
Age	8.473 (8.260)	0.610* (0.325)	1.534 (7.509)	-0.144 (0.257)	
Age ²	-0.822 (0.758)	-	-0.157 (0.690)	-	
DChildren16 ⁽²⁾	-0.282 (0.203)	-	0.091 (0.232)	-0.564* (0.310)	
Married/Partnership	0.093 (0.150)	-0.166 (0.193)	-0.130 (0.160)	-0.175 (0.178)	
AgeParent	-	0.575** (0.200)	-	0.442** (0.161)	
IncomeParent	-	-0.001 (0.0017)	-	-0.0004 (0.0010)	
HealthParent ⁽³⁾					
Very Good/Good	-	-1.235** (0.275)	-	-0.764** (0.191)	
Fair	-	-0.239 (0.243)	-	-0.763** (0.164)	

(Continued)

(Continued)
Table 9. Simultaneous Bivariate Probit Model⁽¹⁾

	Parents-Sample			
	<i>Northern Countries</i>		<i>Southern Countries</i>	
	Labour Participant	Intensive Caregiver	Labour Participant	Intensive Caregiver
DBrothers	-	-0.168 (0.195)	-	-0.343** (0.154)
DSisters	-	-0.424** (0.184)	-	-0.108 (0.146)
BothParents	-	-0.796** (0.218)	-	-0.481** (0.161)
Sweden	0.900** (0.163)	-0.281 (0.237)	-	-
Denmark	0.554** (0.166)	-0.133 (0.257)	-	-
Spain	-	-	0.131 (0.154)	0.125 (0.171)
Italy	-	-	0.114 (0.167)	-0.496** (0.191)
ρ	0.729** (0.193)		0.423 (0.265)	
Log-likelihood	-351.559		-500.316	
Sample Size	543		472	

Note: Standard errors robust to heteroskedasticity and within-family correlation in parentheses.²⁵ (*) 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 pooled category for health status and health status of the parent, and The Netherlands and Greece for the northern and southern countries, respectively. (1) The caregiving decision is treated as endogenous. (2) Regressor DChildren16 is not included in the informal caregiving equation for northern countries in the parents-sample 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.

²⁵See Wooldridge (2002) for more details on the computation of a variance matrix robust to heteroskedasticity and within-cluster correlation.

Table 10. Marginal Effect of Intensive Caregiving on the Probability of Labour Force Participation (Probit Models)

	Sample Mean (Median)	
	Exogenous Intensive Caregiver	Endogenous Intensive Caregiver
<i>Daughters-Sample</i>		
Northern Countries	-0.062 (-0.063)	-0.282 (-0.296)
Southern Countries	-0.044 (-0.047)	-0.316 (-0.339)
<i>Parents-Sample</i>		
Northern Countries	-0.026 (-0.024)	-0.423 (-0.436)
Southern Countries	-0.125 (-0.125)	-0.316 (-0.316)

Note: The marginal effect for individual i is computed as $\Phi(\widehat{\alpha}_1 + \widehat{\beta}'_1 X_{1i}) - \Phi(\widehat{\beta}'_1 X_{1i})$ where X_{1i} is the the value of vector X_1 for individual i .

Table 11. Sensitivity Analysis

Average Marginal Effect of Intensive Caregiving on Labour Force Participation			
	Specification (1)	Specification (2)	Specification (3)
<i>Daughters-Dample</i>			
Northern Countries	-0.243	-0.207	-0.329
Southern Countries	-0.158	-0.338	-0.203
<i>Parents-Sample</i>			
Northern Countries	-0.365	-0.335	-0.430
Southern Countries	-0.369	-0.267	-0.442

Note: Specification (1) does not consider any exclusion restriction; Specification (2) includes as instruments *AgeParent* and *HealthParent* (*Very Good/Good*); and Specification (3) includes as instruments *DBrothers*, *DSisters* and *BothParents*. For the parents-sample, the variable *IncomeParent* is also included in the instrument set.

DATA APPENDIX

DAUGHTERS-SAMPLE: Women aged between 50 and 60, respondents of the survey, and with at least one living parent at the moment of the interview.

Variables:

1. *Daughters' characteristics*: The variables *Labour Participant* and *Caregiver* indicate if the daughter reports a positive number of weekly hours of work at the moment of the interview and if the daughter reports that she has taken care of an elderly parent in the last twelve months, respectively. I additionally define the variable *Intensive Caregiver (Daily/Weekly)* that refers to a daughter that has taken care of at least one elderly parent during the last twelve months prior to the interview in a daily or weekly basis. I 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. Education is measured by four dummy variables (*Educ1*, *Educ2*, *Educ3*, and *Educ4*) generated from the highest level of education completed according to the ISCED-97 code.²⁶ 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). Health is measured by the respondent's self-perceived health status with one generated dummy variable for each of the categories (*Very Good*, *Good*, *Fair*, *Bad*, and *Very Bad*). Non-wage income (*Non-wage Income*) is computed 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.²⁷ I 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*),²⁸ and alternative potential sources of informal care for elderly parents as the number of the respondent's siblings (*Brothers*, *Sisters*) and the fact that only one or both natural parents are alive at the moment of the interview (*Living Parents: Both*, *Only Mother*, *Only Father*).²⁹

2. *Parents' characteristics*: With respect to the information about natural parents' characteristics given by the daughters, I observe each parent's age, health status,

²⁶ISCED stands for International Standard Classification of Education.

²⁷The amounts of euros have been corrected for PPP to control for the differences in the price levels among countries.

²⁸It 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.

²⁹For daughters-sample, this sequence has been computed from the information given by each woman about the living status of her parents at the moment of the interview. The dummy variable *Both* indicates whether both parents are alive but we do not observe whether both of them are living together. The variables *Only Mother* and *Only Father* indicate whether only the mother and the father is alive, respectively, but we do not observe the marital status of them.

and residence closeness. Specifically, when both natural parents are alive, I will measure parental age by the age of the oldest parent (*AgeParent*), and I will consider the health of the parent that exhibits the worst health status (*HealthParent* with the categories *Very Good, Good, Fair, Bad, and Very Bad*). The residence closeness is measured by two dummies (*InsideHH, Lessthan5*) 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 in the same household), respectively.

PARENTS-SAMPLE: 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 reports that the daughter is 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. Additionally, the variable *Intensive Caregiver (Daily/Weekly)* indicates whether the selected daughter has provided informal care to at least one elderly parent during the last twelve months in a daily or weekly basis. I 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 variables for marital status, education and residence closeness (*Married/Partnership, Educ1, Educ2, Educ3, Educ4, InsideHH* and *Lessthan5*) are given by the same definitions as in the daughters-sample. As indicators of other family responsibilities and the existence of alternative sources of informal caring for elderly parents, I use the number of children (*Children*),³⁰ and the number of siblings (*Brothers, Sisters*),³¹ respectively. In addition to this, I also consider the fact that only one or both parents are alive at the moment of the interview (*Living Parents: Both, Only Mother, Only Father*).³²

³⁰For parents-sample, 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 whether 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.

³¹In these variables, we are also including siblings that may be non-biological. In addition to this, we can not know whether the daughter has other natural brothers or sisters in the case that her parents are not living together and have had children with other partners.

³²Specifically, in parents-sample, 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

2. *Parents' characteristics*: With respect to the information about elder parents' characteristics, that in this case are given by themselves, I use each parent's age, health status, income, and formal care received in the last twelve months. Specifically, when both parents are interviewed,³³ I will measure parental age by the age of the oldest parent (*AgeParent*), and I will consider the health of the parent that exhibits the worst health status (*HealthParent* with the categories *Very Good*, *Good*, *Fair*, *Bad*, and *Very Bad*). Parents' income (*IncomeParent*) is measured by the gross annual household income expressed in thousands of 2003 ppp-adjusted euros. Finally, the variable *FormalcareParent* indicates whether at least one parent has been in a nursing home³⁴ overnight or has received home care³⁵ in the last twelve months prior to the interview.

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.

³³We should note that, in parents-sample, 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.

³⁴A "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.

³⁵This 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.