Abstract

The reconciliation of work and family life represents a challenge for most women. The different ways of combining work and childcare include part-time employment, the use of formal care and the use of informal care (which typically consists of care provided by grandparents). Informal childcare has, in fact, been the least studied of these alternatives.

In this paper, we make use of the results obtained in the second wave of the European Social Survey (2004/2005) to investigate how the childcare provided by grandparents in Southern European countries affects the probability of mothers working. We find some evidence linking these two phenomena.

Because we have only considered situations in which the main care received by a child, other than parental care, is provided by grandparents (a scenario which ignores other situations where grandparents may act as an essential background support), the results suggest that grandparental care does indeed play an important role in determining the probability of women working in our chosen set of countries.

***Keywords*:** labor market, women, childcare, grandparents, ageing.

Grandparents and women's participation in the labor market

Introduction

The reconciliation of work and family life places particular strain on the lives of women. Studies that have been made about the effects that the provision of help with childcare can have on the labor supply have tended to focus on women, since they are the main carers (Stier, Lewin-Epstein and Braun 2001). Indeed, the availability and quality of non-parental care tends to affect the care provided by mothers, but not the time that fathers spend taking care of children (Van Dijk and Siegers 1996). Men's participation in childcare is frequently more limited. For instance, in the case of Portugal, Perista (2002) compares the time that men spend caring for children with that spent by women, observing that men's participation in childcare is usually restricted to certain types of activities, such as transportation.

Numerous studies have shown that childcare reduces women's participation in the labor market (Connelly, DeGraff and Levison 1996; Uunk, Kalmijn and Muffels 2005; Angrist and Evans 1998; Carrasco 2001). There are different ways of combining work and childcare: taking up part-time employment, making use of formal care or making use of informal care. A mixture of these alternatives is also possible.

The availability of part-time jobs differs considerably from country to country (Folk and Beller 1993; Pfau-Effinger 1998; Del Boca 2002), varying with the type of welfare regime – liberal, social-democratic or conservative (Stier, Lewin-Epstein and Braun 2001). Part-time employment is usually a temporary arrangement, being a way of reconciling work with family life while children are still young.

Many studies have confirmed the important role played by the availability and cost of formal childcare, as well as its public provision, in determining women's participation in the labor market (Stier, Lewin-Epstein and Braun 2001; Uunk, Kalmijn and Muffels 2005; Marcos 2006; Connelly 1992; Connelly and Kimmel 2003; Del Boca 2002; Del Boca, Pasqua and Pronzato 2007). However, informal childcare still remains under-researched (Kalb 2009). The main reason for this is the lack of available information.

In their survey of a sample of British working parents, Wheelock and Jones (2002) state that "what professionals and academics usually call 'informal care' [is] overwhelmingly 'grandparent care'" (p. 449). In several countries, even in the USA, multigenerational relationships in families (and particularly the role played by grandparents) are expected to grow in importance (Giarrusso and Silverstein 1996; Bengston 2001). As Andreotti et al. (2001, p. 52) note, demographic transformations have extended the kinship network through generations, but have tended to reduce it within the same generation (see also Giarrusso and Silverstein 1996; Grundy, Murphy and Shelton 1999; and Hoff 2007). Grandparents tend to have fewer grandchildren competing for their attention (Gray 2005) and therefore are more present in the life of each one.

Grandparents play diverse roles, some of which are symbolic (Bengtson 1985; Barranti 1985; Giarrusso and Silverstein 1996; etc.). However, in this study, we will focus on a practical role: that of childcare. The care provided by grandparents is usually regarded as the closest to the care that mothers themselves provide (Kuhlthau and Mason 1996; Wheelock and Jones 2002), due to their special characteristics of offering a home environment, attention, flexibility, and trust. Flexibility, for instance, may be a determining factor in enabling mothers to work in jobs that require non-standard hours (Presser 1989; Hunts and Avery 1998, Vandell et al. 2003; Hank and Buber 2009). Gray (2005) finds evidence to suggest that mothers of children under 12 years of age who live with a partner work longer hours if they receive help with childcare from the children's grandparents. Kimmel and Powell (2006) find that an increase in the probability of non-standard work significantly reduces the probability of choosing formal care, while it increases the probability of making use of the care provided by relatives. Davis and Connelly (2005), using data from a US state, find that the women who are most likely to be employed are also those who are most likely to choose family care, which suggests that family care is used in particular to facilitate employment. In the sample used by James-Burdumy (2005) for the US, the mothers who worked longer hours in the first year of their children's lives were more likely to have a grandmother living in the household than the mothers who worked fewer hours. This is only indirect evidence to suggest that there is an association between the working status of mothers and the care provided by the grandmother, since there is no information confirming whether the co-

resident grandmother actually provides childcare. Similarly, Maurer-Fazio et al. (2009) estimate a model for the participation of married Chinese women in the labor force, in which the existence of a co-resident parent/parent-in-law improves the chances of their participation, but it is not known if this involves any care being provided to grandchildren. Further indirect evidence is provided by Del Boca (2002), for Italy, who finds that when the mother has a parent who is alive, this increases her chances of participation in the labor market.

Childcare by grandparents may or may not be the main source of childcare. Informal and formal care strategies are possibly intertwined and complementary (Wheelock and Jones 2002; Larsen 2004; Del Boca, Pasqua and Pronzato 2005; Raeymaeckers et al. 2008; Sümer et al. 2008). Larsen (2004) bases her analysis on interviews held with several families from countries that are traditionally classified under different welfare regimes, finding that, in all of the countries considered, formal care arrangements seem to be insufficient to cover the childcare needs of all families.

In this paper, we investigate whether the care provided by grandparents has a measurable impact on the participation of mothers in the labor market, or whether it does not make much difference.

We will use data for Southern European countries. We have chosen this group of countries for several reasons. Southern Europe is generally viewed as a group of "strong family countries" (Andreotti et al. 2001), and where the involvement of men in household chores and in care is traditionally low (see, for example, Trifiletti 1999; Gonzalez, Jurado, and Naldini 1999; Caldwell and Schindlmayer 2003; Crompton and Lyonette 2006). Although there has been a trend towards re-familializing men and de-familializing women (Saraceno 2008), with consequent progress in gender equalization, there is still a long way to go. The state has a weak presence in social areas, particularly in the provision of publicly-funded daycare for under-fours (Flaquer 2000; Del Boca et al. 2005). Additionally, part-time work is not a common alternative in Southern European countries (Del Boca 2002; Cousins 2000; Mínguez 2005), mostly because the corresponding wages would be too low. Therefore, it is feasible to expect a larger involvement of Southern European grandparents in child care than in the rest of Europe, and to consider that this has an impact on the female labor supply.

Very few articles have addressed this issue, possibly due to the unavailability of data. The studies that are closest to ours are those of Wheelock and Jones (2002) and Gray (2005). In a qualitative study based on a survey conducted in an industrial region in north-east England, Wheelock and Jones (2002) illustrate the importance of informal care, mostly grandparental care, for working parents, even if only in a complementary way. Gray (2005) uses the UK Time Use Survey to investigate whether the care provided by grandparents influences the mother's participation in the labor market. She concludes that there is a significant difference in the proportion of mothers who work with the help of grandparental childcare and the proportion of mothers who work without receiving any help with childcare from the grandparents when these mothers do not have a higher education qualification.

One of the unique features of our study is that it uses a large international database (European Social Survey), which in its second wave (2004/2005) asks the question "What is the main type of childcare that the youngest child receives?" This does not include childcare provided by the parents. The first alternative answer is the "child's grandparent(s)".[1] This information allows us to have a dummy variable that indicates whether the mother's youngest child is taken care of by a grandparent. Alternative databases would not permit this. For instance, using the European Community Household Panel (ECHP), we could identify households with grandparents that mention looking after children. Besides our not being sure whether or not these children are their own grandchildren (although this would certainly be the commonest case), we would also be restricted to co-resident grandparents, which would largely underestimate the level of childcare provided by grandparents. Another alternative database could be the Survey of Health, Ageing and Retirement in Europe (SHARE). However, the problem here is that respondents are individuals aged 50+, and there is only one respondent per household. Even if the respondent was not identified as caring for a grandchild, we would not know about the wife/husband. Furthermore, the information would be centered on the grandparent, rather than on the mother. Hank and Buber (2009) have an interesting study on grandparents who care for their grandchildren, based on SHARE, but they naturally focus on the grandparent. In other words, what they investigate is the probability of grandparents providing care to their

[1] We are grateful to Jane Lewis for kindly offering us this information.

grandchildren. Del Boca et al. (2005) use the ECHP in a study of fertility and employment, but they are restricted to considering co-resident grandparents only.

The inclusion in national surveys of questions about relationships with grandparents or with grandchildren is therefore to be recommended.

To our knowledge, our paper is the only one that addresses this question using an econometric approach, and also the only one focusing on the effects of the provision of care by grandparents mainly in Southern European countries.

Theoretical Framework

The aim of this section is to develop a simple framework to motivate the discussion that we hope will capture the main elements of our general idea.

A mother chooses her employment status as a function of her consumption (x_m), the well-being of her children (k), and the amount of leisure time that she can use (l). She computes $U(x_m, k, l)$ for a situation where she works, and for a situation where she does not work, and decides to work if the utility level obtained when working is greater than the utility level obtained when not working.

$$x_m = \bar{Y} + w.t_w - \sum_{i=0}^{n} x_{k\,i} - \sum_{i=0}^{n} C_i$$

$$k = \mathrm{f}(x_{ki},\ h_i,\ s_i)$$

$$l = \mathrm{T} - t_m - t_w$$

Her consumption depends on the net income that she can use after paying for the children's expenses. She can use income that is independent of her labor market status (part of her husband's income and asset earnings) ($\bar{Y}$), and she can earn her own wage if she is working ($w.t_w$). t_w is the time she spends in the labor market; w is the wage rate. We distinguish the cost of child care (C) from the rest of the children's expenses (x_k); n is the number of children; C is a function of the type of care.

The well-being of her children depends on their consumption (x_k) and on the quality of the care services that they receive. x_k increases with x_m. Following El-Attar (2007), we assume that the quality of the care services consists of h_i, the good treatment of the children, and s_i, their acquisition of social skills. Both h_i and s_i are functions of the type of care they receive. They may receive family care, which may be the care provided by a parent, and which we assume is mainly provided by the mother (t_m), or the care provided by a grandparent (t_{GP}). These two types of family care are assumed to be close substitutes for the children, meaning that both types result in not very different levels in terms of the good treatment of the children and the acquisition of social skills. The alternative to family care is care that is provided by non-relatives, which we shall call professional care (t_{PC}). We assume here that family care is not paid for (C=0), whereas professional care is paid for (C>0). Typically, the level of good treatment is higher in the case of family care, since it is probably more individualized, it is provided in a home environment, and there are probably affective links that are deeper than in professional care. As for the acquisition of social skills, the ranking is more ambiguous. The interaction with other children may be one of the strengths of professional care, but its value depends on the child's age and on the number of siblings that are in family care together.

Leisure is a residual variable. It is what is left from total time (T) after the time spent in the labor market (t_w) and the time spent in mothering (t_m) have been deducted.

As we see, the mother's choice of participation in the labor market has several implications.

If a grandparent is available to care for the children, her participation in the labor market increases x_m, and also increases k through x_k, while not affecting h. It is not clear what happens to s, but, for small children, the balance of the mother's participation when a grandparent cares for the children will be positive. t_{GP} takes the place of t_m. The mother could use that time for either work or leisure purposes, but in this paper we assume that grandparents care for grandchildren in order to allow mothers to participate in the labor market. The effect on leisure is, therefore, simplified and considered to be null. Clearly we expect the existence of caring grandparents to increase the probability of the mother's participation in the labor market.

If the mother uses professional childcare, the increase in x_m is lower, and it may even be negative if $\sum_{i=0}^{n} C_i > (w.t_w)$. As a consequence, x_k is also smaller. h will probably decrease, while s will increase. The overall effect on k, is indeterminate.

This framework offers more incentives to work when there is a grandparent providing care.

This model justifies the inclusion in the empirical specification of variables such as the mother's wage, the income of the household without the mother's wage, the cost of alternative child care, the number of siblings needing care, and the children's ages.

Needless to say, this simple model is by no means a thorough description of the mother's labor supply situation. Several aspects, such as the participation of the husband in childcare or the mother's health status have been omitted. Also, the mother's decision to work may be constrained by the availability of jobs (see Lacroix and Fréchette 1994, for instance).

Empirical specification

Modeling strategy

The above discussion suggests that the existence of a grandparent caring for a grandchild increases the probability of the mother's participation in the labor market. We will now test the empirical verification and significance of such an effect.

The existence of a grandparent caring for a child may not be a truly exogenous variable: the grandparents' decision to care for their grandchildren and the mother's decision to work or seek employment may be jointly determined; there may be unobservable factors that affect the mother's chances of working and of having a grandparent of the child available to provide childcare (the personality of the mother and her preferences, for instance). This selection-bias problem results in the existence of a correlation between the error and the explanatory variable of interest.

The typical methodology that is used when endogeneity is suspected is the instrumental variable approach applied to a standard probit. However, this is only valid

when the endogenous regressor has a normal distribution (Carrasco 2001), which is not possible if it is a binary indicator. In this case, the bivariate probit and the switching probit are valid alternatives. They account for the simultaneity of work and care decisions, the interaction between dummy endogenous variables, or omitted variables related to both the labor market outcome and the use of the care provided by grandparents.

Possibly because it is a somewhat demanding model, the switching probit is not particularly common in the literature. To see other articles that use this econometric framework, look for example at Manski et al. (1992), Carrasco (2001), and Alba et al. (2009).

Each mother of at least one young child (under 6 years of age) is characterized by values for the variables (y_1, y_0, z, x). y_1 is a variable that indicates the labor market outcome of women who use grandparental care; $y_1 = 1$ if the mother participates in the labor market, and zero otherwise; y_0 is a variable that indicates the labor market outcome of women who do not use grandparental care; $y_0 = 1$ if the mother participates in the labor market, and zero otherwise. For each mother, only one of either y_1 or y_0 is realized, the other being latent. y_1 is realized if z=1, and y_0 is realized if z=0. z is a binary variable that indicates if the mother uses grandparental childcare services; x_1 and x_0 are vectors of observed covariates that affect y_1 and y_0; w is a vector of observed covariates that affect the use of grandparental childcare.

The switching probit is a model that estimates the following system:

$y_1 = 1$, if $\beta_1 . x_1 + e_1 > 0$

$= 0$, otherwise;

$y_0 = 1$, if $\beta_0 . x_0 + e_0 > 0$

$= 0$, otherwise;

$z = 1$, if $\gamma . w + u > 0$

$= 0$, otherwise;

The participation outcome for each mother i is therefore:

$$y_i = (1 - z_i).\, y_{0i} + z_i.\, y_{1i}$$

and (e_1, e_0, u) are assumed to be jointly normally distributed with zero mean vector and covariance matrix:

$$\Sigma = \begin{pmatrix} 1 & \rho 10 & \rho 1u \\ & 1 & \rho 0u \\ & & 1 \end{pmatrix}$$

The switching probit is a more general form of the bivariate probit and the univariate probit in that it does not constrain the effect of the unobservables on the outcome under the two selection states to be the same. If $\beta_0 x_0 = \beta_1 x_1$, the three types of models differ only in the assumptions that are made about the error correlations. The bivariate probit assumes that $\rho 1u = \rho 0u$. The univariate probit assumes that $\rho 1u = \rho 0u = 0$. When the error correlations are zero, there is no endogenous switching.[2]

The full set of equations is estimated simultaneously by maximum-likelihood.

Data and explanatory variables

Most of the data used in this study are taken from the second round of the European Social Survey (ESS) – 2004/2005.

We used four different samples, depending on the countries included. Typically, the title of Southern European countries is applied to Portugal, Spain, Greece and Italy. Although it is sometimes noted that there are important differences inside this group,[3] they also display many resemblances, as mentioned in the Introduction. France is occasionally classified as Southern European, as it is a Latin, Catholic country. For

[2] We are aware that, although "assuming that the disturbances are distributed tri-variate normal is enough to identify the model, and it is not strictly necessary to have the presence of a regressor in the labour market status equation that does not directly affect the fertility decision" (Alba et al. 2009, p. 9), we would have a stronger guarantee of the identification of the model if we included a variable that determines the use of grandparental childcare services, but does not affect whether or not the mother works. Unfortunately, our database is rich in information about the respondent, i.e. the mother, but not about the grandparents. We tried some alternatives, but none proved to be a good instrument. We consider that, since our database is nevertheless unique in the context of our problem, the lack of instruments should not hamper the progress of the work.

[3] For instance, Portugal has a considerably higher rate of female labor market participation and Italy has higher social security transfers as a percentage of GDP. It is argued that Northern Italy and Northern Spain have more in common with Continental Europe (Andreotti et al. 2001).

instance, Leibfreid (1992) includes France in the "Latin Rim" group. Also, in a cluster analysis of defamilialization in 21 countries, Bambra (2007) finds that France and Portugal belong to the same cluster, whereas Spain and Greece belong to another cluster (when four clusters are considered), and that they all belong to the same cluster when five clusters are considered. Assous and Ralle (2000) identify three types of institutional systems and have included France in the group of countries where the institutional system for the protection of the dependent elderly follows a logic of social assistance, along with the other Southern European countries.

We are aware that France has stronger family policies than the rest of the countries considered and that it is not a typically strong-family country. Nevertheless, it is also not a weak-family country: Reher (1998) acknowledges that France does not fit easily into either system – strong family or weak family.

The models based on data from the five countries use files surveying 9456 individuals, but we selected only women with at least one child up to 6 years of age, since, on the one hand, we are focusing on mothers and, on the other hand, the benefits of informal care are assumed to be greater for younger children. Therefore, the number of individuals was reduced to 577. Of these, some are missing information in relation to certain variables, and therefore the largest number of observations that could be used for estimation purposes was 440. We also estimated versions of the model with subsets of these countries, some of them being cases in which France is not included.

The explanatory variables used in the estimation are consistent with the theoretical model presented in Section 1.

Data on the **regional female rate of unemployment**, at NUTS 2, is taken from Eurostat. Most of the other explanatory variables are the authors' own calculations, based on data drawn from the European Social Survey (ESS). Although this variable was not explicitly suggested by the theoretical model, it is included as a control variable, since it is potentially important in explaining the labor status of women.

When the household's income is higher, there is less need for the mother to work. However, the household's income also depends on the income earned by the mother, so there is a problem of endogeneity. To avoid this, we construct the variable **household income minus the mother's** in the following way. In the ESS, the

household income is provided by categories. There is a variable consisting of the proportion of household income that is provided by the respondent, also given by categories.[4] We combined information from both variables in order to obtain a new variable with six categories. Further details about this will be supplied on request.

When the income variable is used in explaining childcare provided by grandparents, **total household income** is considered.

The **age** of the mother (like that of the other household members) is obtained using the variables "year of birth" and "year of the interview", which are given in the survey. The range is wide: from 19 to 59. The 59-year-old is a Greek mother of a four-year-old child. This is possible because children may be adopted or fostered.

In the survey, education is divided into levels from zero to six.[5] We regroup these into only four levels, using the zero category as the reference category. Therefore, we have **edu12**, **edu34**, and **edu56**. The education of the mother is a proxy for her wage rate, although it can also affect her subjective preferences for one type of childcare or another.

The **number of siblings** under 12 years old and the **age of the youngest child** are also obtained by calculation. Firstly, in each household we identify the individuals who are children, and then we make the correspondence with their age. The two variables are obtained in this way.

The dummy expressing co-residence with a **partner** is obtained directly from the survey. The presence of a husband may indicate an alternative to the income obtained by the mother and create opportunities for specialization.

The dummy expressing the existence of a caring grandparent, **Gpcaring**, is obtained from a variable that identifies households where care for the youngest child by someone other than the mother or partner is provided by the child's grandparent. This is unique information and unfortunately it is only available in this wave of the ESS. The information includes both grandmothers and grandfathers. Although grandmothers are

[4] 1 = "None", 2 = "Very small", 3 = "Under half", 4 = "About half", 5 = "Over half", 6 = "Very large", 7 = "All".

[5] 0 = "Has not completed primary education", 1 = "Primary or first stage of basic education", 2 = "Lower secondary or second stage of basic education", 3 = "Upper secondary education", 4 = "Post-secondary, non-tertiary education", 5 = "First stage of tertiary education", 6 = "Second stage of tertiary education".

much more likely to be carers, grandfathers also provide childcare, a fact which should not be overlooked. (Guzman 2004).

Dummies for **countries** have Portugal as the reference category.

Carecost is the average cost of formal childcare in each country. The source of these values is Bradshaw and Finch (2002), Table 5.4. Since it is a variable that has a different value for each country when carecost is included, the dummies for the countries are removed, to avoid multicollinearity. In order to have an idea of the range of diversity between situations, it is useful to know that costs in Portugal are 98% of the standard deviation below the average, France and Italy are 62% of the standard deviation below the average, Greece is 55% and Spain is 46% of the standard deviation below the average. The average refers to the 22 countries considered in that study, which also included non-European developed countries.

The dummy indicating that **both** of the mother's **parents** were **born in the country** is intended to capture cultural specificities. In the survey, there are two variables, each indicating whether the mother or the father of the mother were born in the country of the mother's present residence.

The existence of a grandparent in the household, indicated by **Co-resident grandparent,** had to be calculated, using the information available about the relationship of each household member with the respondent (mother).

The variables "regional female rate of unemployment", "household income minus the mother's", "age", "age of youngest child", "partner", "number of siblings", education dummies, country dummies and "gpcaring" are used in the labor status equations. The variables "Coresident grandparent", "number of siblings", "both parents born in country", "cost of formal care", "household total net income", "age of youngest child" and country dummies are used in the gpcaring equation. Since the cost of formal care is measured at the national level, whenever this variable is used, country dummies are removed.

Data are weighted. The appropriate weights are the product of population size weights and design weights. Please see: http://ess.nsd.uib.no/files/WeightingESS.pdf for details.

Summary statistics of the variables are presented in Table 1.

Empirical results

Although the inclusion of France has the advantage of enlarging the number of observations, we suspected that it might weaken the effect of using childcare provided by grandparents on the probability of the mother working, since, according to Lewis, Campbell and Huerta (2008), grandparental care is a highly significant source of childcare in all the countries considered, except in France. However, no such weakening occurs.

We estimated several versions of the switching probit, but in almost all cases where conversion was obtained, the correlation coefficients (rhos) were not significantly different from zero. This means that there are no unobserved factors that justify the labor market behaviors of mothers and simultaneously the use of childcare provided by grandparents, allowing for differences between those using and those not using such childcare. We tried the bivariate probit, but once again the correlation coefficient was not significant, denoting the inexistence of unobserved factors affecting both the labor market status and the use of childcare provided by grandparents. Therefore, we conclude that there is no evidence that childcare provided by grandparents is endogenous to the labor market status. In this case, it is correct to estimate the univariate probit. Nevertheless, the more complex probits provide additional information: they help us to understand the determinants of childcare provided by grandparents, and, in the case of the switching probit, it is possible to identify factors that differently influence the labor market behavior of those mothers who use GPcaring and those who do not. The number of versions of models that we estimated is far too large for us to present all their results here. We have switching probits, bivariate probits and univariate probits. For each case, we used four samples (five countries, four countries excluding Italy, four countries excluding France, and three countries excluding Italy and France). Each model type/sample combination was also estimated with participation in the labor market and with work as the dependent variable for labor

market status. Women are said to be participating in the labor market if they are working or actively looking for a job.

Although the influence of some variables and the importance of GPcaring may differ, depending on the version of the model that we are observing, some results are remarkably persistent. We choose to present only the best estimated models (according to the Akaike Information Criterion), using data for the five countries and work as the labor market status variable. In Table 2, we present the estimated switching probit, in Table 3 the estimated bivariate probit, and in Table 4 the univariate probit. Nevertheless, in our discussion of the results, we also take into account the best models of the other versions.

All models passed the Wald tests for joint significance of the explanatory variables. We re-estimated the univariate probits including the square of the estimated prediction in the controls. As we had expected, this was never statistically significant.

The main aim of this study was to establish whether having a grandparent who takes care of the children facilitates the mother's presence in the labor market. We found some evidence that grandparents are important in this respect, although the result depends on the dependent variable, the sample and the type of model that are adopted.

The effects are seldom significant when the dependent variable is participation, but are generally significant when the dependent variable is work.

The effect of GPcaring on the probability of the mother working, using the switching probits, is obtained via the Average Treatment Effect (ATE) and the Effect of Treatment on the Treated (ETT). The ATE is the average effect on the probability of the mother of a young child randomly selected from the population working. The obtained values are between 0.340 and 0.535, depending on the countries considered in the sample. This means that a randomly-selected mother could have approximately a 50% higher probability of working if she has a grandparent caring for her youngest child.

The ETT is similar, but instead of considering a randomly-selected mother, the focus shifts to mothers who actually make use of the care provided by a grandparent. We obtain values between 0.549 and 0.853, which means that those mothers who use

GPcaring are indeed much more likely to work than if they did not use this form of care.[6]

Based on bivariate probits, the estimated coefficients for GPcaring are quite significant, the marginal effects of GPcaring on work being between 0.127 and 0.135, while those of the ATE are between 0.085 and 0.148. This means that using grandparental care as the main type of childcare for the youngest child predicts an increase in the probability of a randomly-selected mother working by about 10% relative to her probability of working if that was not the chosen type of childcare.

Using the univariate probits, the estimated coefficients for GPcaring and the marginal effects are almost always significant, the exception being when the sample excludes France. These effects are between 0.113 and 0.206.

The difference in the dimension of the effects using the switching probits and the other models is rather large. However, this is not uncommon; see, for instance Damrongplasit, Hsiao and Zhao (2010).

The regional level of female unemployment is highly significant. The higher the unemployment rate, the less mothers work or actively look for jobs.

The influence of the household's income, excluding the part provided by the mother, is also very important. A higher income allows for higher levels of stay-at-home mothers, which is consistent with the theoretical framework.

The level of education has a significant influence on the labor market outcome: the higher the level of education, the more mothers are to be found working or looking for a job, which was to be expected, since the opportunity cost of staying at home and looking after their children is higher. The switching probits indicate that the level of education is more important to those mothers who receive no childcare support from grandparents. This is consistent with the behavior portrayed in the theoretical section: mothers with lower education levels were expected to work less, because the lower wages would be insufficient to compensate for such costs as the payment of formal full-time childcare. The availability of GPcaring would make work compensatory even for

[6] See Krueger et al. (2004) for further details of the calculation of treatment effects based on the estimation of a switching probit.

these less educated mothers, and therefore the education level would be less important for the labor market status of mothers using grandparental childcare.

Whether the mother lives with a partner or not, the number of siblings aged under 12 in the household and the age of the youngest are significant in some models, but not in others. In those cases in which they are significant, the direction of the effects is always the same.

The greater the number of other young children in the household, the lower the probability of a mother being in the labor market, which is in line with our theoretical framework. It also has a negative effect on the probability of there being a grandparent taking care of the youngest child. This may be because taking care of one child would imply taking care of several, and this could place too heavy a burden on the grandparent; it could also mean that grandparents are more interested in taking care of first-born grandchildren, when they themselves are also younger.

Women living with a partner tend to work more and generally participate more in the labor market. Nevertheless, there is no evidence that grandparents have more responsibility in the care of children when the mothers have no partner, contrary to what might be expected.

The older the youngest child, the higher the probability of the mother's participation in the labor market. The age of the youngest child is never significant in models of work, but it is generally very significant in models of labor market participation. This suggests that when children begin to grow older, mothers wish to return to work, but may be unsuccessful in obtaining a job. Contrary to expectations, the age of the youngest child does not seem to affect the probability of using grandparental childcare.

Age is seldom significant. This may be partly explained by the fact that we only selected mothers who had at least one child up to 6 years old, which would limit the age range. Quadratic age was also tried, with no different result. Age appears significant only in some switching probits, and in this case, it has a negative sign for mothers who benefit from grandparental childcare and a positive sign for those who do not.

With few exceptions, mothers with both their parents already born in the country where they live significantly use more grandparental childcare. The same is true for co-resident grandparents: they tend to increase the probability of childcare being provided by grandparents. Moreover, co-residence with grandparents is a common phenomenon, for example in Portugal (Albuquerque 2008). Grandparental childcare does not seem to be affected by the income of the household. Households with lower incomes do not use this type of childcare more than those with higher incomes. Furthermore, the cost of formal childcare is almost never relevant in explaining the decision to use childcare provided by grandparents, but when there is a significant effect, it is positive, as would be expected: the higher the cost, the higher the probability of childcare being provided by a grandparent.

Discussion and conclusions

This research contributes to the literature on women's reconciliation of work and family life by examining the effect of the use of childcare provided by a grandparent on the probability of a mother of young children working.

We found that a mother of a child up to six years of age has a higher probability of working if she lives in a region with a lower unemployment rate, lives with a partner, especially one with low income, has a smaller number of children, has a higher level of education and makes use of the help provided by a grandparent to take care of the youngest child.

The ageing of the population has brought with it an increase in dependency ratios, which has, in turn, given rise to a demand for employment on the part of segments of the population that have smaller rates of activity, i.e. women and the elderly. The Lisbon Strategy has set goals in this area: an overall employment rate of 70% by 2010, an employment rate for women of over 60%, and an employment rate of 50% among older workers. However, if these targets are met, they are likely to have ramifications for grandparental childcare. If the provision of care by grandparents, especially by grandmothers, has a notable impact on the labor supply of mothers of young children, then raising the age of retirement may have the effect of decreasing the

activity rates of women. In this study, we have investigated whether the provision of care by grandparents has any significant impact on the labor-market participation of mothers of children up to six years of age in Southern European countries, and we find evidence of this effect.

We have used information on the provision of childcare by grandparents in general, and not merely co-resident grandparents, which is a further asset of our analysis. We have only considered those situations in which the main care received by a child, other than parental care, is that which is provided by grandparents. Nevertheless, this underestimates the total provision of care by grandparents, since this may not be the main source of care, but may serve as a complementary, although essential form of care. Consequently, we would expect the effect to be greater if we could account for all the care provided by grandparents.

Policymakers should therefore be aware of this dual effect of people retiring at a later date, especially women.

Finally, we stress the need for national surveys to include questions about grandparent-grandchild relationships and care responsibilities as a matter of routine. Future research can advance our findings if it is based on a data set that allows for the inclusion of an instrumental variable to better guarantee the identification of the model, and if there is information about the availability of a grandparent to provide childcare.

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Table 1 – Descriptive statistics of the variables (pooled data for the 5 countries)

	Mean	Std. Dev.	Min.	Max.
regional female unemployment.	12.04	4.49	4.30	28.00
household income minus the mother's (cat.)	4.16	1.66	1	6
total household income (cat.)	6.01	2.16	1	12
age	33.33	5.58	19	59
coresident grandparent	0.07	0.25	0	1
both parents born in country	0.85	0.36	0	1
nr of siblings	0.69	0.76	0	5
age of youngest child	2.98	1.93	0	6
Partner	0.89	0.32	0	1
GPcaring	0.26	0.44	0	1
participation in labor market	0.67	0.47	0	1
work	0.62	0.49	0	1
edu12		36.14%		
edu34		35.45%		
edu56		25.68%		

Table 2 – Switching Probit for Work – 5 countries

	Coefficient	P-value
Dependent variable: GPcaring		
household total net income	0.008	0.898
coresident GP	0.668	0.044
nr of siblings	-0.429	0.000
age of youngest child	0.012	0.825
GR	0.374	0.115
ES	0.328	0.241
FR	-0.378	0.185
IT	1.196	0.000
constant	-0.675	0.044
Dependent var.: Work, if GPcaring = 0		
regional female unemployment	-0.112	0.007
household income minus the mother's	-0.142	0.040
age	0.042	0.009
edu12	0.348	0.485
edu34	0.863	0.120
edu56	0.964	0.105
GR	-0.260	0.435
ES	0.690	0.099
FR	0.758	0.002
IT	-0.079	0.896
constant	-0.580	0.456

	Coefficient	P-value
Dependent var.: Work, if GPcaring = 1		
regional female unemployment	-0.128	0.003
household income minus the mother's	-0.133	0.437
age	-0.091	0.017
edu12	-1.530	0.145
edu34	-0.764	0.458
edu56	0.723	0.509
GR	-0.372	0.480
ES	0.217	0.724
FR	-0.270	0.737
IT	-1.408	0.018
constant	7.294	0.000
ρ0u	-0.676	0.133
ρ1u	-0.180	0.718
Average Treatment Effect	0.468	0.001
Treatment on the Treated	0.751	0.001
Nr. of observations	427	
Wald Chi2	57.23	Prob>chi2=0.000

Note.- Robust standard errors.

Table 3 – Bivariate Probit for Work – 5 countries

	Coefficient	P-value	Marginal effect
Dependent variable: GPcaring			
cost of formal care	0.010	0.074	0.001
coresident GP	0.931	0.009	0.211
nr. of siblings	-0.414	0.000	-0.060
both parents born in country	0.711	0.009	0.072
constant	-2.892	0.006	
Dependent variable: Work			
regional female unemployment	-0.100	0.001	-0.010
household income minus the mother's	-0.183	0.006	-0.018
age of youngest child	0.041	0.297	0.004
partner	0.643	0.037	0.051
GPcaring	1.326	0.003	0.127
edu12	0.169	0.708	0.017
edu34	0.732	0.126	0.072
edu56	0.994	0.047	0.097
GR	-0.246	0.368	-0.022
ES	0.431	0.219	0.043
FR	0.446	0.042	0.042
IT	-0.284	0.391	-0.026
constant	0.543	0.342	
ρ	-0.725	0.930	
Average Treatment Effect	0.085	0.090	
Nr. Observations	440		
Wald Chi2	148.82	Prob>chi2= 0.000	

Note.- Robust standard errors.

Table 4 – Simple Probit for Work– 5 countries

	Coefficient	P-value	Marginal effect
Dependent variable: Work			
household income minus the mother's	-0.209	0.003	-0.073
age of youngest child	0.010	0.842	0.004
nr of siblings	-0.243	0.025	-0.086
age	0.025	0.159	0.009
regional female unemployment	-0.114	0.000	-0.040
partner	0.752	0.028	0.288
GPcaring	0.365	0.097	0.122
edu12	0.352	0.453	0.119
edu34	0.898	0.061	0.286
edu56	1.162	0.017	0.352
GR	-0.190	0.536	-0.070
ES	0.576	0.106	0.184
FR	0.527	0.034	0.185
IT	-0.258	0.508	-0.095
constant	0.176	0.824	
Nr. of observations	440		
Wald Chi2	79.53	Prob > chi2 = 0.0000	
Pseudo R2	0.2095		

Note.- Robust standard errors.