Your Job or Your Folks? Working and Caring for Elderly Parents in Europe[*]

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Abstract

This paper analyzes the interaction between labor supply decisions and the provision of care to elderly parents by working-age individuals in Europe. Using a sample assembled from European survey data, first I document the existence of differences in employment status between people who provide care and those who do not. In the second place, I estimate the effect of informal care provision on employment and hours worked through several reduced-form specifications. Depending on the specification, this effect is negative and small, or not statistically different from zero. Next, I build a static structural model which characterizes the trade-offs in terms of time allocation and care arrangements faced by a working-age individual with an elderly parent. Finally, I use the estimated model to simulate the reactions of agents in several policy experiments.

Keywords: elderly care, informal care, SHARE.
JEL Codes: D64, J14, J22.

I. Introduction

The age structure of the population in Europe is expected to change dramatically in the years to come. As a consequence of the large baby-boomer cohorts reaching retirement age, the continued increase in longevity, and the low fertility rate over the last four decades, the ratio of people aged 65 or above to those aged 15 to 64 is increasing significantly. Having raised from 25% to 29.6% between 2010 and 2016 in the European Union, this ratio is projected to rise up to 51.2% in 2070, moving from four working-age individuals per person older than 65 in 2010 to around two working-age persons at the end of the forecast horizon (European Commission, 2018).

Among the many implications of this demographic shift for the economy, the debates on the future sustainability of public pensions and health care systems have extended to the discussion on how to provide elderly care. Elderly care can be defined as the set of activities that aim to give the best possible quality of life to older adults who are not fully able to look after themselves because of terminal illness or permanent physical and cognitive decline. This includes assistance with activities of daily living (ADLs) such as dressing, bathing, grooming, using the toilet, eating, and getting in and out of bed; and support to perform instrumental activities of daily living (IADLs) such as shopping, cooking, managing medications, doing housework, and settling financial or legal matters (Clancy et al., 2019). Elderly care is said to be *formal* if it is provided by means of paid, professional services in nursing homes or in the residence of the care recipient, and *informal* otherwise. Spouses, children, relatives and friends of care recipients are the usual sources of the latter.

The increasing demand for elderly care arising from population aging will likely put a strain on the existing institutions in charge of the provision of these services. At the household level, these trends might have broad effects on the way in which families meet the needs of their elderly members. On the one hand, resorting to informal care may imply significant costs in terms of health, leisure or labor force participation for caregivers, given the high time commitment that caring activities entail. On the other hand, the purchase of formal care services places a burden on household finances, what may distort consumption and saving behavior. These costs are in conflict with the willingness to provide care out of altruism or the need to fulfill a moral obligation towards your loved ones, and should be accounted for in any discussion about to what extent elderly care should be provided by private entities in the market or by publicly-funded support programs. Thus, it is of interest of policymakers to understand the role of elderly care in household decision-making.

In this context, the aim of this project is to study how the provision of care to elderly parents affects the labor supply decisions made by working-age individuals.

I carry out this task using data from the second wave of the Survey of Health, Aging and Retirement in Europe (SHARE), a cross-national database which collects the details about the living arrangements of people aged 50 and older in a set of European countries. In the first place, I take advantage of the information in the database to describe the prevalence of formal and informal care services across Europe, and to compare the employment status of people who provide informal care with those who do not. This preliminary analysis uncovers several facts which suggest the existence of a negative relation between taking care of elderly parents and labor supply, although this link seems to be stronger in Southern Europe than in the rest of the continent.

Secondly, I inspect the existence of that link in more detail by specifying a linear model where labor market outcomes are assumed to be explained by the provision of informal care. I compare the results of this exercise under two alternative scenarios, one where informal care and employment decisions are assumed to be exogenous, and another one where I contemplate the possibility that the error term is correlated with informal care. Depending on the specification, the effect that I find on the employment rate and the number of hours worked is negative and small, or not statistically different from zero.

Later, I study care and work choices jointly in a static structural model. In my setup, a working-age individual is assumed to maximize utility, defined over consumption, leisure, and the amount of care received by her parent, subject to budget, time, and care requirements constraints. This agent faces a number of trade-offs involving the allocation of time to leisure, hours worked and informal care, along with the choice between formal and informal care to meet her parent's needs. The parameter estimates of the model enable me to perform a couple of policy experiments with which I am able to examine how agents modify their behavior under events such as a change in non-labor income or in the price of formal care services.

The rest of the paper is organized as follows. Section II discusses the relevant literature on the labor market outcomes of elderly care. Section III presents the database. Section IV outlines the reduced-form analysis. Section V presents the model. Section VI shows the simulation results of two policy experiments. Section VII concludes.

II. Related literature

Economists have long been interested in the labor market outcomes of caring for elderly parents. Carmichael and Charles (1998) distinguish several channels through

which informal care can influence labor supply decisions. First, because of time constraints, caring commitments may lead individuals to substitute hours of paid work for hours of care. Second, care activities could make workers less productive because of higher job absenteeism and sickness rates, and curb their opportunities to opt for job positions at the level of skill and responsibility appropriate to their experience. As a consequence, they can end up having lower labor earnings than otherwise similar non-caregivers, what might become a reason to work fewer hours or stop labor force participation. Third, there might be an income effect motivating individuals to increase their labor supply to cover the expenses derived from elderly care. Finally, caregivers might want to take at least some hours of paid work in order to have a respite from caring activities, given the physical and psychological demands associated with caring for highly dependent people.

Concerning methodology, the main challenge in addressing this topic is the potential endogeneity of elderly care to labor supply decisions. The distribution of time between the two can be thought of as the outcome of a decision-making process which is influenced by further elements, such as the availability of formal care alternatives or the presence of other caregivers among family and friends. Apart from that, there might be individual unobserved characteristics which are correlated with the propensity to work and the propensity to give care.

Some studies do not tackle any of these problems, and assume that participation in caring activities is exogenous to work decisions. These studies usually assume that the allocation of time to elderly care does not depend on external circumstances surrounding the caregiver, such as the employment status, childcare responsibilities or the presence of siblings. They also assume that informal care cannot be replaced with formal care, and that the elderly have a certain demand for informal care which cannot be unmet. Consequently, adult children would take the amount of informal care which must be provided as given, and would allocate the remaining time in an optimal manner. Among the studies in this group, we can find, for example, the work by Carmichael and Charles (1998, 2003). These authors investigate the relationship between labor force participation and informal care, using cross-sectional data from the British General Household Survey. They conclude that giving informal care reduces the probability of being employed and the number of hours worked.

Other studies obtain more robust results by using instruments of informal care, such as the health status of the caregiver's parents, distance to parental residence, and the number of siblings of the caregiver. With the exception of Wolf and Soldo (1994), who find no statistically significant effect of informal care on labor supply for the US, the authors who follow this strategy agree that caring for elderly parents

gives place to high labor opportunity costs, especially for women, who often act as the main source of informal care. In contrast to Wolf and Soldo (1994), Ettner (1995, 1996) detects a lower labor force participation among women in the US who take care of parents living in the same household (co-residential care), and a reduction in the number of hours of care when parents and children do not share residence.

Authors who work with European data achieve similar results. For instance, Bolin et al. (2008) use a cross-section of SHARE and find that caring for the elderly is associated with costs in terms of foregone labor market opportunities. Spiess and Schneider (2003) work with three waves of the European Community Household Panel and show that in Mediterranean countries the number of hours worked is affected by the continuation of care provision, while for the rest of countries only the beginning of the care episode matters. Michaud et al. (2010) account for reverse causality between labor supply and informal care, pointing out a lower labor force participation of women and men in the event of co-residential care. The first part of this papertation is related to this group of studies. In trying to estimate the effect of two measures of informal care on employment and hours worked, I run several linear regression models and compare the outcomes obtained under the assumption of exogeneity with the ones under endogeneity.

The second part of this project is closer to the approach followed by authors like Hoerger et al. (1996, 1997), Pezzin and Schone (1999), Van Houtven and Norton (2004), Byrne et al. (2009), or Crespo and Mira (2014), who propose to study labor supply and informal care decisions jointly in a structural framework. In these studies, work and informal care are often modeled as the outcomes of a bargaining process among parents and children, or among siblings facing elderly care responsibilities, acting cooperatively or non-cooperatively. I abstract from the interaction between several family members by modeling the behavior of a working-age individual without siblings who maximizes utility and allocates her time to work, leisure, and care for her parent. In this way, I can concentrate on the child's preferences for elderly care, without having to deal with the complexity brought by interactions with other relatives.

III. Data

In this papertation, I use data from the Survey of Health, Aging and Retirement in Europe (SHARE). This is a longitudinal, cross-national database which collects detailed information about the living conditions of about 140,000 respondents aged 50 and older in 27 European countries. The seven biennial waves of SHARE which are currently available inform about demographics, labor status, physical and men-

tal health, social support, housing, income and consumption at the individual and household level.

I target those respondents who are younger than 65, have not retired yet, and have at least one parent alive, so that they can face the trade-off between work and care for their elderly parents. There are two possible ways of using the information provided by SHARE to study this group of individuals. One is to focus on the potential caregivers, that is, respondents who are younger than 65 who provide information about their parents. The other is to concentrate on the potential care recipients, elderly parents who give information about their children. I use the first of these samples, since it allows to know more details about the characteristics of the potential caregivers, who are the decision-makers in my analysis. This sample also offers some information on the age, health status and closeness of residence of the parents of the potential caregivers.

A. Elderly care

In my sample, I distinguish between informal care and formal care. An individual is considered to provide informal care if in the last twelve months she helped at least one of her parents with personal care (dressing, bathing or showering, eating, getting in or out of bed, using the toilet), practical household help (home repairs, gardening, transportation, shopping, household chores), or help with paperwork (filling out forms, settling financial or legal matters). I focus on care provided to parents by individuals aged 50 and older, since these constitute the most common source of informal care received by the elderly[1] (see Figure B1). Apart from the event of having provided some care, I keep record of the number of hours of care which the respondents give weekly (see Appendix A for more details). Because of the lack of information about the amount of time which respondents spend taking care of their parents after the second wave of SHARE, my analysis is restricted to the sample of individuals interviewed for Wave 2 between 2006 and 2007.

The measures of informal care that I use only comprise care given to parents who live outside the household. In the survey, respondents are also asked whether there is someone living in their household to whom they have helped regularly in the last twelve months with personal care, but there is no information about the number of hours which they spend on it. In any case, the exclusion of co-residential care should not represent a major limitation, since only 1.1% of individuals in the

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[1]The choice of the group of individuals aged 50 and older as the target of study is also justified by the fact that the average difference between the age of parents and children in the second wave of SHARE is 26.9 years. Besides, 64.3% of the individuals who report receiving care from their children are older than 75 (see Figure B2).

sample report to have provided some.

Regarding formal care, in my sample this concept is defined as care in the form of professional or paid nursing home, personal care, help with domestic tasks and meals-on-wheels at home. I check whether the parents of the respondents received this kind of care, as well as for how many hours a week, and how much they paid out-of-pocket for these services. In SHARE, data on these variables are not referred to the parents of the respondents, but to respondents who demand this type of care to receive it themselves, so I use this information to impute a number of hours and expenditure on formal care for the parents of the respondents in my sample.[2]

TABLE 1: DESCRIPTIVE STATISTICS ON INFORMAL CARE GIVEN TO PARENTS. INDIVIDUALS YOUNGER THAN 65 WITH AT LEAST ONE PARENT ALIVE. SHARE WAVE 2

Country	Obs.	Being a caregiver (dummy)		Hours of informal care (weekly) > 0	
		Mean	Std. Dev.	Mean	Std. Dev.
Austria	90	0.28	0.45	10.32	10.90
Belgium	510	0.36	0.48	5.77	11.40
Denmark	422	0.39	0.49	2.01	2.35
France	238	0.19	0.39	5.58	9.48
Germany	401	0.29	0.45	8.43	20.34
Greece	561	0.16	0.37	12.17	20.04
Italy	337	0.26	0.44	11.85	16.38
Netherlands	404	0.38	0.49	4.42	8.68
Spain	274	0.15	0.35	15.40	17.63
Sweden	432	0.40	0.49	3.13	5.13
Switzerland	323	0.28	0.45	4.46	10.27
Total	3,992	0.29	0.46	6.19	12.78

Table 1 presents descriptive statistics on care provided to elderly parents by the individuals in my sample. It shows that, while 29% of respondents with at least one parent alive give some informal care, the prevalence of these activities varies substantially across countries. As documented by Attias-Donfut et al. (2005), there seems to be a North-South gradient characterized by a large share of informal caregivers and a small amount of hours spent at giving care in northern countries (such as Sweden, with 40% of respondents giving some care at an average of 3.13 hours a week), and the opposite situation in southern countries (like Spain, with 15% of respondents being caregivers and an average of 15.4 hours of care a week).

Such heterogeneity in the use of informal care across Europe might be attributed

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[2]See Appendix A for a description of the procedure followed.

FIGURE 1: TYPE OF CARE RECEIVED BY INDIVIDUALS AGED 70 AND OVER. SHARE WAVE 2

Percent of respondents by region
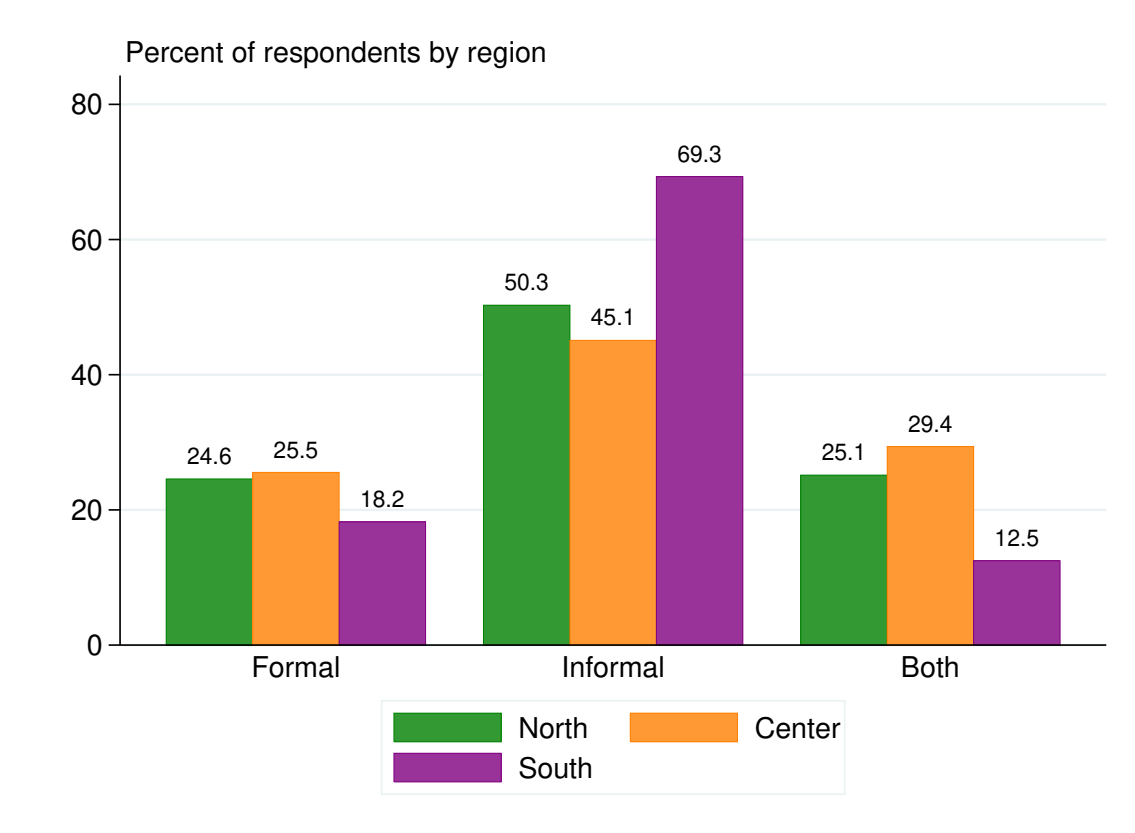
to differences in norms, traditions and preferences which reflect in institutional features, such as the availability of publicly-funded formal care services and long-term care benefits. In fact, northern countries exhibit the highest shares of public expenditure on long-term care over GDP (from 2.6% in Denmark and the Netherlands to 2.9% in Sweden, according to Eurostat), whereas the countries in the South devote less resources to it (from 0.1% in Greece to 0.9% in Italy). In consequence, there is a remarkable discrepancy across countries in the "care mix" selected to meet the needs of the elderly population. As Figure 1 points out, the use of informal care as the only means of help for the elderly is more extended in the South of Europe (69.3% of respondents) than in the North (50.3%), while the share of individuals receiving both types of care is larger in the latter group than in the former.

B. Employment

TABLE 2: DESCRIPTIVE STATISTICS ON EMPLOYMENT AND HOURS WORKED. INDIVIDUALS YOUNGER THAN 65 WITH AT LEAST ONE PARENT ALIVE. SHARE WAVE 2

Country	Obs.	Being employed (dummy)		Hours worked (weekly) > 0	
		Mean	Std. Dev.	Mean	Std. Dev.
Austria	90	0.74	0.44	39.58	12.76
Belgium	510	0.72	0.45	37.33	12.52
Denmark	422	0.91	0.28	37.64	9.37
France	238	0.84	0.37	39.56	10.66
Germany	401	0.75	0.43	37.34	13.24
Greece	561	0.64	0.48	43.67	15.36
Italy	337	0.61	0.49	38.21	13.63
Netherlands	404	0.77	0.42	32.49	13.02
Spain	274	0.57	0.50	41.40	12.96
Sweden	432	0.95	0.22	38.53	10.46
Switzerland	323	0.84	0.3	36.95	15.287
Total	3,992	0.76	0.43	38.22	12.97

I focus on two labor-market outcomes: being in paid employment and the number of hours worked weekly.[3] Table 2 presents descriptive statistics on these variables for individuals younger than 65 with at least one parent alive. 76% of individuals in the group under study reported being employed or self-employed at the time of the interview, a share that rises up to 95% in Sweden and goes down to 57% in Spain. Among the individuals who had a job, for whom the number of hours worked weekly

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[3]See Appendix A for more details about their definition.

was 38.2 on average, those living in southern countries like Spain were working over 41 hours a week, whereas in northern countries like Sweden this amount of time was around 38 hours.

With respect to the interaction between being a caregiver and working, it is relevant to know whether caregivers differ from non-caregivers in their employment rates and the amount of time they spend working. Panel A in Figure 2 compares the distribution of hours worked weekly across these two groups. The distribution is slightly shifted to the left for caregivers with respect to the one of non-caregivers, though the mass of people who are not employed is lower among caregivers.

In connection with the aforementioned heterogeneity in the use of informal care and formal care across Europe, it seems pertinent to ask whether the high reliability on informal care in southern countries entails higher labor opportunity costs in this area than in the North of the continent. Panels B, C and D in Figure 2 and Figure B3 would be consistent with this hypothesis. As can be seen in the latter, whereas there is little variation between the employment status of caregivers with respect to non-caregivers in northern and central countries, the share of non-employed people living in the South is 11% higher for caregivers than for non-caregivers. This increase seems to be associated with a reduction of almost the same size in the share of full-time employed people. When the same comparison is carried out while accounting for gender as well, women in the South are the ones suffering the largest increase in non-employment rates from being caregivers, while the largest loss in full-time employment is suffered by men living in the same area (see Figure B4).

In sum, the descriptive evidence shown in this section suggests that there could be a negative relationship between labor supply and elderly care activities, as well as differences in the strength of this link and the costs it implies for caregivers across Europe. Of course, these results are merely indicative. In the next sections, I adopt a more rigorous approach to investigate the way in which caring activities influence work decisions.

IV. Reduced-form analysis

In this section, I explore the relevance of informal care provision as a factor explaining work decisions. For this purpose, I estimate linear regression models[4] where labor market outcomes are assumed to be a function of parental care, socio-economic and

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[4]Although the analysis of binary outcomes such as being employed versus not being employed is usually carried out by discrete choice models (logit, probit, etc.), for the purpose of my study I rely on a linear probability model, since it can still serve as a guide to which regressors are statistically significant and the sign of their effects.

FIGURE 2: COMPARISON OF HOURS WORKED WEEKLY ACROSS COUNTRY GROUPS. NON-CAREGIVERS VS. CAREGIVERS. KERNEL DENSITY ESTIMATES. INDIVIDUALS YOUNGER THAN 65 WITH AT LEAST ONE PARENT ALIVE. SHARE WAVE 2
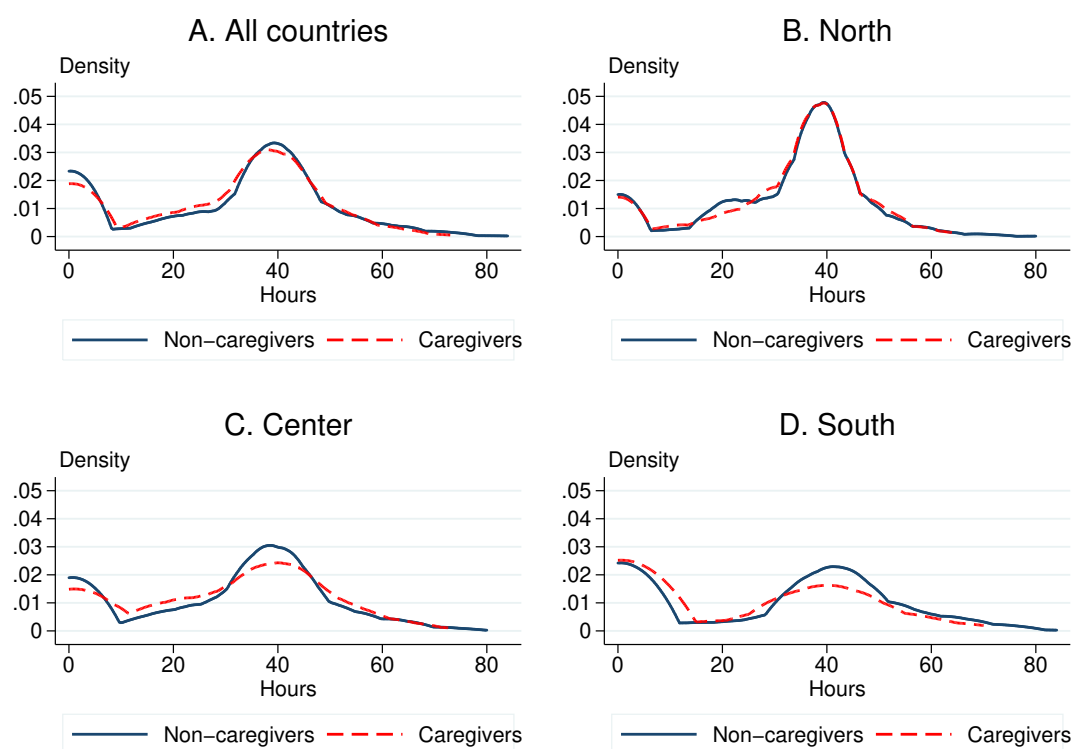
Note: The country groups represented are Northern Europe (Denmark, Netherlands and Sweden), Central Europe (Austria, Belgium, France, Germany and Switzerland) and Southern Europe (Greece, Italy and Spain).

demographic characteristics, and the institutional setting of the country of residence. Formally, I specify a relationship of the form

$$y_j = \alpha + \gamma i_j + x'_j \beta + \sum_k \delta_k c_j(k) + \epsilon_j, \tag{1}$$

where y_j is the labor market outcome of interest for individual j, α is a constant, i_j is a measure of informal care, x_j is a vector of socio-economic and demographic characteristics, $c_j(k)$ is a dummy[5] equal to 1 if j lives in country k, and ϵ_j is the error term. This specification is run for two dependent variables: a dummy which equals 1 if the individual is employed or self-employed at the time of the interview, and 0 otherwise; and the number of hours worked weekly. As for informal care, I use two different regressors: a dummy which equals 1 if the individual is a caregiver, that is, she gives some care to an elderly parent, and 0 otherwise; and the number of hours of informal care which the individual gave weekly. Thus, I analyze how work and care decisions interact at the extensive and intensive margins.

The resulting four specifications include a set of controls for socio-economic and demographic characteristics: age and its square, number of years of education, total household income, a dummy for being married, and a dummy which equals 1 if the individual is in bad health.[6] When estimation is performed on the whole sample, a dummy for women is included. The regressions are also run for men and women, and for northern, central and southern countries separately.

Later, I compare the results obtained by following the above strategy with the ones achieved if the assumption of exogeneity between informal care and work is relaxed. As was explained previously, there might be some unobservable elements generating some degree of correlation between informal care and the error term which results in biased and inconsistent estimates of the coefficients of the model. In order to deal with endogeneity, I instrument informal care by using a dummy which takes value 1 if the health of at least one of the parents of the respondent is bad, and another dummy which equals 1 if at least one of the parents lives less than 25 km away.[7] Both variables are supposed to be correlated with informal care, since worse parental health would increase the child's propensity to provide care, and similarly for a shorter distance between the residences of the parents and the child. Moreover, these variables should not affect labor market outcomes other than

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[5]"Living in Austria" is set as base category.

[6]See Table C1 for descriptive statistics on these variables.

[7]In the search for instruments, I also tried the number of siblings of the respondent and a dummy taking value 1 if the father and the mother of the respondent were deceased. After several trials with different combinations of the instruments, the one with parental health and distance to parental residence was selected based on strong instruments criteria.

through its effect on informal care. As under the assumption of exogeneity, four IV specifications are run for the whole sample, men and women, and each country pool separately.

A. Results

TABLE 3: REGRESSIONS OF BEING EMPLOYED AND HOURS WORKED ON INFORMAL CARE. INDIVIDUALS YOUNGER THAN 65. SHARE WAVE 2

		Being employed (dummy)			Hours worked (weekly)		
		All	Women	Men	All	Women	Men
Hours of	OLS	-0.002**	-0.002***	-0.002	-0.068**	-0.057**	-0.127
informal		(0.001)	(0.001)	(0.003)	(0.031)	(0.025)	(0.124)
care (weekly)	IV	0.009	0.003	0.011	0.304	0.129	0.270
		(0.007)	(0.008)	(0.012)	(0.301)	(0.296)	(0.591)
Being a	OLS	0.008	0.020	-0.004	0.369	1.219	-0.651
caregiver		(0.020)	(0.025)	(0.028)	(0.928)	(1.029)	(1.544)
(dummy)	IV	0.081	0.025	0.088	2.812	1.190	2.120
		(0.060)	(0.071)	(0.100)	(2.709)	(2.763)	(5.185)
	N	9,193	5,315	3,878	9,193	5,315	3,878

Note: Robust standard errors in parenthesis. (*) Significance at 10% level. (**) Significance at 5% level. (***) Significance at 1% level. See Tables C3 and C4 for more details.

Table 3 presents the results of the regressions of labor outcomes on informal care. Under the assumption of exogeneity, the number of hours of care has a negative, significant effect on the propensity to be employed and the number of hours worked in the whole sample and the subsample of women, though this effect is small: when the whole sample is considered, 10 more hours of care a week imply 0.68 hours worked less. The effect for men is not statistically different from zero at the 10% level. Meanwhile, when the dummy for giving some care to parents is used as a measure of informal care, the coefficient of this variable is not statistically different from zero in any of the samples.

In the IV specifications, the effect of informal care on labor outcomes is not statistically different from zero in any of the samples under study. This result does not seem to be driven by the choice of instruments, since the two that I use are both significant at the 5% level and have the expected positive impact on informal care (see Table C2). Except for the number of hours of informal care in the subsamples of men and women, the *F*-test of joint significance of these instruments in the first-stage regressions is above the usual threshold of 10 below which there would be a weak instruments problem (Staiger and Stock, 1997).

In sum, these results suggest that, if any, caring for elderly parents has a small, negative effect on labor supply decisions made by working-age individuals.

B. Results by country groups

Table 4 presents the results of estimating the linear regression model for each country pool. In line with the hypothesis that informal care might have a large impact on the labor supply of Southern European individuals, the OLS specification yields a negative, significant effect of informal care on employment and hours worked weekly in this subsample. Compared to the other regions, the impact of providing some care to parents on hours worked is relatively large in the South, where the decision to become a caregiver is associated with a reduction of 3.6 hours worked weekly. Furthermore, the consequences of informal care on labor supply are greater for women than for men, for whom the estimates are not significant. Nevertheless, as in Table 3, the IV estimates are not statistically different from zero in any of the samples of Southern Europe.

For Northern and Central Europe, the coefficient estimates are not significant either when informal care is instrumented. As for the results of the OLS regressions, except for the impact of being a caregiver on hours worked by women in Central Europe, informal care does not appear to have a significant effect on the work decisions made by middle-aged people in these country groups.

V. Structural model

A. Setup

This section describes a one-child-one-parent model to study the link between informal care and labor supply in a more structured setting than in the linear regressions discussed before. Building on the neoclassical labor-leisure model, I consider an agent (a working-age individual with an elderly parent) who maximizes a single-period utility function,

$$\max_{\{c,l,n,i,f\}} U(c,l) + \delta V(i,f), \qquad (2)$$

where c stands for consumption, l for leisure time, n for hours worked, i for hours of informal care given by the agent to her parent, and f for hours of formal care. The agent draws utility from consumption and leisure through function $U(.)$, as well as from the amount of care, informal and formal, which her parent receives through function $V(.)$. Both $U(.)$ and $V(.)$ are assumed to be continuous, twice continuously differentiable, strictly increasing and strictly concave. The degree to

TABLE 4: REGRESSIONS OF BEING EMPLOYED AND HOURS WORKED ON INFORMAL CARE. COMPARISON ACROSS COUNTRY GROUPS. INDIVIDUALS YOUNGER THAN 65. SHARE WAVE 2

		Being employed (dummy)			Hours worked (weekly)		
		All	Women	Men	All	Women	Men
		Norther Europe					
Hours of informal care (weekly)	OLS	-0.001	-0.000	0.003**	-0.070	-0.011	0.015
		(0.002)	(0.002)	(0.001)	(0.051)	(0.053)	(0.115)
	IV	0.023	0.037	-0.016	-0.036	0.426	-1.576
		(0.018)	(0.023)	(0.021)	(0.767)	(0.759)	(1.340)
Being a caregiver (dummy)	OLS	0.018	0.025	0.009	0.399	0.650	0.198
		(0.016)	(0.025)	(0.015)	(0.770)	(0.965)	(1.081)
	IV	0.061	0.100	-0.041	-0.313	0.941	-4.305
		(0.046)	(0.062)	(0.056)	(2.116)	(2.202)	(3.466)
	N	2,892	1,628	1,264	2,892	1,628	1,264
		Central Europe					
Hours of informal care (weekly)	OLS	-0.002	-0.001	-0.003	-0.062	-0.025	-0.173
		(0.001)	(0.001)	(0.004)	(0.062)	(0.058)	(0.171)
	IV	0.003	-0.000	0.004	0.057	0.179	-0.226
		(0.008)	(0.010)	(0.014)	(0.376)	(0.414)	(0.678)
Being a caregiver (dummy)	OLS	0.035	0.065*	-0.008	2.131	3.756**	-0.234
		(0.028)	(0.037)	(0.040)	(1.431)	(1.611)	(2.254)
	IV	0.029	-0.006	0.037	0.642	1.861	-2.325
		(0.083)	(0.103)	(0.136)	(3.788)	(4.041)	(6.888)
	N	3,122	1,792	1,330	3,122	1,792	1,330
		Southern Europe					
Hours of informal care (weekly)	OLS	-0.002**	-0.002***	-0.001	-0.065**	-0.079***	-0.054
		(0.001)	(0.001)	(0.004)	(0.033)	(0.025)	(0.224)
	IV	0.008	0.001	0.037	0.505	0.025	2.192
		(0.012)	(0.011)	(0.028)	(0.534)	(0.420)	(1.452)
Being a caregiver (dummy)	OLS	-0.062*	-0.059	-0.033	-3.599**	-2.862*	-3.544
		(0.038)	(0.045)	(0.062)	(1.583)	(1.586)	(3.221)
	IV	0.116	0.014	0.344	6.878	-0.231	20.222
		(0.129)	(0.136)	(0.255)	(5.846)	(5.180)	(13.655)
	N	2,701	1,635	1,066	2,701	1,635	1,066

Note: Robust standard errors in parenthesis. (*) Significance at 10% level. (**) Significance at 5% level. (***) Significance at 1% level. Northern Europe: Denmark, Netherlands and Sweden. Central Europe: Austria, Belgium, France, Germany and Switzerland. Southern Europe: Greece, Italy and Spain.

which the parent's welfare from receiving care matters to the agent depends on δ, a parameter which is assumed to take values between 0 and 1 and can be interpreted as a measure of altruism or the strength of the tie between the child and her parent.

The agent chooses her level of consumption, hours of formal care to buy in the market, and how to allocate her time to work, leisure and informal care. When making these decisions, the agent is constrained by the available monetary resources,

$$c + pf \leq y + wn, \tag{3}$$

where p is the price of one hour of formal care, w is the wage per hour worked, and y represents non-labor income. The price of the consumption good is normalized to 1.

The agent is also constrained by time. I assume that she has $\overline{h}$ hours available[8] to distribute among work, informal care, and leisure, which comprises all activities other than work and care for parents:

$$n + i + l = \overline{h}. \tag{4}$$

Besides, the parent has a certain amount of care requirements $\overline{q}$ which the agent must meet by giving care herself or by buying hours of care in the market:

$$i + f \geq \overline{q}. \tag{5}$$

The agent is allowed to choose a combination of the two types of care, and to provide more hours of care than needed, but not less than $\overline{q}$.

Therefore, the agent faces a number of trade-offs. For each hour worked in the labor market, she is paid a wage which can be used together with non-labor income to buy consumption goods. However, one additional hour worked also implies one hour less of leisure or informal care. If the agent is willing to provide one hour of care less to her parent, she might consider to substitute that hour of informal care for one of formal care. Nonetheless, the corresponding expenditure on formal care implies a reduction in the amount of resources to buy consumption goods, and so on.

The agent maximizes utility over c, l, n, i, and f. The first-order conditions

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[8]Eventually, the total amount of time available to the agent is assumed to be 168 hours, that is, a whole week.

associated to the optimization problem are

$$\frac{\partial U}{\partial c}w = \frac{\partial U}{\partial l} \tag{6}$$

$$\delta\frac{\partial V}{\partial i} + \lambda = \frac{\partial U}{\partial l} \tag{7}$$

$$\delta\frac{\partial V}{\partial f} + \lambda = p\frac{\partial U}{\partial c}, \tag{8}$$

where λ is the Lagrange multiplier of the care constraint. I am interested in the case where λ is equal to 0, and so the care constraint is not binding, since in the data the total amount of care is usually larger than the minimum required. If this is the case,

$$\delta = \frac{\partial U/\partial l}{\partial V/\partial i} \tag{9}$$

$$p = \delta\frac{\partial V/\partial f}{\partial U/\partial c}. \tag{10}$$

Thus, the agent provides informal care up to the point in which the marginal utility derived from it equals the marginal utility of leisure. Then, δ is equal to the marginal rate of substitution between informal care and leisure. Furthermore, the agent buys hours of formal care up to the point in which the marginal utility derived from it equals the marginal utility of consumption. Hence, the ratio of p to δ turns out to be equal to the marginal rate of substitution between consumption and formal care.

The combination of (6), (9), and (10) delivers an additional result,

$$\frac{w}{p} = \frac{\partial V/\partial i}{\partial V/\partial f}, \tag{11}$$

according to which, the ratio of the wage to the price of formal care equals the marginal rate of substitution between the two types of care.

B. Estimation

To work in the solution and estimation of the model, I assume that the objective function is log-linear, and set w, p, and δ as the parameters to estimate. Then, the

model which any agent j solves is

$$\max_{\{c_j, l_j, n_j, i_j, f_j\}} \log(c_j) + \log(l_j - \bar{l}) + \delta \left[\log \left(1 + i_j + f_j - \bar{q}_j \right) + \log(1 + i_j) \right]$$

$$\text{s.t.: } c_j + pf_j = y_j + wn_j$$

$$n_j + i_j + l_j = \bar{h}$$

$$i_j + f_j > \bar{q}_j, \tag{12}$$

where $\bar{l}$ represents a minimum amount of leisure which the agent must enjoy.[9] In this specification, the agent does not only draw utility from providing more care than required, but also from providing some care herself. Then, although one hour of informal care can satisfy the same needs that one hour of formal care,[10] the agent has some extra incentives to opt for the first alternative, maybe because her parent would prefer to receive the help needed from her child, or because the agent knows her parent's needs better than anyone else.[11]

As earlier explained, my sample contains data on hours worked, hours of care, and formal care expenditures, as well as on labor earnings, non-labor income, and hours of care required by parents. I estimate w, p and δ by GMM, using a set of moment conditions derived from the solution of the model:

$$y_j + wn_j - pf_j = w(\bar{h} - n_j - i_j - \bar{l}) \tag{13}$$

$$\frac{y_j + wn_j - pf_j}{\bar{h} - n_j - i_j - \bar{l}} = p \left(1 + \frac{1 + i_j + f_j - \bar{q}_j}{1 + i_j} \right) \tag{14}$$

$$\frac{1}{\bar{h} - n_j - i_j - \bar{l}} = \delta \left(\frac{1}{1 + i_j + f_j - \bar{q}_j} + \frac{1}{1 + i_j} \right). \tag{15}$$

Table 5 displays the parameter estimates for the whole sample and for women and men separately, while Table C7 does the same for the three country pools considered. The estimates are reasonable, ranging from 6.9 for w and 4.1 for p in the sample of women from Southern Europe, to 20.2 and 12 in the sample of Northern European

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[9]In order to achieve the best possible model fit with the data, the minimum leisure requirement is set to 88 hours weekly.

[10]Actually, in the literature it is not clearly established whether formal and informal care are substitutes or complements. In trying to answer this question, some authors have stressed the need to take into account the endogeneity between the two types of care, with the provision of informal care having an impact on the use of formal care. They conclude that informal care and formal care are substitutes (see for example Van Houtven and Norton (2004), and Bolin et al. (2008)), although the incentives to use one or the other depend on the institutional settings in place.

[11]This assumption would fit in with the notion of *procedural utility*, the idea that the agent does not only derive utility from the outcome of care, i.e., that her parent is properly cared for, but also from the *process* of caring for her parent. Prior studies have found evidence in support of this point (see for instance Brouwer et al. (2005)).

men.

The tables also report the results of the test of equality between women and men for each parameter. The fact that w and p take different values for women than for men does not necessarily mean that there exists wage or price discrimination in the sample. Rather, this discrepancy may come from the parametrization of the model. Apart from wages and prices of formal care, w and p may be capturing preference related aspects in the absence of more parameters in the utility function. Similarly, δ may be reflecting some additional information to family ties. Indeed, there are two aspects involved in the term of the objective function where this parameter is present: how much the agent values that her parent is well taken care of, and how much she values to give care herself. Perhaps, individuals in the sample appreciate the fact that their parents receive care, but not much being the providers of such care, or the other way round. This might be the reason why the estimate of δ is so low.

TABLE 5: ESTIMATES OF THE STRUCTURAL PARAMETERS. INDIVIDUALS YOUNGER THAN 65. SHARE WAVE 2

	All	Women	Men	Women = Men (χ^2)
w	12.960	10.916	16.522	26.56
	(0.617)	(0.909)	(0.597)	[0.000]
p	8.028	6.148	10.490	27.79
	(0.420)	(0.555)	(0.609)	[0.000]
δ	0.014	0.011	0.018	108.15
	(0.000)	(0.000)	(0.000)	[0.000]
N	8342	4862	3480	

Note: Robust standard errors in parenthesis. *P*-value of the test of equality of coefficients between women and men in square brackets.

To examine the model fit, I plug the parameter estimates into the model and compute predictions for hours worked, hours of informal care, and hours of formal care for each individual in my sample. Table C8 compares the predictions for individuals younger than 65 with the actual magnitudes in the data. Figure 3 concentrates on the distribution of hours worked weekly.

In general, the model overpredicts the employment rate and the share of part-time work, especially in Northern Europe, where the mode of the distribution of hours worked is not 40, as in the other two regions. The model also predicts that all individuals provide some amount of informal care to parents, but the low estimate of δ leads them to spend less hours taking care of them than that observed in the

sample. By contrast, the model slightly overpredicts the share of individuals who use formal care, whereas the number of hours chosen is close to that in the data. Therefore, in the environment described by this model, the agents' incentives to substitute hours worked for hours of informal care are not as strong as they seem to be in the sample.

FIGURE 3: COMPARISON OF HOURS WORKED WEEKLY ACROSS COUNTRY GROUPS. ACTUAL VS. PREDICTED. KERNEL DENSITY ESTIMATES. INDIVIDUALS YOUNGER THAN 65 WITH AT LEAST ONE PARENT ALIVE. SHARE WAVE 2
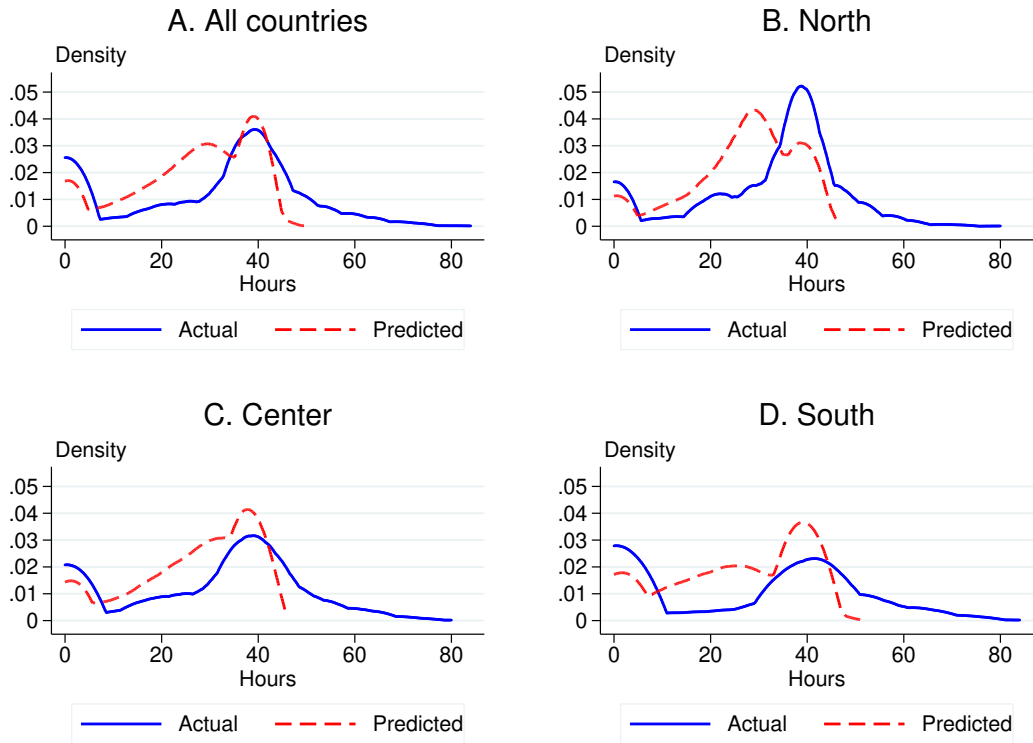
For a better understanding of the results, Figure B5 plots the predicted distribution of hours worked by women and men. Here we can see that the model finds the greatest difficulties at explaining the behavior of Northern European men. The predicted distribution of hours worked is shifted to the left for women and men, but for this group the probability mass accumulated around 40 hours is much higher in the data.

A closer examination of the parameters driving the predictions in the country groups is also convenient. Table C9 compares the predictions discussed above with the ones obtained under three counterfactuals: one in which the wage parameters

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of Central and Southern Europe take the same value than that of Northern Europe; another one in which, apart from w, p is made equal to the estimated price in the North; and another one in which also δ takes the same value in the three country pools. As the outcome of this exercise shows, the greatest differences between the baseline predictions and the counterfactuals emerge in the South and seem to be mostly explained by wage and formal care price differentials. For example, under the first counterfactual there is a 22.3% difference in hours worked with respect to the baseline prediction. This difference goes down to 21.9% after p is fixed in the second counterfactual, and decreases to 21.6% in the last one.

VI. Policy experiments

In the model discussed above, care and work are presented as two competing alternatives in the agent's time allocation problem. Once the minimum leisure and care requirements are met, one more hour of informal care for parents yields utility to the agent, but implies one hour less of paid work, and so a loss in terms of foregone wages. As a consequence, working-age individuals with elderly parents may struggle to combine their role as caregivers with work, giving place to an unsatisfactory distribution of time between these two activities. The willingness to help overcome this trouble has motivated the implementation of policies targeting family carers. As such, many countries have taken actions to reduce the dual pressure from work and care by introducing flexible work schedules, counseling services, or cash benefits for caregivers and care recipients (Colombo et al., 2011).

In this section, I use the model in Section V to study how government sponsored policies in support of elderly care might affect individual labor supply and care provision decisions. In particular, I evaluate the impact of two policies with the same total cost: a weekly €102.7 caregiver allowance for people whose parents need care, and a 80% discount in the price of formal care.[12]

A. Caregiver allowance

As a first policy experiment, I investigate how agents with parents in need of care would react if they were compensated for the potential costs of caring by means of a caregiver allowance. A caregiver allowance acknowledges that taking care of the elderly entails some costs for which caregivers should be compensated in reward for their effort and the social role they play. Countries where these payments to

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[12]Using the observations in my sample and the number of people which they represent according to sampling weights, the total cost of both policies would be €1.858 billion.

caregivers have been implemented exhibit a variety of compensations schemes and eligibility conditions (Colombo et al., 2011). For simplicity, here I simulate the effects of giving all individuals with parents in need of help a transfer of €102.7 a week. In this way, all potential caregivers are treated the same, so there might be cases in which this amount is not enough to cover all the costs of care provision, and others in which, by contrast, the allowance exceeds one's needs by far. Payment is made conditional upon the presence of a parent with help needs. Neither employment status, nor income, nor any other circumstances matter in this version of the policy.

Table C10 compares the outcomes of the allowance with the model predictions under no policy. With respect to the baseline, overall there is a slight decrease in the employment rate and the shares of formal and informal care users. At the same time, when the whole sample is considered, hours worked are reduced by 13% and hours of informal care rise by more than 6%. These effects are stronger in Southern Europe, where the decrease in hours worked doubles the one in the other regions, and the share of formal care users drops by 11% while it barely changes in Northern and Central Europe.

Therefore, this exercise suggests that, when potential caregivers are supported by an external source of non-labor income, they tend to reduce the amount of time spent at work and give some extra attention to parents, instead of using the money to buy more formal care. This underscores once again the conflict between work and family care responsibilities, along with the preference of the agents for informal care over formal care when additional monetary resources are made available to them.

B. Formal care price subsidy

An alternative to transfers paid directly to caregivers is to subsidize the price of formal care services. By doing so, instead of giving agents additional resources which they can freely allocate to satisfy their needs, the government can foster the substitution of informal care for formal care, and so help people not to give up work if they want to take care of their parents. The policy that I study in this section is a government-financed 80% discount in the price of formal care. I assume that this discount applies to all individuals in my sample, and so it is not contingent on individual circumstances such as income, employment status, or degree of disability of the parents.

Table C11 compares the outcomes of the subsidy with the predictions made in the baseline scenario. In contrast to the caregiver allowance, the price subsidy has a negligible effect on the employment rate and hours worked. The impact of the policy is concentrated on the choice of care arrangements. There happens to be a

76% reduction in the share of informal care users, and a 18% increase in the share of formal care users. In the intensive margin, we can appreciate a decrease of around 57% in the number of hours of informal care, whereas the amount of formal care is more than three times larger under the policy than in the baseline. The change of the status quo seems to be greater in Southern Europe, where the share of formal care users grows much more (59%) than in the other two regions, and the number of hours of formal care increases by 169%.

All in all, the policy evaluation exercises carried out in this section teach us two lessons: first, that work and informal care do compete as two alternative uses of time; and second, that depending on the targeted care mix, public authorities will be interested in implementing one particular policy or another. If they prefer informal caregivers to give as much care as possible, resources will be better transferred directly to them, so that they have incentives to replace hours worked with hours of informal care. If, on the contrary, the aim of policymakers is to help individuals not reduce their labor supply when facing care responsibilities, a formal care price subsidy can induce agents to substitute informal care for formal care services.

VII. Conclusion

This papertation studies the interaction between the decision to provide care to elderly parents and the employment status of middle-aged individuals, using the second wave of the Survey of Health, Aging and Retirement in Europe. The analysis of European data reveals the existence of remarkable differences across countries in the way in which elderly care needs are satisfied, with informal care being more prevalent in Southern Europe than in the rest of the continent. Such heterogeneity could have relevant implications for the labor market outcomes of elderly care in the regions under study. While there are little differences in this respect between caregivers and non-caregivers in Northern and Central Europe, caregivers from the South are 11% more likely to be non-employed than otherwise similar non-caregivers.

To inspect the relevance of informal care provision for labor supply decisions, I estimate linear regression models of labor market outcomes on informal care, controlling for socioeconomic and demographic characteristics, and institutional features of the country of residence. This exercise is first carried out under the hypothesis of exogeneity between work and informal care, and later assuming that they are endogenous. The results suggest that, if any, caring for elderly parents has a negative, small impact on the likelihood of being employed and the number of hours worked.

I further explore the link between labor supply and elderly care by specifying a one-child-one-parent static structural model. This model depicts a working-age

individual maximizing utility, defined over consumption, leisure, and the amount of care received by her parent, and subject to budget, time and care requirements constraints. I use the model to evaluate the effects of two policies in support of elderly care. I find that agents substitute hours of work for hours of informal care in response to increases in their non-labor income. By contrast, if the price of formal care falls while holding everything else constant, agents prefer to replace hours of informal care with formal care.

Although a simple framework like this is useful to understand the mechanisms behind working and caring decisions, it might be worth contemplating some extensions. Among them, it would interesting to take advantage of the degrees of freedom that are left in the model and work on a respecification with more parameters to deal with preference-related aspects in detail, or include other time allocation alternatives, such as housework. This might allow us to better describe differences across countries and between women and men, and so improve the model fit.

Furthermore, my model overlooks any aspect regarding dynamics. Dynamics may be important, because time away from the labor market to take care of parents can make it difficult to return to the labor force once the care episode has finished. On top of that, the opportunity costs of providing care may evolve over time, decreasing if the agent becomes more productive at these tasks because of learning, or increasing if the health of the parents deteriorates or the caregiver experiences burnout. A way to address this concerns could be to consider a dynamic structural model incorporating elements such as shocks to the parent's or the caregiver's health, human capital accumulation or depreciation, labor market frictions, and permanent unobserved heterogeneity. That would enable to examine the long-term effects of caring for parents on labor market outcomes, and perhaps extend the analysis to other issues such as savings and retirement.

Apart from that, in my model I dismiss any interaction among siblings or household members, which may have multiple implications. On the one hand, the individual care burden can be reduced in the presence of siblings if they share care responsibilities. On the other hand, each sibling may have incentives to free-ride on the effort exerted by the others and elude care duties. These problems could be approached in a game theoretic setting where each family member decides how to contribute to care for the elderly while anticipating the behavior of the others.

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A1. Hours of informal care given to parents

I obtain this information from the answers of the respondents to the question about the frequency with which they provided care in the last twelve months. They are able to choose among "almost every day", "almost every week", "almost every month" and "less often". Next, they are asked about the number of hours of care which they gave on a typical day/week/month or in the last twelve months. In order to obtain the equivalent amount of hours of care provided weekly, I multiply the number of hours given on a typical day by 7 if the respondent chose this alternative. If she reported giving care almost every week, the number of hours is kept as it is. If care was given on a monthly basis, the number is divided by 4.28, and in the remaining case it is divided by 52. If for some reason the resulting amount of care is larger than 0, but parents were reported to be deceased, the number of hours of care is set to 0.

A2. Hours of formal care received by parents

In SHARE, respondents are asked whether they received professional or paid nursing or personal care, help for domestic tasks that they cannot perform themselves due to health problems, or meals-on-wheels at home during the last twelve months. Following that, they are asked for how many hours a week they received professional or paid nursing care, and for how many hours they received professional help with domestic tasks. Thus, the sum of these two numbers constitutes a measure of the number of hours of formal care received weekly at home. To account for the use of nursing homes, I look at the answers of the respondents when they are asked whether they have been in a nursing home overnight during the last twelve months. Respondents can say "yes, permanently" if they have stayed in a nursing home non-stop during the past twelve months; "yes, temporarily", in the case they definitely moved to a nursing home less than twelve months ago; or "no". If the respondent says "yes", she is assigned 168 hours of formal care weekly. Next, those respondents who report having at least one parent alive are imputed a number of hours of formal care for their parents. This number is computed as the mean by health status, age and household income decile of respondents in my sample. The resulting amount for individuals of health h, age a, and income decile d is assigned to those individuals who report having parents of health h, age a, and income decile d. If the outcome of this process turns out to be larger than 0, but parents were reported to be deceased, this number is set to 0.

A3. Expenditure on formal care received by parents

The SHARE questionnaire asks respondents how much they paid out-of-pocket for all the care which they received in nursing homes and day-care centers, and all home care services in the last twelve months, not counting health insurance premia. Analogously to the number of hours of formal care, I compute the average expenditure on formal care for each combination of health h, age a, and income decile d among respondents, and impute that number to those individuals who report having parents of health h, age a, and income decile d. The outcome of this process intends to approximate the expenditure on formal care received by the parents of the respondents. If the outcome is larger than 0 for individuals whose parents are deceased, this number is set to 0.

A4. Hours of care required by parents

In the health module of SHARE, respondents are asked whether they have any difficulty to perform daily-life activities because of physical, mental, emotional or memory problems. I build a measure of the number of hours of care which respondents in my sample would need to receive every week by assigning a certain amount of time to each activity with which respondents mention to have problems. The daily-life activities considered are dressing, walking across a room, bathing, eating, getting in or out of bed, using the toilet, preparing a hot meal, shopping for groceries, making telephone calls, taking medications, doing work around the house, and managing money. Because of the lack of information about the parents of the respondents having difficulties to perform these activities, I impute a number of hours of care required to those individuals in the sample who have at least one parent alive. In particular, the average number of hours of care required by individuals of health h and age a is assigned to those respondents who report having parents of health h and age a. The outcome of this process is a variable which takes values from 0 to 56 hours of care weekly. If the outcome turns out to be larger than 0, but the parents of the respondents are deceased, this number is set to 0.

A5. Being employed and hours worked

Respondents are asked to describe their current employment situation, which can be categorized as "retired", "employed or self-employed", "unemployed and looking for work", "permanently sick or disabled", "homemaker", and "other" (landlord, living off own property, student, doing voluntary work). For the purpose of my project, I create a dummy variable which equals 1 if the individual is employed

or self-employed, and 0 if she is unemployed or homemaker (non-employed). This dummy only takes values for individuals younger than 65, to exclude those who do not have a job to retire from but are in age of retirement. As for the number of hours worked, respondents report how many hours they usually work a week, excluding meal breaks but including any paid or unpaid overtime.

A6. Health status

The SHARE questionnaire includes a question that asks whether the respondent perceives her health as excellent, very good, good, fair or poor. I use this information about self-perceived health to create a bad health dummy which takes value 1 if the individual reports that her health is fair or poor, and 0 otherwise. A dummy for the health status of the parents of the respondent is created analogously from the information which respondents give about the health of their parents. If both the father and the mother of the respondent are alive, I take the worse health status of the two. In the case that none of them are alive, the dummy takes value 0.

A7. Distance to parental residence

SHARE asks respondents where their mother and father live, being able to choose among "in the same household", "in the same building", or one of seven categories in terms of number of kilometers away. I create a dummy that is equal to 1 if the respondent has at least one parent living less than 25 km away, including the possibility of living in the same household or in the same building. In case both parents are deceased, this variable takes value 0.

A8. Labor income

Respondents are asked whether they had any wages, salaries or other earnings from dependent employment, and whether they had any income at all from self-employment or work for a family business in the previous year. If they reply "yes", they are asked how much income, after any taxes, contributions and production costs, they received from these activities. Using this information, and the number of months which the respondents spent working, I compute the income from employment and self-employment which they would have received every week. Next, I sum the amounts corresponding to these two concepts of labor income, adjust the results by purchasing power parity, and express all quantities in Euros using the exchange rates provided by SHARE.

A9. Non-labor income

This variable comprises all income sources of the household except for the labor earnings of the respondent. This number is obtained as the sum of annual net income from pensions, unemployment benefits and insurance, social assistance, disability and sickness benefits, rent or sublet, bank accounts, bonds, stocks, mutual funds, other regular payments from private pensions or transfers, and other household members. This amount is adjusted by purchasing power parity, expressed in Euros using the exchange rates provided by SHARE, and divided by 52 to have a measure of weekly non-labor income.

APPENDIX B: FIGURES

FIGURE B1: SOURCES OF INFORMAL CARE RECEIVED BY PEOPLE AGED 70 AND OVER. SHARE WAVE 2
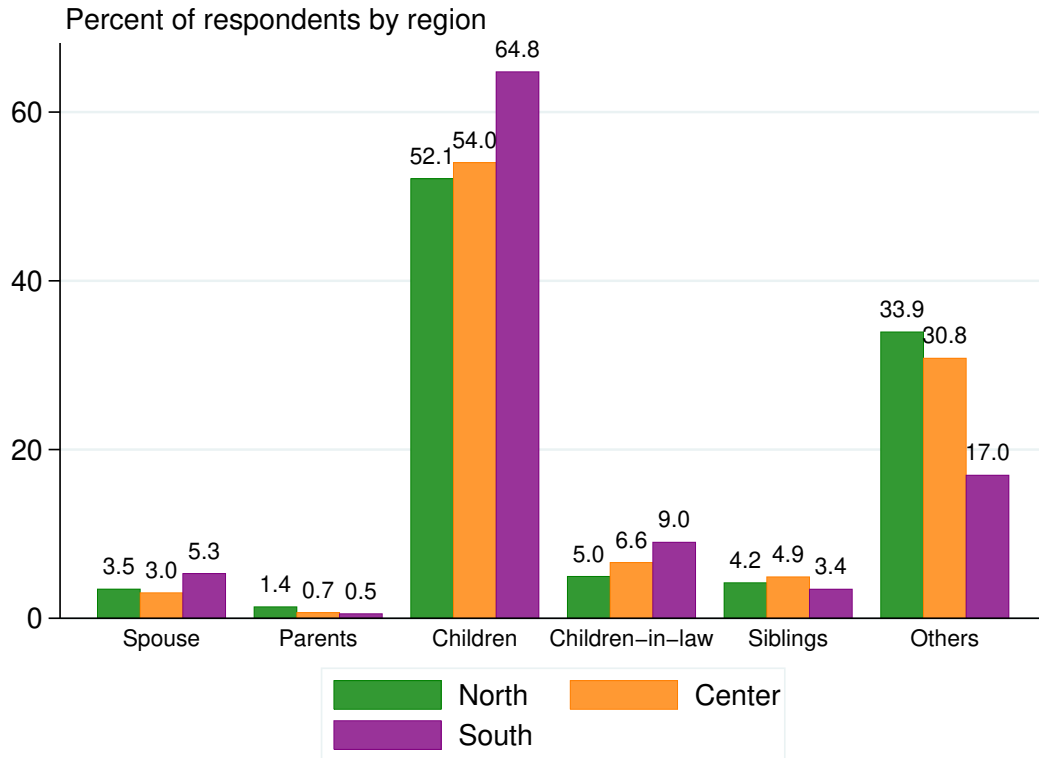
FIGURE B2: AGE OF RECIPIENTS OF DAILY CARE FROM THEIR CHILDREN.
SHARE WAVE 2
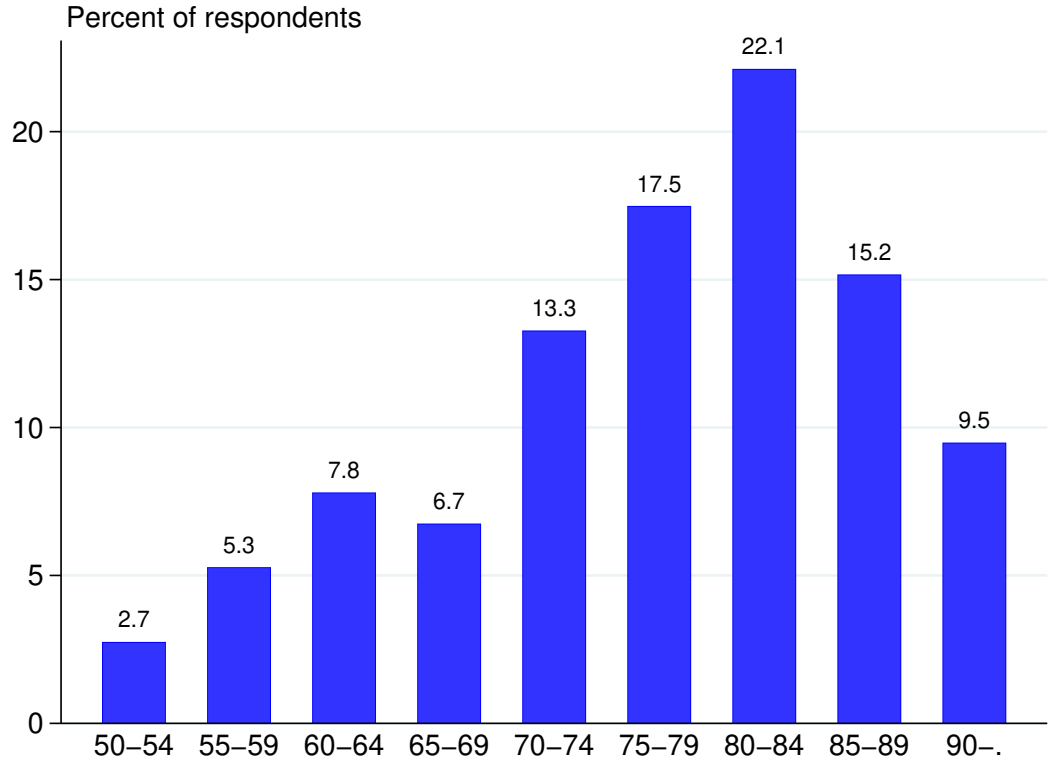
FIGURE B3: COMPARISON OF EMPLOYMENT STATUS ACROSS COUNTRY GROUPS.
NON-CAREGIVERS VS. CAREGIVERS. INDIVIDUALS YOUNGER THAN 65 WITH AT
LEAST ONE PARENT ALIVE. SHARE WAVE 2
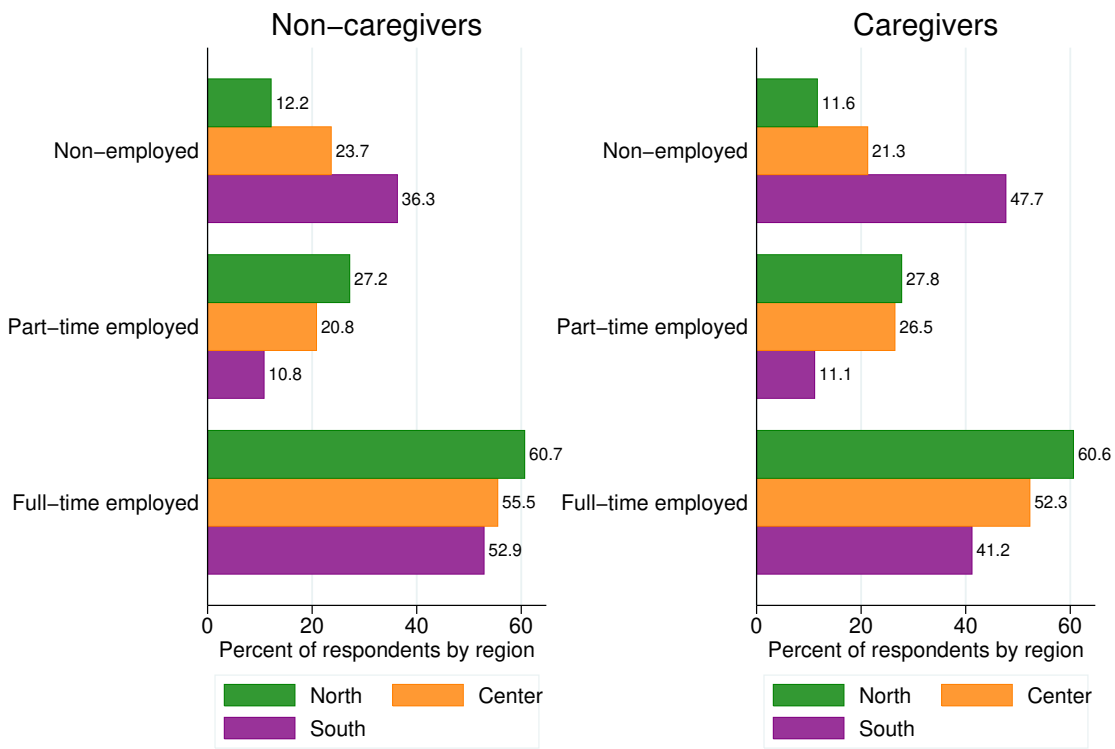
FIGURE B4: COMPARISON OF EMPLOYMENT STATUS ACROSS GENDER AND COUNTRY GROUPS. NON-CAREGIVERS VS. CARE-GIVERS. INDIVIDUALS YOUNGER THAN 65 WITH AT LEAST ONE PARENT ALIVE. SHARE WAVE 2
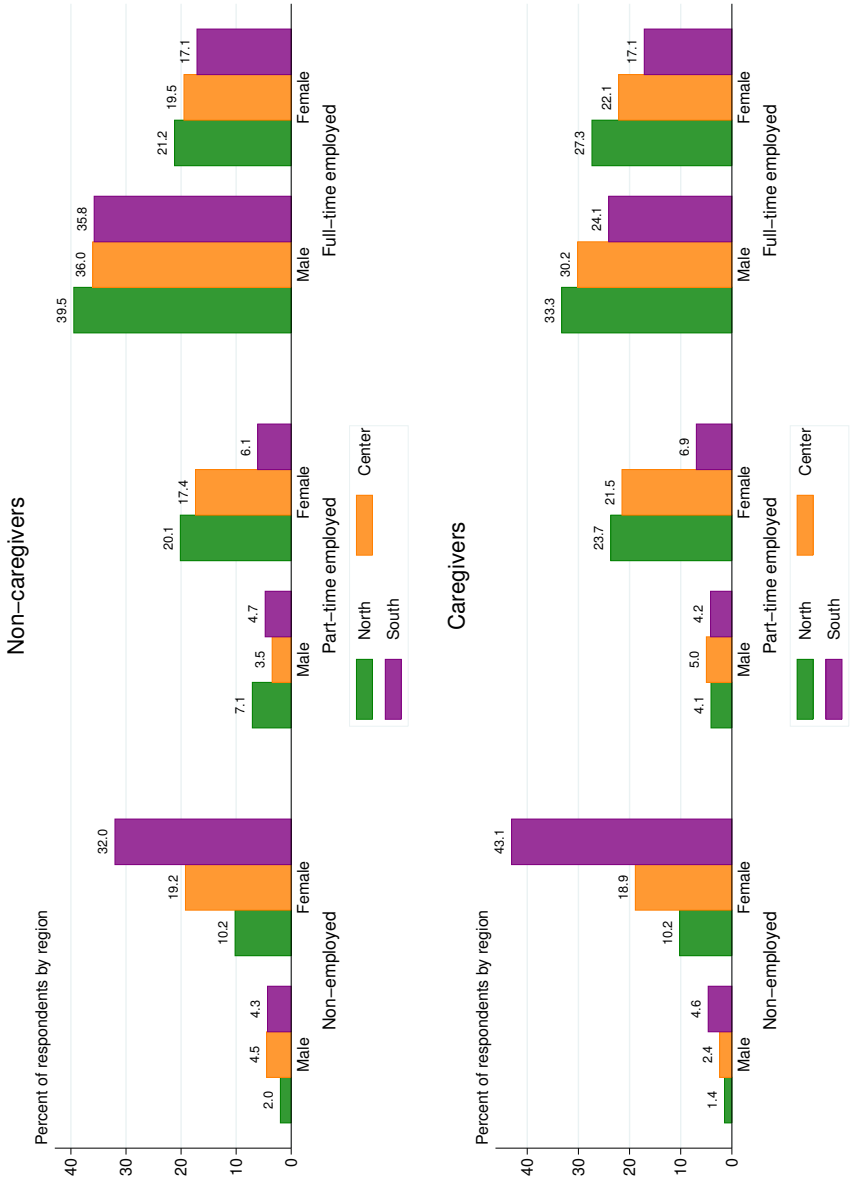
FIGURE B5: COMPARISON OF HOURS WORKED WEEKLY ACROSS GENDER. AC-
TUAL (A) VS. PREDICTED (P). KERNEL DENSITY ESTIMATES. INDIVIDUALS
YOUNGER THAN 65 WITH AT LEAST ONE PARENT ALIVE. SHARE WAVE 2
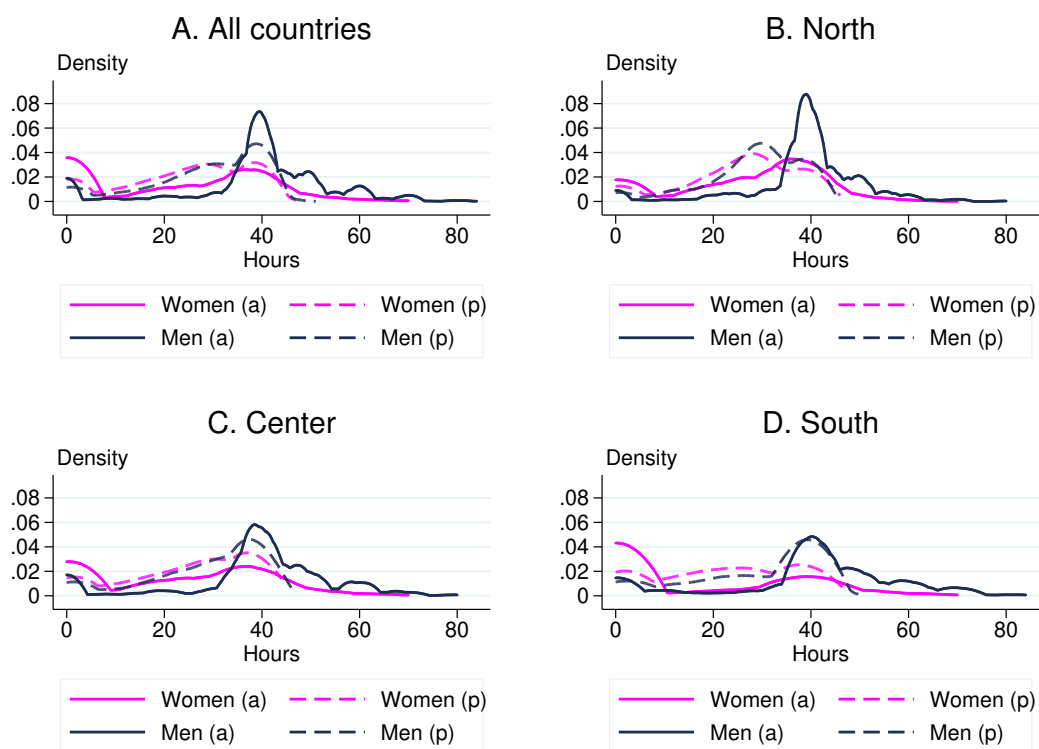
Table C1: Descriptive statistics. All the individuals in the sample. SHARE Wave 2

	Mean	Std. Dev.
Dependent variables		
Being employed (dummy)	0.27	0.44
Hours worked (weekly)	10.33	18.30
Independent variables		
Hours of informal care (weekly)	0.65	5.55
Being a caregiver (dummy)	0.08	0.27
Age	65.33	9.99
Female (dummy)	0.54	0.50
Years of education	10.32	4.47
Log household income (weekly)	5.88	1.30
Married (dummy)	0.74	0.44
Bad health (dummy)	0.32	0.47
Hours of formal care received by parents (weekly)	0.49	3.70
Expenditure on formal care for parents (€, weekly)	0.79	5.22
Hours of care required by parents (weekly)	0.55	2.01
Instruments		
Bad parental health (dummy)	0.98	0.14
Distance to parental residence < 25 km (dummy)	0.14	0.35

Table C2: IV first stage regressions

	Hours of informal care			Being a caregiver (dummy)		
	All	Women	Men	All	Women	Men
Bad parental health (dummy)	1.367***	1.677**	1.068**	0.147***	0.152***	0.142***
	(0.477)	(0.796)	(0.502)	(0.024)	(0.037)	(0.031)
Distance to parental residence	2.401***	2.818***	1.961***	0.260***	0.300***	0.217***
< 25 km (dummy)	(0.443)	(0.667)	(0.566)	(0.015)	(0.020)	(0.023)
Age	1.052	0.878	1.008	0.042	0.036	0.031
	(1.034)	(1.621)	(1.006)	(0.038)	(0.050)	(0.059)
Age squared	-0.009	-0.008	-0.009	-0.000	-0.000	-0.000
	(0.009)	(0.014)	(0.009)	(0.000)	(0.000)	(0.001)
Female (dummy)	1.264***			0.049***		
	(0.309)			(0.011)		
Years of education	0.077	0.153	0.003	0.007***	0.005***	0.009***
	(0.051)	(0.097)	(0.027)	(0.001)	(0.002)	(0.002)
Log household income (weekly)	-0.074	-0.242	0.062	0.008***	0.007*	0.009**
	(0.099)	(0.207)	(0.050)	(0.003)	(0.004)	(0.004)
Married (dummy)	-0.161	-0.138	-0.171	-0.013	-0.003	-0.028
	(0.420)	(0.666)	(0.291)	(0.014)	(0.019)	(0.021)
Bad health (dummy)	0.694	1.223	-0.255	-0.015	-0.010	-0.021
	(0.569)	(0.909)	(0.356)	(0.013)	(0.016)	(0.022)
Constant	-31.752	-26.073	-29.739	-1.310	-1.053	-1.019
	(29.642)	(46.543)	(28.915)	(1.086)	(1.439)	(1.666)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	8,715	5,055	3,660	8,715	5,055	3,660
F-stat excluded instruments	15.114	9.608	6.100	145.259	108.831	45.310

Note: Robust standard errors in parenthesis. (*) Significance at 10% level. (**) Significance at 5% level. (***) Significance at 1% level.

TABLE C3: OLS REGRESSIONS OF BEING EMPLOYED AND HOURS WORKED ON HOURS OF INFORMAL CARE. INDIVIDUALS YOUNGER THAN 65. SHARE WAVE 2

	Being employed (dummy)			Hours worked		
	All	Women	Men	All	Women	Men
Hours of informal care (weekly)	-0.002**	-0.002***	-0.002	-0.068**	-0.057**	-0.127
	(0.001)	(0.001)	(0.003)	(0.031)	(0.025)	(0.124)
Age	0.239***	0.234***	0.196**	8.899***	6.869***	9.943**
	(0.055)	(0.066)	(0.087)	(2.429)	(2.547)	(4.347)
Age squared	-0.002***	-0.002***	-0.002**	-0.085***	-0.069***	-0.090**
	(0.000)	(0.001)	(0.001)	(0.021)	(0.022)	(0.038)
Female (dummy)	-0.288***			-17.759***		
	(0.015)			(0.667)		
Years of education	0.020***	0.030***	0.007***	0.763***	1.125***	0.280**
	(0.002)	(0.003)	(0.002)	(0.080)	(0.103)	(0.120)
Log household income (weekly)	0.026***	0.034***	0.023***	1.064***	1.139***	1.050***
	(0.004)	(0.006)	(0.005)	(0.188)	(0.222)	(0.298)
Married (dummy)	-0.077***	-0.155***	0.062**	-2.409***	-6.833***	4.833***
	(0.019)	(0.023)	(0.029)	(0.846)	(0.979)	(1.375)
Bad health (dummy)	-0.113***	-0.104***	-0.086***	-4.449***	-3.589***	-4.770***
	(0.019)	(0.023)	(0.029)	(0.789)	(0.871)	(1.415)
Constant	-5.624***	-5.715***	-4.675*	-205.194***	-161.197**	-246.232**
	(1.574)	(1.865)	(2.483)	(69.154)	(72.611)	(123.103)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	8,715	5,055	3,660	8,715	5,055	3,660
R^2	0.274	0.281	0.079	0.317	0.257	0.067

Note: Robust standard errors in parenthesis. (*) Significance at 10% level. (**) Significance at 5% level. (***) Significance at 1% level.

TABLE C4: IV REGRESSIONS OF BEING EMPLOYED AND HOURS WORKED ON HOURS OF INFORMAL CARE. INDIVIDUALS YOUNGER THAN 65. SHARE WAVE 2

	Being employed (dummy)			Hours worked		
	All	Women	Men	All	Women	Men
Hours of informal care (weekly)	0.009	0.003	0.011	0.304	0.129	0.270
	(0.007)	(0.008)	(0.012)	(0.301)	(0.296)	(0.591)
Age	0.226***	0.229***	0.180**	8.423***	6.650***	9.468**
	(0.055)	(0.066)	(0.086)	(2.403)	(2.519)	(4.284)
Age squared	-0.002***	-0.002***	-0.002**	-0.080***	-0.067***	-0.085**
	(0.000)	(0.001)	(0.001)	(0.021)	(0.022)	(0.038)
Female (dummy)	-0.302***			-18.224***		
	(0.017)			(0.760)		
Years of education	0.019***	0.029***	0.007***	0.737***	1.098***	0.283**
	(0.002)	(0.003)	(0.002)	(0.086)	(0.114)	(0.120)
Log household income (weekly)	0.027***	0.035***	0.022***	1.090***	1.183***	1.026***
	(0.004)	(0.007)	(0.006)	(0.195)	(0.241)	(0.298)
Married (dummy)	-0.077***	-0.155***	0.061**	-2.412***	-6.834***	4.822***
	(0.020)	(0.024)	(0.029)	(0.851)	(0.978)	(1.380)
Bad health (dummy)	-0.119***	-0.108***	-0.082***	-4.667***	-3.800***	-4.627***
	(0.020)	(0.025)	(0.029)	(0.830)	(0.944)	(1.414)
Constant	-5.257***	-5.585***	-4.256*	-192.385***	-155.594**	-233.506*
	(1.565)	(1.855)	(2.432)	(68.340)	(71.694)	(121.289)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	8,715	5,055	3,660	8,715	5,055	3,660
R^2	0.235	0.273	0.038	0.294	0.246	0.054

Note: Robust standard errors in parenthesis. (*) Significance at 10% level. (**) Significance at 5% level. (***) Significance at 1% level.

TABLE C5: OLS REGRESSIONS OF BEING EMPLOYED AND HOURS WORKED ON BEING A CAREGIVER. INDIVIDUALS YOUNGER THAN 65. SHARE WAVE 2

	Being employed (dummy)			Hours worked		
	All	Women	Men	All	Women	Men
Being a caregiver (dummy)	0.008	0.020	-0.004	0.369	1.219	-0.651
	(0.020)	(0.025)	(0.028)	(0.928)	(1.029)	(1.544)
Age	0.236***	0.231***	0.194**	8.787***	6.722***	9.826**
	(0.055)	(0.065)	(0.087)	(2.418)	(2.520)	(4.339)
Age squared	-0.002***	-0.002***	-0.002**	-0.084***	-0.068***	-0.089**
	(0.000)	(0.001)	(0.001)	(0.021)	(0.022)	(0.038)
Female (dummy)	-0.291***			-17.862***		
	(0.015)			(0.666)		
Years of education	0.020***	0.030***	0.007***	0.756***	1.112***	0.286**
	(0.002)	(0.003)	(0.002)	(0.080)	(0.102)	(0.121)
Log household income (weekly)	0.026***	0.035***	0.022***	1.066***	1.143***	1.048***
	(0.004)	(0.006)	(0.005)	(0.188)	(0.223)	(0.298)
Married (dummy)	-0.077***	-0.155***	0.062**	-2.412***	-6.848***	4.826***
	(0.019)	(0.023)	(0.029)	(0.845)	(0.975)	(1.375)
Bad health (dummy)	-0.114***	-0.105***	-0.086***	-4.479***	-3.628***	-4.745***
	(0.019)	(0.023)	(0.029)	(0.789)	(0.873)	(1.415)
Constant	-5.544***	-5.633***	-4.615*	-202.256***	-157.712**	-243.019**
	(1.566)	(1.853)	(2.479)	(68.840)	(71.801)	(122.884)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	8,715	5,055	3,660	8,715	5,055	3,660
R^2	0.273	0.280	0.078	0.316	0.256	0.065

Note: Robust standard errors in parenthesis. (*) Significance at 10% level. (**) Significance at 5% level. (***) Significance at 1% level.

Table C6: IV regressions of being employed and hours worked on being a caregiver. Individuals younger than 65. SHARE Wave 2

	Being employed (dummy)			Hours worked		
	All	Women	Men	All	Women	Men
Being a caregiver (dummy)	0.081	0.025	0.088	2.812	1.190	2.120
	(0.060)	(0.071)	(0.100)	(2.709)	(2.763)	(5.185)
Age	0.232***	0.231***	0.189**	8.625***	6.724***	9.677**
	(0.055)	(0.065)	(0.086)	(2.397)	(2.511)	(4.310)
Age squared	-0.002***	-0.002***	-0.002**	-0.082***	-0.068***	-0.087**
	(0.000)	(0.001)	(0.001)	(0.021)	(0.022)	(0.038)
Female (dummy)	-0.295***			-17.979***		
	(0.015)			(0.673)		
Years of education	0.019***	0.030***	0.006**	0.742***	1.112***	0.265**
	(0.002)	(0.003)	(0.003)	(0.083)	(0.103)	(0.130)
Log household income (weekly)	0.026***	0.035***	0.022***	1.046***	1.143***	1.023***
	(0.004)	(0.006)	(0.006)	(0.188)	(0.222)	(0.299)
Married (dummy)	-0.078***	-0.155***	0.062**	-2.425***	-6.848***	4.842***
	(0.019)	(0.023)	(0.029)	(0.842)	(0.972)	(1.377)
Bad health (dummy)	-0.112***	-0.105***	-0.083***	-4.414***	-3.628***	-4.657***
	(0.019)	(0.023)	(0.029)	(0.785)	(0.870)	(1.409)
Constant	-5.428***	-5.627***	-4.494*	-198.354***	-157.753**	-239.366**
	(1.551)	(1.849)	(2.447)	(68.248)	(71.557)	(122.114)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	8,715	5,055	3,660	8,715	5,055	3,660
R^2	0.270	0.280	0.070	0.315	0.256	0.063

Note: Robust standard errors in parenthesis. (*) Significance at 10% level. (**) Significance at 5% level. (***) Significance at 1% level.

TABLE C7: ESTIMATES OF THE STRUCTURAL PARAMETERS ACROSS COUNTRY GROUPS. INDIVIDUALS YOUNGER THAN 65. SHARE WAVE 2

	Northern Europe				Central Europe				Southern Europe			
	All	Women	Men	Women = Men (χ^2)	All	Women	Men	Women = Men (χ^2)	All	Women	Men	Women = Men (χ^2)
w	16.352	13.818	20.149	72.03	15.886	14.065	18.728	4.72	8.535	6.837	12.085	23.47
	(0.356)	(0.405)	(0.626)	[0.000]	(1.242)	(1.960)	(0.875)	[0.030]	(0.397)	(0.313)	(1.037)	[0.000]
p	8.811	6.501	12.017	22.56	9.413	7.643	11.417	6.76	5.714	4.143	8.212	16.12
	(0.705)	(0.831)	(0.812)	[0.000]	(0.744)	(1.100)	(0.947)	[0.009]	(0.449)	(0.404)	(0.929)	[0.000]
δ	0.015	0.013	0.017	53.01	0.015	0.012	0.018	37.07	0.013	0.010	0.017	63.94
	(0.000)	(0.000)	(0.000)	[0.000]	(0.001)	(0.001)	(0.001)	[0.000]	(0.000)	(0.000)	(0.001)	[0.000]
N	2,766	1,563	1,203		2,960	1,704	1,256		2,616	1,595	1,021	

Note: Robust standard errors in parenthesis. *P*-value of the test of equality of coefficients between women and men in square brackets.

TABLE C8: OBSERVATIONS VS. PREDICTIONS BY THE STRUCTURAL MODEL. MEANS FOR INDIVIDUALS YOUNGER THAN 65 WITH AT LEAST ONE PARENT ALIVE. SHARE WAVE 2

	Being employed (dummy)		Hours worked (weekly) > 0		Being a caregiver (dummy)		Hours of informal care (weekly)>0		Use of formal care (dummy)		Hours of formal care (weekly)> 0	
	Actual	Predicted	Actual	Predicted	Actual	Predicted	Actual	Predicted	Actual	Predicted	Actual	Predicted
North	0.88	0.94	36.82	29.08	0.40	1.00	3.20	1.24	0.78	0.98	2.99	2.68
	(0.01)	(0.01)	(0.32)	(0.27)	(0.01)	(0.00)	(0.28)	(0.02)	(0.01)	(0.00)	(0.29)	(0.13)
Center	0.77	0.91	38.07	29.71	0.30	1.00	6.58	1.57	0.78	0.93	2.86	2.34
	(0.01)	(0.01)	(0.40)	(0.30)	(0.01)	(0.00)	(0.61)	(0.06)	(0.01)	(0.01)	(0.26)	(0.10)
South	0.61	0.86	41.77	30.11	0.19	1.00	13.27	1.75	0.81	0.63	3.08	2.77
	(0.01)	(0.01)	(0.56)	(0.45)	(0.01)	(0.00)	(1.30)	(0.05)	(0.01)	(0.01)	(0.34)	(0.15)
All	0.76	0.90	38.42	29.56	0.30	1.00	6.40	1.46	0.79	0.86	2.95	2.55
	(0.01)	(0.00)	(0.24)	(0.19)	(0.01)	(0.00)	(0.37)	(0.03)	(0.01)	(0.01)	(0.17)	(0.07)

Note: Standard errors in parenthesis. The standard error of the prediction does not take into account the error in the estimation of the coefficients.

TABLE C9: DECOMPOSITION OF REGIONAL DIFFERENCES IN THE OUTCOMES PREDICTED BY THE STRUCTURAL MODEL. MEANS FOR INDIVIDUALS YOUNGER THAN 65 WITH AT LEAST ONE PARENT ALIVE. SHARE WAVE 2

	Being employed (dummy)		Hours worked (weekly) > 0		Being a caregiver (dummy)		Hours of informal care (weekly) >0		Use of formal care (dummy)		Hours of formal care (weekly) > 0	
	Baseline	Counterf.	Baseline	Counterf.	Baseline	Counterf.	Baseline	Counterf.	Baseline	Counterf.	Baseline	Counterf.
Same w than Northern Europe												
Center	0.91	0.91	29.09	29.46	1.00	1.00	1.51	1.42	0.93	0.95	2.52	2.53
	(0.01)	(0.01)	(0.26)	(0.26)	(0.00)	(0.00)	(0.03)	(0.02)	(0.01)	(0.01)	(0.10)	(0.10)
		[0.00%]		[1.27%]		[0.00%]		[-5.96%]		[2.15%]		[0.40%]
South	0.86	0.96	28.53	34.89	1.00	0.34	2.96	1.10	0.63	1.00	3.00	4.39
	(0.01)	(0.01)	(0.35)	(0.18)	(0.00)	(0.01)	(0.12)	(0.03)	(0.01)	(0.00)	(0.15)	(0.16)
		[11.63%]		[22.29%]		[-66.00%]		[-62.84%]		[58.73%]		[46.33%]
Same w and p than Northern Europe												
Center	0.91	0.91	29.09	29.60	1.00	1.00	1.51	1.30	0.93	0.97	2.52	2.54
	(0.01)	(0.01)	(0.26)	(0.26)	(0.00)	(0.00)	(0.03)	(0.02)	(0.01)	(0.00)	(0.10)	(0.10)
		[0.00%]		[1.75%]		[0.00%]		[-13.91%]		[4.30%]		[0.79%]
South	0.86	0.96	28.53	34.77	1.00	0.99	1.86	1.10	0.63	0.96	3.00	3.32
	(0.01)	(0.01)	(0.35)	(0.18)	(0.00)	(0.00)	(0.05)	(0.02)	(0.01)	(0.01)	(0.15)	(0.16)
		[11.63%]		[21.87%]		[-1.00%]		[-40.86%]		[52.38%]		[10.67%]
Same w, p and δ than Northern Europe												
Center	0.91	0.91	29.09	29.62	1.00	1.00	1.51	1.29	0.93	0.97	2.52	2.54
	(0.01)	(0.01)	(0.26)	(0.26)	(0.00)	(0.00)	(0.03)	(0.02)	(0.01)	(0.00)	(0.10)	(0.10)
		[0.00%]		[1.82%]		[0.00%]		[-14.57%]		[4.30%]		[0.79%]
South	0.86	0.96	28.53	34.69	1.00	1.00	1.85	1.15	0.63	0.96	3.00	3.32
	(0.01)	(0.01)	(0.35)	(0.18)	(0.00)	(0.00)	(0.05)	(0.02)	(0.01)	(0.01)	(0.15)	(0.16)
		[11.63%]		[21.59%]		[0.00%]		[-37.84%]		[52.38%]		[10.67%]

Note: For each variable, column *baseline* refers to the prediction under region-specific parameters, and column *counterf.* to the prediction in the counterfactual scenario where the parameters take the same value than in Northern Europe. Standard errors in parenthesis. The standard error of the prediction does not take into account the error in the estimation of the coefficients. Difference between baseline and counterfactual predictions in square brackets.

TABLE C10: RESULTS OF THE CAREGIVER ALLOWANCE ON EMPLOYMENT AND ELDERLY CARE. MEANS FOR INDIVIDUALS YOUNGER THAN 65 WITH AT LEAST ONE PARENT ALIVE. **SHARE WAVE 2**

	Being employed (dummy)		Hours worked (weekly) > 0		Being a caregiver (dummy)		Hours of informal care (weekly)>0		Use of formal care (dummy)		Hours of formal care (weekly) > 0	
	Baseline	Policy	Baseline	Policy	Baseline	Policy	Baseline	Policy	Baseline	Policy	Baseline	Policy
North	0.94	0.92	28.90	25.80	1.00	1.00	1.20	1.26	0.97	0.97	2.98	2.98
	(0.01)	(0.01)	(0.25)	(0.25)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.12)	(0.12)
	[-2.13%]		[-10.73%]		[0.00%]		[5.00%]		[0.00%]		[0.00%]	
Center	0.91	0.89	29.56	26.39	1.00	1.00	1.51	1.61	0.93	0.92	2.53	2.52
	(0.01)	(0.01)	(0.25)	(0.25)	(0.00)	(0.00)	(0.03)	(0.03)	(0.01)	(0.01)	(0.10)	(0.10)
	[-2.20%]		[-10.72%]		[0.00%]		[6.62%]		[-1.08%]		[-0.40%]	
South	0.86	0.83	29.67	23.73	1.00	1.00	1.85	2.01	0.63	0.56	3.24	3.17
	(0.01)	(0.01)	(0.33)	(0.32)	(0.00)	(0.00)	(0.05)	(0.05)	(0.01)	(0.01)	(0.17)	(0.17)
	[-3.49%]		[-20.02%]		[0.00%]		[8.65%]		[-11.11%]		[-2.16%]	
All	0.90	0.88	29.37	25.46	1.00	1.00	1.51	1.61	0.85	0.83	2.84	2.82
	(0.00)	(0.00)	(0.16)	(0.16)	(0.00)	(0.00)	(0.02)	(0.02)	(0.01)	(0.01)	(0.07)	(0.07)
	[-2.22%]		[-13.31%]		[0.00%]		[6.62%]		[-2.35%]		[-0.70%]	

Note: Standard errors in parenthesis. The standard error of the prediction does not take into account the error in the estimation of the coefficients. Difference between baseline and policy in square brackets.

TABLE C11: RESULTS OF THE FORMAL CARE PRICE SUBSIDY ON EMPLOYMENT AND ELDERLY CARE. MEANS FOR INDIVIDUALS YOUNGER THAN 65 WITH AT LEAST ONE PARENT ALIVE. SHARE WAVE 2

	Being employed (dummy)		Hours worked (weekly) > 0		Being a caregiver (dummy)		Hours of informal care (weekly) >0		Use of formal care (dummy)		Hours of formal care (weekly) > 0	
	Baseline	Policy	Baseline	Policy	Baseline	Policy	Baseline	Policy	Baseline	Policy	Baseline	Policy
North	0.94	0.94	28.54	28.72	1.00	0.21	1.99	1.03	0.97	1.00	2.98	9.98
	(0.01)	(0.01)	(0.26)	(0.25)	(0.00)	(0.01)	(0.04)	(0.01)	(0.00)	(0.00)	(0.12)	(0.13)
	[0.00%]		[0.63%]		[-79.00%]		[-48.24%]		[3.09%]		[234.90%]	
Center	0.91	0.91	29.09	29.54	1.00	0.27	2.54	1.13	0.93	1.00	2.52	8.81
	(0.01)	(0.01)	(0.26)	(0.26)	(0.00)	(0.01)	(0.07)	(0.03)	(0.01)	(0.00)	(0.10)	(0.11)
	[0.00%]		[1.55%]		[-73.00%]		[-55.51%]		[7.53%]		[249.60%]	
South	0.86	0.87	28.53	29.12	1.00	0.23	3.41	1.23	0.63	1.00	3.00	8.06
	(0.01)	(0.01)	(0.35)	(0.34)	(0.00)	(0.01)	(0.18)	(0.06)	(0.01)	(0.00)	(0.15)	(0.18)
	[1.16%]		[2.07%]		[-77.00%]		[-63.93%]		[58.73%]		[168.67%]	
All	0.90	0.91	28.75	29.15	1.00	0.24	2.63	1.13	0.85	1.00	2.79	9.07
	(0.00)	(0.00)	(0.17)	(0.16)	(0.00)	(0.01)	(0.06)	(0.02)	(0.01)	(0.00)	(0.07)	(0.08)
	[1.11%]		[1.39%]		[-76.00%]		[-57.03%]		[17.65%]		[225.09%]	

Note: Standard errors in parenthesis. The standard error of the prediction does not take into account the error in the estimation of the coefficients. Difference between baseline and policy in square brackets.