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DOES INFORMAL ELDERCARE IMPEDE WOMEN'S EMPLOYMENT? THE CASE OF EUROPEAN WELFARE STATES

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ABSTRACT

European states vary in eldercare policies and in gendered norms of family care, and this study uses these variations to gain insight into the importance of macro-level factors for the work–care relationship. Using advanced panel data methods on European Community Household Panel (ECHP) data for 1994–2001, this study finds women's employment to be negatively associated with informal caregiving to the elderly across the European Union. For the countries included in the study, the effects of informal caregiving seem to be more negative in Southern Europe, less negative in Nordic countries, and in between these extremes in Central Europe. This study explains that since eldercare is a choice in countries with more formal care and less pronounced gendered care norms, the weaker impact of eldercare on women's employment in these countries has to do with the lesser degree of coercion in the caring decision.

KEYWORDS

Informal care, female labor supply, European welfare states

JEL Codes: I11, I12, J22

INTRODUCTION

Employment is likely to affect women's power in society not only by improving their material conditions but also by affecting their self-perception, identity, and bargaining power within the family (see Walter Korpi [2000]; Torben Iversen and Frances Rosenbluth [2006]; Niklas Jakobsson and Andreas Kotsadam [2010]). Informal care is widely acknowledged to affect paid employment, but the main focus in the work–life balance discourse in academic scholarship and public policy is on childcare (Peter Ackers 2003; Rosemary Crompton and Clare Lyonette 2006). Eldercare is frequently discussed only in the context of the effects of an aging population on the tax burdens of younger, paid workers, even though it has policy implications beyond taxation (Jill Rubery, Mark Smith,

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Dominique Anxo, and Lennart Flood 2001; Ackers 2003). For example, one of the main labor participation objectives within the European Union is to increase the total employment rate to 70 percent, women's employment to 60 percent, and the employment rate of elderly workers (aged ≥55 years) to 50 percent (Rubery et al. 2001). It is interesting to note that policy makers see efforts to increase the availability and quality of childcare as supporting the goal of increasing women's employment, but do not have similar aims for eldercare.

If the time devoted to informal eldercare is negatively associated with women's employment, it is a fact that merits consideration when discussing eldercare and especially the increasing reliance on informal care. Furthermore, if different institutions and policies change the impact informal care has on women's employment, the results can serve as a base for further policy discussions. Such discussions ought to consider that women's employment is important for fostering their agency, and that social services, for childcare as well as eldercare, act as emancipatory tools (see, for example, Anneli Anttonen and Jorma Sipilä [1996]). Proponents of the so-called family demoralization thesis would disagree and argue that increased women's employment and less informal care undermine family solidarity (Matthias Junge and Tobias Krettenauer 1998). Their conclusions would probably focus on re-familialization policies rather than on trying to enhance women's employment possibilities. Yet, looking at family relations from a quality perspective, intergenerational relations may very well improve when informal care becomes a less coercive option (see, for example, Janet Finch and Jennifer Mason [1993]). Reciprocity may be enhanced and relations may form on love and affection instead of guilt and responsibility, even though these concepts may be hard to disentangle in practice (Finch and Mason 1993; Martin Lewinter 2003; Martin Kohli and Harald Künemund 2003). In line with the family democratization thesis, a move away from traditional family responsibilities most likely implies possibilities for individuals to create their own families and to redefine the meaning of "family" (see David Morgan [1996]). These possibilities are especially important when seen from a feminist perspective.[1]

Most previous studies on the relationship between informal care and employment have been carried out in the United States and the United Kingdom and have generally found a negative relationship. For the US, see Douglas Wolf and Beth Soldo (1994); Susan Ettner (1996); Richard Johnson and Anthony Lo Sasso (2000); Eliza Pavalko and Julie Artis (2003). For the UK, see Fiona Carmichael and Susan Charles (1998, 2003a, 2003b); Axel Heitmueller and Kirsty Inglis (2004, 2007); Fiona Carmichael, Gemma Conell, Claire Hulme, and Sally Sheppard (2004, 2008); and Axel Heitmueller (2007). Meredith B. Lilly, Audrey Laporte, and Peter C. Coyte (2007) conducted a systematic analysis of studies on this topic from 1986 to 2006 and found that informal caregivers tend to be less likely to be employed.[2]

Although there are few comparative studies in this field, there are three that compare European countries (Katharina Spiess and Ulrike Schneider 2003; Tarja Viitanen 2005; Kristian Bolin, Björn Lindgren, and Petter Lundborg 2008b). Spiess and Schneider (2003) use two waves from the European Community Household Panel (ECHP) survey to look at twelve European countries. They find a statistically significant negative relationship between starting (and increasing) informal caregiving and changes in number of hours worked. Spiess and Schneider (2003) divide the countries into two groups: those with well-developed institutional care and home help services, and those with fewer such resources.

Viitanen (2005) also uses data from the ECHP to investigate the relationship between employment participation and informal eldercare in thirteen countries. While she looks at micro variables such as age cohort and marital status, she does not consider differences in institutional settings. Bolin, Lindgren, and Lundborg (2008b) use the first wave from the Survey of Health, Ageing, and Retirement in Europe (SHARE) data and look at the institutional impact on the relationship between informal care and employment. They divide their total sample into three groups: Nordic, Central European, and South European. Their main hypothesis is that the adverse effects of informal caregiving on women's employment are stronger in the Nordic group, since family care is less accepted in these states, leading to less support among, for example, employers. Considering the employment probability for women, they find a significant negative marginal effect of being a caregiver but no differences among the groups. Looking at women's number of hours worked, they find that care has a statistically significant larger negative correlation in Central European countries.

Contrary to Bolin, Lindgren, and Lundborg (2008b), the main hypothesis in this study is that the effects should be lowest in the Nordic group and highest in the South European group due to the greater availability and quality of formal care and less coercive gendered-care norms in the former group. Informal caregiving is more voluntary for women in those countries, and hence I argue that all negative effects, including those on employment, are weakened. Since countries vary in eldercare policies and in gendered norms of family care, the results of this paper are relevant also for countries outside of Europe. The findings also shed light on the importance of macro-level factors for the work–care relationship.

DATA, SAMPLE, AND DESCRIPTIVE STATISTICS

This study used data from the ECHP survey, which focuses on household income and living conditions and contains eight waves (running from 1994 to 2001). The dataset is input harmonized and provides information on the number of hours of care and paid work as well as care and paid-work status. The panel contains fifteen European countries, although only twelve were

included from the beginning. Furthermore, Sweden did not provide any data on informal care and is therefore excluded. For Germany, Luxembourg, and the UK, satisfactory ECHP data on hours of care provided exists only for the first three waves. Data for Finland for the first two waves are unavailable; finally, Austria was not included in the first wave.

The best alternative to this dataset would be SHARE as used by Bolin, Lindgren, and Lundborg (2008b). One advantage of the SHARE dataset is the rich information included on health-related variables of relatives and social-support variables. However, the disadvantages seem more restrictive. One limitation is that it only contains two waves, and another is that it only includes people older than 50. While it is clear that caring obligations increase with age, an analysis with different age samples and an analysis with age-interaction terms show that the correlations between caregiving and employment probability are actually greater at lower ages.[3] The limitation of using the SHARE data might thereby be greater than what Bolin, Lindgren, and Lundborg (2008b) expect when they argue that the care burden in Europe is greatest among those older than 50.

When constructing the sample, I dropped all men from the data. I also removed women who were students, retirees, or trainees. Furthermore, I restricted the sample to only include people aged 20–65 years.[4] Figures 1 and 2 make evident that employment falls with age while caring obligations for elderly rise.

Table 1 provides the definitions of the main variables, and Table 2 presents the summary statistics for those variables.

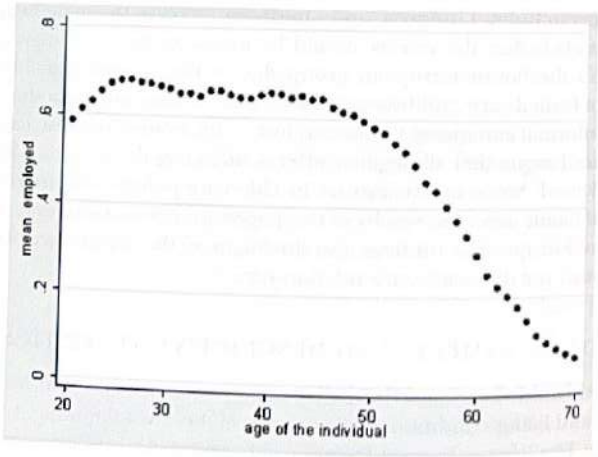

Figure 1 Women's employment in the sample, by age.
Source: Own calculation based on ECHP data.

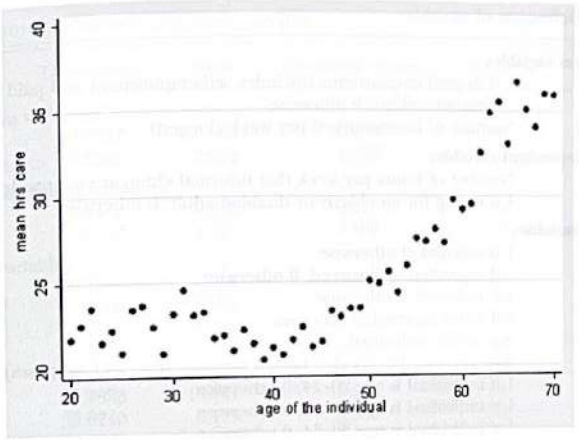

Figure 2 Women's care-hours in the sample, by age for caregivers only.
Source: Own calculation based on ECHP data.

It is interesting to compare the summary statistics in Table 2 with those for the subsample of caregivers provided in Table 3. Caregivers have a 13.5 percent lower employment rate and work fewer hours. In addition, they are more likely to be married, separated, or widowed. They are also older, less educated, have worse health, and the other members of their household earn less money than non-caregivers. Household size is also greater for caregivers, even though fewer of them live with dependent children. This implies that it is important to control for factors on the individual level, and that we might expect that doing so would make the correlation between informal care and employment probability lower than 13.5 percent.

Table 4 shows that the countries do not differ very much in terms of proportion of individuals who provide some care (5–10 percent of women), while they do differ a lot in the amount of care provided. The lowest median value among caregivers of 6 hours per week is found in Denmark, whereas the highest median value of 35 hours per week is found in Spain. The differences in employment between caregivers and the total population also vary across countries.

COUNTRY GROUPS AND HYPOTHESES

Bolin, Lindgren, and Lundborg (2008b) capture the effects of different cultural and institutional settings by dividing their sample into three groups: a Nordic group consisting of Sweden and Denmark; a Central European group comprising Germany, France, the Netherlands, Austria, and Switzerland; and a South European group consisting of Spain, Italy,

Table 1 Definition of variables

Dependent variables	
employed	1 if in paid employment (includes self-employment and paid apprenticeship), 0 otherwise
hrsworked	Number of hours worked per week (logged)
Main independent variables	
carehrs	Number of hours per week that informal eldercare is provided
care	1 if caring for an elderly or disabled adult, 0 otherwise
Control variables	
married	1 if married, 0 otherwise
divorced	1 if separated or divorced, 0 otherwise
widow	1 if widowed, 0 otherwise
single	1 if never married, 0 otherwise
age	Age of the individual
agesq	Age squared/100 (Scaled by 100 for presentational purposes)
age1	1 if individual is age 20–24, 0 otherwise
age2	1 if individual is age 25–29, 0 otherwise
age3	1 if individual is age 30–34, 0 otherwise
age4	1 if individual is age 35–39, 0 otherwise
age5	1 if individual is age 40–44, 0 otherwise
age6	1 if individual is age 45–49, 0 otherwise
age7	1 if individual is age 50–54, 0 otherwise
age8	1 if individual is age 55–59, 0 otherwise
age9	1 if individual is age 59–65, 0 otherwise
edu1	1 if highest level of schooling is first level or above, 0 otherwise
edu2	1 if highest level of schooling is second level, 0 otherwise
edu3	1 if highest level of schooling is below second level, 0 otherwise
badh	1 if health is assessed to be poor or very poor, 0 otherwise
hhsize	Number of people living in the household
wage	Hourly wage (measured in euros)
hwage	(Monthly household wage – monthly personal wage)/1,000
ch	1 if there are dependent children living in the household, 0 otherwise

and Greece. For comparability with their results, this study includes three groups that also represent Northern, Central, and Southern Europe.[5] As a complement, I also include Spiess and Schneider's division of countries according to level of formal care.[6] Table 5 shows the country groups included in this analysis.

There are stark differences between the groups regarding the level of formal care services provided. Dominique Anxo and Colette Fagan (2005) compare Denmark, Italy, Finland, the Netherlands, Sweden, and the UK with respect to eldercare and classify the countries according to different welfare regimes. The Nordic, social-democratic, universalist system of eldercare is the most extensive in terms of services provided. The key elements of this system are universal citizens' rights, extended public childcare, and – regarding eldercare in the case of Sweden and Finland – the abolishment of children's legal obligation to care for their parents. Public eldercare is assigned according to need and financed mainly

Table 2 Summary statistics of main variables

Variable	*Observations*	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
Dependent variables					
employed	30,0752	0.583	0.493	0	1
hrsworked	29,6795	2.012	1.756	0	4.564
Main independent variables					
care	30,1142	0.081	0.273	0	1
carehrs	30,0363	1.92	9.109	0	96
Control variables					
married	30,1590	0.696	0.460	0	1
divorced	30,1590	0.062	0.240	0	1
widow	30,1590	0.036	0.185	0	1
single	30,1590	0.207	0.405	0	1
age	30,1883	41.011	11.926	20	65
agesq	30,1883	18.241	10.093	4	42.25
edu1	29,6740	0.175	0.380	0	1
edu2	29,6740	0.312	0.463	0	1
edu3	29,6740	0.512	0.500	0	1
badh	30,0218	0.063	0.243	0	1
hwage	30,1883	0.821	1.026	0	40.422
hhsize	30,1883	3.450	1.450	1	16
ch	29,8764	0.554	0.497	0	1

Source. Own calculation based on ECHP data.

Table 3 Summary statistics of main variables for caregivers

Variable	*Observations*	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
Dependent variables					
employed	24,275	0.448	0.497	0	1
hrsworked	23,986	1.508	1.730	0	4.564
Main independent variables					
care	24,359	1	0	1	1
carehrs	23,580	24.507	22.441	1	96
Control variables					
married	24,341	0.763	0.425	0	1
divorced	24,341	0.062	0.241	0	1
widow	24,341	0.044	0.206	0	1
single	24,341	0.130	0.336	0	1
age	24,359	46.387	10.352	20	65
agesq	24,359	22.589	9.276	4	42.25
edu1	24,110	0.112	0.315	0	1
edu2	24,110	0.275	0.445	0	1
edu3	24,110	0.613	0.487	0	1
badh	24,303	0.087	0.282	0	1
hwage	24,359	0.715	0.947	0	24.527
hhsize	24,359	3.686	1.564	1	16
ch	23,930	0.502	0.500	0	1

Source. Own calculation based on ECHP data.

Table 4 Employed, care, and *carehrs* by country

Country	*Mean employment*	*Employment for caregivers*	*Mean care*	*Median carehrs given care*
Germany	0.67	0.55	0.10	15
Denmark	0.85	0.83	0.06	6
Netherlands	0.63	0.45	0.08	14
Belgium	0.67	0.51	0.09	8
Luxembourg	0.56	0.39	0.07	10
France	0.66	0.51	0.05	8
Ireland	0.51	0.36	0.08	20
Italy	0.47	0.37	0.10	19
Greece	0.46	0.43	0.08	19
Spain	0.41	0.28	0.10	35
Portugal	0.66	0.49	0.07	25
Austria	0.66	0.58	0.08	15
Finland	0.83	0.80	0.07	6.5
UK	0.69	0.54	0.10	15

Source: Own calculation based on ECHP data.

Table 5 Country groups

Geographic groups
South: Portugal, Spain, Greece, Italy
Central: The Netherlands, Germany, Belgium, France
Nordic: Denmark, Finland

Spiess and Schneider's groups
Spiess and Schneider group A (SSA): Countries with well-developed formal care
Belgium, Denmark, France, Germany, Luxembourg, the Netherlands, UK
Spiess and Schneider group B (SSB): Countries with less-developed formal care
Greece, Ireland, Italy, Spain, Portugal

through general taxation. By contrast, the South European, family-based system of eldercare, such as that in Italy, has the lowest rate of publicly provided eldercare. There is an implicit male-breadwinner ideology underlying this system, and families provide three-quarters of all needed eldercare. The supply of public eldercare is very low, and eligibility for public assistance is not only based on need but also on social situation and economic resources. The income-related contributions to public assistance are based on the elder's income and that of other relatives living in the same household.

Anttonen and Sipilä (1996) compare the proportions of elderly over 65 who receive institutional care or home help across fourteen European countries. They describe a Scandinavian model of public services in which eldercare services are widely available. Within this model, universalism is the guiding principle, which means that women benefit and that the

middle class uses the services, which in turn facilitates public funding. Anttonen and Sipilä (1996) also describe the family-care model, found in Portugal, Spain, Greece, and Italy, which is characterized by a limited supply of social care services. The authors also identify a Central European model, found in Germany and the Netherlands and to a lesser degree France and Belgium, where the responsibility for eldercare formally falls on the family. In the Central European countries, voluntary organizations provide a large range of services, and the state has the main responsibility for funding. The volume of eldercare services provided is at an intermediate level, except in the Netherlands where it is high. The differences in quality of formal eldercare services are great across countries and also follow the North–South dimension. The level of education and skills required for employment in eldercare is lowest in the Southern European countries and highest in the Nordic countries, while the Central European countries are placed in between (Anxo and Fagan 2005; Annamaria Simonazzi 2009).

There are several different motives for informal caregiving, with altruism and social norms being commonly stated (see Ettner [1996]; Spiess and Schneider [2003]; and Elisabeth Fevang, Snorre Kverndokk, and Knut Roed [2008]). Looking at the altruism motive, it is common to assume that a caregiver considers the well-being or the health of the one in need when making the care decision (Ettner 1996; Johnson and Lo Sasso 2000). The costs of caregiving are often discussed as a loss of time that could be spent on leisure or paid work (for example, Carmichael and Charles [1998, 2003b]; Johnson and Lo Sasso [2000]). In equilibrium, the marginal rate of substitution between leisure, paid work, and caregiving should be equal. If one then considers care provided by others (for example, formal care) and assumes that caregivers consider the well-being of the person needing care, it is not hard to imagine (or model) that employment for caregivers increases if more formal care is available (see, for instance, Fevang, Kverndokk, and Roed [2008]). Whether informal care decreases, however, depends on whether informal care and formal care are substitutes or complements.

The studies using versions of Michael Grossman's (1972) health production function to investigate the relationship between formal and informal care in Europe and the United States usually find that the two forms of care are substitutes. However, the relationship appears complementary when considering only doctor and hospital visits or high-skilled care or care for highly disabled persons (Courtney Harold Van Houtven and Edward C. Norton 2004; Kristian Bolin, Björn Lindgren, and Petter Lundborg 2008a; Erik Bonsang 2009). Tarja Viitanen (2007) looks at government spending on in-kind eldercare (home care as well as institutional care) and the effects it has on informal care in European countries, and finds a statistically significant negative correlation implying

that more formal care reduces informal care. Another reinforcing factor is the quality of the formal eldercare services. The quality of public services affects their utilization rate, and it has also been argued, in other settings, to affect the "ethics of care" impacting the gendered division of household labor (Anne Lise Ellingsæter and Lars Gulbrandsen 2007). However, formal care is not the only factor determining the relationship between women's employment and informal care; gendered norms affect that relationship as well. At the individual level, there are gendered norms that condition the choices made by women and men. The gender ideologies present at the macro level, by structuring the incentives for individual action, also influence the behavior and choices of men and women. Individual action is thereby constrained, enabled, and conditioned by societal rules and norms (Richard Swedberg 2003; Ola Sjöberg 2004; Klas Åmark 2005; Dominique Anxo, Jean-Yves Boulin, Colette Fagan, Inmaculada Cebrián, Saskia Keuzenkamp, Ute Klammer, Christina Klenner, Gloria Moreno, and Luís Toharía 2006; Jakobsson and Kotsadam 2010).

Spiess and Schneider (2003) suggest that gendered social norms impose severe limitations on free choices in the work–care relationship. Other authors have also highlighted the degree of choice in the work-care relationship (Agneta Stark 2005; Heitmueller 2007). Carmichael and Charles (2003b) argue along the same lines as presented here when they link the larger negative effect of caring on employment probabilities for women than for men in the UK to the more limited degree of choice for women. It is also plausible that there is a link between gendered norms and formal care, since formal institutions may structure gender relations. When formal institutional solutions to care are not present, the personal choices of women are restricted, since the distribution of these tasks "are ascribed by birth and gender" (see Ulrich Beck and Mark Ritter [1992: 107]; Tommy Ferrarini [2003, 2006]; Makiko Fuwa and Philip N. Cohen [2007]). The low level of formal care in the Southern European countries and the male-breadwinner norms in these countries are thereby expected to reinforce each other's adverse effects on women's employment.

These circumstances lead to the expectation that the effects of informal care are lower in the countries characterized by Spiess and Schneider (2003) as having more formal care – that is, that the effects are lower in Spiess and Schneider group A (SSA) than in Spiess and Schneider group B (SSB). It is also fair to expect the Nordic countries to stand out as having the lowest effects due to the high level and high quality of formal institutions in these countries, which should create a less stringent informal obligation to care for elderly. Also Nordic societies are generally characterized by more equality between men and women, which further promotes the free choice of women (see, for instance, Mikko Kautto, Johan Fritzell, Björn Hvinden, Jon Kvist, and Hannu Uusitalo 2001). Another hypothesis is that the Central European model entails intermediate effects, since the level of formal

eldercare is in between the Nordic and South European models and voluntary organizations produce some of the care and thereby relieve families of some responsibilities. The Southern European countries are expected to exhibit more pronounced negative effects due to a strong male-breadwinner ideology and low supply (and quality) of formal eldercare, both factors making informal care more compulsory for women.

THE RELATIONSHIP BETWEEN INFORMAL ELDERCARE AND EMPLOYMENT PROBABILITY

In analyzing the relationship between informal eldercare and employment probability, I employed several different panel data methods. In general, I used two different specifications, namely:

$$\text{i)}\ \Pr(\textit{employed} = 1|x) = \alpha + \beta_1\, \textit{care} + \beta x,$$

$$\text{ii)}\ \Pr(\textit{employed} = 1|x) = \alpha + \beta_1\, \textit{carehrs} + \beta x,$$

where *employed* is a binary variable representing employment, *care* is a binary variable representing whether or not the individuals provide informal eldercare, *carehrs* is the number of weekly hours of care provided, and x is a vector of control variables.[7] I applied the different specifications to different samples corresponding to the groupings offered above.

Applying a logit model, the estimable equation is: $\Pr(\text{employed} = 1|x) = G(x\beta)$, where the function for $G(x\beta)$ is the logistic distribution function. Note that the vector x now includes either the *carehrs* or the *care* variable. I explore the panel nature of the data by estimating $\Pr(\text{employed} = 1|x_{it}, c_i) = G(x_{it}\beta + c_i)$, where c_i represents individual, fixed effects. As a first step, I estimated a random-effects logit model. A major limitation of this model is that it assumes that the fixed, individual effects are uncorrelated with the other explanatory variables.

Since the logit model is nonlinear, the individual effects cannot simply be eliminated by applying the fixed-effects estimator. However, a fixed-effects logit model can be used, conditioning on changes in the dependent variable with the minimal sufficient statistic $\sum_{t=1}^{T} y_{it}$ for the individual, fixed effects (Badi H. Baltagi 2005). A problem with this method is that I cannot compute the conventional, marginal effects, since no consistent estimates of the fixed, individual effect are produced. However, the estimates of this model serve as an important test of whether the previously found marginal effects are biased by time-invariant, unobserved, individual heterogeneity. Applying a Hausman-type test for the difference between the fixed and random effects logit model shows whether unobserved individual heterogeneity is present. Another problem with the fixed-effects logit model is that the minimum, sufficient statistic requires that there is a

change in the dependent variable and drops all observations that do not change. One could thereby argue that the control for unobserved, individual heterogeneity is somewhat strange, since it is conducted on another sample. To cope with this problem, I also estimated a linear, fixed-effects panel model. Another way to deal with unobserved, individual heterogeneity is to use Chamberlain's random effects logit model, which has the advantages of providing reliable marginal effects and not conditioning on changes in the dependent variable.

The empirical strategy is to compare the coefficients from the random-effects model to the fixed-effects model (using Hausman-type tests). If the coefficients differ significantly, I will use Chamberlain's random-effects logit model. This model allows for correlation between the fixed effects and the other explanatory variables by adding the means (over time) of the time-varying explanatory variables as control variables.

I start by analyzing the results obtained in the random-effects logit models. Table 6 shows the marginal effects of *care* and *carehrs* in the total sample and in the different subgroups. I evaluated all marginal effects at the mean values of *care* and *carehrs* for the corresponding sample.[8]

As can be seen in the total sample, the negative marginal effect of being an informal caregiver is statistically significant and the magnitude is large enough to be deemed important. There are large differences between the Nordic countries and the other groups. While the marginal effect of being an informal caregiver on women's employment is insignificant in the

Table 6 Marginal effects of *care* and *carehrs* in random-effects logit models. Dependent variable is *employed*

	dy/dx	*Standard Error*	*z*	*P>z*	*X*	*N*
care						
Total:	-0.088	0.007	-12.00	0.000	0.081	290,776
SSA:	-0.057	0.008	-6.79	0.000	0.071	103,784
SSB:	-0.099	0.010	-10.12	0.000	0.088	159,010
Nordic:	-0.007	0.005	-1.36	0.173	0.065	25,186
South:	-0.106	0.010	-10.28	0.000	0.089	140,102
Central:	-0.068	0.011	-6.23	0.000	0.067	81,059
carehrs						
Total:	-0.004	0.000	-17.42	0.000	1.937	290,022
SSA:	-0.002	0.000	-8.17	0.000	1.211	103,496
SSB:	-0.005	0.000	-15.58	0.000	2.527	158,638
Nordic:	-0.000	0.000	-1.64	0.102	0.7040	25,130
South:	-0.005	0.000	-14.55	0.000	2.515	139,844
Central:	-0.002	0.000	-6.63	0.000	1.161	80,807

Note: Included as controls are *age, agesq, hhsize, hwage, ch,* and dummies for year, education, marital status, and bad health.

Nordic subsample, it is about 10.5 percent in the Southern European group. (Note that the insignificance in the Nordic sample is not driven by exceptionally high standard errors; in fact, they are smaller for this sample than for all other samples.) The marginal effect of being a caregiver in the Central European group is also in between the ones for the Southern European group and the Nordic group, as expected. Moreover, the classification by Spiess and Schneider points in the predicted direction, whereby countries with more formal eldercare seem to entail a lower correlation between caregiving and paid work.

The lower part of Table 6 shows the corresponding marginal effects for *carehrs*. The marginal effect in the total sample is large, negative, and statistically significant. Applying the grouping offered by Spiess and Schneider implies marginal effects that point in the expected direction, and the picture once again becomes even clearer when applying the geographical grouping. The Nordic subsample has the lowest marginal effect of providing one extra hour of informal eldercare; it is statistically insignificant, which again is not driven by high standard errors. The Southern European group has the largest marginal effects, and the Central European group places in between, as expected.

As discussed above, I am not completely satisfied with the random-effects logit model, especially since it assumes that c_i and x_{it} are independent. A way to check whether individual heterogeneity is biasing the results is to compare the results with those from a fixed-effects logit model shown in Table 7.[9] Since the fixed-effects model is consistent also when individual heterogeneity is present, a difference between the coefficients of the two models stem from a bias in the random-effects results.

For *care*, all samples except the Nordic exhibit a statistically significant negative coefficient and that the coefficients for all other samples still point in the predicted directions. For *carehrs*, I note qualitatively the same group results as for *care*. Unfortunately with this model, I cannot calculate marginal effects, but Hausman-type tests show that the coefficients differ between the models.[10] Since the fixed-effects logit model conditions on there being a change in the dependent variable over time, the sample is reduced. One might therefore worry about the results from the fixed-effects logit model serving as a control for individual heterogeneity, since the effects are actually estimated on another sample. To overcome this problem, I estimate linear, fixed-effects panel regressions as well, yielding qualitatively similar results.[11]

I therefore conclude that I must control for unobserved, individual heterogeneity. A way to proceed, which also enables calculations of marginal effects, is to apply Chamberlain's approach and add the means (over time) of all time-varying regressors as additional explanatory variables to allow for correlation between c_i and x_{it}. Table 8 shows the marginal effects of Chamberlain's random-effects logit model.[12]

Table 7 Fixed-effects logit model with *care* and *carehrs*. Dependent variable is *employed*

	(1) *Total*	(2) *SSA*	(3) *SSB*	(4) *Nordic*	(5) *South*	(6) *Central*
care						
care	-0.270***	-0.188***	-0.280***	-0.155	-0.337***	-0.259***
	(0.038)	(0.069)	(0.047)	(0.152)	(0.051)	(0.077)
Observations	84,046	26,409	50,389	6,559	44,349	21,574
Individuals	14,501	4,929	8,149	1,306	7,150	3,792
carehrs						
carehrs	-0.013***	-0.006**	-0.014***	-0.011	-0.015***	-0.007**
	(0.001)	(0.003)	(0.001)	(0.007)	(0.001)	(0.003)
Observations	83,789	26,315	50,258	6,545	44,276	21,487
Individuals	14,478	4,919	8,140	1,304	7,144	3,784

Notes: Standard errors in parentheses; ***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively. Included as controls are *age, agesq, hhsize, hwage, ch*, and dummies for year, education, marital status, and bad health.

Table 8 Marginal effects of Chamberlain's r.e. probit model for *care* and *carehrs*. Dependent variable is *employed*

	dy/dx	*Standard Error*	*z*	*P>z*	*X*	*N*
care						
Total:	-0.050	0.007	-6.54	0.000	0.081	290,776
SSA:	-0.020	0.008	-2.58	0.010	0.072	103,784
SSB:	-0.062	0.011	-5.82	0.000	0.088	159,010
Nordic;	-0.004	0.005	-0.84	0.404	0.064	25,186
South:	-0.074	0.011	-6.51	0.000	0.089	140,102
Central:	-0.032	0.011	-3.06	0.002	0.070	81,059
carehrs						
Total:	-0.002	0.000	-10.23	0.000	1.936	290,022
SSA:	-0.000	0.000	-1.79	0.073	1.211	103,496
SSB:	-0.003	0.000	-9.94	0.000	2.527	158,638
Nordic:	-0.000	0.000	-1.16	0.248	0.704	25,130
South:	-0.003	0.000	-10.21	0.000	2.515	139,844
Central:	-0.001	0.000	-2.08	0.038	1.161	80,807

Notes: Included as controls are *age, agesq, hhsize, hwage, ch*, and dummies for year, education, marital status, and bad health.

Regarding the *care* variable, all subsamples retain statistically and economically significant marginal effects except the Nordic one. However, the marginal effect in the Nordic subsample was not significant before either and has the lowest standard errors, which indicates that the insignificance stems from the actual effect being close to zero. The Southern European countries seem to show the strongest correlations, and again we find more pronounced marginal effects of being a caregiver in the

countries characterized by Spiess and Schneider as having less formal care than in the ones with more formal care. The difference between the Nordic group and the Southern European group is large (caregivers in Southern Europe are 7 percent less likely to be employed), and statistically significant at the 1 percent level. The difference between the Central European group and the Southern group is not statistically significant; nor is the difference between SSA and SSB.[13]

Regarding *carehrs*, the marginal effect in the Nordic subsample is insignificant, but the standard errors are still lower than in all other subsamples. All marginal effects are smaller with this specification, but the differences between the groups still point in the same direction. The marginal effects seem to be higher in the countries with less formal care as specified by Spiess and Schneider (the country group with more formal care is even marginally insignificant at the 5 percent level in this specification), and the Southern European countries exhibit the highest values. The difference between the Nordic group and the Southern group is statistically significant at the 1 percent level, the difference for the Central European group is statistically significant at the 5 percent level, and this is also true for the difference between SSA and SSB.

Some of the differences between the groups in the *carehrs* regressions may be obscured since they are evaluated at very different mean values. A related worry might be that the Nordic group's low mean number of hours of care provided drives this group's distinctiveness. In order to investigate this issue further, I estimated the samples in Chamberlain logit models at the total mean number of care hours for those caring, at the mean number of hours for caregivers in the Nordic countries (lowest), and at the mean number of hours for caregivers in the Southern European countries (highest). The results show that the Nordic exceptionality is indeed a persistent feature and so are the other group differences.[14]

A preliminary conclusion is that providing informal care is negatively associated with the employment probability for women in Europe. A persistent feature is that the countries characterized as having more formal care seem to entail lower marginal effects than the countries with less formal care in the grouping offered by Spiess and Schneider. In the geographical groupings, I systematically find that the Southern European, family-care countries entail larger marginal effects, and that the Nordic countries do not exhibit any significant marginal effects. I also conclude that there is a statistically significant negative correlation between providing one more hour of informal care and women's employment probability, and that the group differences for this correlation are qualitatively the same as for the overall caring decision.

THE RELATIONSHIP BETWEEN NUMBER OF HOURS WORKED AND INFORMAL CARE

I investigate the relationship between number of hours worked and informal care here in the same way as in Bolin, Lindgren, and Lundborg (2008b), by running regressions conditional on being employed. I improve the analysis, however, by exploiting the panel structure of the ECHP dataset and running random- and fixed-effects models. Table 9 presents the results from the random-effects model.[15] (Note that the dependent variable is logged hours worked.)

The first column of Table 10 shows that the correlation is negative and statistically significant. We see the same difference as before where countries with more developed formal care, as specified by Spiess and Schneider, seem to have lower correlations between being a caregiver and number of hours worked. However, specifically testing for the significance of this difference in the same way as before reveals that it is not statistically significant. The correlation is nonexistent in the Nordic countries, is highest in the Southern European countries, and the difference between these two groups is statistically significant at the 5 percent level. The result suggests

Table 9 Random-effects model for *care*. Dependent variable is logged hours of work

	(1) Total	*(2) SSA*	*(3) SSB*	*(4) Nordic*	*(5) South*	*(6) Central*
care	-0.029***	-0.021***	-0.035***	-0.012	-0.029***	-0.020**
	(0.004)	(0.007)	(0.006)	(0.007)	(0.006)	(0.008)
Observations	165,033	66,783	77,773	20,894	68,176	49,690
Individuals	43,834	18,734	19,574	5,451	16,710	13,044

Notes: Robust standard errors in parentheses. ***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively. Included as controls are *wage, age, agesq, hhsize, hwage, ch,* and dummies for year, education, marital status, and bad health.

Table 10 Fixed-effects model for *care*. Dependent variable is logged hours of work

	(1) Total	*(2) SSA*	*(3) SSB*	*(4) Nordic*	*(5) South*	*(6) Central*
care	-0.020***	-0.009	-0.023***	-0.010	-0.019***	-0.009
	(0.003)	(0.006)	(0.005)	(0.007)	(0.005)	(0.007)
Observations	165,033	66,783	77,773	20,894	68,176	49,690
Individuals	43,834	18,734	19,574	5,451	16,710	13,044

Notes: Standard errors in parentheses. ***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively. Included as controls are *wage, age, agesq, hhsize, hwage, ch,* and dummies for year, education, marital status, and bad health.

that being a caregiver in the Southern European countries lowers the number of hours worked by 2.9 percent for those who are employed. To account for time-invariant, unobserved, individual heterogeneity, I also estimated the model using the fixed effects estimator. Table 10 presents the results.[16]

As expected, the magnitudes of the effects are lower with this specification, and it can be noted that the coefficients for care are only significant in the Southern European countries and the countries classified as having less developed formal care. I now turn to a discussion of endogeneity and unobserved heterogeneity.

Endogeneity

Why would the results go in the direction proposed here? The work–care relationship is delicate, and it would of course be good to take into account the simultaneous decision making that goes on. The endogeneity problem is important, since one might suspect that caregivers self-select from a pool of underemployed individuals or labor force nonparticipants (Lilly, Laporte, and Coyte 2007). Laura Crespo (2006) argues, however, that the direction of the endogeneity bias is uncertain a priori. There might also be a positive correlation between caregiving and the error term in the participation equation if some women are more active than others and perform a lot of both caregiving and paid work. She actually finds that the effect of informal caregiving on employment becomes underestimated if endogeneity is not controlled for.

Carmichael, Conell, Hulme, and Sheppard (2004) acknowledge the endogeneity problem and try to find the characteristics of people who later became informal caregivers. The strategy is to identify people who started to provide informal care in their two panels and examine their employment histories before and after. Regarding joint endogeneity, they find it to be important for men but not for women, and argue that this may indicate that care provision is less of a free choice for women. Carmichael, Hulme, Sheppard, and Conell (2008) also look at caregivers' employment before and after they start to give care and relate it to hours of care and duration of caregiving spells. They find that many gave up paid work when they started to provide care, especially women. They observed both intensity and duration of a care spell to be important factors in this respect. They also directly asked respondents who provided intensive amounts of care whether they had changed their working behavior due to caregiving. Altogether, 68 percent of the caregivers who were still in employment answered that they had changed their number of paid work hours, and 54 percent said they had changed jobs. The authors thereby conclude that at least some of the employment-related differences between caregivers and non-caregivers are explained by caring.

In the review by Lilly, Laporte, and Coyte (2007), the endogeneity problem does not seem to be a big issue once education, age, and bad health are controlled for. Two studies in their review that used an instrumental-variables approach and where the instruments were found to be valid both failed to show that caregiving is endogenous to women's employment.

Bolin, Lindgren, and Lundborg (2008b) argue that it is likely that the effects of informal care on employment outcomes are overestimated if endogeneity is not controlled for. To investigate the issue, they use an instrumental-variables approach where they apply health of parents, distance to parents' home, and the number of siblings as instruments. They found the estimated marginal effects to be larger (albeit insignificant due to high standard errors) in cases where the instruments were relevant than when care is treated as exogenous. Furthermore, they do not reject the hypothesis that informal care is exogenous, and therefore argue that unobserved heterogeneity and/or reversed causality is unlikely to drive their results.

Heitmueller (2007) also tries to account for the fact that caring and working may be endogenous by using an instrumental-variable approach. He mainly uses the number of sick and disabled persons in the household as an instrument for caring, controlling for the individuals' own health statuses and household incomes. This instrument is correlated with the caring decision and is not likely to impact labor participation other than through caring once personal health is controlled for. However, Heitmueller also includes household income as a control variable since disability may be correlated with poverty, which might influence the paid-work decision. In addition, he includes the following instruments in order to be able to do over-identification tests and increase the correlation in the first stage regression: age of three closest friends, age of parents, and geographic proximity of parents and friends. When treating care as endogenous in the total sample, the effects of caregiving increase substantially. Heitmueller (2007) further argues that the endogeneity is likely to vary between different types of care provision according to the degree of freedom inherent in the decision. The results indicate that there is no endogeneity problem for high-intensity caregivers or for co-residential caregivers. There are indications of a simultaneous endogeneity problem for extraresidential, low-intensity care, although the instruments used were weak in the first-stage regression for this group.

Fevang, Kverndokk, and Roed (2008) argue that the instrumental-variable approach used in previous studies in the field has relied on questionable, potentially invalid, or weak instruments (for example, due to a strong intergenerational correlation in health and labor market performance); they try to assess the causal relationship in another way. Since the heaviest care burden for children arises in the final years of the

life of the last living parent, they look at labor market outcomes during these final years and the years after the death of the parent. They find that children's employment in Norway decreases in the years prior to the death of the last living parent, which they interpret as care causing reduced participation. While this is plausible, it does not reject the hypothesis of there being an endogeneity problem, but only that the whole effect is not due to reversed causality.

Heitmueller (2007) complements the analysis of endogeneity in a panel-data framework by controlling for fixed, unobserved heterogeneity. There, he finds that the effects become overestimated if endogeneity is not controlled for. The parts of the unobserved heterogeneity that can affect both the caring decision and also employment will bias the results if they are not controlled for. Examples of such factors suggested by Heitmueller (2007) are ability and level of altruism. By applying fixed-effects estimators, one can control for the part of the unobserved heterogeneity that is time invariant; assuming that this part is the most important, fixed-effects estimation will then result in unbiased and consistent estimates. The present analysis includes a fixed-effects logit estimation and thereby some of the endogeneity can be said to be controlled for.[17]

Following Heitmueller (2007) and Carmichael et al. (2004), differences in unobserved heterogeneity can be interpreted as also stemming from differences in choice possibilities. That is, when informal care is more of a free choice, we may expect a greater endogeneity problem, since people actually have a choice. If no real choice exists, there can be no simultaneity in the decision. It is noteworthy that in the regressions on number of hours worked, controlling for unobserved heterogeneity led to results that were only significant in the Southern European countries and in the countries with less formal care – that is, in the countries with less free choice for women regarding the care decision.

To sum up, there does not seem to be a strong case for a general endogeneity bias, especially not in the sense that the whole effect is driven by reverse causality. Furthermore, by applying fixed-effects estimations, part of the endogeneity can be controlled for, and the results from that exercise further point in the direction that the effects of informal care are lower in the countries where it is argued that women's free choice is enhanced.

CONCLUSION

Using data from the ECHP, this study finds women's employment to be negatively associated with informal caregiving to elderly. The amounts of both formal and informal eldercare clearly differ across countries; the effects of informal caregiving seem to be more negative in the Southern European countries, less negative in the Nordic countries, and in between in the Central European countries. That is, not only do women in some

countries provide more care, but the care they provide also has a stronger negative correlation with the probability of being employed and the number of hours worked. This study argued that a possible explanation for the phenomenon of lower effects in countries with more formal care and less pronounced gendered-care norms has to do with the lesser degree of coercion in the caring decision. With formal care being a viable alternative, informal caregivers may feel less forced to engage in providing the care that would otherwise harm them in terms of, for instance, decreased employment.

Although welfare regimes are to some extent institutionally resistant to change, their policies are not written in stone. The results indicate that not only childcare but also eldercare should be considered in policies concerning women's employment and work–life balance, and that the EU should integrate eldercare into its policy packages and recommendations.

Further research is definitely warranted on the links between informal eldercare and women's employment, especially the link between numbers of paid hours worked and informal eldercare. Technically, it would be interesting to incorporate more elaborate statistical tools such as panel Heckit models. On the more qualitative side of the analysis, there is scope for further typology building that incorporates work-schedule flexibility and leave rights. Differences among women within countries also merit further analysis since the effects of informal eldercare may differ depending on, for example, social class, ethnicity, or marital status.

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NOTES

1 Familialization of care refers to a process whereby families, rather than the state, are responsible for the care of dependent family members. Welfare states differ in the degree of familialization and some states actively work for de-familialization by taking over responsibilities for care. Proponents of the family democratization thesis view de-familialization as democratizing in the sense that it enables individuals to choose how and with whom to form a family. On the other side of the debate, proponents of the family demoralization thesis argue that de-familialization undermines family solidarity and they advocate a reversal of the process. That is, they long for a process of re-familialization.

2 In total, they analyzed thirty-five studies where one was a multinational European study, one was a Canadian study, and the remaining studies were from the US or the UK.

3 The results are available upon request.

4 The sample restriction is intended to facilitate the identification of the relationship between informal care and employment and to reduce measurement errors. For example, in the dataset there are persons over 80 years of age who are not classified as retired but work for zero hours. A sensitivity analysis was conducted with other age limits, but the qualitative interpretation of the main results was unchanged. The results are available upon request.

5 It should be noted, however, that the results presented here are not completely comparable to those in Bolin, Lindgren, and Lundborg (2008b) since different data sources are used. Most notably, different results may be due to different operationalizations of the Nordic group: while this study uses Denmark and Finland, Bolin, Lindgren, and Lundborg (2008b) use Denmark and Sweden as a proxy for the Nordic countries.

6 In the countries classified as having less-developed formal care, less than 5 percent of the population aged 65 years or older receive formal home care or institutional care.

7 The control variables in this setting include marital status, age, age squared, education, bad health, children, and household wage. For further information, see Table 1.

8 The underlying regressions are available upon request.

9 Note that the specification is slightly changed for this model to work properly. Instead of including *age* and *agesq*, I included nine age dummies. It may actually make sense to drop the age dummies as well, since we cannot distinguish between age effects and time effects. This is so since the model is estimated in differences. In fact, a separate regression was run without age variables, and the interpretation of the results was the same.

10 The results are available upon request.

11 The results are available upon request.

12 The underlying regressions are available upon request.

13 I carried out the tests of significant differences between the groups by interacting *care/carehrs* with Central and Nordic in a pooled regression, letting South be the comparison group (dropping all countries not included in the typologies). The tests of differences between SSA and SSB were carried out in a similar fashion. The test results are available upon request.

14 I performed a final examination of the differences between the country groups by evaluating the effects for caregivers only, and the differences pointed in the same direction. The results are available upon request.

15 I use the same control variables as before, except that hourly wage is added.

16 The underlying regressions are available upon request.

17 Note that Heitmueller (2007) used a different specification: a quasi fixed-effects specification, where lags and leads of the care-dummy variable are included. It is also

important to note that nothing in the analysis controls for time-variant endogeneity. I cannot account for the fact that people might provide care since they are, for instance, temporarily unemployed for nonpermanent reasons.

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