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MIDLIFE CAREGIVING & EMPLOYMENT

AN ANALYSIS OF ADJUSTMENTS IN WORK HOURS AND INFORMAL CARE FOR FEMALE EMPLOYEES IN EUROPE

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AND
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Who will take care of the old in an ageing society?

Studies of employment and caregiving frequently focus on women, who are more likely to engage in caregiving and provide more time-intensive support than men. Research on the relationship between childcare and female labour force participation is particularly replete in the literature. Informal care to older dependents has attracted less attention.

On the other hand, scenarios on the social and economic consequences of ageing frequently conclude that one response to the ageing of the population of the EU will be to increase the participation of women and, more generally, to roll back the tendency towards a lowering of the effective retirement age through less recourse to early retirement. However, in many countries and regions of Europe, women, and notably middle-aged females, are frequently involved in informal caregiving to the elderly and oldest-old. In fact, a low labour force participation rate for women is in many countries associated with a relatively low level of development of formal, institutionalised caregiving for the elderly.

The vast majority of empirical work in this area relates to the US and Canada. However, more recently research on the implications of the process of ageing has now sparked off research in this field on this side of the Atlantic. In this ENEPRI Working Paper, **Katharina Spiess and Ulrike Schneider**, using data from the European Community Household Panel, investigate eldercare and employment in 12 European countries. They focus in particular on the association between changes in weekly work hours and changes in weekly care hours for women aged 45 to 59.

They find indeed that starting or increasing informal caregiving is normally associated with a reduction in the number of hours worked per week. On the other side there does not appear a positive effect on hours worked for women terminating a caregiving spell or reducing care hours. This suggests that, among midlife women, reductions in work hours or exits from the labour force in order to provide care to family members are unlikely to be reversed after terminating care giving responsibilities.

The (negative) link between start of caregiving and a working time reduction seems to be particularly strong in Northern European countries where formalised home care is more frequent and where re-entry into the labour market may be easier. In Southern Europe and Ireland, where the female participation ratio is comparatively low, the association between caregiving and labour market participation is significant if an already existing care activity is intensified. However, scenarios assuming an increase in the female labour force participation rate in response to the ageing of population clearly ought to take account also of the need to replace the resulting decline in informal family care by the development of appropriate formal home or institutionalised care for the elderly.

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C. KATHARINA SPIESS & ULRIKE SCHNEIDER*

Abstract

This study examines eldercare in private households and the employment behaviour of female caregivers in Europe. Based on the first three waves of the European Community Household Panel we estimate probit-models to analyse the probability of caregiving and we use a simplified difference-in-difference approach to explain the correlation between changes in caregiving behaviour and changes in working hours. We restrict our sample to middle-aged women in 12 EU-countries. In order to control for country-effects we include country dummies in our models. In addition, we run separate estimations for northern European countries on the one hand and southern European countries on the other hand. We find a significant negative association between starting or increasing informal caregiving and the change in weekly work hours. No such association emerges for women terminating a caregiving spell or reducing care hours.

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CONTENTS

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1. Introduction

Long-term care policy in all OECD countries currently focuses on home care in general and family care in particular, which are considered cost-effective settings to provide for the frail elderly. However, a variety of studies show that informal care implies considerable monetary and non-monetary cost for family caregivers. The indirect cost of family caregiving consist in a compression of leisure and social activities as well as in forgone employment opportunities. This paper explores the relationship between caregiving and employment. The question to be answered is whether informal care is adversely related to employment. If this were the case, there would be empirical grounding for the deepening concerns with the increase in women's labour force participation and how it will effect the future supply of family caregiving.

Studies of employment and caregiving frequently focus on women, who are more likely to engage in caregiving and provide more time-intensive support than men. In addition, women tend to be confronted with a sequence of care demands over their adult life cycle, starting with childcare and followed by care of spouses, frail parents and grandchildren. Thus far, research and policy interest in family labour has focused on the earlier stages of the family life cycle, whereas informal care for older dependents has attracted less attention. Empirical evidence on the relationship between employment and caregiving remains particularly scarce in Europe.

Our analysis uses data from the European Community Household Panel to investigate eldercare and employment in 12 European countries. We describe the association between *changes* in weekly work hours and *changes* in weekly care hours for midlife women. The models control for policy variation across groups of countries.

2. Theoretical Backdrop

The relationship between caregiving and work has been studied in the labour supply, home production and caregiving literatures. A variety of contributions embark on microeconomic time allocation theory to derive testable hypotheses for the time use patterns of caregiver households. The parent-care model presented by Johnson and Lo Sasso (2000, 5-10) provides

an illustration. The model focuses on the caregiver household, which is the household of an altruistic adult child to the dependent. With altruism, the utility function of the caregiver accounts for the utility derived from own consumption and for the utility derived from the well being of the care recipient. The maximisation problem of the caregiver is subject to the familiar budget constraint and a time constraint.

The time allocation model suggests a variety of factors that determine the strength of the relationship between work hours and care hours. It implies that decisions on work hours and care hours are interrelated, because caregiving and employment compete for the caregiver's time resources. The model predicts that caregivers allocate their time in a way that an additional hour of time in either paid work, leisure or caregiving generates the same utility. An increase in the marginal utility of caregiving (ceteris paribus) prompts a reduction in work hours and leisure and vice versa. The value of an hour of the caregiver's time spent in paid employment can be measured by the wage rate. The marginal value of caregiving depends on factors such as the care-recipient's health status, the hours of care provided by third parties and the prices of market substitutes for informal care.

Time allocation models rest on a standard set of assumptions from microeconomic theory, such as rational and unrestricted choice (Kooreman and Wunderink 1997). This implies that caregivers could realise any combination of work and care hours. *"However, carers may not be able to achieve their preferred choice because of either resource constraints on residential or domiciliary care or ... because a personal optimum is not socially efficient."* (Smith and Wright 1994, 140).

Rationing is a very real possibility in the case of elderly care. A caregiver might want to share his responsibility with other family members. Yet, this option depends on the size and structure of kin-networks. Social norms and traditions that relate to family caregiving further restrain caregivers' choices. Institutional factors such as collective bargaining agreements and legal provisions on part-time and flexitime work or organisational factors are likely to interfere with a flexible and smooth adjustment of work hours. Finally, informal caregivers who would prefer to purchase formal care services may find such services to be inadequate or on short supply. Waiting lists for placements in nursing homes or day care centres are indicative of rationing.

In summary, a complete structural model of the work-caregiving relationship should allow for simultaneous decisions on both activities. In the ideal case, the estimation of such a model

would also account for the impact of workplace factors and factors that pertain to the supply of formal care on the work-care association. Estimating such a model is empirically challenging. Our approach to the issue is just a first step towards a more complex, structural model. In this paper we are content to describe the correlation between *changes* in work hours and *changes* in the caregiving status. The analysis does, however, devote some attention to institutional factors that determine the work-care relationship. It is the advantage of multinational analysis to introduce variation in the policy environment. More specifically, using pooled data from 12 countries allows to control for the provision of long-term care services and caregiver benefits (see section 4).

3. Past Research

The empirical literature offers mixed findings on the relationship between transfers of time and money on the one hand and employment on the other. Transfers appear to affect work behaviour differently in different stages of the life cycle and also depending on whether support mainly consists in financial transfers or time transfers. Soldo and Hill (1995) hypothesise that financial support of dependents tends to encourage paid work, whereas time help is supposed to affect employment in an adverse manner. Another possible reason for patchy conclusions on the work-care relationship is the great diversity of research designs used in investigating the problem.

The majority of studies on the relationship between employment and time help to older dependents have either treated employment status or caregiving status as exogenous[1]. In the former case, the analysis tests for negative impacts of employment on the odds or intensity of informal care. This "caregiving crunch" hypothesis has little grounding in empirical evidence[2]. In like manner, caregiving status has been used as an exogenous predictor of employment, generating inconclusive results[3]. To the extent that decisions on paid work are interrelated with decisions on adult care these approaches imply a simultaneity bias.

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1 See Wolf and Soldo (1994, 1260-62) and Pavalko and Artis (1997, S170-S171) for a brief review and discussion of the literature.

2 See, for example, studies for Canada (Rosenthal et al. 1999) and the U.S. (Starrels et al. 1995, Gerstel and Gallagher 1994, or Brody and Schonoover 1986).

3 Pavalko and Artis (1997) and Mutschler (1994), for instance, find that time-help adversely affects work hours. Franklin et al. (1994) show that caregiving prompts short-term rather than long-term adjustments at the workplace.

Also, past research on employment and caregiving has often used samples of workers or non-probability samples of caregivers. In these cases, findings are subject to selectivity bias. Studies, for instance, that focus on persons who are both employed and caregiving miss *potential* caregivers among employees as well as caregivers that were forced to give up employment in order to meet the care-recipient's needs. Furthermore, the sample design also by-passes persons who are either looking for work or opting out of work for reasons other than caregiving commitments.

Simultaneous estimates of employment and caregiving for the U.S. have been presented by Wolf and Soldo (1994), Ettner (1995) and Johnson and Lo Sasso (2000). Wolf and Soldo do not find a significant negative relationship between caregiving and employment. Ettner as well as Johnson and Lo Sasso report large and significant negative effects of caregiving on work hours. Johnson and Lo Sasso use longitudinal data from the 1994 and 1996 waves of the Health and Retirement Survey and focus on parent care. Schneider and Wolf (2000) present evidence for Germany. They investigate the impact of caregiving to adults (irrespective of family bonds), building on cross-sectional data from the European Community Household Panel. Their bivariate Probit model controls for both, simultaneity and selectivity. Schneider and Wolf find a small but insignificant trade-off between caregiving and employment. Among the explanations offered for this result one relates to sample size (n = 227). Therefore, it will be intriguing to conduct further estimations for Europe, using the full ECHP data set.

Our own analysis (see section 4) constitutes a first move into this direction. The sample design tries to avoid selectivity bias. However, we do not test a model of simultaneous decisions on work and care hours. The aim is to provide descriptive information on the correlation between *changes* in work hours and *changes* in care hours. We do not pretend to use any structural model or explain a causal relationship in one or the other direction. In our further methodological approach, we follow Pavalko and Artis (1997) who study the relationship between *changes* in work hours and *changes* in caregiving. We will now briefly summarise the research strategy and findings from their paper. Next we will present our own endeavour to replicate and improve their approach with European data.

Pavalko and Artis use the 1984 and 1987 waves of the National Longitudinal Survey (NLS) of Mature Women to analyse changes in care status and in usual work hours over a three-year period. Their estimation sample includes women age 50 to 64 in 1987 caring for husbands, ill or disabled children, parents, or grandchildren. The authors estimate the likelihood to start

caregiving in 1987 and proceed with estimating the association between working hours and caregiving. Four groups of independent variables are used in the estimation: demographic controls, caregiving status (in the employment estimation), employment variables (status, hours, wages, satisfaction) and work history variables.

Findings from this study show that the initiation of caregiving is independent of employment status. Employed women and women with a higher work status were as likely to start caregiving as other women in 1987. Job tenure displays a positive, though marginal, effect on the odds of caregiving, which supposedly reflects better chances of workplace flexibility. The impact of caregiving on work hour changes (hours in paid work) is asymmetrical depending on whether caregiving is being taken up or terminated: starting caregiving adversely affects work hours, while stopping care provision is not associated with resuming usual work hours.

Our analysis for Europe reproduces Pavalko and Artis' study with regard to sample design and the main issues considered: It focuses on women age 45 to 59 and studies the likelihood of becoming a caregiver, the incidence of labour force participation, the frequency of dual work care commitments, and the correlation between changes in work and changes in caregiving. It should be made clear, however, that we take a different approach to estimating the association between work hours and care hour changes than Pavalko and Artis, whose empirical model is unsatisfactory in this respect.

To study the association between work hours and care hour changes, Pavalko and Artis regress usual weekly work hours in 1987 on a vector of independent variables, using 1984 work hours as a right-hand side control variable. In doing so, they interpret independent variables in terms of their effect on *changes* in work hours. Formally, they posit the following empirical model $y_{t+3} = \beta_0 + \beta_1 \cdot y_t + \beta_2 \cdot X + \varepsilon$, where y denotes work hours, X is the vector of other independent variables and t is a time index. This "regressor-variable approach" is widely used in sociology. It neither represents a bivariate nor a Heckman two stage type of model.

The study of Pavalko and Artis compares (a) female employees with and without caregiving responsibilities and (b) female caregivers in paid employment to care providers who are not employed. Moreover, their empirical model exploits the panel quality of data. Looking at *changes* in work and care hours individuals are supposed to serve as their own controls.

We hold, however, that Pavalko and Artis' model is not equivalent to regressing the change on work hours on the same vector of control variables and, more importantly, that it might

cause problems of serial correlation[4]. Therefore, we base our empirical analysis for Europe on a simplified version of a difference-in-difference approach. The major distinction between the latter and the regressor-variable approach concerns the dependent variable, which in our model is the true difference between the work hours at the two points of time. Hence, the work hours at the beginning of the observation period enter the left hand rather than the right hand side of the equation. The next section details the data, method, and variables underlying our estimations.

4. Empirical Analysis

4.1 Data

The analysis is based on data from the European Community Household Panel (ECHP), a large-scale longitudinal survey set up and funded by the European Union[5]. The first wave of data was collected in 1994 in twelve countries, using a standardised questionnaire. Additional waves followed in each of the subsequent years. The ECHP offers data on individual characteristics, household composition, income and expenditure, education, employment and unemployment, various measures of life satisfaction. A small range of questions is related to childcare and to the care of adults who need special help because of old age, illness or disability. The survey focuses on regular caregiving to persons living in the same household or elsewhere. It identifies caregivers among adult household members (age 16 and over) and provides information about the average weekly hours of caregiving. However, the survey does neither ask for characteristics of care-recipients other than their co-residence status nor for the use of formal care services.

Nevertheless, ECHP data offer considerable advantages for our analysis. To begin with, the data are not subject to selectivity bias and thus allow to consider several counterfactual states: employment and caregiving, employment and no care, no employment but caregiving, and neither employment nor caregiving. Secondly, national panels in Europe often fail to ask whether a person is involved in caring other than childcare. Surveys that account for adult

[4] There would be serial correlation if, for example, there were a "fixed effect" in y, making y_t correlated with the error term in the equation for y_{t+3}.

[5] For further details see EUROSTAT (1996a,b), Clémenceau and Verma (1996) and http://forum.europa.eu.int/Public/irc/dsis/echpanel/library.

care do not always provide a measure of care intensity[6]. In addition, the information on the individual care responsibilities can be linked with the entire set of employment questions addressed at each individual age 16 and older. Furthermore, the ECHP is relatively large compared to some other data sets: more than 12.000 middle-aged women participated in the 1994 survey. Last but not least, due to the concept of "input harmonisation" that underlies the data collection, our results are directly comparable across countries.

The following countries participated in the 1994 survey: Denmark, the Netherlands, Belgium, Luxembourg, France, the UK, Germany, Ireland, Italy, Greece, Spain and Portugal. Austria, Finland, and Sweden joined the ECHP in 1995 (wave 2), 1996 (wave 3), and 1997 (wave 4) respectively. We analyse changes over time of both work hours and caregiving hours. In order to capture a fair number of transitions between the various care modes, we consider changes over the two-year period 1994 to 1996[7]. This implies that only the twelve countries that participated in the first three waves of the ECHP can be included in the analysis, while Austria, Finland and Sweden are missing.

4.2 Method and Measures

Our analysis builds on maximum-likelihood probit estimation and ordinary-least square regressions. First, we estimate probit models analysing (a) if a woman commits herself to caregiving and (b) whether a person starts providing more than 14 hours of caregiving per week. In each case the dependent variable is a dummy that takes on the value of 1 for the two positive outcomes "starts caregiving" or "starts high-intensity caregiving".

The predictors entering the probit models fall into two categories. The first category of predictors comprises micro-level variables relating to individual characteristics and circumstances at the time of the first interview in 1994 (age, education, nationality, health, employment status, family status and household type)[8]. The second category includes macro-level variables. We use the ratio of the population 65 and older to midlife women as a proxies of the informal care demand in each of the 12 countries under study, the female

[6] The German Socio-Economic Panel, for instance, does not ask how much time individuals spend on caregiving. The caregiving commitments for individual household members can only be derived from the information that was obtained on the care needs of other household members.

[7] The 1997 wave was not available for the scientific community at the time when we finished our empirical work.

[8] If a women started caregiving, these controls reflect a non-caregiver status in 1994 and a caregiver status in 1996.

unemployment rate, variables capturing the influence of long-term care policy and country-group dummies.

Countries are grouped according to female labour market participation and according to the relative importance of institutional care on the respective long-term care policy agendas[9]. The institutionalisation rates for the older population refer to the early 1990s. We discern seven country groups, where the two "groups" at the poles include only one country each: Denmark is the one extreme, with a very high proportion of older persons living in institutions and a female labour market participation high above the EU-average. Greece is located at the opposite pole and is characterised by an almost marginal proportion of institutionalised elderly and a female labour force participation that is markedly below average.[10]

A second set of estimations uses OLS regressions to explore the association between changes in work hours and changes in caregiving hours. The question on the usual weekly caregiving hours was bracketed in the first wave of the ECHP. Therefore, changes in caregiving have to be measured as changes between three levels of care intensity. Adjustments in employment, by contrast, can be measured by the hour. Thus, the dependent variable is the change in weekly work hours, that is, work hours in 1996 minus work hours in 1994. Formally, the model we are using can be described as follows: $y_{t+2} - y_t = b_0 + b_1 \cdot Z + b_2 \cdot X_t + e.$ In the equation, y again denotes work hours, t is a time index, X is a vector of independent variables describing the starting situation and Z is a vector of independent variables capturing the change in either care status or care intensity from t to t+2.

This empirical model takes full advantage of the caregiving information in the data. Most importantly, it makes use of the information on the intensity of caregiving, which is exceptionally rare in most large scale, representative household surveys. Using bivariate probit estimations would confine the analysis to incidents of change, that is, to studying the likelihood of starting, stopping caregiving or the probability of changing work hours. The difference-in-difference model, by contrast, allows to account for the level (intensity) of

[9] For a further description of the various European long-term care policies, see for example, Hutten and Kerkstra (1996).

[10] In the early 90s the proportion of elderly people receiving long-term care in institutions in Denmark ranged between 5.5 and 6.4 percent while the corresponding proportion for Greece was less than 1 percent (Royal Commission on Long-term Care, 1999: 161). Denmark reported the highest (76 percent) and Greece one of lowest rates (44 percent) of female labor force participation in 1994 (Europäische Kommission 1999).

changes in work hours. In addition, while bivariate models certainly have their own merits, they are also subject to a very restrictive set of assumptions. Yet, we also have to concede that the results obtained from difference-in-difference estimations are subject to bias if unobserved variables vary over time.

Independent variables in the OLS regressions greatly overlap with the predictors in the probit estimation. The two modifications in the vector of independent variables concern 1994 work hours and variables pertaining to caregiving. In the OLS models, 1994 work hours enter the left hand-side of the equation. Furthermore, we add five substantive independent variables which are dichotomous and capture changes in the caregiving status and caregiving intensity from 1994 to 1996: (i) whether the respondent stopped caregiving, (ii) whether she started care provision, (iii) whether she increased, (iv) decreased her care intensity, (v) did not adjust caregiving hours at all or (vi) did neither report caregiving in 1994 nor in 1996.

Table 1 shows the means and ranges of the independent variables that were included in the probit and OLS models.

Table 1. Description of Independent Variables

Name	Description	N	Range	Mean	SD
Socio-Demographic 1994					
Age	Age	12,027	43-57	49.55	4.30
Age_2	Age squared	12,027	1,849-3,249	2474.38	429.51
Education	Second/Third level education = 1	12,027	0-1	0.38	0.49
National	Nationals = 1	12,027	0-1	0.98	0.14
Married	Married = 1	12,027	0-1	0.82	0.38
Unwed	Never Married = 1	12,027	0-1	0.05	0.22
Health	Housework limited by health =1	12,027	0-1	0.13	0.33
Children_12	Child(ren) younger than 12 years of age in household =1[#]	12,027	0-1	0.12	0.32
Children_15	Child(ren) 12 – 15 years of age in household =1[#]	12,027	0-1	0.13	0.34
Caregiving					
Start Care	Start Caregiving in 1996	12,027	0-1	0.06	0.23
Stop Care	Stop Caregiving in 1996	12,027	0-1	0.08	0.28
Both care	Caregiving in 1994 and 1996	12,027	0-1	0.06	0.25
Increase Care	Increase in care hours from 1994 to 1996 (and bothcar=1)	12,027	0-1	0.01	0.12
Decrease Care	Decrease in care hours from 1994 to 1996 (and bothcar=1)	12,027	0-1	0.02	0.13
Stable Care	No change in care hours from 1994 to 1996 (and bothcar=1)	12,027	0-1	0.03	0.18

[#] As these variables are not included in the 1994 wave, this information refers to 1995.

Note: Table continues on the following page.

Table 1, continued

Name	Description	N	Range	Mean	SD
Employment Characteristics 1994					
Employed	Employed	12,027	0-1	0.50	0.50
Wage	Current wage and salary earnings (net. monthly), logged	5,056	-0.83-4.49	1.48	0.87
Vulnerability	Ability making ends meet (6 = very easily)	5,056	1-6	3.65	1.27
Satisfaction	Satisfaction with leisure time (6 = fully satisfied)	5,056	1-6	3.91	1.43
Employment History 1994					
Unemployed	Former unemployment period = 1 (only if hours >= 15)	5,056	0-1	0.14	5.48
Tenure	Years in current job (since 1980)	5,056	0-14	9.49	5.48
Macro-Level variables					
Dep. Ratio	Dependency ratio (elderly population/ midlife aged women) 1994	12,027	1.17-1.39	1.28	0.07
Unemp. Rate	Female unemployment rate 1994	12,027	4.1-31.4	14.30	7.12
Country Group1	Denmark (a) high/ (b) above*	12,027	0-1	0.05	0.21
Country Group2	Netherlands, Luxembourg (a) high/ (b) below*	12,027	0-1	0.09	0.28
Country Group3	Germany, France, UK (a) modest/ (b) above*	12,027	0-1	0.26	0.44
Country Group4	Belgium, Ireland (a) modest/ (b) below*	12,027	0-1	0.11	0.32
Country Group5	Portugal (a) small/ (b) above*	12,027	0-1	0.10	0.30
Country Group6	Italy, Spain (a) small/ (b) below*	12,027	0-1	0.30	0.45
Country Group7	Greece (a) very small/ (b) below*	12,027	0-1	0.11	0.31

Source: ECHP, 1994 and 1996 (midlife women), own calculations.

Note: * Country Groups are classified according two main characteristics: (a) proportion of older persons living in institutions (high, medium, small or very small) and (b) female labour market participation (above or below EU-average).

4.3 Results

4.3.1 Patterns of caregiving and employment across EU-countries: Descriptive statistics

So far, empirical studies of employment and caregiving almost entirely relate to North America and results vary depending on the type of data used. Some analyses build on samples of caregivers, while others use samples of employees, where both approaches confront selectivity problems. Evidence from caregiver samples find 30 to 40 percent of U.S. caregivers to be employed. Surveys on the corporate level show that at least 8 percent of U.S. employees face dual work and caregiving responsibilities (Fast, Williamson, and Keating 1999, 312; Tennstedt and Gonyea 1994).

These estimates for North America account for male and female caregivers and consider employees of all age groups. However, similar to Europe, in the U.S. care to older dependents is predominantly provided by middle-aged and older women. Hence, evidence from the U.S. still provides a useful backdrop for our analysis of midlife women (age 45 to 59) in twelve EU countries. Among European midlife women with caregiving commitments (see below) more than 40 percent spend time in paid work, which is consonant with U.S. evidence. There is, however, considerable variation in the employment and caregiving patterns across Western Europe.

At first glance, employment and caregiving appear to be negatively related. On average, one of two women in this age group participates in the labour market, one in seven women provides care, and one in 16 women - some 6 percent of all women - combine employment and caregiving (see Table 2). Countries displaying the highest labour force participation rates for midlife women report relatively low proportions of caregivers in the very same group and vice versa. The top three countries with regard to labour force participation of midlife women are Denmark, the UK and Germany. Caregiving is most prevalent in the southern European countries of Italy, Spain and Greece.

Table 2. Labour Force Participation and Caregiving Commitment: European Midlife Women, 1994 (row percentages)

	Midlife Women	Proportion of women working	Proportion of women caring	Proportion of women doing both
	N	%	%	%
EU12	12,526	49.3	15.1	6.1
Belgium	614	51.5	14.6	5.8
Denmark	567	75.8	10.1	7.1
Germany	1,089	60.9	14.3	7.2
Greece	1,285	40.9	17.4	8.4
Spain	1,520	31.4	19.3	4.7
France	1,447	57.2	8.5	3.6
Ireland	842	32.0	16.8	4.0
Italy	2,056	40.5	21.6	7.2
Luxembourg	223	43.2	11.0	3.4
The Netherlands	860	50.5	14.5	5.6
Portugal	1,276	57.6	8.2	4.6
United Kingdom	*747*	71.3	16.4	10.2

Source: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

Table 3. Employment Status of Caregivers 1994:European Midlife Women, 1994 (row percentages)

	Caring at all			Caring more than 14 hrs		
		Employed	not employed		Employed	not employed
	N	%	%	N	%	%
EU12	1,861	40.1	59.9	1,193	32.1	67.9
Belgium	92	39.8	60.2	39	32.3*	67.7
Denmark	54	70.6	29.4*	8	/	/
Germany	157	50.0	50.0	87	43.0	57.0
Greece	233	48.4	51.6	151	44.2	55.8
Spain	277	24.5	75.5	229	24.1	75.9
France	118	42.7	57.3	44	/	80.9
Ireland	139	23.7	76.3	101	/	90.9
Italy	424	33.4	66.6	322	27.0	73.0
Luxembourg	24	31.0*	69.0*	8	/	/
Netherlands	119	38.6	61.4	43	41.3*	58.7*
Portugal	99	56.3	43.7	90	54.6	45.4
UK	*125*	62.4	37.6	*71*	51.9	48.1

Note: (/) N ≤ 10; (*) N = 11-30
Source: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

A similar country pattern emerges when focusing on the subsample of caregiving women (Table 3). With the exception of Portugal and Ireland, the differences in the prevalence of

work and caregiving appear as difference between north and south. Table 3 also shows that, on average, the percentage of women combining employment and caregiving is markedly lower when the intensity of caregiving exceeds 14 hours per week. In the U.K. there is a difference of 10 percentage points in the labour force participation rates of the "full" and the "high-intensity" caregivers. However, this relationship is not equally pronounced in all countries considered. Where the overall percentage of working caregivers is low, it is hardly conceivable at all.

Table 4. Frequency of Changes in Caregiving Hours and Work Hours 1994-1996 (as a percentage of women caring/working in 1994)

	Changes in categories of care hours	**Changes in work hours**
EU12	78.0	65.9
Belgium	75.6	66.3
Denmark	57.7	41.0
Germany	75.4	61.4
Greece	87.6	81.1
Spain	80.8	75.5
France	74.3	61.6
Ireland	71.0	79.5
Italy	83.6	58.9
The Netherlands	71.1	58.4
Portugal	74.2	71.6
United Kingdom	73.2	69.7
N	1,787	4,965

Note: Luxembourg is missing due to sample-size problems.

Source: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

Table 4 presents the incidence of changes in caregiving hours and work hours from 1994 to 1996. On average, three quarters of all women that were providing care to an adult dependent in 1994 have adjusted their weekly hours of caregiving over time. A "change in caregiving hours" is defined as a move between three levels of caregiving intensity: 1 to13 hours, 14 to 28 hours and more than 28 hours of caregiving per week.

Again, there is considerable cross-country variation in the percentages of women that report such changes (less than 60 percent of female caregivers in Denmark but close to 90 percent of Greek women report such adjustments). Two thirds of women that were working at the time of the first interview adjusted the number of hours worked per week, with a cross-country variation of 30 percentage points between Denmark (50 percent) and Greece (80 percent).

Adjustments in caregiving and employment can also be expressed in terms of the direction of the changes in the caregiving or employment status between the first interview in 1994 and the 1996 interview (Tables 5 and 6).

Table 5 .Frequency of Change in Caregiving Status and Caregiving Intensity 1994-1996 (N=12,027) (row percentages)

	No care at all	**Caring**				
		No change	**Decrease**	**Increase**	**Stop care**	**Start care**
EU12	79.35	3.32	1.89	1.42	8.46	5.57
Belgium	78.21	3.60*	/	/	8.33	7.03
Denmark	84.82	4.19*	/	/	4.40*	5.29*
Germany	80.00	3.54	2.03*	1.73*	7.07	5.62
Greece	78.20	2.16*	1.69*	1.55*	12.00	4.40
Spain	74.04	3.66	1.86*	2.61	10.88	6.94
France	87.35	2.19*	1.17*	/	4.58	4.11
Ireland	78.08	4.85	1.84*	1.20*	9.07	5.22
Italy	72.53	3.59	4.60	1.36*	12.29	5.63
The Netherlands	77.40	4.15	/	1.54*	8.04	8.22
Portugal	87.13	2.08*	/	/	4.32	4.83
United Kingdom	78.31	4.39	1.73*	1.54*	8.70	5.32

Note: (/) N ≤ 10; (*) N = 11-30, Luxembourg is missing completely due to sample-size problems.

Source: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

Among the 20 percent of midlife women who were caregiving in at least one of the years 1994 or 1996, most experienced a change in either care status *or* caregiving hours. More women who report adjustments, terminated a caregiving spell or decreased hours than started or increased informal caregiving. Only 3 percent did not experience any changes in their caregiving commitment. Yet, women in the latter group may still have adjusted their time input (and the type of help provided) within the distinct intervals of caregiving hours.

Looking at individual countries, the absolute number of women in the sample who decrease or increase caregiving hours between 1994 and 1996 (in terms of changing between low-,

medium- or high-intensity caregiving) is very small. With the exception of Italy less than 2 percent of caregivers in each country report a decrease in the intensity of caregiving. Similarly, less than 2 percent have increased their care hours (with the exception of Spain). This underlines the advantage of clustering countries for the analysis.

Table 6. Frequency of Change in Employment Status and Work Intensity 1994-1996 (N=12,027) (row percentages)

	Not employed	**Employed**				
		No change	**Decrease**	**Increase**	**Stop work**	**Start work**
EU12	45.45	16.88	13.67	12.17	6.82	5.01
Belgium	46.47	17.34	16.15	12.15	5.60*	2.16*
Denmark	20.70	37.21	16.50	14.47	7.81	3.30
Germany	34.06	23.57	18.86	12.24	6.41	4.86
Greece	52.34	7.73	12.80	10.07	10.27	6.79
Spain	64.84	7.72	9.01	8.06	6.65	3.72
France	36.88	22.20	14.79	13.80	7.03	5.30
Ireland	58.84	6.81	9.31	10.50	6.57	7.96
Italy	55.06	17.36	8.73	10.29	5.81	2.76
Luxembourg	55.44	17.16	9.98*	6.90*	8.76*	/
The Netherlands	43.28	20.96	12.88	13.96	2.55	6.38
Portugal	36.52	16.00	19.08	14.02	7.25	7.11
United Kingdom	22.66	21.65	20.28	21.64	7.74	6.03

Note: (/) N ≤ 10; (*) N = 11-30, Luxembourg is missing completely due to sample-size problems.

Source: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

A higher share of women in the sample is employed in 1994 or 1996 when compared to the percentage of women that engage in caregiving at some point of time. Therefore, there is no "small-n-problem" when it comes to analysing an adjustment in weekly work hours for singular countries, except for Luxembourg and Belgium. The majority of women in paid employment in the EU 12 do adjust weekly work hours. Again to stop working or to decrease work hours are more prevalent than taking up a paid employment or increasing work hours. The same overall pattern holds for individual countries. Yet it appears that in southern European countries and in Ireland, where the percentage of women working in at least one of the two years under study is relatively small, so is the percentage of women who do not adjust their hours.

There is more cross-country variation in the frequencies of different types of changes in employment than was the case for changes in caregiving. One possible explanation for this difference is that changes in work hours can be measured continuously. In any case, the frequencies for the changes in employment and informal care display an interesting communality. On average, midlife women tend to rather reduce than expand time spent on these two "productive" activities. This behaviour does not fit into the picture of an adverse relationship between work and informal care, where one activity should increase (decrease) at the expense (to the benefit of) the other.

Table 7. Changes in Caregiving and Employment for the EU12. 1994-1996 (N=12,027) (row percentages)

Employment Change Caregiving Change	Not working both times	Start working	Working, no change	Working, hours increase	Working, hours decrease	Stop working
Not caregiving both times	43.6	4.9	17.9	12.8	14.0	6.8
Start caregiving	50.1	4.6	14.6	9.8	12.7	8.4
Caregiving. No hours change	58.4	4.9	13.4	8.9	10.9	3.5
Caregiving. Hours increase	45.0	5.1	12.3	11.5	15.0	11.2
Caregiving. Hours decrease	56.9	6.2	10.4	11.1	10.4	5.1
Stop caregiving	52.7	5.9	12.0	9.9	12.9	6.7

Source: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

Table 7 describes – over a two-year interval - the bivariate relationship between changes in informal caregiving and changes in employment[11]. It shows that changes in caregiving status or care intensity only partly overlap with changes in employment. Nonetheless, some of the frequencies reported in the table conform to the hypothesised negative trade-off between caregiving and employment:

[11] Not shown in the table is the (significant) result of the Pearson chi-square test, which indicates that the rows and columns of table 7 are independent.

- The percentage of women that did neither work in 1994 nor in 1996 is higher for caregivers than non-caregivers. This might suggest that caregiving is conducive to maintaining a given non-working status.
- Among women who start caregiving, a smaller fraction than in any other group (4.4 percent) also starts working, although the differences are very small.
- The transition from a non-working status to employment occurs most often when women reduce caregiving hours or stop caregiving altogether.
- Non-caregivers more frequently stick to their schedules and are also more apt to increase the hours worked per week than any group of caregiving women.
- The share of women who decrease work hours and the percentage reporting transitions into a non-working status are both times highest in the group of respondents with an increasing intensity of caregiving.

Still, a relatively sizeable proportion of caregiving women starts both - caregiving and working, increases both – work hours and caregiving hours, or reduces work effort along with care effort. Even if it concerns only a minority of all cases, this behaviour could point to additional financial needs and economic strain that are related to a caregiving responsibility.

A closer look at table 7 reveals that changes in the opposite direction dominate the picture for caregivers that start or increase caregiving commitment: they rather decrease than increase work hours and more often stop than start working. This pattern breaks when caregiving is terminated. In this case adjustments in both activities tend to run parallel to each other: Higher percentages of respondents decrease rather than increase work hours and stop rather than start working. Hence, the response of employment to changes in caregiving appears to be asymmetrical.

Table 8. Size of Change in Work Hours by Changes in the Care Mode
(N=12,027) (in hours per week, EU-means)

	All	Start caregiving	Stop caregiving	Both caregiving	Not caregiving
Reduced Hours	-9.5 hrs	-9.5 hrs	-9.7 hrs	-9.6 hrs	-9.5 hrs
Increased Hours	8.9 hrs	9.5 hrs	10.5 hrs	9.7 hrs	8.6 hrs

Source: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

Table 8 reports the mean hours of reductions and increases in weekly work hours for the entire sample, for different sub-samples of caregiving women and for women who were not caregiving in the period under study. The average reduction in work hours for midlife women in the EU 12 between 1994 and 1996 amounts to 9.5 hours per week. On average, non-caregivers in the sample reduced their work hours by exactly the same amount. With regard to the mean increase in work hours, all sub-samples of caregivers show above average increases, whereas non-caregivers slightly fall behind. The average increase in work hours is highest for women who stopped caregiving altogether (10.5 hours) and for women who were providing care in both years (9.7 hours). However, the differences are not significant big.

Taken together, no clear pattern emerges from the descriptive statistics for the relationship between changes in caregiving and changes in work hours. On the one hand, we find that work hours increase markedly as the provision of informal care is terminated, which supports an adverse relationship between employment and caregiving for midlife women. On the other hand, the reduction in work hours for employed women who start caregiving and for women who were working in 1994 and 1996 is well in line with the average decline in work hours. More importantly, the *increase* in work hours for the same two subgroups of employed caregivers even exceeds the sample average. The potential economic strains of caregiving offer an explanation for this fuzzy picture. The primarily negative relationship between changes in caregiving and changes in work hours could be mitigated if economically distressed caregivers are forced to increase their weekly work hours. Hence a secondary effect of caregiving on work hours might unfold through the economic circumstances of caregivers and care recipients.

The following sections will build on multivariate procedures to further explore the relationship between employment and caregiving. We will first examine factors that determine the likelihood of caregiving using probit analysis, paying special attention to employment status and the weekly workload.

4.3.2 Probability of Caregiving: Multivariate Analysis

Tables 9 and 10 show the results of the probit estimations. The predictive power of the models is low, ranging from a Pseudo-R^2 of 5 percent (for the odds of high-intensity caregiving) to a Pseudo-R^2 of 1 percent (for the odds of caregiving at all). This comes to no surprise, given that we could not include the information on the characteristics of the care-recipient. There is sound empirical evidence that the odds and intensity of caregiving are

need-driven[12]. If there were a way to include information on the functional status of the care recipient, the explanatory power of the models would – most probably - increase considerably. For some of the ECHP countries (i.e. Germany), such information can be derived from additional country specific variables. However, our analysis for the EU12 has to dispense with these predictors.

In a similar vein, information on the size and structure of the kin network would greatly enhance the explanatory capacity of the model. Empirical evidence for the US points to differences in the division of care tasks across different types of sibling groups, which are categorised by size and gender mix. A variety of literature indicates that the number of female relatives and the resource distribution in the extended family are significantly related to the likelihood of caregiving. Wolf, Freedman and Soldo (1997) as an example, show that the higher the number of sisters of a potential caregiver, the less likely that caregiver is to be engaged in parent care. Women with sisters devote significantly less time to parent care, whereas the number of brothers does not affect care effort.

Furthermore, the model does neither include controls for the economic status of the caregiver household nor for the financial status of care recipients. Income and wealth variables have been found to be of minor (if any) importance for the likelihood of caregiving[13]. Yet, they may affect the employment and caregiving relationship for pockets of economically distressed households and may also gain importance over the course of a caregiving relationship[14]. We still decided to not to account for economic status, because (a) we were not interested in modelling and estimating inter-family or intra-family decision making on caregiving and (b) information on the income and wealth of care recipients was not available for the analysis. Adding economic status to the controls calls for the consideration of non-work income as well as the employment status and income of husbands. Such an endeavour should be grounded in theory and approached with a structural model. Having said this, some tentative conclusions can still be drawn from the probit estimations.

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[12] *"In short, the provision of care appears to be determined by the needs of the parent, while the ease with which children can fulfill those needs plays only a secondary role." (Johnson and Lo Sasso 2000, 27).* See also McGarry and Schoeni (1995) and Wolf, Freedman and Soldo (1997).

[13] See i.e. McGarry and Schoeni (1995) for caregivers age 50 to 60.

[14] McKinlay et al. (1995), to quote an example, find that economic circumstances co-determine transitions into institutions. *"In short, impact on the caregiver's time and financial situation, rather than impact on family life and work, appeared to lead to institutionalization of the elder."* (McKinlay, Crawford and Tennstedt 1995, 519).

Indications for a negative trade-off between employment and caregiving nearly exclusively emerge for the odds of providing more than 14 hours of care per week. This holds for the employment status, in particular. Being employed in 1994 reduced the likelihood to take on high-intensity care responsibilities in 1996. For women with paid employment in 1994[15] the analysis does not reveal any significant relationship between the weekly work hours, wages or other employment-related variables and the likelihood of starting care. But we estimate a small and significant impact of the country specific female unemployment rate on the odds of becoming a caregiver who provides 14 or more hours of care per week. This effect is more marked for the sub-sample of employed women female unemployment rate on the odds of becoming a caregiver who provides 14 or more hours of care per week. This effect is more marked for the sub-sample of employed women.

[15] As we expect a substantially different relationship between changes in care and work hours for self-employed women, the sample of employed women only refers to women in salaried employment (a similar approach is proposed by Pavalko and Artis, 1996).

Table 9. Probit Model Predicting the Start of Caregiving (midlife women not caregiving in 1994)
(t-statistics in parentheses, marginal effects in italic)

	Start Caring > 0 hours			**Start Caring > 14 hours**			**Start Caring > 14 hours, only at home+**		
1994 Variables	*N=10,240*			*N=10,240*			*N=9,369*		
Employed	-0.038	(-0.484)	*-0.005*	-0.196*	(-1.845)	*-0.013*	-0.318**	(-2.311)	*-0.014*
Hours	-0.002	(-1.005)	*-0.000*	-0.000	(-0.035)	*-0.000*	0.004	(1.408)	*0.002*
Age	0.065	(0.541)	*0.008*	-0.027	(-0.183)	*-0.002*	-0.044	(-0.238)	*-0.002*
Age_2	-0.001	(-0.577)	*-0.000*	0.000	(0.149)	*0.000*	0.000	(0.219)	*0.000*
Education	-0.012	(-0.260)	*-0.001*	-0.132**	(-2.211)	*-0.009*	-0.196**	(-2.482)	*-0.008*
Children_12	0.042	(0.664)	*0.005*	0.122	(1.620)	*0.009*	0.221**	(2.500)	*0.011*
Children_15	-0.048	(-0.769)	*-0.006*	0.044	(0.579)	*0.003*	0.062	(0.667)	*0.003*
Married	-0.077	(-1.329)	*-0.010*	-0.049	(-0.643)	*-0.003*	0.042	(0.406)	*0.002*
Unwed	0.129	(1.348)	*0.018*	0.245*	(2.061)	*0.020*	0.299**	(1.971)	*0.017*
National	0.176	(1.257)	*0.019*	0.280	(1.362)	*0.014*	0.259	(0.954)	*0.009*
Health	-0.073	(-1.207)	*-0.009*	-0.042	(-0.557)	*-0.003*	-0.027	(-0.287)	*-0.001*
Unemp. Rate	0.001	(0.357)	*0.000*	0.014**	(2.518)	*0.001*	0.009	(1.315)	*0.000*
Dep. Ratio	-0.103	(-0.226)	*-0.013*	-0.347	(-0.527)	*-0.023*	0.342	(0.372)	*0.015*
Country Group 2	0.110	(0.956)	*0.015*	0.825***	(3.158)	*0.102*	-	-	-
Country Group 3	-0.027	(-0.264)	*-0.003*	0.592**	(2.344)	*0.052*	-0.199	(-1.042)	*-0.008*
Country Group 4	0.038	(0.350)	*0.005*	0.533**	(2.061)	*0.052*	-0.272	(-1.503)	*-0.009*
Country Group 5	-0.052	(-0.451)	*-0.006*	0.850***	(3.304)	*0.105*	0.317**	(2.198)	*0.018*
Country Group 6	0.060	(0.521)	*0.008*	0.669**	(2.576)	*0.062*	-0.015	(-0.080)	*-0.001*
Country Group 7	-0.090	(-0.791)	*-0.011*	0.763***	(2.981)	*0.089*	0.137	(0.867)	*0.007*
Intercept	-2.963	(-0.979)		-1.594	(-0.416)		-1.648	(-0.348)	
Pseudo-R^2	0.01			0.03			0.05		
Pred. Probability	0.06			0.03			0.02		

*** p < 0.01, ** p < 0.05, * p < 0.10, + without Denmark.
Source: ECHP 1994 and 1996 (midlife women), own calculations.

Table 10. Probit Model Predicting the Start of Caregiving (midlife women in salaried employment not caregiving in 1994)
(t-statistics in parentheses, marginal effects in italic)

	START CARING > 0 HOURS			START CARING > 14 HOURS		
1994 Variables	N = 4,437			N = 4,437		
Hours	-0.003	(-1.075)	*-0.000*	-0.005	(-1.423)	*-0.000*
Age	0.0512	(0.271)	*0.006*	-0.199	(-0.750)	*-0.009*
Age_2	-0.000	(-0.187)	*-0.000*	0.002	(0.853)	*0.000*
Education	0.066	(0.915)	*0.007*	0.048	(0.458)	*0.002*
Children_12	0.155	(1.507)	*0.019*	0.265*	(1.942)	*0.014*
Children_15	0.106	(1.118)	*0.013*	0.177	(1.340)	*0.009*
Married	-0.133	(-1.563)	*-0.015*	-0.117	(-0.936)	*-0.005*
Unwed	0.265**	(2.099)	*0.035*	0.327*	(1.897)	*0.019*
National	0.357	(1.332)	*0.030*	-0.052	(-0.163)	*-0.002*
Health	0.055	(0.548)	*0.006*	0.083	(0.585)	*0.004*
Wage	-0.051	(-1.072)	*-0.006*	-0.093	(-1.392)	*-0.004*
Vulnerability	-0.004	(-0.124)	*-0.000*	-0.058	(-1.483)	*-0.003*
Satisfaction	-0.034	(-1.418)	*-0.003*	-0.010	(-0.290)	*-0.000*
Unemployed	-0.119	(-1.171)	*-0.012*	0.002	(0.018)	*0.000*
Tenure	-0.006	(-0.816)	*-0.001*	0.013	(1.215)	*0.001*
Unemp. Rate	0.002	(0.218)	*0.000*	0.023**	(2.203)	*0.001*
Dep. Ratio	-0.253	(-0.387)	*-0.028*	-0.649	(-0.625)	*-0.028*
Country Group 2	-0.013	(-0.086)	*-0.001*	0.685*	(1.858)	*0.053*
Country Group 3	-0.102	(-0.801)	*-0.011*	0.575*	(1.668)	*0.030*
Country Group 4	0.035	(0.238)	*0.004*	0.487	(1.331)	*0.032*
Country Group 5	-0.315*	(-1.757)	*-0.029*	0.700*	(1.882)	*0.055*
Country Group 6	-0.019	(-0.112)	*-0.002*	0.608	(1.634)	*0.040*
Country Group 7	-0.151	(-0.829)	*-0.015*	0.719*	(1.925)	*0.059*
Intercept	-2.832	(-0.586)		2.605	(0.385)	
Pseudo-R^2	0.02			0.06		
Pred. Probability	0.05			0.02		

*** p < 0.01, ** p < 0.05, * p < 0.10.
Source: ECHP 1994 and 1996 (midlife women), own calculations.

Other than employment-related factors, which turn out to be significant predictors for the likelihood of getting into caregiving are education and family status. The negative coefficient of the education variable shows that, all else being equal, higher educated people have a lower probability to start caregiving in 1996. This effect is only significant for the full sample. One might argue that the wage-variable absorbs the effect of education in the model-specification for employed women. This argument is in line with time allocation theory, which proposes that the higher the value of time spent on paid work the higher, the opportunity cost of caregiving. If education is merely a proxy for potential earnings the wage rate could indeed cannibalise the education effect. In an alternative specification of the model for the full estimation sample, not shown here, we have tested if the significance of the education variable disappears as wage is included. The result shows that this is not entirely the case. Education preserves its significant influence despite the inclusion of a wage variable.

The odds of caregiving were also found to be higher for never married females. This variable proved to be the most important predictor of caregiving commitments in all probit estimations. Living with young children (age 12 or under) is positively related to the odds of high-intensity caregiving. For both samples, this effect is only significant for women caring more than 14 hours, which points to economies of scale and scope in household production.

The influence of the country group variables differs by care intensity and between the full sample and the sub-sample. In the estimations, Denmark is used as the (omitted) reference case. Looking at the estimates for the full sample, the institutional and labour force participation factors appear to affect the likelihood of taking on a caregiving responsibility. However, the difference between countries mainly occurs if the high-intensity care measure is used. As we might expect, midlife women in all countries have a higher probability to start caregiving than their Danish peers. In particular Portuguese women (country group 5), who are confronted with labour market conditions and a long-term care environment that are utterly distinct from the Danish setting, have a significant higher probability to start caregiving at home. This is also the case if we use the regular care measure for employed women.

Compared to the results of Pavalko and Artis (1997), who used a very similar model specification for the US, we detect a greater variety of significant relationships. The only factor that proved to be an important predictor of caregiving in their study - job tenure – does not even come close to significance in our estimations. In return, our results highlight family

status, education and country specific settings. These findings corroborate evidence from previous studies that socio-demographic factors and behaviour assume primary importance in caregiving decisions.

4.3.3 Association between Adjustments in Caregiving and Work Hours: Multivariate Analysis

Using OLS regressions to explore the association between changes in work hours and changes in caregiving reveals several general patterns. Tables 11 to 13 show the results of the different OLS regressions on the difference in work hours from 1994 to 1996. As indicated by the respective values for R^2, the explained variation in the dependent variable is low for all models and particularly so for models that pertain to the sub-sample of employed women (the same holds true in the study of Pavalko and Artis, 1997). The explanation for this relatively poor goodness-of-fit might be similar to the one suggested for the probit estimates. However, given the data limitations, our results still offer valuable insight into the relationship between changes in care hours and changes in work hours in Europe.

Since the dependent variable is the change in weekly work hours, a positive (negative) coefficient for an independent variable may be read in two different ways: it either signals that an overall reduction in work hours is mitigated (reinforced) or that the variable adds to (reduces) an increase in work hours between 1994 and 1996. Our descriptive statistics show that the majority of women in the sample cut down on work hours between 1994 and 1996. Therefore we suggest that a negative association between an explanatory variable and the dependent variable actually indicates a net reduction in weekly work hours.

To begin with, the response of changes in work hours to changes in caregiving is asymmetrical. In all models and for almost all estimation samples, starting caregiving and increasing the hours spent on informal care are both significantly and negatively correlated with a change in the number of weekly work hours. Equally important is the finding that terminating the provision of care, restraining care efforts or maintaining the same level of care intensity stand in no significant relationship with the change in work hours. These findings are consonant with those from Pavalko and Artis (1997) for the US.

Among the variables controlling for the respondent's situation in 1994, age, education and health are significantly related to a change of work hours in almost all models. The overall relationship between age and a change in work hours is positive and non-linear. As age increases so do positive adjustments of weekly work hours. Also the relationship between health and change in work hours goes in the expected direction: ceteris paribus, women with

health problems in 1994 tend to decrease their weekly work hours from 1994 to 1996. Women with a high level of education in 1994 significantly and positively adjust their weekly work hours in comparison with respondents who report lower levels of education. The influence of the remaining predictors varies by employment status in 1994, country group, or caregiving status in 1996.

Table 11 presents results for specifications of the OLS models that include six country dummies (where Denmark is again used as the reference case). We report estimates for the full estimation sample and for the sub-sample of employed women. Among the variables of primary interest, taking on a new caregiving responsibility or increasing the hours of care in previous commitments take a significant adverse effect on changes in weekly work hours. For the sub-sample of employed women, however, the "start care" dummy is only significant at the 10-percent level. The coefficient for the increase in care hours turns to be insignificant for this group of women.

Other differences in the predictors of a change in work hours between the full sample and the sub-sample of employed women concern (i) the effect of having older children in the household and (ii) citizenship. The first variable positively and significantly affects the change in work hours for employed women only[16]. By contrast, the positive impact of citizenship on the change in work hours only unfolds in the estimation for the full sample. Similarly, the influence of the country dummies on changes in the dependent variable differs between the full sample and the sample of employed women. Relative to Danish women and irrespective of their employment status in 1994, women living in the country groups 4 (Belgium and Ireland), 6 (Italy and Spain) and 7 (Greece) tend to decrease weekly work hours significantly from 1994 to 1996. Among employed women, the country of residence only mattered significantly for those living in Greece. At the same time, the coefficient on living in Greece was much more pronounced than in the full sample and is by far the most striking coefficient in the model for employed women.

Our results for the impact of age and employment status match Pavalko and Artis' (1997) findings for the midlife women in the US. Using a similar set of independent variables our study finds that age impacts positively on changes in weekly work hours, whereas being employed in the starting year has a significant and adverse effect on the dependent variable.

[16] As stated earlier, in most cases, this means that women still *reduced* work hours, but to a lesser extent than women in households without children age 15 and older.

Table 12 displays the results by country groups. The group of so-called "southern" countries comprises Greece, Ireland, Italy, Spain and Portugal. These countries are characterised by a very modest policy focus on institutional care or formal home help (The Royal Commission on Long-term Care 1999). The second group accommodates northern countries with a much stronger focus on institutional care or formal home help. This specification of the model uncovers that the northern countries fully account for the significant impact of caregiving on changes in work hours whereas no such association emerges for the southern countries. One might conclude that the role overload is simply not an issue in these countries because being employed does not fit into the standard role expectations for midlife women, whereas family caregiving naturally does.

Among both country groups and for all models there were no significant differences in the impact of education on changes in work hours. The effects for family status variables, nationality and health status, differed by country group as well as between the full sample and the sample of employed women. Poor health takes a significant negative impact in northern countries only. Co-residence with older children is significantly associated with positive adjustments in work hours in northern countries only and more so in the sample of employed women. The same holds true for the significant and negative effect of marital status on the dependent variable. The nationality effect is entirely "southern driven". Once again country dummies are used to highlight within-group differences. The model for northern countries includes country dummies for country groups 2 (The Netherlands and Luxembourg), 3 (Germany, France and the UK) and 4 (Belgium and Ireland), where country group 1 (Denmark) serves as the omitted category. The specification for southern countries makes use of the country dummies for group 6 (Italy and Spain) and 7 (Greece), with Portugal as the reference case. For both sub-samples, country-dummies are only significant for the full sample of women. Cross-national variation appears to be more relevant for the group of southern countries, with a relative high aptitude of midlife women in Italy, Spain and Greece to reduce work hours (or to increase work hours only moderately) when compared to Portuguese women. The coefficients for country groups 6 and 7 are not only significant but also quite large. Among northern countries changes in weekly work hours for women in Belgium and Ireland significantly and negatively deviate from changes measured for their Danish peers.

Table 13 provides results for the sub-sample of women in salaried employment at the time of the first interview by caregiving status in 1996. The models highlight the differential impact

of various explanatory variables for caregivers and non-caregivers, who were employed in 1994. Among both groups the caregiving status in 1994 does not show a significant association with the change of work hours from 1994 to 1996. With regard to other controls, there are some important differences in the predictors of changes in work hours between 1996-caregivers and non-caregivers.

Overall, we can identify more significant relationships for the non-caregiver sample than for the caregiver sample. If we look at relationships that are significant at the five or one percent level the caregiver model uncovers three and the non-caregiver model eight significant relations. The (positive) coefficient for age is extremely powerful and highly significant in the estimation for the caregiver sub-sample but hardly matters for women who were not caregiving in 1996. The significant effects on the adjustment of weekly work hours of health status, the wage rate and a former unemployment spell are all confined to the sample of non-caregivers. The wage earned in 1994 and employment history show the most striking coefficients in the latter group. The wage rate exerts a positive influence on changes in work hours whereas an unemployment spell in the past is associated with a decrease (or a diminished increase) in work hours. Further differences between both groups concern the macro-level predictors, namely the unemployment rate, the dependency ratio and the country dummies. There is a puzzling difference in the coefficients for the dependency ratio in the estimation for caregivers on the one hand and the estimation for non-caregivers on the other hand – although these effects are only significant at the 10 percent level. With regard to the country specific variables, no systematic pattern can be discerned. In the estimation for non-caregivers more country variables show a significant association with changes in work hours: In this sub-sample women who are living in the Netherlands, Italy, Portugal and Spain tend to increase their work hours (or reduce hours more slowly) relative to Danish women.

Some of the differences may be a result of the much bigger sample size of the non-caregiver sub-sample. The significant relationship between the satisfaction and tenure variable with the change in work hours, however, is strong enough to even emerge in the much smaller caregiver sample. More satisfied employees tend to increase work hours, while those with longer tenure tend to decrease work hours. The latter effect might be caused by women, who have spent enough years in paid employment to meet the qualifying requirements for social security benefits or employer pensions.

A final comparison of our results for Europe with the results of the almost identical models for the US as presented in Pavalko and Artis (1997) shows that there are more similarities than differences. This lends support to the hypothesis that even against the background of different policy settings there are common patterns describing the relationship between changes in caregiving and changes in work hours. Both studies find significant results for age and satisfaction on the job, and it is obvious that employment related factors play a more significant role than socio-demographic factors other than age.

Table 11. OLS Regression Prediction of Change in Work Hours, 1994-1996
(t-statistics in parentheses)

	All Women		**Employed Women, 1994 (not self-employed)**	
	N=12,027		N=5,672	
Stop Care	-0.282	(-0.638)	0.276	(0.335)
Start Care	-1.417***	(-2.640)	-1.776*	(-1.689)
Increase Care	-2.838***	(-2.645)	-2.087	(-1.103)
Decrease Care	0.274	(0.307)	-0.536	(-0.290)
Stable Care	-0.367	(-0.613)	0.696	(0.511)
Employed	-9.202***	(31.916)		
Age	1.656**	(2.291)	3.631***	(2.764)
Age_2	-0.019***	(-2.701)	-0.040***	(-3.002)
Education	1.791***	(6.604)	2.471***	(5.754)
Children_12	-0.184	(-0.437)	0.596	(0.866)
Children_15	0.497	(1.287)	1.199**	(1.989)
Married	-0.456	(-1.289)	-0.550	(-1.070)
Unwed	1.015	(1.613)	-0.248	(-0.291)
National	1.896**	(2.192)	1.872	(1.198)
Health	-1.469***	(-4.444)	-2.267***	(-3.361)
Unemp. Rate	-0.029	(-1.065)	-0.107*	(-1.782)
Dep. Ratio	-0.914	(-0.359)	-2.815	(-0.737)
Country Group 2	-0.643	(-1.051)	1.222	(1.584)
Country Group 3	-0.215	(-0.382)	0.104	(0.156)
Country Group 4	-1.904***	(-3.048)	-1.409	(-1.602)
Country Group 5	-0.381	(-0.535)	-1.210	(-1.151)
Country Group 6	-1.693**	(-2.585)	-0.382	(-0.389)
Country Group 7	-2.772***	(-3.944)	-5.956***	(-4.987)
Intercept	-29.622	(-1.614)	-82.865	(-2.546)
R^2		0.10		0.05

*** p < 0.01, ** p < 0.05, * p < 0.10, robust standard errors.
Source: ECHP 1994 and 1996 (midlife women), own calculations.

Table 12. OLS Regression Prediction of Change in Hours of Work, 1994-1996 for Northern and Southern Countries
(t-statistics in parentheses)

	All women				**Employed women, 1994 (Not self-employed)**			
	„Northern“		**„Southern“**		**„Northern“**		**„Southern“**	
	N= 5,322		N=6,705		N=3,009		N=2,109	
Stop Care	-0.760	(-1.225)	0.043	(0.072)	-0.024	(-0.026)	0.463	(0.355)
Start Care	-1.895***	(-2.599)	-1.011	(-1.311)	-2.641**	(-2.378)	-0.449	(-0.219)
Both Care	-0.311	(-0.488)	-0.987	(-1.490)	0.359	(0.334)	-1.386	(-0.809)
Employed	-8.021***	(-21.216)	-10.133***	(-23.926)	-	-	-	-
Age	2.570**	(2.558)	0.788	(0.768)	5.394***	(3.641)	1.662	(0.685)
Age_2	-0.029***	(-2.871)	-0.011**	(-1.037)	-0.057***	(-3.801)	-0.021	(-0.847)
Education	1.930***	(5.418)	1.810***	(4.320)	1.750**	(3.379)	3.629***	(4.807)
Children_12	0.380	(0.562)	-0.544	(-1.010)	2.413**	(2.962)	-1.121	(-1.028)
Children_15	1.115**	(1.976)	0.039	(0.076)	1.939**	(2.928)	0.238	(0.230)
Married	-1.069**	(-2.462)	0.402	(0.666)	-1.171**	(-2.169)	0.925	(0.808)
Unwed	0.521	(0.627)	1.829*	(1.934)	-0.515	(-0.534)	0.601	(0.382)
National	1.039	(1.197)	5.293**	(2.058)	1.700	(1.149)	4.807	(0.738)
Health	-2.152***	(-4.885)	-0.743	(-1.497)	-2.920***	(-3.877)	-1.0230	(-0.771)
Unemp. Rate	-0.116	(-1.449)	-0.369*	(-1.879)	-0.119	(-1.069)	-0.113	(-0.298)
Dep. Ratio	1.051	(0.330)	106.366*	(1.673)	-2.667	(-0.614)	6.497	(0.052)
Group 2 (north)	-0.355	(-0.548)	-	-	1.232	(1.557)	-	-
Group 3(north)	0.030	(0.051)	-	-	0.028	(0.040)	-	-
Group 4 (north)	-2.071**	(-2.594)	-	-	-1.743	(-1.527)	-	-
Group 6 (south)	-	-	-8.472*	(-1.834)	-	-	-0.368	(-0.040)
Group 7 (south)	-	-	-5.931**	(-2.405)	-	-	-5.278	(-1.085)
Intercept	-53.302	(-2.103)	-138.58	-1.797	-126.796	(-3.484)	-49.162	-0.307
R^2		0.10		0.11		0.04		0.04

*** p < 0.01, ** p < 0.05, * p < 0.10, robust standard errors.
Source: ECHP 1994 and 1996 (midlife women), own calculations.

Table 13. OLS Regression Prediction Change in Hours of Work 1994-1996 - Midlife Women in Salaried Employment in 1994 (t-statistics in parentheses)

	CAREGIVERS 1996		**NON-CAREGIVERS 1996**	
	N=513		N=4,543	
Care94	1.754	(1.230)	0.848	(1.063)
Age	12.995***	(2.688)	2.154	(1.605)
Age_2	-0.134***	(-2.750)	-0.025*	(-1.805)
Education	1.674	(0.981)	0.598	(1.283)
Children_12	2.843	(1.051)	0.395*	(0.567)
Children_15	-1.061	(-0.482)	1.155	(1.841)
Married	-0.027	(-0.014)	-0.189	(-0.350)
Unwed	0.653	(0.261)	-0.445	(-0.492)
National	11.921	(1.579)	1.709	(1.030)
Health	1.203	(0.649)	-2.595***	(-3.544)
Wage	2.500*	(1.674)	3.705***	(8.825)
Vulnerability	-0.514	(-0.808)	-0.041	(-0.208)
Satisfaction	1.523**	(2.910)	0.408**	(2.370)
Unemployed	-3.389	(-1.117)	-4.691***	(-6.687)
Tenure	-0.461**	(-2.437)	-0.314***	(-5.856)
Unemp. Rate	0.010	(0.048)	-0.110*	(-1.801)
Dep. Ratio	22.751*	(1.816)	-7.931*	(-1.921)
Country Group 2	3.8223	(1.539)	1.721**	(2.046)
Country Group 3	-0.335	(-0.158)	1.382*	(1.922)
Country Group 4	0.766	(0.267)	-0.061	(-0.064)
Country Group 5	6.136	(1.325)	2.474**	(2.046)
Country Group 6	-0.721	(-0.222)	2.590**	(2.436)
Country Group 7	1.283	(0.356)	-1.186	(-0.811)
Intercept	-365.307	(-3.043)	-45.445	(-1.368)
R^2	0.10		*0.08*	

*** p < 0.01, ** p < 0.05, * p < 0.10, robust standard errors.
Source: ECHP 1994 and 1996 (midlife women), own calculations.

5. Conclusions

With this paper we made a first attempt at studying the empirical relationship between the changes in caregiving and changes in weekly work hours in a European context. A better understanding of this association is particularly relevant in light of population aging on the one hand and an increase in female labour force participation on the other hand[17]. While we know that the growth of the population age 65 and older does not necessarily increase the population in need of long-term care, a variety of empirical research in fact projects a rise in the demand for long-term care[18]. And although we know that not all women wishing to join the labour market will actually succeed in doing so, there is solid evidence for a continuing increase in the labour force participation of women in general and of midlife women in particular (Jenson and Jacobzone 2000: 12-13; Schulz et al. 2001: 34).

Given these two main trends a better understanding of the relationship between caregiving and work is overdue. What do the results of our study contribute to fill this knowledge gap? In our bivariate descriptive analysis we found that apart from cross-national differences between the 12 European states under study, there is some evidence for a negative correlation between changes in work hours and changes in hours of caregiving. The first set of multivariate models, which explained the probability to start caregiving in 1996 shows that employment status or other work related factors hardly explain why women become caregivers. Yet, employment status does matter for women who start to provide at least 14 hours of care per week, which is a plausible result. It is easier to combine employment with low-intensity rather than high intensity caregiving.

Given this result we can conclude, that the provision of care to older persons in need of high levels of support is more of an issue in respect to the labour force participation of midlife women than is caregiving to the less incapacitated elderly. Independent of the intensity of care, the age and the family status of a woman are significantly related to the likelihood of becoming a caregiver. Never married midlife women are much more likely to assume a caring responsibility than those who are married, divorced or widowed. This finding is in accordance with empirical evidence for the US indicating that competing family obligations (child care, time spent with partners or significant others) reduces the odds of caregiving.

[17] This holds particularly true for midlife women who enter an age, where most children can take care for themselves.

[18] For the German context, see for example, Schulz et al., 2001.

The models to describe the relationship between the changes in weekly work hours and changes in caregiving show that a change in work hours is significantly and negatively associated with the start or the increase of informal caregiving, while no such association emerges for women terminating a caregiving spell or reducing care hours. This suggests that among midlife women, reductions in work hours or exits from the labour force are not likely to be recovered after caregiving responsibilities stop.

The negative association between starting or intensifying the provision of care and changes in work hours is significant in northern Europe (except for Ireland) but not in southern countries, and it is stronger for women who were employed at the time of the first interview. The first result might be influenced by better substitution possibilities for women in northern countries, with a more intensive focus on institutional care and formal home help. Women in these countries really have a choice in deciding if they should start caregiving or increase their caregiving, while strong family boundaries and limited access to formal care might not leave such a choice to women in southern countries. Thus their caregiving decision is independent of any change in the work hours.

It would be intriguing to compare our results to estimations that use bivariate models. In addition, further research is needed to account for simultaneity in the decisions on work hours and care hours, to improve our understanding of country specific effects, and to explore the role of economic distress in explaining patterns of work and care for midlife women.

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