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Does the Negative Effect of Caregiving on Work Persist over Time?

RWI #703

Imprint

Ruhr Economic Papers

Published by

RWI Leibniz-Institut für Wirtschaftsforschung
Hohenzollernstr. 1-3, 45128 Essen, Germany

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Ruhr Economic Papers #703

Responsible Editor: Jochen Kluve

ISSN 1864-4872 (online) – ISBN 978-3-86788-817-2

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Bibliografische Informationen der Deutschen Nationalbibliothek

Die Deutsche Bibliothek verzeichnet diese Publikation in der deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über: *http://dnb.d-nb.de* abrufbar.

Das RWI wird vom Bund und vom Land Nordrhein-Westfalen gefördert.

http://dx.doi.org/10.4419/86788817
ISSN 1864-4872 (online)
ISBN 978-3-86788-817-2

Dörte Heger and Thorben Korfhage[1]

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Abstract

Informal caregivers provide valuable services to elderly persons with long-term care needs. However, the time commitment of caregiving often competes against time spent in the labour force. In addition to the momentary trade-off, long-term consequences are possible since especially older workers might find it difficult to re-enter the labour market after a caregiving spell. While several studies document a negative relationship between caregiving and work, little is known about whether this effect is persistent over time. Analysing a large panel data set of 15 European countries and Israel, we show that care provision to an elderly parent has lasting negative effects on employment for both men and women but only women reduce their working hours.

JEL Classification: J14, J22

Keywords: Informal care; labour market outcomes; short and medium term effects

July 2017

1 Both, RWI. – We are grateful for comments by Stefan Etgeton and Anica Kramer. The authors gratefully acknowledge financial support from the European Investment Bank under the EIB-Universities Research Action Programme. Any errors remain those of the author. The findings, interpretations and conclusions presented in this article are entirely those of the author and should not be attributed in any manner to the European Investment Bank. Thorben Korfhage also gratefully acknowledges the support of a special grant (Sondertatbestand) from the German Federal Ministry for Economic Affairs and Energy and the Ministry of Innovation, Science, and Research of the State of North Rhine-Westphalia.– *All correspondence to: Thorben Korfhage, RWI , Berlin Office, Invalidenstr. 112, 10115 Berlin, Germany, e-mail: thorben.korfhage@rwi-essen.de*

1 Introduction

When a parent's health declines, adult children are faced with the decision whether to assist their parent with personal care or household chores. While caregiving can be rewarding as it may give the caregiver a feeling of purpose or strengthen family bonds, frequent caregiving, besides being emotionally and physically demanding, presents a considerable time requirement. Acting as an informal caregiver thus often competes with participating in the labour force. As a consequence, caregivers may occur considerable costs since reducing working hours or dropping out of the labour force leads to income losses, reduced pension benefits, and a lower chance of future employment or promotions. Such opportunity costs of caregiving could be even larger if the negative relationship persists over time. For example, if caregivers are unable to take to employment again after the care spell has ended due to labour marked frictions, caregiving not only reduces present labour income but also expected future earnings (Skira, 2015). In light of our ageing societies, labour market outcomes for mature caregivers are of special interest since individuals close to the retirement age are less attached to the labour force than younger individuals and re-entering the labour market close to retirement might be especially difficult. Understanding whether caregiving and work are compatible thus also provides insight into caregivers' risk of financial vulnerability later in life. To shed light on this issue, our paper focusses on short- and medium term outcomes of caregiving on labour force participation of mature caregivers.

Theoretically, the direction of the effect of caregiving on labour market outcomes is uncertain. Caregiving may reduce employment or hours worked if caregivers substitute work time with care time, or if increased absenteeism of caregivers to fulfill caregiving obligations leads to job loss (Heitmueller and Inglis, 2007). Yet, labour market participation may increase if work offers respite from caregiving or if caregivers require additional income (Carmichael and Charles, 1998, 2003). Empirically determining causal effects, however, is challenging due to reverse causality. Persons with less attachment to

the labour market or a low time cost could be more likely to become caregivers (Ettner, 1995, 1996a; Heitmueller, 2007; Carmichael et al., 2010). In addition, labour force participation and caregiving may be influenced by the same unobserved characteristics, which would produce a spurious correlation. For example, individuals with high (unobserved) ability may be more productive employees and may also be more productive at providing informal care (He and McHenry, 2013).

The majority of existing studies report a negative relationship between care activities and labour participation (for example, Bolin et al., 2008; Berecki-Gisolf et al., 2008; Carmichael and Charles, 2003; Crespo and Mira, 2014; Heger, 2014; King and Pickard, 2013; Kotsadam, 2011; Leigh, 2010; Lilly et al., 2010; Nguyen and Connelly, 2014; Schneider et al., 2001; Van Houtven et al., 2013; Viitanen, 2010). While effects are usually small, for example, Bolin et al. (2008) estimates that, for Europe, a 10% increase in time spent on caregiving can be associated with a 3.7 percentage points decrease in caregivers' employment probability, larger effects are found for intensive care (see Bauer and Sousa-Poza, 2015; Lilly et al., 2007, for reviews) and on co-residential caregivers (Heitmueller, 2007). Other studies, however, do not find a significant effect (for example, Meng, 2013; Stern, 1995; Wolf and Soldo, 1994). Looking at the intensive margin, results are more consistent: Caregivers are more likely to work fewer hours than non-caregivers, but the magnitude of the effect is again small (for example, Bauer and Sousa-Poza, 2015; Lilly et al., 2007; Berecki-Gisolf et al., 2008; Bolin et al., 2008; Carmichael et al., 2008; Ettner, 1995, 1996b; Johnson and Lo Sasso, 2006; Lilly et al., 2010; Spiess and Schneider, 2003; Van Houtven et al., 2013). Bolin et al. (2008), for instance, find an average elasticity of -0.26 for working hours with respect to hours spent on caring activities for a pooled sample of men and women but insignificant results once they divide their sample by gender.

Yet, very little is known about the persistence of these effects. To the best of our knowledge, only four previous studies analyse possible long-term consequences of caregiving on labour market outcomes, and only one of those looks at both male and female

caregivers. The results are mixed and depend on the circumstances and on the country under study. Michaud et al. (2010) estimate a set of reduced form dynamic equations in order to approximate the solution of a dynamic structural model. They find a negative effect of present co-residential caregiving on future employment for women in England. Going further, Skira (2015) estimates a dynamic discrete choice model using U.S. data. Similarly, her results highlight the importance of labour marked friction and suggest that a woman who dropped out of the labour market or reduced working hours to become a caregiver will face difficulties returning to the labour market or increasing hours once the care spell is over. Schmitz and Westphal (2016) estimate both a static and dynamic model of labour market outcomes of women up to eight years after care provision and find a persistent negative effect on full time work as well as long-run wage penalties that only fades slowly using German data. Contrary to these results, Fevang et al. (2012), who use Norwegian register data to estimate labour market outcomes up to 10 years before and five years after parents death, cannot confirm persistence: While the authors find a notable decrease of daughters' employment prior to a lone parent's death (for sons the effect is negligible), on average the daughters' return to their previous level of employment again after their parent's death.

Our paper contributes to this emerging strand of literature by analysing short- and medium-term effects on employment and hours worked of caregiving, by looking at both male and female caregivers, by focusing on the especially vulnerable group of individuals close to retirement, and by using a large sample of 15 European countries and Israel. Specifically, we analyse how recent and past care provision to a parent affects labour market outcomes using data drawn from five waves of the Survey of Health, Ageing, and Retirement (SHARE). Endogeneity of caregiving is addressed using an instrumental variables approach.

We find that recent caregiving reduces the employment probability by 6 to 7 percentage points, while past caregiving leads to a reduction of 3 to 8 percentage points. In both cases, larger effects are found for men. Both past and recent caregiving leads

to a small reduction of working hours for women but has no significant effect on men's working hours. Our results further suggest that a large fraction of the estimated effects of past caregiving on recent labour marked outcomes actually results from the correlation between recent and past caregiving. The effects on female working hours and male employment are especially strong if individuals are continuous caregivers, that is, especially individuals who provided care in the past and are still caregivers today are likely to work less (or fewer hours). However, for men's employment and women's working hours we also find (weak) evidence for persistence. One possible explanation for the observed difference between gender is the higher share of part-time employment amongst women, which makes combining work and caregiving more feasible.

2 Empirical strategy

2.1 Baseline specification

In this paper we are interested in the effect of past and recent caregiving on several labour marked outcomes at the extensive and intensive margin. In our baseline specification, we first estimate the effect of caregiving, CG, and a set of control variables, X, on a binary employment variable, L, in a linear probability model (1) which allows us to capture the labour supply decisions of individual i at time t on the extensive margin.

$$L_{it} = \beta_1 + \lambda_{OLS} CG_{it} + \beta_2 X_{it} + u_{it}, \tag{1}$$

where λ_{OLS} captures the effect of interest. To analyse the effects of recent and past caregiving, we estimate separate regressions where caregiving is defined by (i) a binary dummy variable indicating recent caregiving (in $t = 0$), and (ii) a binary dummy variable indicating past caregiving (in $t = -1$).

Next, we estimate hours worked, H, in a log-linear regression model (2) conditional on positive working hours. That is, we only use the subsample of working individuals

which allows us to estimate the effect of caring at the intensive margin.

$$\log(H_{it}) = \beta_1 + \lambda_{OLS} CG_{it} + \beta_2 X_{it} + u_{it}, \text{ for } L_{it} = 1. \quad (2)$$

To allow for heterogeneous effects between men and women, separate regressions are estimated for each gender. For further exploration, we add a third caregiving specification and estimate an interacted model where caregiving is defined by a set of dummy variables indicating recent, past, and continuous caregiving, where continuous caregiving equals one if a person was a recent as well as a past caregiver. We use this third specification for all labour market outcomes.

2.2 Endogeneity concerns

So far, we have treated the explanatory care variables as exogenous. However, since characteristics such as the individual's level of altruism, his or her attachment to the labour force, or emotional closeness to the parent are not observable (at least not in our data set), the ordinary least square (OLS) coefficient estimates in the baseline equations (1) and (2) might be biased if those characteristics affect both our dependent and our independent variable of interest. Furthermore, our estimates might suffer from reverse causality if at least in some cases children decide to care for their parents because they retired or have lost their jobs and have low chances of receiving new job offers again (Heitmueller, 2007). We therefore apply an instrumental variables (IV) approach in order to check for those potential endogeneity concerns.

In order to find causal effects in the presence of endogenous explanatory variables, we need to find a vector of instruments Z such that $corr(Z_{it}, CG_{itp}) \neq 0$ and $corr(Z_{it}, u_{it}) = 0$. In other words, we need to find a set of instruments that is sufficiently correlated with the caregiving variable but should affect labour market participation only through the channel of caregiving (the so called *independence assumption* and *exclusion restriction*). If and only if this is the case, we can use the exogenous variation of the instruments in a

two stage least square (2SLS) approach to yield unbiased estimates (for example, Angrist and Pischke, 2009).

Similar to Van Houtven et al. (2013) we use proxies for parents' informal care demand as additional excluded instruments Z. More precisely, our vector of instruments in the first stage includes two additional variables. First, a binary dummy variable is used to indicate whether at least one of the parents has a 'poor' or 'fair' health status (compared to 'good' or 'very good').[1] Second, we use a binary dummy variable indicating whether the mother is widowed.

Our instruments capture the extent of the parents' need for care. The IV estimates hence measure the effect of caregiving as a result of an increase in parental need for care on the child's labour force participation. On theoretical grounds, this set of instruments is quite convincing: First, we believe that parents' health has a very straight forward influence on informal care demand and therefore on the likelihood that their children decide to provide care (to their parents). Furthermore, demand for help is likely to increase if a single parent is unable to rely on residential care from a spouse. This is captured by the variable indicating whether the mother is widowed. We do not use the information on whether the father is a widower since, due to the longer life expectancy of women, this situation is less frequent. Second, we cannot think of an influential channel through which parents' informal care demand could influence the labour supply of their children other than through caregiving. One might argue that parents' health could be correlated with the child's health due to, for example, intergenerational transmission of poor health or because a sudden health shock that decreases parents' well-being (or in the worst case leads to the parent's death) could cause mental stress and therefore also increase the likelihood of illness of the child, which could lower labour force participation. We believe that those channels are (i) on average probably not strong enough to disturb

[1]This measure is based on the respondents' assessment of their parents' health. The possible categories for parental health changed from "very good", "good", "fair", "poor", and "very poor" in wave 1 to "excellent", "very good", "good', and "poor" in succeeding waves. Jürges et al. (2008) show that combining the categories "poor", and "very poor" as well as "excellent" and "very good' results in a consistent measure of health.

the set of our instruments and (ii) the large number of health characteristics of the potential caregiver we control for should capture those minor effects, if they exist.[2] We present evidence on the appropriateness of our instruments and whether endogeneity is a concern in our data together with the IV estimation results in the results section 4 and in the appendix.

3 Data

We use data from waves 1, 2, and 4 to 6 of the Survey for Health, Ageing and Retirement in Europe (SHARE) collected in 2004/2005, 2006/2007, 2010/2011, 2013, and 2015, which covers the population 50+ in Europe and Israel (see Börsch-Supan et al. (2013) for methodological details).[3][4] SHARE is modelled after the English Longitudinal Study of Ageing (ELSA) and the US Health and Retirement Survey (HRS) and is the first data set to include a wide variety of health and socio-demographic information of the elderly at a pan-European level.[5] The included countries are Austria, Germany, Sweden, Spain, Italy, France, Denmark, Switzerland, Belgium (all waves), the Netherlands (waves 1 to 5), Greece (waves 1 and 2), the Czech Republic, Slovenia, Estonia (waves 4 to 6), Israel (waves 5 and 6), and Luxembourg (waves 5 and 6).

Only individuals who participated in at least two consecutive waves, that is, waves

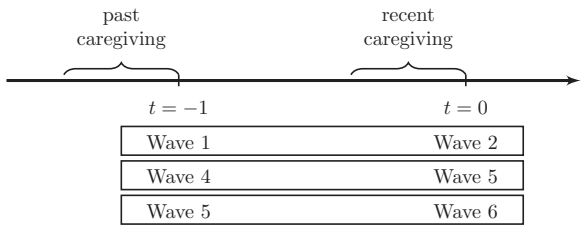
[2]Coe and Van Houtven (2009) find that the death of a parent does not have a lasting effect on one's (mental) health.

[3]DOIs: 10.6103/SHARE.w1.600, 10.6103/SHARE.w2.600, 10.6103/SHARE.w4.600, 10.6103/SHARE.w5.600, 10.6103/SHARE.w6.600.

[4]Wave 3, a retrospective survey, has been excluded since it does not contain the relevant variables. The SHARE questionnaires and data are available at www.share-project.org. The SHARE data collection has been primarily funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812) and FP7 (SHARE-PREP: N°211909, SHARE-LEAP: N°227822, SHARE M4: N°261982). Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C) and from various national funding sources is gratefully acknowledged (see www.share-project.org).

[5]Data is collected using a computer-assisted personal interviewing technique. Sample selection varies across countries from simple random selection of households to multi-stage designs due to varying institutional conditions regarding sampling (Börsch-Supan, A. and Jürges, H. (eds.), 2005, chap. 5). For further methodological information see Malter and Börsch-Supan (2013, 2015).

Figure 1: Time structure of the data



1 and 2, 4 and 5, or 5 and 6, are included in the sample. This restriction is necessary as we require both current and lagged information for our analysis. Due to attrition and the age of the interviewed individuals, few respondents are interviewed in all waves. Hence, we consider all pairs of consecutive waves separately and pool the data such that the first of the two consecutive waves represents the "current period" $t = 0$ and the second of the two consecutive waves represent the "past period" $t = -1$ (see figure 1 for a graphical representation).[6] In each wave, respondents are asked about their caregiving activities in the last twelve months.[7] The "current period" hence provides information about recent caregiving activities. For information about past caregiving we drawn from the "past period". Past caregiving thus represents caregiving activities between approximately three and four years in the past. Further, each wave provides information on parents' living status and health. Following the same strategy, the "past period" provides information about parental health and living status in $t = -1$ and the "current period" provides information about parental health and living status in $t = 0$. Information about labour force participation, socio-economic and demographic characteristics are drawn from the "current period".

Since we are interested in labour market outcomes, we limit our sample to individuals aged 50 to 70 and drop individuals who are permanently sick or disabled. Further, we exclude individuals who have no living parent in $t = -1$. After deleting observations

[6]Individuals who participated, for example, in wave 4, 5, and 6 are thus included twice.

[7]In wave 2, respondents are asked whether they have provided care since the last interview, which corresponds to approximately 24 months.

with missing information in our main variables, our sample includes 7,973 women and 6,530 men. Descriptive statistics are shown in Table I separately for carers and non-cares as well as for women and men. The dependent variables are a dummy for being employed (including self-employed), and the number of hours worked, conditional on positive hours. To obtain a smoother distribution, the log of the number of hours is used for the estimation. For information, we also report the share of individuals in full time employment, defined as working 30 or more hours per week. While women and men are similarly likely to be employed, women more often work part-time, that is, they work fewer hours. The main independent variable of interest is a dummy variable for caregiving activities, which takes on the value of one if the respondent provides daily or almost daily care to his or her mother or father. Both, care outside and inside the household is considered. To distinguish between help during a short-term sickness, providing help to a co-residing parent is only considered caregiving if this help occurs during at least three months. About 10% of women and 5% of men are recent caregivers. Out of the sample of recent caregivers 51% of the women and 49% of the men are also past caregivers, while out of the sample of non-recent caregivers only 5% of women and 3% of men have been caregivers in the past. Hence, also the persistence of caregiving activities needs to be considered. Further independent variables are the respondents' age (linear and squared), a dummy for having reached the country specific effective retirement age as well as being within two years of the effective retirement age, the number of chronic conditions, the presence of any limitations with activities of daily living and any instrumental activities of daily living, a dummy for being married, the number of children, two dummies indicating low and high educational attainment (the reference category being medium educational attainment), household wealth in 10 000 Euros and country dummies for all countries but France, which serves as reference category.[8]

[8]Education is grouped into lower (0-2), medium (3), and higher (4-6) education based on the ISCED-97 classification (OECD, 1999). Wealth is measured as household net worth including, amongst others, the value of primary residency, mortgages, other real estates, and bank accounts (Börsch-Supan, A. and Jürges, H. (eds.), 2005), and is adjusted for household size by division by the square root of the number of household members.

Table I: Descriptive statistics

	(1) Carers F			(2) Non-carers F			(3) Carers M			(4) Non-carers M		
	mean	sd	count	mean	sd	count	mean	sd	count	mean	sd	count
Outcome												
Employed	0.53	0.50	821	0.69	0.46	7,125	0.51	0.50	348	0.69	0.46	6,177
Working-hours[a]	33.26	12.70	434	33.76	12.05	4,951	42.03	12.30	174	40.82	12.31	4,249
Fulltime work	0.77	0.42	434	0.78	0.42	4,951	0.94	0.24	174	0.91	0.29	4,249
Retired	0.45	0.50	814	0.29	0.46	7,049	0.45	0.50	348	0.30	0.46	6,122
Explanatory variables												
Recent caregiver	1.00	0.00	821	0.00	0.00	7,125	1.00	0.00	348	0.00	0.00	6,177
Past caregiver	0.51	0.50	821	0.05	0.21	7,125	0.39	0.49	348	0.03	0.16	6,177
Parent alive	0.86	0.34	821	0.87	0.34	7,125	0.88	0.32	348	0.86	0.35	6,177
Age	60.22	4.77	821	58.77	4.76	7,125	60.32	4.72	348	59.18	4.62	6,177
Past effective retirement age	0.43	0.50	821	0.30	0.46	7,125	0.38	0.49	348	0.26	0.44	6,177
Close to effective retirement age	0.55	0.50	821	0.42	0.49	7,125	0.51	0.50	348	0.38	0.48	6,177
Married	0.62	0.49	821	0.63	0.48	7,125	0.61	0.49	348	0.74	0.44	6,177
Number of children	1.90	1.13	821	2.05	1.19	7,125	1.66	1.31	348	2.06	1.25	6,177
Wave 2	0.18	0.39	821	0.24	0.43	7,125	0.25	0.43	348	0.31	0.46	6,177
Wave 5	0.38	0.49	821	0.32	0.47	7,125	0.34	0.48	348	0.28	0.45	6,177
Wave 6	0.44	0.50	821	0.44	0.50	7,125	0.41	0.49	348	0.42	0.49	6,177
Number of chronic deseases	1.28	1.25	821	1.13	1.24	7,125	1.12	1.15	348	1.07	1.18	6,177
Limitations with activities of daily living	0.06	0.48	821	0.06	0.35	7,125	0.05	0.25	348	0.06	0.37	6,177
Limitations with instrumental activities of daily living	0.10	0.59	821	0.10	0.44	7,125	0.04	0.26	348	0.08	0.47	6,177
Education												
Low	0.26	0.44	821	0.23	0.42	7,125	0.27	0.45	348	0.24	0.43	6,177
Medium	0.40	0.49	821	0.36	0.48	7,125	0.41	0.49	348	0.39	0.49	6,177
High	0.34	0.47	821	0.41	0.49	7,125	0.31	0.46	348	0.36	0.48	6,177
Household wealth (in 10 000 EURO)	28.92	52.90	821	32.73	50.15	7,125	34.20	51.74	348	36.56	55.19	6,177
Instruments												
Mother widowed	0.67	0.47	817	0.56	0.50	7,081	0.67	0.47	346	0.57	0.50	6,139
Either parent's health poor, or fair[b]	0.64	0.48	814	0.50	0.50	7,021	0.67	0.47	346	0.49	0.50	6,073
Instruments (t-1)												
Mother widowed (t-1)	0.70	0.46	701	0.60	0.49	6,241	0.69	0.47	302	0.61	0.49	5,455
Either parent's poor, or fair (t-1)[b]	0.62	0.49	662	0.50	0.50	5,809	0.61	0.49	284	0.47	0.50	5,105
Observations	821			7125			348			6177		

Note: [a] Working-hours is conditional on employment.

Note: [b] Zeros also include cases were no parent is alive.

Source: SHARE, own calculation.

4 Results

4.1 Strength of instruments and exogeneity of regressors

Before turning to our regression results, we need to validate the strength and necessity of our instruments. While we argue that parental health and widowhood of the mother are appropriate instruments on grounds that these variables do not have a direct effect on son's or daughter's labour fore participation, this exclusion restriction of the instrument cannot be tested. We can however validate the relevance of the instruments by checking the first stage regression. More precisely, one criteria of a strong instruments is the joint significance of the excluded instruments in the first stage. Following Staiger and Stock (1997) we assume the instruments to be relevant and strong enough to affect the causal channel of interest if the joint F-statistic is larger than 10. Furthermore, we use the Sargan-Hansen test in order to test the over-identifying restriction. Even though not a sufficient test for the independence assumption, rejection of the over-identifying restriction is usually interpreted as indicating that at least one of the instruments is not valid (Cameron and Trivedi, 2005). We therefore see the over-identification test as a necessary condition for valid set of instruments. Finally, we use the Durbin-Wu-Hausmann test in order to test for regressor exogeneity.

Table II provides a summary of the empirical strength of our excluded instruments. For women, our instruments pass all test criteria in any of the analyzed models. Similar to Bolin et al. (2008) or Van Houtven et al. (2013), we cannot reject exogeneity of caregiving. Likewise, we find support for our instruments and no evidence for endogeneity for men analysing the employment decision. However, possibly due to the smaller sample size, our instruments are weak, that is, the F-statistic is smaller than 10, when looking at men's working hours. As a consequence, the endogeneity test is not informative. Since males seem less likely to change their caregiving behaviour in response to parental need, we argue that a direct effect of parental need on labour market outcome is also unlikely and

report OLS results.[9] However, the results for male working hours should be interpreted with caution.

In the absence of endogeneity, OLS estimates can be interpreted as causal effects. We thus focus on the more efficient OLS estimates rather than the 2SLS estimates whenever exogeneity cannot be rejected but report 2SLS results in the appendix for comparison.

Table II: Summary of the Empirical Strength of the Instruments

	Employment		**Hours**	
	(1) Recent caregiver	(2) Past caregiver	(3) Recent caregiver	(4) Past caregiver
Women				
Weak instrument test[a]	✓	✓	✓	✓
Over-identification test[b]	✓	✓	✓	✓
Exogeneity test[c]	✓	✓	✓	✓
Men				
Weak instrument test[a]	✓	✓	✓	✗
Over-identification test[b]	✓	✓	✗	✓
Exogeneity test[c]	✓	✓	✓	✓

[a] ✓indicates that the joint F-statistic for the excluded instruments in the first stage equation is greater than 10; ✗ indicates that it is not.

[b] ✓indicates that we do not reject the over-identification test at conventional significance levels; ✗ indicates that we reject the test.

[c] ✓indicates that we do not reject exogeneity at conventional significance levels; ✗ indicates that we reject the test.

4.2 The effect of caregiving on labour force participation

In Table III we report the results for female labour participation on the extensive and on the intensive margin. The extensive margin is estimated in a linear probability model with an employment dummy as the depended variable (models 1 – 3). Hours worked represent the intensive margin (models 4 – 6). We estimate hours worked conditional on employment. As we us the log of the number of hours, the results should be interpreted as semi-elasticities.

In line with most of the literature, our results indicate a negative relationship between recent caregiving and labour force participation. Recent caregiving reduces the probability of being currently employed by 5.7 percentage points, while past caregiving

[9]For males, endogeneity of working hours is also not rejected by Van Houtven et al. (2013).

leads to a reduction of 2.6 percentage points when each form of caregiving is considered separately. The effects are statistically significant at the 1% and 10% significance level, respectively. In model 3, we consider both recent and past caregiving simultaneously to account for the fact that about half of recent caregivers have also provided care in the past. The result shows that the effect of present caregiving dominates: Women who provided care only recently have a 7.2 percentage point lower probability of being employed while the effect of only past caregiving is statistically insignificant. The point estimate, however, remains negative. Given the relatively low share of individuals who only provided care in the past, failure to find a significant effect might also be driven by sample size limitations. We also report the effect of continuous caregiving (in italic), which is not an additional regressor but results as the sum of the two single effects as well as the interaction term. It can be interpreted as the effect of caregiving in the past and recently. Continuous caregiving has a significantly negative effect of -4.5 percentage points on female employment. Interestingly, continuous caregiving has a slightly smaller effect than recent caregiving only, though the difference is not statistically significant.

Table III: Regression on Female Employment and Working Hours (log)

	(1) employed	(2) employed	(3) employed	(4) log(hours)	(5) log(hours)	(6) log(hours)
Recent caregiver	-0.057^{***}		-0.072^{***}	-0.061^{**}		0.002
	(0.015)		(0.019)	(0.028)		(0.030)
Past caregiver		-0.026^{*}	-0.014		-0.085^{***}	-0.041
		(0.015)	(0.020)		(0.029)	(0.033)
Recent & past caregiver			0.041			-0.085
			(0.033)			(0.061)
Continuous caregiver[a]			*-0.045***			*-0.124****
Demographics	✓	✓	✓	✓	✓	✓
Health	✓	✓	✓	✓	✓	✓
Education	✓	✓	✓	✓	✓	✓
Wealth	✓	✓	✓	✓	✓	✓
Country	✓	✓	✓	✓	✓	✓
Obs.	7946	7946	7946	5412	5412	5412
R^2	0.46	0.46	0.46	0.15	0.15	0.15

Significance levels are clustered on individual level: $*$ p <0.10, $**$ p <0.05, $***$ p <0.01

[a] Continuous caregiver = Recent caregiver + Past caregiver + Recent caregiver & Past caregiver

Source: SHARE, own calculation.

A slightly different story can be told when looking at the intensive margin (models 4 – 6). While recent caregiving reduces working hours by 6.1% ($p<0.05$), past caregiving leads to a lightly stronger reduction of 8.5% ($p<0.01$). Taking the average working hours of female caregivers of 33.23 hours, these effects correspond to a reduction of 2.03 and 2.82 hours, respectively. Treating recent and past caregiving separately, past caregiving hence seems to be more important. The finding of persistence is partially backed by model 6. While the effect for solely recent caregiving is zero, the point estimate of past caregiving remains at -4.1% though it is not statistically significant. Model 6 further shows, that effects on female working hours are primarily driven by continuous caregivers. If women are continuous caregiver, they work 12.4% fewer hours which corresponds to a total effect of about -4.12 hours.

Table IV summarizes the results for men. Similar to women, our result suggest that being a recent caregiver reduces the probability of working for men. With an estimated reduction of -7.0 and -7.8 percentage points for recent and past caregiving, respectively, the point estimates are slightly larger for men than for women when either form of caregiving is considered separately. Both effects are statistically significant at the 1% significance level. The negative effects are again driven by continuous caregivers.[10] The coefficients of both only recent and only past caregiving remain negative, indicating some persistence, however, they become statistically insignificant. Continuous caregiving on the other hand leads to a highly significant reduction of 12 percentage points.

Differently from the results for women, we do not find statically significant effects of caregiving for men and all our estimates are close to zero. Since men more often work in full time positions (as can be seen in the descriptives in Table I), they might be less flexible to reduce working hours than women.

[10] In table VI in the appendix, we also show effects of caregiving on retirement. They show a persistent positive effect of past caregiving on retirement, indicating that many of those men who do not find a new job after their care spell is over turn to retirement and leave the labour market permanently.

Table IV: Regression on Male Employment and Working Hours (log)

	(1) employed	(2) employed	(3) employed	(4) log(hours)	(5) log(hours)	(6) log(hours)
Recent caregiver	−0.070***		−0.042	0.039		0.042
	(0.022)		(0.027)	(0.030)		(0.039)
Past caregiver		−0.078***	−0.047		−0.003	−0.022
		(0.023)	(0.031)		(0.031)	(0.042)
Recent & past caregiver			−0.029			0.009
			(0.053)			(0.070)
Continuous caregiver[a]			*-0.118***			*0.029*
Demographics	✓	✓	✓	✓	✓	✓
Health	✓	✓	✓	✓	✓	✓
Education	✓	✓	✓	✓	✓	✓
Wealth	✓	✓	✓	✓	✓	✓
Country	✓	✓	✓	✓	✓	✓
Obs.	6525	6525	6525	4428	4428	4428
R^2	0.42	0.42	0.42	0.09	0.09	0.09

Significance levels are clustered on individual level: ∗ p <0.10, ∗∗ p <0.05, ∗ ∗ ∗ p <0.01

[a] Continuous caregiver = Recent caregiver + Past caregiver + Recent caregiver & Past caregiver

Source: SHARE, own calculation.

5 Discussion and conclusion

Providing sufficient long-term care support to the elderly is a major policy challenge in our ageing societies. Informal caregiver contribute a substantial time commitment to long-term care provision. While informal care appears – at first glance – as the least expensive form of long-term care provision, informal care is often favoured by long-term care systems. However, the results of this paper show that frequent informal caregiving comes at the cost of reduced employment rates and, for women, also reduced working hours. While for women, the negative employment effect of recent caregiving dominates, it is especially continuous caregiving that leads to a reduction of women's working hours as well as men's employment probability. Moreover, though statistically insignificant, negative point estimates were found for past caregiving on both women's and men's intensive and extensive labour force participation. Interestingly, the negative effect of continuous caregiving on employment is larger for men than for women.

Two possible explanations exist. First, women, who often work part time, might find

it easier to re-enter the labour force working only a few hours or in low skilled jobs where breaks in the employment history might not pose as much of a barrier to entry as in traditionally male dominated full-time or high skilled positions. Second, females provide care more frequently. Hence, employers might consider female caregiving as the norm, while male caregivers might be regarded as less career driven and less committed to the job. Relatedly, Rudman and Mescher (2013) find that men who request parental leave are considered weaker, which in turn may lead to employment discrimination (Moss-Racusin et al., 2010).

Acknowledging the time conflict caused by work and care obligations and the financial loss associated with reduced labour force participation, care leave options have been implemented in several countries (Colombo et al., 2011). While unpaid care leaves aim to reduce the risk of dropping out of the labour force by guaranteeing a job, paid care leaves such as for example in some regions of Sweden also reduce the financial burden that comes with a break in employment. Whether such policies reduce the negative effect of caregiving on employment or at least alleviate the persistence of the effect, will have to be explored in more detail as newer data becomes available.

References

Angrist, J. and Pischke, J.-S. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press.

Bauer, J. M. and Sousa-Poza, A. (2015). Impacts of informal caregiving on caregiver employment, health, and family. *Journal of Population Ageing*, 8(3):113–145.

Berecki-Gisolf, J., Lucke, J., Hockey, R., and Dobson, A. (2008). Transitions into informal caregiving and out of paid employment of women in their 50s. *Social Science & Medicine*, 67(1):122 – 127.

Bolin, K., Lindgren, B., and Lundborg, P. (2008). Your next of kin or your own career?: Caring and working among the 50+ of Europe. *Journal of Health Economics*, 27(3):718–738.

Börsch-Supan, A., Brandt, M., Hunkler, C., Kneip, T., Korbmacher, J., Malter, F., Schaan, B., Stuck, S., and Zuber, S. (2013). Data resource profile: the Survey of Health, Ageing and Retirement in Europe (SHARE). *International Journal of Epidemiology*, page dyt088.

Börsch-Supan, A. and Jürges, H. (eds.) (2005). *The Survey of Health, Ageing and Retirement in Europe - Methodology*. MEA, Mannheim.

Cameron, A. C. and Trivedi, P. K. (2005). *Microeconometrics: methods and applications*. Cambridge University Press, Cambridge; New York.

Carmichael, F. and Charles, S. A. (1998). The labour market costs of community care. *Journal of Health Economics*, 17(6):747–765.

Carmichael, F. and Charles, S. A. (2003). The opportunity costs of informal care: Does gender matter? *Journal of Health Economics*, 22(5):781–803.

Carmichael, F., Charles, S. A., and Hulme, C. (2010). Who will care? Employment participation and willingness to supply informal care. *Journal of Health Economics*, 29(1):182–190.

Carmichael, F., Hulme, C., Sheppard, S., and Connell, G. (2008). Work – life imbalance: Informal care and paid employment in the UK. *Feminist Economics*, 14(2):3–35.

Coe, N. B. and Van Houtven, C. H. (2009). Caring for mom and neglecting yourself? The health effects of caring for an elderly parent. *Health Economics*, 18(9):991–1010.

Colombo, F., Llena-Nozal, A., Mercier, J., and Tjadens, F. (2011). Help Wanted? Providing and Paying for Long-Term Care. OECD Health Policy Studies.

Crespo, L. and Mira, P. (2014). Caregiving to elderly parents and employment status of European mature women. *Review of Economics and Statistics*, 96(4):693–709.

Ettner, S. L. (1995). The impact of "Parent care" on female labor supply decisions. *Demography*, 32(1):63–80.

Ettner, S. L. (1996a). The opportunity costs of elder care. *Journal of Human Resources*, pages 189–205.

Ettner, S. L. (1996b). The opportunity costs of elder care. *The Journal of Human Resources*, 31(1):189–205.

Fevang, E., Kverndokk, S., and Røed, K. (2012). Labor supply in the terminal stages of lone parents' lives. *Journal of Population Economics*, 25(4):1399–1422.

He, D. and McHenry, P. (2013). Does labor force participation reduce informal caregiving? *Available at SSRN 2292700*.

Heger, D. (2014). Work and well-being of informal caregivers in Europe. *Ruhr Economic Paper*, (512).

Heitmueller, A. (2007). The chicken or the egg?: Endogeneity in labour market participation of informal carers in England. *Journal of Health Economics*, 26(3):536–559.

Heitmueller, A. and Inglis, K. (2007). The earnings of informal carers: Wage differentials and opportunity costs. *Journal of Health Economics*, 26(4):821–841.

Johnson, R. W. and Lo Sasso, A. T. (2006). The impact of elder care on women's labor supply. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, 43(3):195–210.

Jürges, H., Avendano, M., and Mackenbach, J. P. (2008). Are different measures of self-rated health comparable? An assessment in five European countries. *European journal of epidemiology*, 23(12):773–781.

King, D. and Pickard, L. (2013). When is a carer's employment at risk? Longitudinal analysis of unpaid care and employment in midlife in England. *Health & Social Care in the Community*, 21(3):303–314.

Kotsadam, A. (2011). Does Informal Eldercare Impede Women's Employment? The Case of European Welfare States. *Feminist Economics*, 17(2):121–144.

Leigh, A. (2010). Informal care and labor market participation. *Labour Economics*, 17(1):140–149.

Lilly, M. B., Laporte, A., and Coyte, P. C. (2007). Labor market work and home care's unpaid caregivers: a systematic review of labor force participation rates, predictors of labor market withdrawal, and hours of work. *Milbank Quarterly*, 85(4):641–690.

Lilly, M. B., Laporte, A., and Coyte, P. C. (2010). Do they care too much to work? The influence of caregiving intensity on the labour force participation of unpaid caregivers in Canada. *Journal of Health Economics*, 29(6):895–903.

Malter, F. and Börsch-Supan, A. (2013). *SHARE Wave 4: Innovations & Methodology*. Munich Center for the Economics of Aging (MEA).

Malter, F. and Börsch-Supan, A. (2015). *SHARE Wave 5: Innovations & Methodology*. Munich Center for the Economics of Aging (MEA).

Meng, A. (2013). Informal home care and labor-force participation of household members. *Empirical Economics*, 44(2):959–979.

Michaud, P.-C., Heitmueller, A., and Nazarov, Z. (2010). A dynamic analysis of informal care and employment in England. *Labour Economics*, 17(3):455 – 465.

Moss-Racusin, C. A., Phelan, J. E., and Rudman, L. A. (2010). When men break the gender rules: Status incongruity and backlash against modest men. *Psychology of Men & Masculinity*, 11(2):140.

Nguyen, H. T. and Connelly, L. B. (2014). The effect of unpaid caregiving intensity on labour force participation: Results from a multinomial endogenous treatment model. *Social Science & Medicine*, 100:115–122.

OECD (1999). *Classifying educational programmes – Manual for ISCED-97 implementation in OECD countries*. OECD Publishing, Paris.

Rudman, L. A. and Mescher, K. (2013). Penalizing men who request a family leave: Is flexibility stigma a femininity stigma? *Journal of Social Issues*, 69(2):322–340.

Schmitz, H. and Westphal, M. (2016). Informal care and long-term labor market outcomes. Ruhr Economic Papers #646, RWI.

Schneider, T., Drobnic, S., and Blossfeld, H.-P. (2001). Pflegebedürftige Personen im Haushalt und das Erwerbsverhalten verheirateter Frauen. *Zeitschrift für Soziologie*, 30(5):362–383.

Skira, M. (2015). Dynamic wage and employment effects of elder parent care. *International Economic Review*, 56(1):63–93.

Spiess, C. K. and Schneider, A. U. (2003). Interactions between care-giving and paid work hours among european midlife women, 1994 to 1996. *Ageing and Society*, 23(1):41–68.

Staiger, D. and Stock, J. H. (1997). Instrumental variables regression with weak instruments. *Econometrica*, 65(3):557–586.

Stern, S. (1995). Estimating family long-term care decisions in the presence of endogenous child characteristics. *Journal of Human Resources*, 30(3):551–580.

Van Houtven, C. H., Coe, N. B., and Skira, M. (2013). The effect of informal care on work and wages. *Journal of Health Economics*, 32(1):240 – 252.

Viitanen, T. K. (2010). Informal Eldercare across Europe: Estimates from the European Community Household Panel. *Economic Analysis and Policy*, 40(2):149–178.

Wolf, D. A. and Soldo, B. J. (1994). Married women's allocation of time to employment and care of elderly parents. *Journal of Human Resources*, 29(4):1259–1276.

A Appendix

Table V: Regression on Female Fulltime Work and Retirement

	(1) fulltime	(2) fulltime	(3) fulltime	(4) retired	(5) retired	(6) retired
Recent caregiver	−0.011		0.043*	0.034***		0.039**
	(0.020)		(0.025)	(0.013)		(0.016)
Past caregiver		−0.046**	−0.022		0.027**	0.026
		(0.021)	(0.029)		(0.013)	(0.018)
Recent & past caregiver			−0.085*			−0.032
			(0.046)			(0.028)
Continuous caregiver[a]			*-0.064***			*0.032**
Demographics	✓	✓	✓	✓	✓	✓
Health	✓	✓	✓	✓	✓	✓
Education	✓	✓	✓	✓	✓	✓
Wealth	✓	✓	✓	✓	✓	✓
Country	✓	✓	✓	✓	✓	✓
Obs.	5385	5385	5385	7863	7863	7863
R^2	0.13	0.13	0.13	0.58	0.58	0.58

Significance levels are clustered on individual level: ∗ p <0.10, ∗∗ p <0.05, ∗ ∗ ∗ p <0.01

[a] Continuous caregiver = Recent caregiver + Past caregiver + Recent caregiver & Past caregiver

Source: SHARE, own calculation.

Table VI: Regression on Male Fulltime Work and Retirement

	(1) fulltime	(2) fulltime	(3) fulltime	(4) retired	(5) retired	(6) retired
Recent caregiver	0.020		0.022	0.039*		0.007
	(0.020)		(0.023)	(0.020)		(0.023)
Past caregiver		−0.025	−0.050		0.071***	0.051*
		(0.027)	(0.037)		(0.022)	(0.029)
Recent & past caregiver			0.040			0.036
			(0.055)			(0.049)
Continuous caregiver[a]			*0.013*			*0.095***
Demographics	✓	✓	✓	✓	✓	✓
Health	✓	✓	✓	✓	✓	✓
Education	✓	✓	✓	✓	✓	✓
Wealth	✓	✓	✓	✓	✓	✓
Country	✓	✓	✓	✓	✓	✓
Obs.	4423	4423	4423	6470	6470	6470
R^2	0.10	0.10	0.10	0.51	0.51	0.51

Significance levels are clustered on individual level: ∗ p <0.10, ∗∗ p <0.05, ∗ ∗ ∗ p <0.01

[a] Continuous caregiver = Recent caregiver + Past caregiver + Recent caregiver & Past caregiver

Source: SHARE, own calculation.

Table VII: Regression on Female Employment

	(1) 2SLS	(2) 2SLS	(3) OLS	(4) OLS	(5) OLS
Recent caregiver	−0.247*		−0.057***		−0.072***
	(0.134)		(0.015)		(0.019)
Past caregiver		−0.216		−0.026*	−0.014
		(0.150)		(0.015)	(0.020)
Recent & past caregiver					0.041
					(0.033)
Parent alive	0.014	0.003	0.012	0.010	0.012
	(0.013)	(0.016)	(0.013)	(0.013)	(0.013)
Age	0.159***	0.161***	0.154***	0.152***	0.153***
	(0.021)	(0.021)	(0.020)	(0.020)	(0.020)
Age squared/100	−0.156***	−0.160***	−0.152***	−0.152***	−0.152***
	(0.017)	(0.018)	(0.017)	(0.017)	(0.017)
Past effective retirement age	−0.242***	−0.246***	−0.247***	−0.248***	−0.248***
	(0.020)	(0.022)	(0.020)	(0.020)	(0.020)
Close to effective retirement age	−0.078***	−0.065***	−0.076***	−0.075***	−0.076***
	(0.017)	(0.019)	(0.017)	(0.017)	(0.017)
Married	−0.004	−0.002	−0.005	−0.005	−0.005
	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)
Number of children	−0.005	−0.005	−0.004	−0.004	−0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Wave 2	−0.086***	−0.087***	−0.086***	−0.087***	−0.085***
	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)
Wave 5	−0.038***	−0.027**	−0.043***	−0.044***	−0.042***
	(0.008)	(0.013)	(0.008)	(0.008)	(0.008)
Number of chronic deseases	−0.028***	−0.027***	−0.028***	−0.028***	−0.028***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Limitations with activities of daily living	−0.018	−0.020	−0.017	−0.017	−0.017
	(0.015)	(0.017)	(0.014)	(0.014)	(0.014)
Limitations with instrumental activities of daily living	−0.044***	−0.037***	−0.045***	−0.044***	−0.045***
	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)
Low	−0.042***	−0.036**	−0.039***	−0.038***	−0.039***
	(0.013)	(0.014)	(0.013)	(0.013)	(0.013)
High	0.050***	0.042***	0.055***	0.055***	0.055***
	(0.011)	(0.012)	(0.010)	(0.010)	(0.010)
Above medium household wealth	0.011	0.009	0.010	0.010	0.010
	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)
Constant	−3.045***	−3.065***	−2.872***	−2.828***	−2.863***
	(0.610)	(0.633)	(0.582)	(0.583)	(0.582)
Country	✓	✓	✓	✓	✓
F-Stat.	39.98	33.00			
Endog. test (P-val.)	0.16	0.21			
Overid. test (P-val.)	0.55	0.47			
Obs.	7807	6362	7946	7946	7946
R^2	0.44	0.44	0.46	0.46	0.46

Significance levels are clustered on individual level: ∗ p <0.10, ∗∗ p <0.05, ∗ ∗ ∗ p <0.01

Source: SHARE, own calculation.

Table VIII: Regression on Male Employment

	(1) 2SLS	(2) 2SLS	(3) OLS	(4) OLS	(5) OLS
Recent caregiver	−0.461*		−0.070***		−0.042
	(0.274)		(0.022)		(0.027)
Past caregiver		−0.204		−0.078***	−0.047
		(0.328)		(0.023)	(0.031)
Recent & past caregiver					−0.029
					(0.053)
Parent alive	0.008	−0.010	0.001	−0.003	−0.001
	(0.015)	(0.019)	(0.014)	(0.014)	(0.014)
Age	0.136***	0.132***	0.127***	0.128***	0.128***
	(0.027)	(0.028)	(0.026)	(0.026)	(0.026)
Age squared/100	−0.139***	−0.135***	−0.133***	−0.133***	−0.133***
	(0.023)	(0.024)	(0.022)	(0.022)	(0.022)
Past effective retirement age	−0.144***	−0.165***	−0.150***	−0.151***	−0.150***
	(0.024)	(0.025)	(0.023)	(0.023)	(0.023)
Close to effective retirement age	−0.131***	−0.142***	−0.134***	−0.134***	−0.134***
	(0.020)	(0.022)	(0.020)	(0.020)	(0.020)
Married	−0.026*	−0.012	−0.013	−0.013	−0.014
	(0.015)	(0.016)	(0.012)	(0.012)	(0.012)
Number of children	0.008	0.012**	0.011***	0.011***	0.011**
	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
Wave 2	−0.079***	−0.080***	−0.084***	−0.085***	−0.085***
	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)
Wave 5	−0.042***	−0.038**	−0.045***	−0.046***	−0.046***
	(0.011)	(0.015)	(0.010)	(0.010)	(0.010)
Number of chronic deseases	−0.028***	−0.030***	−0.027***	−0.027***	−0.027***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Limitations with activities of daily living	−0.041**	−0.066***	−0.039**	−0.039**	−0.039**
	(0.019)	(0.019)	(0.018)	(0.018)	(0.018)
Limitations with instrumental activities of daily living	−0.022	−0.007	−0.019	−0.018	−0.019
	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)
Low	−0.036**	−0.020	−0.035**	−0.035**	−0.035**
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
High	0.070***	0.079***	0.072***	0.071***	0.071***
	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)
Above medium household wealth	0.060***	0.062***	0.059***	0.059***	0.059***
	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)
Constant	−2.359***	−2.282***	−2.118***	−2.124***	−2.139***
	(0.808)	(0.829)	(0.772)	(0.771)	(0.771)
Country	✓	✓	✓	✓	✓
F-Stat.	19.63	14.78			
Endog. test (P-val.)	0.15	0.74			
Overid. test (P-val.)	0.66	0.28			
Obs.	6398	5328	6525	6525	6525
R^2	0.38	0.43	0.42	0.42	0.42

Significance levels are clustered on individual level: ∗ p <0.10, ∗∗ p <0.05, ∗ ∗ ∗ p <0.01

Source: SHARE, own calculation.

Table IX: Regression on Female Working-Hours (in logs)

	(1) 2SLS	(2) 2SLS	(3) OLS	(4) OLS	(5) OLS
Recent caregiver	0.005		−0.061**		0.002
	(0.241)		(0.028)		(0.030)
Past caregiver		0.068		−0.085***	−0.041
		(0.256)		(0.029)	(0.033)
Recent & past caregiver					−0.085
					(0.061)
Parent alive	0.028	0.041	0.026	0.022	0.025
	(0.026)	(0.029)	(0.026)	(0.026)	(0.026)
Age	0.274***	0.291***	0.282***	0.280***	0.281***
	(0.073)	(0.079)	(0.072)	(0.072)	(0.072)
Age squared/100	−0.256***	−0.270***	−0.263***	−0.261***	−0.262***
	(0.065)	(0.070)	(0.064)	(0.064)	(0.064)
Past effective retirement age	−0.092**	−0.102**	−0.090**	−0.090**	−0.089**
	(0.039)	(0.042)	(0.039)	(0.039)	(0.039)
Close to effective retirement age	0.019	0.008	0.017	0.018	0.018
	(0.027)	(0.029)	(0.026)	(0.026)	(0.026)
Married	−0.071***	−0.056***	−0.070***	−0.070***	−0.071***
	(0.017)	(0.019)	(0.017)	(0.017)	(0.017)
Number of children	−0.016**	−0.015**	−0.017***	−0.017***	−0.018***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Wave 2	−0.044**	−0.052**	−0.046**	−0.046**	−0.047**
	(0.020)	(0.021)	(0.020)	(0.020)	(0.020)
Wave 5	−0.014	0.002	−0.016	−0.016	−0.017
	(0.015)	(0.026)	(0.014)	(0.014)	(0.014)
Number of chronic deseases	−0.035***	−0.038***	−0.034***	−0.035***	−0.035***
	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)
Limitations with activities of daily living	−0.028	−0.042	−0.031	−0.030	−0.029
	(0.035)	(0.041)	(0.034)	(0.034)	(0.034)
Limitations with instrumental activities of daily living	−0.024	−0.017	−0.024	−0.023	−0.024
	(0.023)	(0.025)	(0.022)	(0.022)	(0.022)
Low	−0.033	−0.041	−0.034	−0.034	−0.035
	(0.025)	(0.027)	(0.024)	(0.024)	(0.024)
High	0.085***	0.089***	0.082***	0.080***	0.080***
	(0.017)	(0.019)	(0.016)	(0.016)	(0.016)
Above medium household wealth	−0.012	−0.013	−0.010	−0.010	−0.010
	(0.016)	(0.017)	(0.015)	(0.015)	(0.015)
Constant	−3.764*	−4.258*	−3.987*	−3.904*	−3.941*
	(2.065)	(2.232)	(2.034)	(2.030)	(2.028)
Country	✓	✓	✓	✓	✓
F-Stat.	27.79	25.27			
Endog. test (P-val.)	0.84	0.56			
Overid. test (P-val.)	0.21	0.12			
Obs.	5308	4253	5412	5412	5412
R^2	0.14	0.14	0.15	0.15	0.15

Significance levels are clustered on individual level: ∗ p <0.10, ∗∗ p <0.05, ∗ ∗ ∗ p <0.01

Source: SHARE, own calculation.

Table X: Regression on Male Working-Hours (in logs)

	(1) 2SLS	(2) 2SLS	(3) OLS	(4) OLS	(5) OLS
Recent caregiver	−0.422		0.039		0.042
	(0.531)		(0.030)		(0.039)
Past caregiver		−0.246		−0.003	−0.022
		(0.790)		(0.031)	(0.042)
Recent & past caregiver					0.009
					(0.070)
Parent alive	0.011	−0.002	0.011	0.011	0.010
	(0.023)	(0.042)	(0.023)	(0.023)	(0.023)
Age	0.472***	0.490***	0.465***	0.466***	0.466***
	(0.075)	(0.078)	(0.069)	(0.069)	(0.069)
Age squared/100	−0.422***	−0.437***	−0.417***	−0.418***	−0.417***
	(0.065)	(0.068)	(0.060)	(0.060)	(0.060)
Past effective retirement age	−0.010	−0.032	−0.015	−0.014	−0.015
	(0.040)	(0.044)	(0.039)	(0.039)	(0.039)
Close to effective retirement age	0.016	0.033	0.024	0.023	0.024
	(0.029)	(0.031)	(0.028)	(0.028)	(0.028)
Married	−0.035*	−0.026	−0.021	−0.022	−0.022
	(0.021)	(0.023)	(0.016)	(0.016)	(0.016)
Number of children	0.017**	0.018**	0.019***	0.019***	0.019***
	(0.007)	(0.008)	(0.006)	(0.006)	(0.006)
Wave 2	0.014	0.019	0.013	0.013	0.013
	(0.018)	(0.018)	(0.017)	(0.017)	(0.017)
Wave 5	0.012	0.002	0.010	0.010	0.010
	(0.016)	(0.026)	(0.016)	(0.016)	(0.015)
Number of chronic deseases	−0.014**	−0.019**	−0.017**	−0.017**	−0.017**
	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)
Limitations with activities of daily living	0.000	0.016	0.001	0.001	0.001
	(0.039)	(0.041)	(0.038)	(0.038)	(0.038)
Limitations with instrumental activities of daily living	−0.062**	−0.048	−0.058**	−0.059**	−0.058**
	(0.029)	(0.030)	(0.029)	(0.029)	(0.029)
Low	0.020	0.033	0.021	0.021	0.021
	(0.020)	(0.021)	(0.019)	(0.019)	(0.019)
High	0.002	0.004	0.006	0.006	0.006
	(0.016)	(0.019)	(0.016)	(0.016)	(0.016)
Above medium household wealth	0.072***	0.086***	0.070***	0.070***	0.070***
	(0.014)	(0.016)	(0.014)	(0.014)	(0.014)
Constant	−9.545***	−10.112***	−9.372***	−9.396***	−9.378***
	(2.125)	(2.223)	(1.967)	(1.969)	(1.967)
Country	✓	✓	✓	✓	✓
F-Stat.	10.00	5.52			
Endog. test (P-val.)	0.32	0.73			
Overid. test (P-val.)	0.09	0.48			
Obs.	4339	3561	4428	4428	4428
R^2	0.05	0.08	0.09	0.09	0.09

Significance levels are clustered on individual level: ∗ p <0.10, ∗∗ p <0.05, ∗ ∗ ∗ p <0.01

Source: SHARE, own calculation.

Table XI: Regression on Female Fulltime Work

	(1) 2SLS	(2) 2SLS	(3) OLS	(4) OLS	(5) OLS
Recent caregiver	−0.139		−0.011		0.043*
	(0.195)		(0.020)		(0.025)
Past caregiver		−0.137		−0.046**	−0.022
		(0.194)		(0.021)	(0.029)
Recent & past caregiver					−0.085*
					(0.046)
Parent alive	0.015	0.019	0.011	0.009	0.010
	(0.019)	(0.021)	(0.019)	(0.019)	(0.019)
Age	0.116**	0.106**	0.126***	0.125***	0.125***
	(0.045)	(0.048)	(0.045)	(0.045)	(0.045)
Age squared/100	−0.112***	−0.103**	−0.122***	−0.121***	−0.121***
	(0.040)	(0.042)	(0.040)	(0.040)	(0.040)
Past effective retirement age	−0.061**	−0.063**	−0.057**	−0.057**	−0.056**
	(0.028)	(0.030)	(0.028)	(0.028)	(0.028)
Close to effective retirement age	0.020	0.011	0.023	0.024	0.024
	(0.021)	(0.023)	(0.021)	(0.021)	(0.021)
Married	−0.065***	−0.057***	−0.066***	−0.066***	−0.066***
	(0.014)	(0.015)	(0.014)	(0.014)	(0.014)
Number of children	−0.011**	−0.013**	−0.011**	−0.011**	−0.011**
	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)
Wave 2	−0.044***	−0.042**	−0.046***	−0.046***	−0.047***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Wave 5	−0.018	−0.005	−0.020*	−0.020*	−0.022**
	(0.011)	(0.019)	(0.011)	(0.011)	(0.011)
Number of chronic deseases	−0.028***	−0.031***	−0.029***	−0.029***	−0.029***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Limitations with activities of daily living	−0.009	−0.012	−0.017	−0.016	−0.014
	(0.028)	(0.032)	(0.028)	(0.028)	(0.028)
Limitations with instrumental activities of daily living	−0.042**	−0.033	−0.039*	−0.039*	−0.039*
	(0.021)	(0.023)	(0.021)	(0.021)	(0.021)
Low	−0.058***	−0.059***	−0.055***	−0.056***	−0.056***
	(0.019)	(0.021)	(0.019)	(0.019)	(0.019)
High	0.047***	0.055***	0.047***	0.046***	0.046***
	(0.014)	(0.015)	(0.014)	(0.014)	(0.014)
Above medium household wealth	−0.024*	−0.025*	−0.023*	−0.023*	−0.022*
	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)
Constant	−2.027	−1.761	−2.309*	−2.272*	−2.282*
	(1.294)	(1.352)	(1.291)	(1.289)	(1.290)
Country	✓	✓	✓	✓	✓
F-Stat.	28.10	24.86			
Endog. test (P-val.)	0.50	0.72			
Overid. test (P-val.)	0.40	0.15			
Obs.	5281	4232	5385	5385	5385
R^2	0.12	0.13	0.13	0.13	0.13

Significance levels are clustered on individual level: ∗ p <0.10, ∗∗ p <0.05, ∗ ∗ ∗ p <0.01

Source: SHARE, own calculation.

Table XII: Regression on Male Fulltime Work

	(1) 2SLS	(2) 2SLS	(3) OLS	(4) OLS	(5) OLS
Recent caregiver	−0.239		0.020		0.022
	(0.338)		(0.020)		(0.023)
Past caregiver		−0.417		−0.025	−0.050
		(0.524)		(0.027)	(0.037)
Recent & past caregiver					0.040
					(0.055)
Parent alive	0.016	0.000	0.015	0.014	0.013
	(0.015)	(0.027)	(0.014)	(0.015)	(0.015)
Age	0.310***	0.337***	0.316***	0.317***	0.316***
	(0.046)	(0.049)	(0.043)	(0.043)	(0.043)
Age squared/100	−0.274***	−0.296***	−0.280***	−0.281***	−0.280***
	(0.040)	(0.043)	(0.038)	(0.038)	(0.038)
Past effective retirement age	−0.040	−0.046	−0.042	−0.042	−0.043
	(0.027)	(0.029)	(0.026)	(0.026)	(0.026)
Close to effective retirement age	0.003	0.011	0.010	0.010	0.010
	(0.019)	(0.020)	(0.018)	(0.018)	(0.018)
Married	−0.007	−0.009	−0.001	−0.002	−0.002
	(0.013)	(0.016)	(0.011)	(0.011)	(0.011)
Number of children	0.004	0.004	0.006	0.005	0.005
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)
Wave 2	−0.006	−0.001	−0.006	−0.006	−0.006
	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)
Wave 5	0.007	0.007	0.008	0.008	0.008
	(0.010)	(0.017)	(0.009)	(0.010)	(0.009)
Number of chronic deseases	−0.018***	−0.017***	−0.019***	−0.019***	−0.019***
	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)
Limitations with activities of daily living	0.033	0.038	0.034	0.034	0.034
	(0.025)	(0.029)	(0.024)	(0.024)	(0.024)
Limitations with instrumental activities of daily living	−0.079***	−0.065**	−0.077***	−0.077***	−0.076***
	(0.026)	(0.027)	(0.026)	(0.026)	(0.026)
Low	−0.003	−0.001	−0.002	−0.002	−0.002
	(0.013)	(0.014)	(0.013)	(0.013)	(0.013)
High	−0.005	−0.006	−0.004	−0.004	−0.004
	(0.010)	(0.012)	(0.010)	(0.010)	(0.010)
Above medium household wealth	0.026***	0.034***	0.025***	0.025***	0.025***
	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)
Constant	−7.797***	−8.596***	−7.969***	−7.996***	−7.974***
	(1.322)	(1.410)	(1.241)	(1.243)	(1.241)
Country	✓	✓	✓	✓	✓
F-Stat.	10.00	5.51			
Endog. test (P-val.)	0.41	0.43			
Overid. test (P-val.)	0.23	0.94			
Obs.	4334	3557	4423	4423	4423
R^2	0.06	0.04	0.10	0.10	0.10

Significance levels are clustered on individual level: ∗ p <0.10, ∗∗ p <0.05, ∗ ∗ ∗ p <0.01

Source: SHARE, own calculation.

Table XIII: Regression on Female Retirement

	(1) 2SLS	(2) 2SLS	(3) OLS	(4) OLS	(5) OLS
Recent caregiver	0.152		0.034***		0.039**
	(0.117)		(0.013)		(0.016)
Past caregiver		0.071		0.027**	0.026
		(0.130)		(0.013)	(0.018)
Recent & past caregiver					−0.032
					(0.028)
Parent alive	−0.006	−0.001	−0.004	−0.002	−0.003
	(0.012)	(0.014)	(0.011)	(0.011)	(0.012)
Age	−0.176***	−0.164***	−0.175***	−0.174***	−0.174***
	(0.017)	(0.018)	(0.017)	(0.017)	(0.017)
Age squared/100	0.173***	0.164***	0.172***	0.171***	0.171***
	(0.015)	(0.015)	(0.014)	(0.014)	(0.014)
Past effective retirement age	0.305***	0.314***	0.309***	0.310***	0.310***
	(0.019)	(0.021)	(0.019)	(0.019)	(0.019)
Close to effective retirement age	0.094***	0.075***	0.092***	0.092***	0.092***
	(0.016)	(0.017)	(0.015)	(0.015)	(0.015)
Married	0.014	0.011	0.014*	0.014*	0.014*
	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)
Number of children	0.004	0.002	0.003	0.003	0.003
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Wave 2	0.072***	0.073***	0.073***	0.073***	0.072***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Wave 5	0.024***	0.035***	0.029***	0.029***	0.028***
	(0.007)	(0.011)	(0.007)	(0.007)	(0.007)
Number of chronic deseases	0.017***	0.018***	0.017***	0.017***	0.017***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Limitations with activities of daily living	0.008	0.013	0.006	0.006	0.006
	(0.014)	(0.015)	(0.013)	(0.013)	(0.013)
Limitations with instrumental activities of daily living	0.040***	0.035***	0.041***	0.040***	0.040***
	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)
Low	0.025**	0.023*	0.023**	0.023**	0.023**
	(0.011)	(0.012)	(0.011)	(0.011)	(0.011)
High	−0.029***	−0.024**	−0.031***	−0.031***	−0.031***
	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)
Above medium household wealth	0.006	0.007	0.006	0.006	0.006
	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)
Constant	4.440***	4.059***	4.393***	4.367***	4.381***
	(0.508)	(0.523)	(0.487)	(0.487)	(0.487)
Country	✓	✓	✓	✓	✓
F-Stat.	39.18	33.34			
Endog. test (P-val.)	0.32	0.68			
Overid. test (P-val.)	0.40	0.52			
Obs.	7726	6301	7863	7863	7863
R^2	0.57	0.57	0.58	0.58	0.58

Significance levels are clustered on individual level: ∗ p <0.10, ∗∗ p <0.05, ∗ ∗ ∗ p <0.01

Source: SHARE, own calculation.

Table XIV: Regression on Male Retirement

	(1) 2SLS	(2) 2SLS	(3) OLS	(4) OLS	(5) OLS
Recent caregiver	0.158		0.039*		0.007
	(0.243)		(0.020)		(0.023)
Past caregiver		−0.027		0.071***	0.051*
		(0.298)		(0.022)	(0.029)
Recent & past caregiver					0.036
					(0.049)
Parent alive	−0.017	−0.013	−0.015	−0.012	−0.013
	(0.014)	(0.017)	(0.013)	(0.013)	(0.013)
Age	−0.207***	−0.211***	−0.203***	−0.204***	−0.204***
	(0.023)	(0.024)	(0.022)	(0.022)	(0.022)
Age squared/100	0.203***	0.205***	0.200***	0.200***	0.201***
	(0.019)	(0.020)	(0.019)	(0.019)	(0.019)
Past effective retirement age	0.169***	0.182***	0.171***	0.171***	0.171***
	(0.023)	(0.025)	(0.023)	(0.023)	(0.023)
Close to effective retirement age	0.144***	0.156***	0.146***	0.146***	0.146***
	(0.019)	(0.021)	(0.019)	(0.019)	(0.019)
Married	0.045***	0.038***	0.042***	0.043***	0.043***
	(0.013)	(0.014)	(0.011)	(0.011)	(0.011)
Number of children	−0.015***	−0.018***	−0.016***	−0.016***	−0.016***
	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
Wave 2	0.085***	0.085***	0.086***	0.086***	0.086***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Wave 5	0.032***	0.031**	0.032***	0.032***	0.032***
	(0.009)	(0.014)	(0.008)	(0.008)	(0.009)
Number of chronic deseases	0.027***	0.028***	0.028***	0.027***	0.028***
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)
Limitations with activities of daily living	0.022	0.031*	0.021	0.021	0.021
	(0.017)	(0.019)	(0.017)	(0.017)	(0.017)
Limitations with instrumental activities of daily living	0.020	0.011	0.020	0.020	0.020
	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)
Low	0.022*	0.013	0.021*	0.021*	0.021*
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
High	−0.044***	−0.050***	−0.044***	−0.044***	−0.044***
	(0.011)	(0.012)	(0.011)	(0.011)	(0.011)
Above medium household wealth	−0.014	−0.015	−0.012	−0.012	−0.012
	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)
Constant	5.299***	5.477***	5.195***	5.211***	5.222***
	(0.669)	(0.711)	(0.655)	(0.654)	(0.655)
Country	✓	✓	✓	✓	✓
F-Stat.	19.49	14.75			
Endog. test (P-val.)	0.63	0.74			
Overid. test (P-val.)	0.94	0.70			
Obs.	6343	5283	6470	6470	6470
R^2	0.51	0.51	0.51	0.51	0.51

Significance levels are clustered on individual level: ∗ p <0.10, ∗∗ p <0.05, ∗ ∗ ∗ p <0.01

Source: SHARE, own calculation.