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Behavioral Patterns among Older Workers

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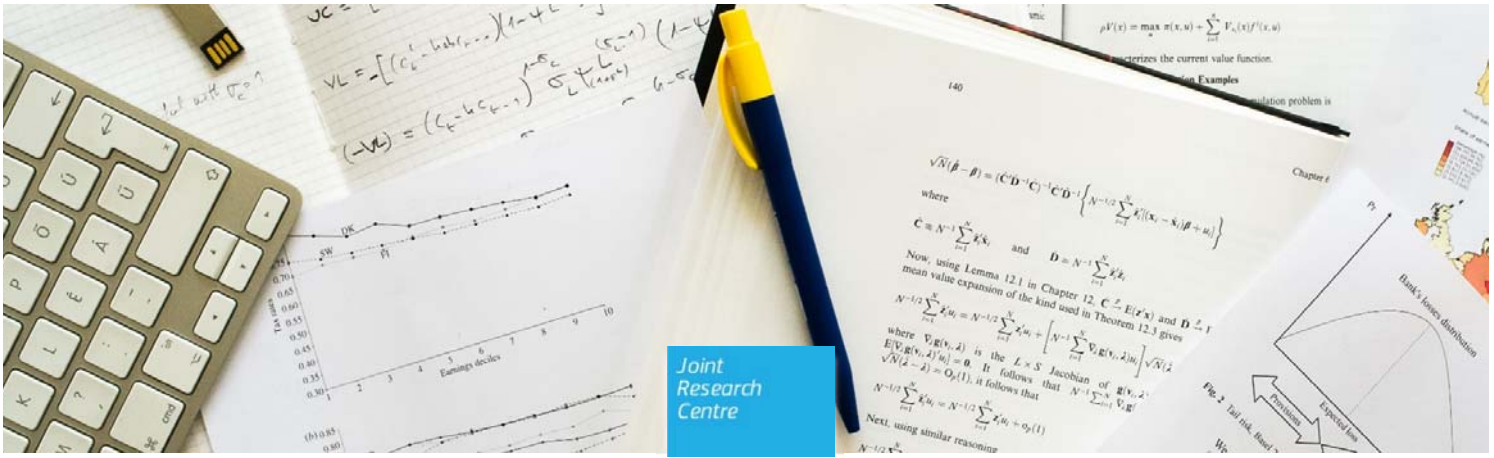

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Retirement and Informal Care-giving:

Behavioral Patterns among Older Workers

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(Joint Research Centre)

September 12, 2017

Abstract

This paper uses panel data from the Survey of Health, Aging and Retirement in Europe (SHARE) to study the effect of care-giving on retirement. The findings suggest that care- and support-giving contributes to the retirement decision, in particular for men. While the frequency of care activities is more influential in the male retirement decision, the most important factor for both genders turns out to be out-of-household care.

JEL Classification: I19, J26, J22.

Keywords: Informal Care-giving, Retirement; Economics of Aging; Panel Data.

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1 Introduction

Older workers frequently engage in support and care activities for people in their social networks. Aside from the growing market for institutional, mobile and in-house care for older adults, informal support and care activities have maintained their importance within the larger family context. In the light of financing constraints of public expenditures for elderly care, traditional care-giving in the social network might not be fully substituted by professional care in any case. For older workers, such activities are typically increasing pressures on their leisure time as many of them reallocate their time budgets towards fewer hours of labor supply. At the same time, the extent to which older workers engage in such activities determines the extent of labor supply reduction, in many cases leading to a full withdrawal from the labor force, and - if eligibility rules allow - to the take-up of retirement. This paper attempts to quantify the effect of informal support or care on retirement. Yet, we realize that support activities materialize in various ways and intensities, not only in the form of classical parental care-giving in the household. Consequently, we see the need to define support and care-giving as broadly as possible in order to capture these important variations, ranging from minimal household help on an occasional basis up to intense daily care 'around the clock'.

This paper investigates the effect of support and care-giving of older workers on retirement, taking into account a comprehensive set of dimensions over which these activities span. The novelty of our approach is a rather broad definition of such activities, exploiting recent survey data on older people in Europe. Our findings underline the importance of care-giving for the retirement decision, showing behavioral differences across gender,

intensity, and type of activity.

The empirical strategy entwines around a binary indicator of retirement as the dependent variable. Two different specifications are deployed in order to capture the effect of care and support giving on retirement. First, the 'bird perspective' approach with a unique indicator variable for engaging in any sort of activity related to support or care on an informal basis. In order to better understand the particular factors for care-givers to take up retirement, our second specification uses variables spreading out the numerous aspects and dimensions of support and care activities. We consider informal care only which naturally excludes care professionals, except they were to provide care or support during their leisure time to people in their social networks.

The following section discusses previous findings on the determinants of the retirement decision and on informal care-giving.

2 Previous related literature

Many studies have been dealing with the retirement decision, yet, causal factors like informal care-giving only recently got more attention. Financial incentives have been identified as important determinants of the retirement decision by Gruber and Wise (2004); pension benefit computations frequently embed behavioral signals with respect to the timing of retirement. Another strand of research is the coordination of retirement among couples; Blau (1998) and more recently Bingley and Lanot (2007) find evidence of joint retirement, implying that there exist preferences among couples for sharing retirement leisure. Further

considerations for retirement stem from someone's health status: Rust and Phelan (1997) and Sammartino (1987) draw their attention to health status and find evidence of poor health increasing the propensity of early retirement. Authors such as Hurd (1996) deal with institutional arrangements encouraging retirement, for instance, mandatory retirement rules, the cost of older labor, and age discrimination. On the demand side for labor, employers' attitudes towards older workers bear substantial implications for retirement behavior. However, these ideas have so far not been fully investigated.

Another important feature for the retirement decision is care-giving within one's social network or family. Let us now turn to the discussion of this relatively young research agenda. Two major directions have been investigated, the nature of informal-care as a good, and the impact of informal care on labor supply dimensions. Considering the first line of research, Bolin *et al.* (2008) test whether informal care by children or grandchildren is a substitute or complement to formal care. They find that formal and informal care are substitutes, and informal care is a complement to doctor and hospital visits. Likewise, Bonsang (2009) investigates the question whether informal care by adult children is a substitute for formal long-term care. They find that informal and formal long-term care are substitutes, independent of the degree of disability of the person given care to. Moreover, Van Houtven and Norton (2004) find that informal care reduces formal home care use and delays entry into nursing home services. So, for the financing of the increasing demand for elderly care, the findings related to the substitutability of formal and informal care might become important for policy in near future.

Labor supply aspects have been approached from various angles. Summarizing the find-

ings of the rudimentary 'older' literature, Gorey *et al.* (1992) point out that up to a third of informal care-giving leads to labor market exit. Dentinger and Clarkberg (2002) emphasize the importance of the closeness of care-giver and care recipient and of the gender of the care-giver when analyzing the effect of informal care-giving on retirement. Also, Van Houtven *et al.* (2013) find an effect of care-giving on hours of work and wages, but only for females. Skira (2015) find that females have low probabilities to return to their job after a spell of leave from work for the purpose of care-giving. Lee *et al.* (2015) point out that females on lower household income are more likely to provide informal care. Also, He and McHenry (2016) find a strong link between informal care-giving and the workplace. Reverting the chain of causality, they conclude that for women at per-retirement age, working 10 percent more hours results in a decrease of the probability of providing informal care. Vlachantoni (2010) also stresses the gender differences of care-giving activities. An interesting side issue has been investigated by Jacobs *et al.* (2015) who attempt to identify whether women giving informal care have different patterns of labor force participation according to the generation they belong to. They contrast 'Baby Boomers' and the generation born pre-World-War II, finding no evidence of intergenerational gaps in hours of work and labor force participation.

This paper contributes to the literature in three ways. First, we decompose care and support giving into important dimensions to study in depth the conditions under which these activities contribute to retirement. Second, we apply a rather broad notion of informal care- and support-giving going beyond the definitions previously used. Finally, novel micro-data has become available for Europe which serves as a base of most current

empirical evidence. The next section discusses the empirical strategy and the data used.

3 Empirical strategy

3.1 Empirical model

In order to estimate the retirement impact of care- and support-giving of older workers, we use a binary logit model in which $y^*$is the underlying latent variable, the propensity to retire, according to

$$y^* = x'\beta + u \tag{1}$$

where x' is a vector of explanatory variables including care and support variables, personal attributes, country and year fixed effects. Since $y^*$is not observed, we use observed retirement choices, where a value of one represents the status of retirement; a value of zero stands for any labor market status other than retired (employed, unemployed, etc.). The error term u follows a logistic distribution. The latent variable and the observed dependent variable relate to each other in the following way:

$$y = \begin{cases} 1 \;\; if \quad y^* > 0 \\ \\ 0 \;\; if \quad y^* \leq 0 \end{cases} \tag{2}$$

The marginal effects implied by the estimates can legitimately be interpreted as ceteris-

paribus causal impacts on the probability to retire. We run regressions separately by gender, while two model specifications are deployed for each gender.

First, we estimate an equation with a single explanatory variable for giving support or care. The variable *Care* is coded as a dummy just indicating support- or care-giving, no matter how intense or how frequent this engagement is (specification 1). Second, we use a specification based on a set of variables capturing various crucial aspects of support and care activities. These variables include information about the location of care, i.e., inside or outside the household of the care-giver, then, the time spent on giving support or care, and, finally, the number of people receiving care or support (specification 2).

Yet, the decision to retire on the one hand and giving informal care or support on the other hand, potentially raise concerns about reversed causality. In case someone retired in order to give more care, one could observe an increase in care activities at the time of retirement. If such an increase happened, a strong argument for the presence of endogeneity could be made. Therefore, we run both model specifications with care variables lagged by one period. We also consider a panel fixed effects approach. However, this would be problematic due to the high proportion of single-observation cross-sections, but also because of the small number of time periods in the panel in general, i.e., a maximum of three observations per cross-section.

3.2 Data and sample selection

For the empirical analysis, data from the Survey of Health, Aging, and Retirement in Europe (SHARE) are used. Observations come from waves one, two, and four, appended

into a panel of older workers. The logic of the analysis requires that people included in the panel experience the transition from paid work into formal retirement. Retirement is an absorbing state, therefore, we include the first year of retirement only, but not the second and consecutive years. The panel only includes people taking up retirement during the years observed in the panel window, but not before. Furthermore, we do not impose the restriction that every person needs to retire while being observed. Thus, the interpretation of the final output of the regression analysis is, in fact, the predicted probability of retirement conditional on having worked before retirement. The empirical definition of one's labor force status before receiving a pension is indeed not a trivial exercise; possible transitions into retirement could also stem from people never employed or working. We chose to stick to a rather broad notion of work over time, such that each person included reports a minimum of one observed episode of work before retirement. Therefore, with respect to their labor force status, we include people reporting to be employed, self-employed, civil servant, unemployed, homemaker or to be retired during any interview year.

The descriptive and regression analysis are done separately by gender. Here, the male sample consists of 4,639 persons observed over 7,052 observations. In the female sample, there are 4,157 persons spanning over 6,333 observations. Both samples include the age groups between 55 and 70. Excluded are people over the age of 70 since these cohorts are unlikely to follow standard patterns of retirement.

Interviews for wave one of SHARE were conducted in 2004 and 2005, for wave two in 2006 to 2007, and for wave four in 2011 to 2012. Wave three had to be excluded because

it was designed to retrieve work histories and other retrospective life course information. Naturally, the panel is unbalanced and has some degree of attrition. Therefore, most individuals are not observed in all three waves, and they may join the panel as refreshments after wave one.

We had to drop several observations due to missing values in key variables. We also excluded observations from countries where very few interviews had been conducted. Also, some countries joined SHARE in wave three, and therefore those observations were dropped. However, the set of countries used in the present paper comprises of all major economies in Europe such that our results can be generalized in a meaningful way. In fact, observations come from Austria, Germany, Sweden, the Netherlands, Spain, Italy, France, Greece, Switzerland, Belgium, the Czech Republic, Poland, and Denmark. Finally, we dropped a few implausible outliers. This resulted in two panels separated by gender, including 8,796 individuals over 13,385 person-year observations.

The subsequent section discusses descriptive statistics of these samples, in particular, summary measures of the support and care variables.

4 Descriptive statistics

4.1 Sample characteristics

Observations in the male sample have an average age of 59.6 years, female observations average at 59.3 years of age (Table 1). No important gender differentials exist for self-

reported health; the means of the health variable range between *very good* and *good* health across both samples. 87.1 percent of men and 75.2 percent of women live together with their partner or spouse in a household. This differential is likely to be explained by a generally higher life expectancy of women. Education years come close across both samples at around twelve years. The number of children is on average 2.1 for men and two for women. The analysis also includes a set of country dummies, for which summary measures are not reported in Table 1. Finally, a set of year dummies complete the range of variables. We might note that the period 2008 to 2010 is not included in the samples due to the specific design of wave three in SHARE.

[Insert Table 1 here]

4.2 Dimensions of informal care and support

SHARE provides a set of discrete survey questions covering various aspects of giving care or support to other people. In Table 2, we report summary statistics and explain the content of the care variables used in the analysis; these variables will be denoted in italics throughout. We construct the comprehensive dummy variable *Care* indicating any kind and extent of care- and support-giving. In fact, 31.8 percent of male observations are coming from personal care or household help, both within and outside the household.

[Insert Table 2 here]

In the female sample, this share is higher as we would expect, amounting to 37.5 percent. The dummy variable *Incare* is defined as giving daily care in the household, which we

would hypothesize to be a rather intense activity. It has a higher share of women, 4.4 percent, in contrast to men with only 3.7 percent. For *Carehelp*, a dummy variable indicating care or household help outside the household - which also reports activities less frequent than daily - is higher for women (34.5 percent) compared to men (28.4 percent). *Caretime*, a categorical variable indicating the extent of care in terms of time devoted to these activities, is higher for females as well. As a minor shortcoming, SHARE only reports *Caretime* in case the activity happens outside the household, but not for in-household care. In terms of the number of people given care to, again females are topping males, while in both genders the average number of people cared for is less than one on average.

Table 3 outlines the contrast of care activities before and during the year of retirement. In case these activities were to increase, we could could hypothesize that people retire in order to give more care. However, care activities remain relatively stable before and in the retirement period. The share of people giving care, captured by the variable *Care*, is 31.1 percent before and 31 percent upon retirement for males. For females, we compare 38.1 percent before to 34 percent in the retirement period. Therefore, an increase in care activities during the retirement cannot be observed. The only variable showing a considerable increase is *Caretime*, but only in the male case. Here, the mean goes up by approximately ten percentage points in the period of retirement. In summary, the descriptive evidence does not support the proposition of major change in behaviour towards care activity during the year of retirement.

[Insert Table 3 here]

5 Results

We now turn to the discussion of the regression results, which are reported in Table 4 for specification one and in Table 2 for specification 2. In order to use a more intuitive way of interpreting logit coefficients, we report both, odds ratios, and average marginal effects. Finally, in order to better grasp the extent of the effect of care-giving on retirement, we compute predicted probabilities of retirement over age, contrasting care-givers versus non-care-givers. In general, model specification one shows that care mainly matters for males in their retirement decision. This effect for males is however relatively small compared to factors like age, income, and cohabitation. For females, health does not impact on the retirement decision. Model specification two shows a stronger impact of specific care activities and of the intensity of such activity on retirement. This holds relative to other covariates, but also in comparison to specification one.

5.1 Results: one care dummy

Specification one uses a single dummy variable for giving care or household help. For the male sample, this dummy variable is significant, but not for the females. We may interpret the effect of care on retirement in following way: in case a male person is giving care, his odds of retiring are 1.26 times higher than for a male not giving care. We do not interpret the odds ratio for females due to its statistical insignificance. Regarding the other covariates, we receive significant estimates for Age, Age2 (only females), some health categories (only males), for living in a household with a partner, for the number

of kids (only females) and for some positions in the income distribution. Also, a majority of country dummies and year effects is significant. However, years of education turn out to be insignificant. Deploying the corresponding marginal effects interpretation, the probability of retirement increases by two percentage points when giving care as opposed to not giving care. Yet, the magnitude of this effect is among the smallest compared to other covariates.

[Insert Table 4 here]

5.2 Results: care variables

This specification uses, instead of a single dummy for care, a set of variables of care in and outside the household, the frequency of care activities, and the number of people cared for. For males and females, results are considerably different. In the male case, the only significant variable is *Caretime*. When the frequency of care goes from daily or almost daily to no care, the odds of retirement is reduced by a factor of 0.41. If care activity goes from daily or almost daily to less than monthly, the odds of retirement go down by a factor of 0.46. In summary, more time spent on care activities increases the probability of retirement as we may expect. For females, giving care or household help outside the household increases the odds of retirement by a factor of 1.8. The other care variables for women turn out to be insignificant. Simultaneously, the remaining covariates largely preserve their significance compared to specification one. In terms of average marginal effects, the significant care variables in both data sets are of considerable magnitudes compared to the covariates. In case men went from daily to less than monthly care fre-

quencies, a decrease of the probability of retirement by 7.5 percentage points would arise. When women provide care or household help outside their household, their probability of retirement increases by 4.7 percentage points. Other covariates exhibit effects of various magnitudes; cohabitation has lower marginal effects of 3.4 and 2.6 percentage points for males and females, respectively. Yet, age clearly has the highest impact on retirement.

[Insert Table 5 here]

Finally, turning to the goodness-of-fit of the models estimated, no important differences exist across specifications and gender in terms of choices correctly predicted. The proportion of correctly predicted retirement choices for specification one is 88.4 percent for both, males and females. Specification 2 yields a model fit of 88.3 percent for males and 88.6 percent for women. Therefore, we obtain relatively strong goodness-of-fit across all models.

6 Robustness checks

Our robustness checks address the issue of potential endogeneity in the equations estimated before. Two strategies are deployed to this end, first, a replacement of current period care variables by their one-year lags. Second, we specify an instrumental variables estimation (two stage least squares) in which the potential candidate for endogeneity, *Care*, is instrumented.

6.1 Lagged care variables

Let us first consider the rationale for this approach. In case we suspect an explanatory variable to be endogenous, we might choose to replace the contemporary values of this variable by their lagged values. This approach of lagging variables in order to remedy endogeneity has been deployed in many studies, for instance recently in Buch *et al.* (2013) and Stiebale (2011) among numerous others.

In this study, we suspect the variable *Care* to be contemporaneously correlated with the error term. We hope to remove this endogeneity by replacing current year care with its one-year lag. Due to the short time horizon of the panel - we remember that an individual is observed at most three points in time - it would be unreasonable to go beyond the one-year lag. For individuals with only one observation in time, we leave *Care* at their current values.

How do the estimates differ from the results presented earlier (see Table 6 and Figure 2). Overall, specification 1 with coefficients of the *CareLag* dummy comes quite close to its current period counterpart. For males, the odds ratios of *Care* are 1.26 and 1.57, respectively, where in the lag-specification, *CareLag* achieves a higher level of significance. In both specifications, the odds ratios for females remain insignificant.

In specification two, the significance of *CarehelpLag* switches from females to males; in case of *CaretimeLag* the switch happens in the revered direction. As before for contemporaneous care, *OuthelpnumberLag* remains insignificant for both genders.

[Insert Table 6 here]

6.2 Instrumental variables estimation

So far, we have not yet determined whether *Care(Lag)* are actually endogenous or not. Therefore, we perform an instrumental variable estimation and subsequently a test for endogeneity. In a two-stage least squares estimation, we instrument the variable *Care* by the variable *Outhelpnumber*; the same is repeated for the lagged spefication. In the first-step equation, a care-giving probability is predicted, while the second step these predicted probabilities are used to estimate the retirement decision. In Tables 7 and 8, we report the results, first for contemporaneous, then for lagged care.

[Insert Table 7 here]

[Insert Table 8 here]

Following the estimations, we test for exogeneity of *Care(Lag)* (see Tables 7 and 8). Durbin and Wu-Hausman tests reveal that in case of lagged care, the H0 of exogeneity cannot be rejected, while for contemporaneous care, males' estimates turn out to be endogenous. Hence, OLS and IV estimates are similar, and the presence of endogeneity is unlikely (except for males with contenporaneous care - which is not a big issue in this context). Regarding the weakness of the instrument, *Outhelpnumber(Lag)* turns out to be a relatively strong instrument for *Care(Lag)*. The partial R2 of the first-stage regression is relatively high in all estimates, and so is the first-stage F-statistic.

Hence, a two-stage least squares approach discloses that endogeneity is not an important issue. Finally, across all econometric techniques, results do show some degree of variation, but these non-congruencies are dispensable.

7 Predicted retirement probabilities

In order to complete the analysis of the effect of care on retirement, we compare predicted probabilities to retire of care-givers versus non-care-givers. Since age is a crucial factor in the decision to retire, we depict predicted retirement probabilities over age (Figure 1). The differences of these retirement probabilities are visible as the discrepancies between the two probability functions in each picture. Overall, the pure effect of care on retirement reaches a maximum of approximately three percentage points for males, and 1.6 for females at the age of 63.

[Insert Figure 1 here]

In general, the age profiles reveal higher probabilities of retirement in case of giving care. Both specifications deliver quite consistent patterns, while confidence intervals for the predictions are greater for males than for females. As an example for males' behavior, the probability of retirement at age 63 is 72.6 percent when giving care and 69.6 percent when not giving care. Therefore, the probability effect of care on retirement is three percentage points at this age. For women, this effect is about half in magnitude, 1.6 percent. At the female age of 63, the retirement probability amounts to 83.6 percent for care-givers, and to 82 percent for non-care-giving. Thus, care-giving turns out to have a greater impact on men.

Also, we repeat the computation of age profiles of predicted retirement probabilities, but now with lagged care variables (Figure 2). In comparison to the profiles in Figure 1, it becomes apparent that differentials of retirement probabilities of care versus non-care-

givers increase for males. Yet, no important differences to the aforementioned results emerge.

[Insert Figure 2 here]

8 Conclusions

In this paper, we attempted to investigate the effect of care-giving on retirement in general and the underlying circumstances in particular. The notion of care- and support-giving activity was defined as broad as possible. Therefore our results - in the lack of imposing many restrictions on the sample used - should be read with the expectation of identifying an effect, but not an effect with maximum precision. Yet, robustness checks across some econometric techniques did not yield substantial differences with respect to the magnitudes and significance of the parameters estimated.

Two specifications were used to conduct the analysis. It turned out that care activities and the intensity of care play a considerable role in the decision to retire. Important variations across gender arise in our results. In the single care-dummy specification, significance was achieved in the male sample only, amounting to a crude effect of care and support increasing the probability of retirement. Specification two decomposed the activities into their dimensions. For males, the intensity of care matters most for their retirement decision; for both genders, giving care outside the own household is the most important trigger.

Overall, the results indicate that informal care and support has an impact on males retir-

ing. For females, there is no important effect which might be understood as a persistence of traditional role models within the family.

References

Bingley, P. and Lanot, G. (2007) Public pension programmes and the retirement of married couples in Denmark, *Journal of Public Economics*, **91**, 1878--1901.

Blau, D. M. (1998) Labor force dynamics of older married couples, *Journal of Labor Economics*, **16**, 595--629.

Bolin, K., Lindgren, B. and Lundborg, P. (2008) Informal and formal care among single-living elderly in Europe, *Health Economics*, **17**, 393--409.

Bonsang, E. (2009) Does informal care from children to their elderly parents substitute for formal care in Europe?, *Journal of Health Economics*, **28**, 143--154.

Buch, C., Koch, C. and Koetter, M. (2013) Do banks benefit from internationalization? revisiting the market power--risk nexus, *Review of Finance*, **17**, 1401--1435.

Dentinger, E. and Clarkberg, M. (2002) Informal caregiving and retirement timing among men and women gender and caregiving relationships in late midlife, *Journal of Family Issues*, **23**, 857--879.

Gorey, K. M., Rice, R. W. and Brice, G. C. (1992) The prevalence of elder care responsibilities among the work force population response bias among a group of cross-sectional surveys, *Research on Aging*, **14**, 399--418.

Gruber, J. and Wise, D. (2004) *Social security programs around the world: Micro estimation*, Chicago: University of Chicago Press.

He, D. and McHenry, P. (2016) Does formal employment reduce informal caregiving?, *Health Economics*, **25**, 829--843.

Hurd, M. D. (1996) *Advances in the Economics of Aging*, Chicago and London: The University of Chicago Press., chap. The effect of labor market rigidities on the labor force behavior of older workers., pp. 11--60.

Jacobs, J. C., Van Houtven, C. H., Laporte, A. and Coyte, P. C. (2015) Baby Boomer caregivers in the workforce: Do they fare better or worse than their predecessors?, *The Journal of the Economics of Ageing*, **6**, 89--101.

Lee, Y., Tang, F., Kim, K. H. and Albert, S. M. (2015) The vicious cycle of parental caregiving and financial well-being: A longitudinal study of women, *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, **70**, 425--431.

Rust, J. and Phelan, C. (1997) How Social Security and Medicare affect retirement behavior in a world of incomplete markets, *Econometrica*, **65**, 781--831.

Sammartino, F. J. (1987) The effect of health on retirement, *Social Security Bulletin*, **50**, 31.

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

Stiebale, J. (2011) Do financial constraints matter for foreign market entry? a firm-level examination, *The World Economy*, **34**, 123--153.

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

Van Houtven, C. H. and Norton, E. C. (2004) Informal care and health care use of older adults, *Journal of Health Economics*, **23**, 1159--1180.

Vlachantoni, A. (2010) The demographic characteristics and economic activity patterns of carers over 50: evidence from the English Longitudinal Study of Ageing, *Population Trends*, pp. 51--73.

Appendix of tables and figures

Table 1 Sample characteristics

Variable	Description	Males		Females	
		Mean	SD	Mean	SD
Retirement cases	Dummy, 1 if retired, 0 otherwise	0.147	0.354	0.139	0.346
Income decile	Position in income distribution	6.859	2.608	6.485	2.687
Age	Age at interview	59.553	3.237	59.256	3.162
Health	Self-perceived, 1 if excellent, ..., 5 if poor	2.637	0.991	2.636	0.987
Partnerhh	Cohabitation dummy, 1 if yes, 0 otherwise	0.871	0.335	0.752	0.432
Education	Years of education	12.303	4.305	12.122	4.074
Kids	Number of children	2.113	1.1228	2.044	1.175
N		7,052		6,333	
Persons		4,639		4,157	

Source: Author's own calculations based on SHARE, wave 1, 2, and 4

Table 2 Care-giving variables, in percent of observations

Variable	Description	Males	Females
Care	Dummy, 1 if giving care or support, 0 if no	31.07	37.50
Incare (in household)	Dummy giving daily care	3.70	4.42
Carehelp (out of household)	Dummy, care or support	28.42	34.47
Caretime (out of household)	no help	74.56	69.62
	less often	9.34	7.53
	almost monthly	6.34	6.96
	almost weekly	7.36	11.38
	almost daily	2.40	4.50
Outhelpnumber (out of household)	Number of people given care to	0.368	0.428
N		7,052	6,333
Persons		4,639	4,157

Source: Author's own calculations based on SHARE, wave 1, 2, and 4

Table 3 Incidence of care before and in retirement period

Variable	Males		Females	
	Mean before	Mean in ret. period	Mean before	Mean in ret. period
Care	0.311	0.31	0.381	0.340
Incare	0.037	0.035	0.045	0.036
Carehelp	0.284	0.288	0.35	0.314
Caretime	0.52	0.637	0.74	0.716
Outhelpnumber	0.361	0.404	0.43	0.411
N	6,015	1,037	5,454	879

Source: Author's own calculations based on SHARE, wave 1, 2, and 4

Table 4 Logit regression - single care dummy

		Males			Females		
Dep. var.:	**Retired**	**Coef.**	**OR**	**ME**	**Coef.**	**OR**	**ME**
Care		0.231	1.26	0.02	-0.005	0.995	0
		(2.50)*			(-0.05)		
Age		1.249	3.488	0.107	2.336	10.339	0.19
		(2.46)*			(4.30)**		
Age2		-0.006	0.994	-0.001	-0.015	0.985	-0.001
		(-1.53)			(3.40)**		
Health	excellent	omitted			omitted		
	very good	0.234	1.264	0.019	0.102	1.107	0.008
		(-1.59)			(-0.72)		
	good	0.364	1.439	0.03	0.231	1.26	0.018
		(2.58)**			(-1.67)		
	fair	0.406	1.501	0.034	0.314	1.369	0.025
		(2.51)*			(-1.9)		
	poor	0.478	1.613	0.04	0.237	1.267	0.019
		(-1.83)			(-0.69)		
Partnerhh		0.358	1.431	0.031	0.321	1.379	0.026
		(2.56)*			(2.77)**		
Educ		-0.018	0.982	-0.002	-0.008	0.992	-0.001
		(-1.76)			(-0.65)		
Kids		-0.056	0.945	-0.005	-0.084	0.92	-0.007
		(-1.51)			(2.12)*		
Income decile	1	0.19	1.209	0.015	0.718	2.05	0.061
		(-0.84)			(3.01)**		
	2	0.602	1.826	0.052	0.474	1.607	0.038
		(2.58)**			(2.05)*		
	3	0.443	1.557	0.037	0.488	1.629	0.039
		(2.13)*			(2.30)*		
	4	0.625	1.868	0.054	0.063	1.065	0.005
		(3.36)**			(-0.3)		
	5	0.518	1.678	0.044	0.237	1.267	0.018
		(2.96)**			(-1.19)		
	6	0.567	1.764	0.049	0.373	1.453	0.029
		(3.47)**			(2.02)*		
	7	0.236	1.266	0.019	0.323	1.381	0.025
		(-1.47)			(-1.78)		
	8	0.227	1.255	0.018	0.302	1.353	0.024
		(-1.47)			(-1.69)		
	9	0.109	1.115	0.009	0.093	1.098	0.007
		(-0.71)			(-0.53)		
	10	omitted			omitted		
Countries	Austria	0.702	2.017	0.06	0.455	1.576	0.037
		(2.72)**			(-1.49)		
	Germany	0.538	1.712	0.046	0.238	1.269	0.019
		(2.74)**			(-1.21)		
	Sweden	-0.102	0.903	-0.009	-0.466	0.627	-0.038
		(-0.57)			(2.98)**		
	Netherlands	0.808	2.243	0.069	-0.27	0.763	-0.022
		(4.31)**			-1.36		
	Spain	0.212	1.236	0.018	-1.257	0.285	-0.102
		(-0.92)			(3.42)**		

	Italy	1.044	2.839	0.089	0.715	2.045	0.058
		(4.33)**			(3.07)**		
	France	1.558	4.748	0.133	0.559	1.749	0.045
		(7.77)**			(3.06)**		
	Greece	-0.956	0.384	-0.082	-1.951	0.142	-0.158
		(2.36)*			(2.57)*		
	Switzerland	-0.657	0.518	-0.056	-1.207	0.299	-0.098
		(3.07)**			(5.46)**		
	Belgium	1.414	4.111	0.121	0.581	1.787	0.047
		(7.46)**			(2.85)**		
	Czech Rep.	0.138	1.148	0.012	0.663	1.941	0.054
		(-0.68)			(2.98)**		
	Poland	-0.17	0.843	-0.015	1.263	3.536	0.103
		(-0.34)			(2.77)**		
	Denmark	omitted			omitted		
Years	2004	-3.06	0.047	-0.262	-3.099	0.045	-0.252
		(5.52)**			(5.86)**		
	2005	-3.019	0.049	-0.259	-3.125	0.044	-0.254
		(4.33)**			(3.68)**		
	2006	-0.864	0.421	-0.074	-0.928	0.395	-0.075
		(-1.66)			(2.06)*		
	2007	-1.305	0.271	-0.112	-1.256	0.285	-0.102
		(2.60)**			(2.91)**		
	2011	-0.97	0.379	-0.083	-0.846	0.429	-0.069
		(-1.91)			(-1.92)		
	2012	omitted			omitted		
Constant		-54.462			-87.902		
		(3.46)**			(5.23)**		
LL		-1,985.57			-1,688.47		
Wald chi2		1,030.49			886.27		
p		0.000			0.000		
pseudo R2		0.326			0.3381		
CPC		0.884			0.884		
N		7,052			6,333		

Notes: Robust z-statistics in parentheses. (*), (**), (***) indicate $p < 0.05$, $p < 0.01$, $p < 0.001$. CPC refers to the percentage of correctly predicted choices.

Table 5 Logit regression - care dimensions

		Males			Females		
Dep. var.:	**Retired**	**Coef.**	**OR**	**ME**	**Coef.**	**OR**	**ME**
Incare		-0.133	0.876	-0.011	-0.434	0.648	-0.035
		(-0.59)			(-1.88)		
Carehelp		-0.236	0.79	-0.02	0.586	1.796	0.047
		(-0.72)			(2.20)*		
Caretime	no help	-0.891	0.41	-0.086	0.418	1.519	0.034
		(2.04)*			(-1.08)		
	less often	-0.767	0.465	-0.075	-0.232	0.793	-0.016
		(2.79)**			(-0.85)		
	almost monthly	-0.401	0.67	-0.042	-0.152	0.859	-0.011
		(-1.42)			(-0.58)		
	almost weekly	-0.196	0.822	-0.021	-0.296	0.744	-0.02
		(-0.71)			(-1.22)		
	almost daily	omitted			omitted		
Outhelpnumber		0.059	1.061	0.005	0.013	1.013	0.001
		(-0.5)			(-0.1)		
Age		1.251	3.494	0.107	2.309	10.061	0.187
		(2.45)*			(4.22)**		
Age2		-0.006	0.994	-0.001	-0.015	0.985	-0.001
		(-1.52)			(3.32)**		
Health	excellent	omitted			omitted		
	very good	0.224	1.251	0.018	0.088	1.092	0.007
		(-1.51)			(-0.62)		
	good	0.357	1.429	0.029	0.224	1.252	0.018
		(2.52)*			(-1.62)		
	fair	0.397	1.487	0.033	0.308	1.361	0.025
		(2.45)*			(-1.85)		
	poor	0.494	1.639	0.041	0.272	1.312	0.022
		(-1.87)			(-0.8)		
Partnerhh		0.393	1.482	0.034	0.325	1.384	0.026
		(2.76)**			(2.77)**		
Educ		-0.019	0.981	-0.002	-0.01	0.99	-0.001
		(-1.78)			(-0.81)		
Kids		-0.054	0.947	-0.005	-0.084	0.92	-0.007
		(-1.43)			(2.11)*		
Income decile	1	0.18	1.198	0.014	0.699	2.013	0.059
		(-0.79)			(2.93)**		
	2	0.617	1.853	0.053	0.464	1.591	0.037
		(2.62)**			(2.00)*		
	3	0.429	1.535	0.036	0.468	1.598	0.038
		(2.07)*			(2.20)*		
	4	0.617	1.853	0.053	0.061	1.063	0.005
		(3.30)**			(-0.29)		
	5	0.512	1.669	0.043	0.214	1.239	0.016
		(2.92)**			(-1.08)		
	6	0.565	1.759	0.048	0.373	1.452	0.029
		(3.44)**			(2.02)*		
	7	0.247	1.28	0.02	0.316	1.372	0.025
		(-1.54)			(-1.76)		
	8	0.223	1.25	0.018	0.29	1.336	0.022
		(-1.44)			(-1.63)		

	9	0.113	1.119	0.009	0.102	1.108	0.008
		(-0.73)			(-0.58)		
	10	omitted			omitted		
Countries	Austria	0.694	2.002	0.059	0.436	1.546	0.035
		(2.67)**			(-1.43)		
	Germany	0.558	1.748	0.048	0.242	1.274	0.02
		(2.81)**			(-1.22)		
	Sweden	-0.089	0.914	-0.008	-0.491	0.612	-0.04
		(-0.5)			(3.12)**		
	Netherlands	0.841	2.319	0.072	-0.274	0.761	-0.022
		(4.45)**			(-1.37)		
	Spain	0.233	1.262	0.02	-1.268	0.281	-0.103
		(-1.0)			(3.41)**		
	Italy	1.052	2.864	0.09	0.707	2.028	0.057
		(4.36)**			(2.99)**		
	France	1.574	4.824	0.134	0.55	1.734	0.045
		(7.80)**			(2.99)**		
	Greece	-0.946	0.388	-0.081	-1.912	0.148	-0.155
		(2.33)*			(2.51)*		
	Switzerland	-0.637	0.529	-0.054	-1.232	0.292	-0.1
		(2.95)**			(5.50)**		
	Belgium	1.394	4.032	0.119	0.586	1.797	0.047
		(7.33)**			(2.85)**		
	Czech Rep.	0.132	1.141	0.011	0.659	1.933	0.053
		(-0.64)			(2.96)**		
	Poland	-0.094	0.91	-0.008	1.276	3.584	0.103
		(-0.19)			(2.77)**		
	Denmark	omitted			omitted		
Years	2004	-3.011	0.049	-0.257	-3.164	0.042	-0.256
		(5.53)**			(5.91)**		
	2005	-2.898	0.055	-0.247	-3.166	0.042	-0.256
		(4.22)**			(3.74)**		
	2006	-0.801	0.449	-0.068	-0.974	0.377	-0.079
		(-1.57)			(2.14)*		
	2007	-1.232	0.292	-0.105	-1.307	0.271	-0.106
		(2.51)*			(2.98)**		
	2011	-0.928	0.395	-0.079	-0.846	0.429	-0.068
		(-1.88)			(-1.9)		
	2012	omitted			omitted		
Constant		-53.772			-87.501		
		(3.40)**			(5.16)**		
LL		-1,976.02			-1,683.43		
Wald chi2		1,035.29			891.13		
p		0.000			0.000		
pseudo R2		0.3289			0.340		
CPC		0.883			0.886		
N		7,052			6,333		

Notes: Robust z-statistics in parentheses. (*), (**), (***) indicate $p < 0.05$, $p < 0.01$, $p < 0.001$.
CPC refers to the percentage of correctly predicted choices.

Table 6 Results logit regression - lagged care variables

Dependent variable: Retired		**Males S1**	**Females S1**	**Males S2**	**Females S2**
CareLag		1.572***	0.960		
		(5.16)	(-0.45)		
IncareLag				0.959	0.882
				(-0.18)	(-0.57)
CarehelpLag				1.778**	1.231
				(3.09)	(1.29)
CaretimeLag	no help			1.413	2.125*
				(0.98)	(2.16)
	less often			1.333	1.693
				(0.96)	(1.82)
	almost monthly			1.158	1.135
				(0.47)	(0.42)
	almost weekly			1.597	1.404
				(1.53)	(1.24)
	almost daily			omitted	omitted
OuthelpnumberLag				0.972	1.117
				(-0.27)	(0.84)
age		3.415*	10.356***	3.439*	9.978***
		(2.42)	(4.30)	(2.44)	(4.22)
age2		0.994	0.985***	0.994	0.985***
		(-1.48)	(-3.41)	(-1.50)	(-3.32)
Health	excellent	omitted	omitted	omitted	omitted
	very good	1.262	1.106	1.277	1.106
		(1.59)	(0.71)	(1.66)	(0.71)
	good	1.436*	1.259	1.449**	1.256
		(2.56)	(1.67)	(2.61)	(1.65)
	fair	1.489*	1.368	1.526**	1.380
		(2.45)	(1.89)	(2.59)	(1.94)
	poor	1.642	1.264	1.702*	1.285
		(1.90)	(0.69)	(2.04)	(0.74)
Partnerhh		1.424*	1.376**	1.436**	1.381**
		(2.54)	(2.76)	(2.59)	(2.78)
Educ		0.981	0.992	0.981	0.990
		(-1.81)	(-0.65)	(-1.80)	(-0.79)
Kids		0.947	0.920*	0.949	0.919*
		(-1.45)	(-2.12)	(-1.40)	(-2.12)
Income decile	1	1.248	2.041**	1.260	2.055**
		(0.97)	(3.00)	(1.01)	(3.02)
	2	1.845**	1.600*	1.861**	1.606*
		(2.63)	(2.03)	(2.65)	(2.03)
	3	1.549*	1.626*	1.564*	1.604*
		(2.12)	(2.30)	(2.18)	(2.24)
	4	1.885***	1.065	1.930***	1.074
		(3.38)	(0.30)	(3.50)	(0.34)
	5	1.688**	1.263	1.698**	1.240
		(2.96)	(1.17)	(3.00)	(1.08)
	6	1.819***	1.451*	1.830***	1.436*
		(3.67)	(2.02)	(3.69)	(1.96)
	7	1.299	1.379	1.303	1.366
		(1.63)	(1.77)	(1.64)	(1.72)

	8	1.279	1.350	1.290	1.333
		(1.59)	(1.68)	(1.63)	(1.61)
	9	1.140	1.095	1.142	1.088
		(0.86)	(0.51)	(0.86)	(0.47)
	10	omitted	omitted	omitted	omitted
Countries	Austria	2.186**	1.565	2.198**	1.577
		(3.05)	(1.47)	(3.04)	(1.47)
	Germany	1.726**	1.266	1.727**	1.251
		(2.75)	(1.19)	(2.73)	(1.13)
	Sweden	0.883	0.626**	0.872	0.615**
		(-0.69)	(-2.99)	(-0.75)	(-3.10)
	Netherlands	2.266***	0.764	2.254***	0.758
		(4.34)	(-1.35)	(4.30)	(-1.39)
	Spain	1.360	0.282***	1.390	0.278***
		(1.33)	(-3.44)	(1.42)	(-3.45)
	Italy	3.062***	2.035**	3.078***	2.064**
		(4.65)	(3.05)	(4.68)	(3.07)
	France	5.151***	1.733**	5.187***	1.735**
		(8.10)	(2.99)	(8.13)	(2.98)
	Greece	0.412*	0.141**	0.420*	0.142*
		(-2.18)	(-2.58)	(-2.13)	(-2.56)
	Switzerland	0.549**	0.297***	0.549**	0.299***
		(-2.79)	(-5.47)	(-2.79)	(-5.41)
	Belgium	4.182***	1.784**	4.169***	1.831**
		(7.56)	(2.84)	(7.52)	(2.94)
	Czech Republic	1.198	1.928**	1.217	1.968**
		(0.89)	(2.94)	(0.96)	(3.01)
	Poland	0.874	3.477**	0.885	3.638**
		(-0.27)	(2.73)	(-0.24)	(2.79)
	Denmark	omitted	omitted	omitted	omitted
Years	2004	0.049***	0.045***	0.048***	0.045***
		(-5.58)	(-5.89)	(-5.54)	(-5.82)
	2005	0.050***	0.044***	0.050***	0.044***
		(-4.35)	(-3.69)	(-4.33)	(-3.67)
	2006	0.446	0.391*	0.436	0.397*
		(-1.59)	(-2.08)	(-1.61)	(-2.02)
	2007	0.282**	0.282**	0.278**	0.286**
		(-2.59)	(-2.93)	(-2.58)	(-2.86)
	2011	0.384	0.425	0.379	0.432
		(-1.94)	(-1.95)	(-1.94)	(-1.88)
	2012	omitted	omitted	omitted	omitted
Constant		0.000***	0.000***	0.000***	0.000***
	(-3.44)	(-5.23)	(-3.48)	(-5.19)	
Wald chi2		1,039.119	887.539	1,044.026	895.813
p		0.000	0.000	0.000	0.000
N		7,052	6,333	7,052	6,333

Notes: Robust z-statistics in parentheses. (*), (**), (***) indicate $p < 0.05$, $p < 0.01$, $p < 0.001$.
Estimates presented in this table are odds ratios.

Table 7 Results 2 SLS - IV, contemporaneous care

Dependent variable:	**First stage Care (males)**	**Second stage Retired (males)**	**First stage Care (females)**	**Second stage Retired (females)**
Outhelpnumber	0.483***		0.488***	
	(94.917)		(88.427)	
Care		0.041***		-0.001
		(3.798)		(-0.068)
Age	-0.038	-0.449***	0.045	-0.416***
	(-1.077)	(-12.561)	(1.100)	(-10.977)
Age2	0.000	0.004***	-0.000	0.004***
	(1.000)	(13.999)	(-1.132)	(12.370)
Health: excellent	omitted	-0.038	omitted	-0.011
		(-1.591)		(-0.410)
very good	0.015	-0.025	0.002	-0.003
	(1.325)	(-1.092)	(0.148)	(-0.117)
good	0.011	-0.015	-0.013	0.007
	(0.964)	(-0.646)	(-1.023)	(0.296)
fair	0.011	-0.009	0.002	0.013
	(0.812)	(-0.361)	(0.112)	(0.505)
poor	0.040	omitted	-0.015	omitted
	(1.695)		(-0.534)	
Partnerhh	-0.022	0.037**	-0.026*	0.026**
	(-1.900)	(3.145)	(-2.415)	(2.579)
Educ	0.001	-0.001	0.000	-0.000
	(1.387)	(-1.528)	(0.246)	(-0.254)
Kids	-0.008**	-0.004	-0.001	-0.007*
	(-2.822)	(-1.338)	(-0.377)	(-2.166)
Income decile: 1	-0.020	0.022	-0.046*	0.060**
	(-1.090)	(1.159)	(-2.107)	(2.951)
2	-0.026	0.060**	-0.041	0.033
	(-1.209)	(2.758)	(-1.950)	(1.698)
3	-0.023	0.043*	-0.007	0.037*
	(-1.212)	(2.300)	(-0.359)	(2.030)
4	-0.019	0.058***	-0.003	-0.003
	(-1.112)	(3.340)	(-0.147)	(-0.154)
5	-0.025	0.037*	0.010	0.014
	(-1.598)	(2.300)	(0.564)	(0.880)
6	-0.028*	0.049***	-0.018	0.022
	(-1.964)	(3.393)	(-1.149)	(1.506)
7	-0.021	0.010	0.004	0.017
	(-1.591)	(0.733)	(0.253)	(1.171)
8	-0.019	0.013	0.002	0.020
	(-1.473)	(1.001)	(0.128)	(1.414)
9	-0.025*	0.006	-0.018	0.007
	(-2.103)	(0.462)	(-1.197)	(0.478)
10	omitted	omitted	omitted	omitted
Austria	0.022	0.047*	0.019	0.020
	(1.031)	(2.212)	(0.814)	(0.941)
Germany	0.022	0.051**	0.034	0.017
	(1.243)	(2.851)	(1.769)	(0.989)
Sweden	0.026	-0.012	0.034*	-0.045**
	(1.685)	(-0.795)	(2.105)	(-3.021)
Netherlands	0.053***	0.079***	0.027	-0.017

	(3.356)	(4.864)	(1.465)	(-1.010)
Spain	-0.009	0.026	-0.014	-0.084***
	(-0.458)	(1.320)	(-0.584)	(-3.704)
Italy	-0.001	0.092***	0.046*	0.050*
	(-0.071)	(4.763)	(2.083)	(2.460)
France	-0.030	0.131***	0.003	0.039*
	(-1.702)	(7.297)	(0.186)	(2.339)
Greece	-0.058**	-0.009	-0.042	-0.053
	(-2.784)	(-0.439)	(-1.351)	(-1.822)
Switzerland	-0.009	-0.048**	-0.001	-0.093***
	(-0.560)	(-2.825)	(-0.041)	(-5.269)
Belgium	0.026	0.127***	0.063***	0.040*
	(1.578)	(7.739)	(3.355)	(2.321)
Czechia	0.006	0.007	0.041*	0.029
	(0.381)	(0.427)	(2.074)	(1.586)
Poland	-0.023	0.005	-0.044	0.086
	(-0.638)	(0.134)	(-0.841)	(1.756)
Denmark	omitted	omitted	omitted	omitted
Y2004	0.033	-0.183***	0.014	-0.220***
	(0.777)	(-4.288)	(0.251)	(-4.341)
Y2005	0.049	-0.213***	0.013	-0.233***
	(1.071)	(-4.540)	(0.211)	(-4.190)
Y2006	0.069	-0.076	-0.003	-0.139**
	(1.620)	(-1.763)	(-0.051)	(-2.714)
Y2007	0.044	-0.116**	0.022	-0.169***
	(1.091)	(-2.830)	(0.418)	(-3.400)
Y2011	-0.026	-0.072	-0.088	-0.125*
	(-0.630)	(-1.738)	(-1.639)	(-2.508)
Y2012	omitted	omitted	omitted	omitted
Constant	1.370	12.296***	-1.102	11.297***
	(1.283)	(11.314)	(-0.892)	(9.855)
chi2		2,696.281		2,451.488
p	0.000	0.000	0.000	0.000
N	7,052	7,052	6,333	6,333
Exogeneity tests				
Durbin	chi2(1)	7.423	chi2(1)	0.214
	p	0.006	p	0.883
Wu-Hausman	F(1,7014)	7.423	F(1,6295)	0.214
	p	0.007	p	0.884
Instr. weakness				
Partial R2	0.562		0.554	
1st stage F	9,009.18		7,819.29	
p	0.000		0.000	

Notes: Robust t-statistics in parentheses. (*), (**), (***) indicate $p < 0.05$, $p < 0.01$, $p < 0.001$.

Table 8 Results 2 SLS - IV, lagged care

Dependent variable:	First stage Care (males)	Second stage Retired (males)	First stage Care (females)	Second stage Retired (females)
Outhelpnumber	0.278***		0.269***	
	(38.442)		(34.752)	
CareLag		0.041***		-0.009
		(3.806)		(-0.794)
Age	0.033	-0.453***	0.062	-0.415***
	(0.662)	(-12.691)	(1.083)	(-10.969)
Age2	-0.000	0.004***	-0.001	0.004***
	(-0.755)	(14.132)	(-1.157)	(12.360)
Health: excellent	omitted	-0.039	omitted	-0.010
		(-1.614)		(-0.390)
very good	0.011	-0.025	-0.021	-0.003
	(0.644)	(-1.106)	(-1.154)	(-0.106)
good	0.008	-0.015	-0.030	0.007
	(0.505)	(-0.665)	(-1.723)	(0.303)
fair	0.023	-0.009	-0.006	0.013
	(1.191)	(-0.403)	(-0.286)	(0.520)
poor	0.015	omitted	-0.023	omitted
	(0.436)		(-0.600)	
Partnerhh	-0.012	0.035**	-0.015	0.025*
	(-0.733)	(3.015)	(-1.020)	(2.545)
Educ	0.002	-0.001	0.001	-0.000
	(1.499)	(-1.522)	(0.788)	(-0.237)
Kids	-0.007	-0.004	-0.003	-0.007*
	(-1.598)	(-1.333)	(-0.576)	(-2.166)
Income decile: 1	-0.062*	0.023	-0.100**	0.059**
	(-2.336)	(1.202)	(-3.267)	(2.896)
2	-0.049	0.060**	-0.091**	0.032
	(-1.590)	(2.749)	(-3.106)	(1.651)
3	-0.002	0.042*	-0.023	0.037*
	(-0.059)	(2.232)	(-0.812)	(2.014)
4	-0.018	0.058***	-0.019	-0.003
	(-0.724)	(3.324)	(-0.723)	(-0.161)
5	-0.016	0.036*	-0.033	0.014
	(-0.734)	(2.287)	(-1.371)	(0.859)
6	-0.045*	0.049***	-0.031	0.022
	(-2.254)	(3.445)	(-1.395)	(1.486)
7	-0.045*	0.011	-0.021	0.017
	(-2.368)	(0.796)	(-0.928)	(1.161)
8	-0.038*	0.014	-0.027	0.019
	(-2.057)	(1.037)	(-1.281)	(1.391)
9	-0.046**	0.006	-0.060**	0.006
	(-2.690)	(0.495)	(-2.901)	(0.439)
10	omitted	omitted	omitted	omitted
Austria	-0.105***	0.050*	-0.144***	0.019
	(-3.521)	(2.324)	(-4.371)	(0.858)
Germany	0.018	0.049**	-0.014	0.017
	(0.746)	(2.787)	(-0.520)	(0.949)
Sweden	0.062**	-0.014	-0.007	-0.045**
	(2.819)	(-0.921)	(-0.328)	(-3.044)
Netherlands	0.024	0.078***	0.016	-0.017

	(1.063)	(4.847)	(0.640)	(-1.018)
Spain	-0.153***	0.028	-0.187***	-0.087***
	(-5.594)	(1.414)	(-5.450)	(-3.801)
Italy	-0.109***	0.093***	-0.059	0.049*
	(-4.033)	(4.822)	(-1.885)	(2.399)
France	-0.135***	0.132***	-0.141***	0.037*
	(-5.399)	(7.356)	(-5.665)	(2.213)
Greece	-0.147***	-0.010	-0.150***	-0.055
	(-4.952)	(-0.459)	(-3.418)	(-1.898)
Switzerland	-0.114***	-0.047**	-0.128***	-0.094***
	(-4.754)	(-2.716)	(-4.815)	(-5.341)
Belgium	0.017	0.127***	-0.011	0.040*
	(0.731)	(7.717)	(-0.421)	(2.292)
Czechia	-0.071**	0.008	-0.104***	0.027
	(-2.977)	(0.491)	(-3.794)	(1.500)
Poland	-0.090	0.005	-0.227**	0.083
	(-1.746)	(0.130)	(-3.058)	(1.696)
Denmark	omitted	omitted	omitted	omitted
Y2004	-0.124*	-0.175***	-0.105	-0.221***
	(-2.083)	(-4.127)	(-1.375)	(-4.362)
Y2005	-0.107	-0.206***	-0.074	-0.234***
	(-1.629)	(-4.398)	(-0.877)	(-4.205)
Y2006	-0.118	-0.067	-0.081	-0.140**
	(-1.955)	(-1.548)	(-1.045)	(-2.733)
Y2007	-0.097	-0.110**	-0.083	-0.170***
	(-1.699)	(-2.674)	(-1.101)	(-3.418)
Y2011	-0.089	-0.070	-0.087	-0.126*
	(-1.521)	(-1.669)	(-1.153)	(-2.527)
Y2012	omitted	omitted	omitted	omitted
Constant	-0.453	12.403***	-1.233	11.296***
	(-0.299)	(11.438)	(-0.711)	(9.855)
chi2		2,706.064		2,451.935
p	0.000	0.000	0.000	0.000
N	7,052	7,052	6,333	6,333
Exogeneity tests				
Durbin	chi2(1)	0.017	chi2(1)	0.556
	p	0.898	p	0.456
Wu-Hausman	F(1,7014)	0.016	F(1,6295)	0.552
	p	0.898	p	0.457
Instr. weakness				
Partial R2	0.514		0.493	
1st stage F	7,406.87		6,121.25	
p	0.000		0.000	

Notes: Robust t-statistics in parentheses. (*), (**), (***) indicate $p < 0.05$, $p < 0.01$, $p < 0.001$.

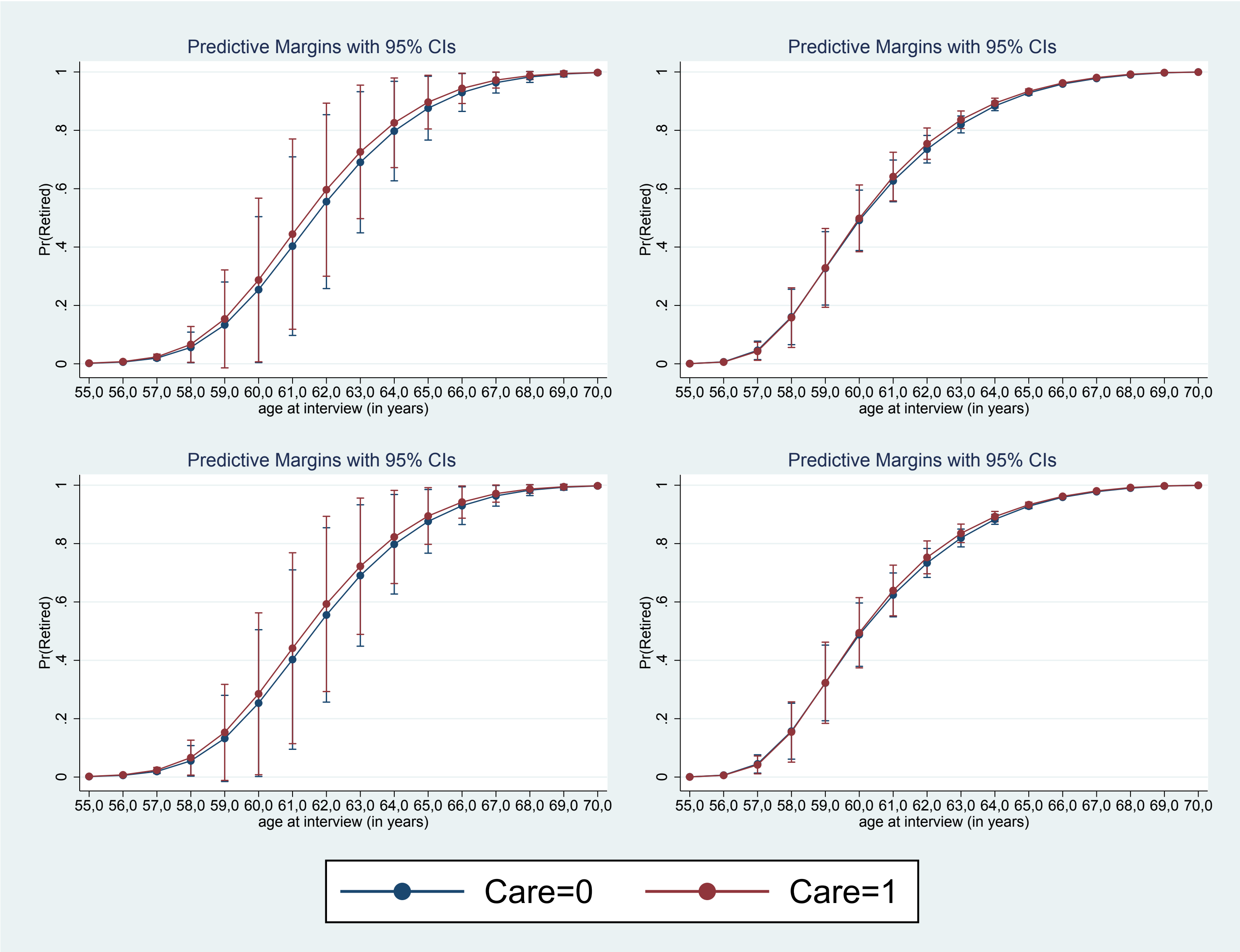

Figure 1 Predicted retirement probabilities by *Care*

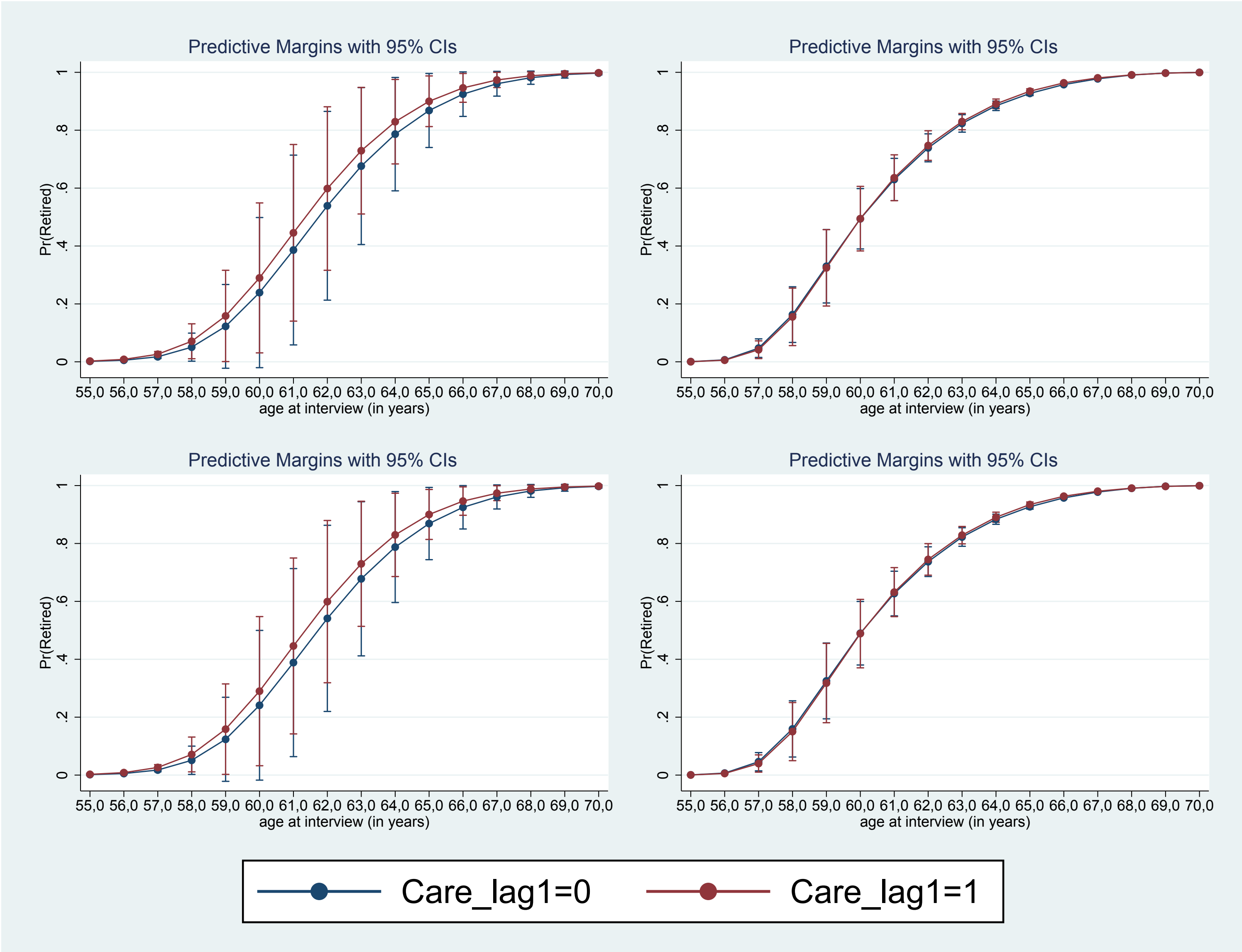

Figure 2 Predicted retirement probabilities by *CareLag*

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