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Regular provision of grandchild care and participation in social activities

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Abstract

A considerable proportion of older people regularly care for their grandchildren. This role in later life may subtract time and energies from participation in social activities, which are considered fundamental for active ageing. Using an instrumental variable approach on data from the Survey of Health, Ageing and Retirement in Europe, we test whether regular grandchild care reduces participation in social activities. Our results show a significant negative effect on the number of activities in which grandmothers participate. When considering the activities separately by type, we find a negative effect on engagement in educational or training courses for both grandfathers and grandmothers, while a negative effect on volunteering and participating in political or community-related organization is additionally found only for grandmothers. These results stimulate the debate on active ageing to consider possible competition between grandchild care and participation in social activities.

Key words: grandchild care; social participation; intergenerational transfers; instrumental variables; SHARE.

1. Introduction

Active ageing, defined by the World Health Organization as "the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age" (WHO, 2002: 12), is one of the most important topics on the political agenda. Being "active" until later in life is not only defined in terms of minimizing physical and mental deterioration, but it also refers to continuing participation in social, economic, cultural, spiritual, and civic affairs. Socio-psychological models of ageing emphasise the importance of social participation (see Bowling and Dieppe, 2005 for a review). This is given

impetus by several studies indicating that involvement in social activities is a modifiable risk factor for cognitive decline and plays a decisive role in influencing life satisfaction, health, autonomy and mortality (e.g. Engelhardt et al., 2010; Hultsch et al., 1999; Scarmeas and Stern, 2003).

Living aside the benefits of participating in social activities, the aim of this paper is to investigate the relationship between regular grandchild care and social participation. While a considerable number of studies exist on the interrelationship between participation in different activities (see e.g., Choi et al., 2007; Hank and Stuck, 2008), the literature has overlooked possible conflicts between provision of grandchild care and participation in social activities (e.g., volunteering or participating in a social club). In fact, engaging in grandchild care on a regular basis may reduce time and willingness of older people to also participate into social activities and this may have negative consequences for grandparents' wellbeing.

We focus, in particular, on regular grandchild care, defined as grandchild care provided almost on a daily basis. In additional analyses (Section 4.3) we will consider a less stringent definition, where grandchild care will be considered as regular if provided at least weekly.

To the best of our knowledge, the only previous study that analysed the interrelationship between different activities and included grandchild care is that by Kohli, Hank, and Künemund (2009), which considered three dimensions of social connectedness: formal social relations (social relationships tied to some kind of formalised group membership), informal social relations (i.e., having received or given practical help from/to friends, neighbours, colleagues), and family relations (a broad measure that included having at least one cohabiting child and/or having received or given practical help primarily from/to a family member from outside the household including grandchild care). They found that the relationship between the various dimensions of social connectedness was cumulative rather

than competitive (i.e., older people that are involved in one type of relation also tend to be more engaged in other types). An exception was the relationship between informal social relations and family relations.

We add to this isolated study a deeper analysis on the effect of grandchild care on several variables related to engagement in social activities, which included the scope, that is, the number of different social activities in which individuals are involved, and the type of social activities. Moreover, Kohli et al. (2009) were interested in social connectedness per se and therefore did not distinguish whether the individual was the provider or the recipient of help. We, instead, focus on regular grandchild care as an important type of help given by grandparents and we study whether or not grandchild care interferes with participation in social activities. Using data from the Survey of Health, Ageing and Retirement in Europe (SHARE) allows us to study the effect of a regular provision of grandchild care on engagement in five different types of social activities (i.e., voluntary or charity work; educational or training course; sport, social or other kind of club; religious organization; political or community-related organization).

2. Background and hypotheses

During their life, individuals interact with others, within and outside the family. The family and intimate friends form what can be defined as "primary social groups" (Cooley, 1912). Individuals, however, may also be members of an array of "secondary social groups", e.g., clubs or organizations. In later life, people seem to reallocate their time from participation in secondary groups to primary group activities. In fact, partner, children, and grandchildren usually account for the majority of older people's social ties (Lubben and Gironda, 2003).

Some early theories of the sociology of ageing proposed that social disengagement at an advanced age was normal and even desired. As Cumming and Henry (1961: 14) argued,

growing old involves a gradual and "inevitable mutual withdrawal or disengagement, resulting in decreased interaction between an aging person and others in the social systems he belongs to". On the one hand, the individuals "want" to disengage in later life and do so by reducing the number and variety of roles they play and weakening the intensity of those that remain; on the other hand, societal norms offer them the freedom to disengage. Along these lines some scholars have referred to old age as a roleless period (Burgess, 1960).

This view has been contested by other authors (e.g., Neugarten, Havighurst, and Tobin, 1968). In particular, the socioemotional selectivity theory elaborated in the 1990s (e.g., Carstensen, 1992) emphasised that with advancing age individuals may choose to reduce certain activities, but maintain others, especially those involving the most intimate ties.

Recent empirical evidence from numerous studies on either intergenerational family relationships (e.g., Bordone, 2009; Hank, 2007) or on social participation in later life (e.g., Engelhardt et al., 2010; Hank and Stuck, 2008) shows the ongoing integration of the individuals into both primary and secondary social groups. Moreover, the importance of secondary group participation for nurturing and replenishing older adults' social support networks is now consistently advocated by scholars (see e.g., Berkman and Harootyan, 2003).

Yet, the relationship between participation in primary and secondary social groups in later life remains understudied. In particular, little is known about social participation among grandparents and whether the provision of grandchild care interferes or stimulates participation in social activities. Indeed, grandchild care is a common family activity and an increasingly important source of informal childcare to help mothers participate in the labour market (Aassve, Arpino, and Goisis, 2012; Arpino, Pronzato, and Tavares, 2014). In the USA, for example, 50% of grandmothers provide regular or occasional care to their

grandchildren (Guzman, 2004); and in Europe, even more grandmothers are involved in childcare (Hank and Buber, 2009; see also Glaser et al., 2010, for a review), although the prevalence and intensity of the provision of grandchild care varies across countries (see e.g., Bordone, Arpino, and Aassve, 2012).

We may think that, by stimulating grandparents' sense of purpose in life (Silverstein and Giarrusso, 2013), grandchild care may also foster grandparents' engagement in social activities. This argument would support a *cumulation hypothesis*, namely, that grandparents involved in childcare cumulate this role with social activities. Some studies on the interrelationship between participation in different activities have found support for a cumulation hypothesis. For example, Hank and Stuck (2008) found evidence of a positive propensity for being engaged in volunteer work, provision of informal help, and care, even controlling for a series of individual characteristics. They interpreted this correlation as the result of a general (unobservable) motivation for being active.

We will use instrumental variable regression in order to control for possible unobserved characteristics (as explained in Section 3.5). Net of the person-specific general motivation, there are good reasons to favour a *competition hypothesis*. Albertini and Kohli (2009) showed that parents were less likely than childless to participate in some social activities, arguing that such differences may arise from fewer time constraints for the childless and from the fact that these latter are more likely to search for support networks outside the household. We can similarly argue that, first, engaging in regular grandchild care is likely to reduce time availability of the grandparents as well as their willingness and energy. Therefore, grandchild care may limit grandparents' opportunities to carry out those activities that do not involve grandchildren (Koslowski, 2009; Minkler, 1999). As a result, grandparents may be selective in their choice of social activities when they regularly look after their grandchildren. Second, family obligations could also reduce participation in social

activities for normative reasons. Banfield (1958), and more recently Heady and Kohli (2010), argued that strong family commitments tend to block the development of social engagement. Moreover, when family relationships are stronger, individuals may feel less pressure to find support outside the family. Based on these arguments, our first hypothesis is that regular grandchild care has a negative effect on participation in social activities. In particular, we expect that grandparents looking after grandchildren on a regular basis may reduce the number of different activities in which they participate (Hypothesis 1).

We also acknowledge that social activities are not all the same in terms of amount of time, abilities, and effort they require (Bukov, Maas, and Lampert, 2002). Therefore, we expect that those activities requiring more resources will be mostly affected by competition with regular provision of grandchild care (Hypothesis 2).

Although from the literature we cannot derive a specific hypothesis about differences by gender in the interrelationship among several activities, as most of previous studies have used gender only as a control variable, we structured our analyses for men and women separately. Indeed, different levels of engagement were found in grandchild care (Hank and Buber, 2009; Lee and Tang, 2013), with women taking on most of the responsibilities entailed. Also participation in social activities is gendered. Bukov et al. (2002), for example, showed that after retirement men are more likely than women to be engaged in political activities and clubs. Therefore, we will also assess if gender differences arise in the relationship between grandchild care and participation in social activities. Indirect evidence is provided by research on caregiving among spouses which showed that wife caregivers tend to restrict activities carried out outside the family due to caregiving duties. The same does not seem to hold for husband caregivers (Choi et al., 2007). This evidence hints to a stronger competition effect between regular grandchild care and social participation for women than for men, that we test in our analyses.

3. Data and method

3.1. Data and sample selection

We use data from the Survey of Health, Ageing and Retirement in Europe (SHARE). SHARE is a multidisciplinary longitudinal survey, representative of the non-institutionalised population aged 50 and over in Europe (for details on the sampling procedure, questionnaire contents, and fieldwork methodology see Börsch-Supan et al., 2005 and Börsch-Supan and Jürges, 2005).

Our analyses are based on the first interview for each respondent from the first, second, and fourth wave (2004, 2006, 2010) of SHARE, including 19 countries: Austria, Belgium, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Netherlands, Poland, Portugal, Slovenia, Spain, Sweden, and Switzerland. The third wave (2008) of SHARE is called SHARELIFE and contains only retrospective information on the respondents. In the first wave, household response rates, defined as the proportion of selected households including at least one eligible person from whom an interview was successfully obtained, varied from 39% in Belgium and Switzerland to 81% in France. Cooperation at the individual level, conditional on household participation at interview was on average obtained from more than 85% of eligible household members. In the second wave of SHARE, response rates for the new countries were on average very similar to wave 1 (about 61%). In refreshment samples, response rates were on average a little lower than in the first wave (54%). In wave 4, average response rates in the baseline (56%) and refresher samples (49%) were lower than in previous waves, confirming the general decline in response rates in face-to-face surveys in Europe and worldwide (Börsch-Supan et al., 2013).

We restricted our sample to respondents with at least one child aged 50-85 and who did not report being permanently sick or disabled. Disability decreases the probability of looking after grandchildren. This is because ill grandparents are less able (physically) to take care of grandchildren, and parents might prefer to leave their children with fit grandparents. Disability also decreases the likelihood to participate in social activities. For similar reasons, in a robustness check analysis (Section 4.3) we also excluded respondents who reported ever having been diagnosed with stroke, Parkinson's disease, or cancer (similar selection criteria are commonly employed in this literature: see e.g., Arpino and Bordone, 2014 and Engelhardt et al., 2010). After application of the aforementioned selection criteria, our sample included 27,102 women and 20,354 men. Missing values in each of the variables used in the statistical analyses were other criteria for the exclusion of cases. The final sample was composed of 26,161 women and 19,807 men aged 50-85 who had at least one child.

3.2. Dependent variables

Our dependent variables measured participation in social activities. The SHARE questionnaire asked: "Have you done any of these activities in the last four weeks?"[1]. Respondents could tick several activities from a list. We first considered as outcome a dummy variable that takes value 1 if the respondent has participated to at least one of the following social activities: voluntary or charity work; educational or training course; a sport, social or other kind of club; taken part in a religious organization (church, synagogue, mosque etc.); a political or community-related organization[2].

[1] In the fourth wave the time reference was the 12 months before the interview instead of the previous month. We have also carried out additional analyses excluding wave 4. Since the results were qualitatively very similar to those presented here, we opted for retaining the analyses on the larger sample.

[2] SHARE additionally includes two other activities, that is, care for a sick or disabled adult and help to family, friends, or neighbours. We did not consider these activities for three reasons: 1) the focus of the paper is on the impact of grandchild care on extra-family social activities; 2) the "help to family" activity did not explicitly exclude grandchild care; 3) in the fourth wave these two activities were not included in the option list.

A second outcome variable we considered was the number of different types of activities in which the respondent was engaged. Finally, in a third set of analyses, we considered separately the participation in each activity as outcome variables.

Respondents were also asked about the frequency of participation in the activities mentioned (almost daily; almost every week; less often). However, it would be difficult to capture empirically the effect of grandchild care on the frequency of participation because participation on a daily basis is quite rare[3]. Therefore, we did not consider the frequency of engagement in social activities as a dependent variable.

3.3. Regular grandchild care

The independent variable of interest to us was the provision of regular grandchild care. Information on grandchild care in SHARE is obtained through a first question asking "During the last twelve months, have you regularly or occasionally looked after your grandchild without the presence of the parents?" If the answer was "yes", a second question asked for each respondent's child "During the last twelve months, on average, how often did you look after the child(ren) of {child name}, without the presence of the parents?" The possible answers are: "Almost daily;" "Almost every week"; "Almost every month";" Less often"[4]. Regular grandchild care, the independent variable used in the main analysis, is a dummy variable taking value 1 if the respondent provided childcare on a daily basis to the child(ren) of at least one child and 0 otherwise. Among women, 8.26% looked after grandchildren on a daily basis; among men, grandchild care had daily frequency in 5.5% of cases (Table 1).

[3] From about 0.5% for education and political activities to 2.9% for sport or social club.

[4] In wave 1 and 2, respondents were additionally asked about the number of childcare hours on a typical day/in a typical week/in a typical month/in the last twelve months, depending on the answer to the previous question. However, this information is not asked in wave 4. This information is also not available for Israel. Therefore, we did not use the number of hours in defining the frequency of the provision of regular grandchild care.

As mentioned before, in additional analyses (see Section 4.3), we also considered a less stringent measure of regular grandchild care, including provision of childcare on a daily *or* weekly basis.

3.4. Control variables

Control variables were chosen according to past evidence on important determinants of participation in social activities (see e.g., the review by Bukov et al., 2002) and provision of grandchild care (see e.g., Hank and Buber, 2009), that is, potential confounding variables. We therefore included socio-demographic variables, such as age (six dummy variables: "50-55" (reference), "56-60", "61-65", "66-70", "71-75", "76-80", and "80-85") and partnership status (= 1 if not living with a partner; = 0 otherwise), which are usually found to be negatively associated with the level of social participation. Education may also affect both the level of social engagement and the frequency of grandchild care. For example, Arpino and Bordone (2014) found that people with low education are more likely to provide grandchild care. To control for education level, we used three binary variables: "low" (corresponding to ISCED 0-1, no or primary education; reference), "medium" (ISCED 2, lower secondary education), "high" (ISCED 3-4, higher secondary education; and ISCED 5-6, tertiary education).

Retired grandparents have more free time to care for grandchildren than their working counterparts as found, for example, in the study by Hank and Buber (2009) that distinguished between working and not working grandparents. Similarly, retirees can be expected to have more free time for participation in social activities. There is evidence showing that people after retirement tend to expand some activities, such as volunteering (van den Bogaard, Henkens, and Kalmijn, 2014). We therefore included three dummy variables: "retired"

(reference), "employed", and "other" (i.e., unemployed, homemaker, etc.). The vast majority of women in the group "other" were housewives.

Living in rural areas has been found to be positively associated with grandchild care (see e.g., Elder and Conger, 2000), and it may also influence participation in social activities (see e.g., Nummela et al., 2008 for a review). Thus, we included a dummy variable "rural" (= 1 if living in a rural area; = 0 otherwise)[5].

Finally, we considered several measures of health. Functional impairment and depressive symptoms may be independent reasons for not looking after grandchildren, and negative associations were found between health problems and social participation. Thus, we controlled for the number of limitations in activities of daily living ("ADL limitations", ranging from 0 to 6[6]), "self-reported health" (ranging from 1 to 5; the higher the value, the worse the health), and "depression". The latter was measured using the EURO-D scale (which ranges from 0 to 12; the higher the value, the more symptoms of depression).

Across SHARE countries, substantial variation in the frequency of grandchild care has been documented (Bordone et al., 2012; Hank and Buber, 2009). Considerable cross-national differences have also been shown with regard to older individuals' engagement in social activities (Kohli et al., 2009). Therefore, we included country fixed effects to catch variability across European countries.

3.5. Method

Grandparents who provide childcare (and especially those who do so regularly) could be different from other people in observable and unobservable ways. For example, individual

[5] More specifically, we used the question on the type of area where the building is located and we coded as "rural" respondents in the category "rural area or village", while all other categories ("big city", "suburbs or outskirts of a big city", "large town", and "small town") were included in the reference group.

[6] The ADL variable is based on six items: dressing (including putting on shoes and socks), walking across a room, bathing or showering, eating (such as cutting up your food), getting in and out of bed, using the toilet (including getting up or down).

preferences and values may impact on the decision to provide childcare on a regular basis. Similarly to Hank and Stuck (2008), we could also argue that a general motivation for being active could influence both the provision of grandchild care and participation in social activities.

These unobserved factors may be controlled for by using regression models with individual fixed effects. However, fixed effects models require considerable within-individual variation in the variables of interest from one wave to another. Moreover, we could also face a problem of reversed causality: not only may grandchild care affect participation in social activities but also previous engagement in these activities may influence the provision of grandchild care. Fixed effects models cannot deal with reverse causality. For these reasons we implemented an instrumental variable (IV) approach, that can deal both with unobserved variables and reverse causality.

The IV method requires a variable to be used as an instrument that must be *relevant*, that is, associated with the endogenous variable (grandchild care in our case) and *valid*, that is, this variable should influence the outcome (social participation) only through its effect on the endogenous variable. Therefore, the instrument should not have a direct effect on the outcome. Similarly to other papers studying the impact of intergenerational transfers (e.g., Arpino and Bordone, 2014), our instrument is the availability of grandchildren (a binary variable with a value of 1 if the interviewee has at least one grandchild, and a value of 0 otherwise). As expected, our instrument easily passed the test of relevance in all the analyses. In fact, the value of the F-test statistic measuring the association between the IV and regular grandchild care in the different analyses (including robustness checks) was never smaller than 865 for women and 474 for men; that is, the value of the F-test statistic was always much bigger than the threshold of 10 usually considered acceptable (Staiger and Stock, 1997).

The most frequently used instrumental variable estimator is Two-Stage Least Squares (2SLS). The first stage consists of regressing the endogenous variable on both the instrumental variable and the control variables. In our case, the first stage consisted of predicting the provision of regular grandchild care. In the second stage, we subsequently regressed social participation on the provision of regular grandchild care, as estimated in the first stage, and on control variables. Using the predicted value of regular grandchild care instead of the actual provision cleans the "bad" variation of the endogenous variable (i.e., the part of variation that is correlated with unobserved factors and social participation and that causes endogeneity). By using the Stata command *ivreg2*, the two stages are estimated jointly to obtain corrected standard errors (Baum, Schaffer, and Stillman, 2007). We used a linear model also for binary outcomes as advocated by many authors (see e.g., Angrist and Pischke, 2009: 198-204; Heerwig and Conley, 2013) for its advantages over alternatives, such as bivariate probit models: results are more straightforward to interpret, tests on the IV can be easily implemented, and we do not have to rely on normality assumptions on the error terms for identification.

4. Results

4.1. Descriptive results

Table 1 presents some descriptive statistics on the dependent variables we used in the multivariate analyses. As it can be seen from the table, participation in at least one social activity is quite common among Europeans (about 42% of respondents declared that they participated in at least one of the five social activities considered). However, participating in more than one type of activity is less common. In fact, the average number of different memberships is 0.62 and only about 15% of the respondents are involved in more than one activity (not shown in the table). In line with previous research suggesting a hierarchy of the

different types of activities (e.g., Bukov et al., 2002), the most common activity is participation in a sport or social club (22.45%), while participation in political organizations is the rarest (about 5%).

Table 1: Descriptive statistics on participation in social activities by gender and grandchild care (%).

Social participation	Total	Women			Men		
		Total	Daily grandchild care		Total	Daily grandchild care	
			Yes	No		Yes	No
At least one activity	41.58	40.19	34.46	40.71	43.40	39.80	43.61
Number of activities (mean)	0.62	0.59	0.49	0.60	0.66	0.60	0.67
Voluntary or charity	13.74	12.85	9.90	13.11	14.92	12.41	15.07
Education	9.79	10.39	5.87	10.80	9.00	5.88	9.18
Sport or social club	22.45	19.97	14.29	20.48	25.71	20.31	26.03
Religious organizations	11.91	13.34	16.19	13.08	10.02	14.89	9.73
Political organizations	4.99	3.41	2.78	3.47	7.06	6.89	7.07
N	45,968	26,161	2,162	23,999	19,807	1,088	18,719
%	100.00	56.91	8.26	91.74	43.09	5.49	94.51

With respect to gender, we find that participation rates, as well as the average number of different types of activities, are higher for men than for women. Looking at each activity separately, participation rates are higher for men with the exception of educational courses and religious organizations. Both for women and men, regular grandchild care (i.e., on a daily basis) is negatively associated with social participation. Participation rate in at least one activity is 35% for grandmothers regularly providing childcare against a participation rate of 41% for the others. For men these percentages are 40% versus 44%. A similar pattern can be observed if the number of different activities and the prevalence of participation in each social activity are considered, with the exception of religious organizations.

In Table 2, we report descriptive statistics on the covariates separately for those who are and those who are not engaged in regular grandchild care and by gender. This table shows

that, on average, both women and men regularly involved in grandchild care are less educated, more likely to be retired, living with a partner, and having more children than the others. Depression and self-perceived health seem to be slightly worse on average for those engaged in regular grandchild care, while living in a rural area is positively associated with being a regular grandparent. Finally, we notice that the rate of older people engaged in regular grandchild care decreases with age.

Table 2: Descriptive statistics on control variables by gender and grandchild care (%).

Independent variables	Total	Women			Men		
		Total	Daily grandchild care		Total	Daily grandchild care	
			Yes	No		Yes	No
Age: 50-55	22.93	22.65	14.66	23.37	23.30	8.73	24.15
56-60	17.84	17.89	23.54	17.38	17.77	15.53	17.90
61-65	16.81	16.61	25.86	15.78	17.07	23.81	16.68
66-70	14.76	14.23	19.33	13.77	15.47	25.55	14.89
71-75	12.29	12.38	10.31	12.57	12.16	16.54	11.91
76-80	9.51	9.79	5.18	10.21	9.13	7.44	9.23
81-85	5.86	6.44	1.11	6.92	5.08	2.39	5.24
Education: low	42.90	47.21	57.72	46.26	37.21	50.09	36.47
middle	36.78	35.09	32.33	35.34	39.02	36.12	39.18
high	20.31	17.69	9.94	18.39	23.77	13.79	24.35
Not living with partner	32.00	42.83	35.34	43.50	17.70	6.99	18.32
N. children (mean)	2.40	2.38	2.57	2.36	2.43	2.62	2.42
Job: retired	50.47	47.80	50.83	47.53	53.99	73.07	52.88
working	35.06	30.27	18.27	31.35	41.39	22.33	42.50
other	13.67	20.91	29.46	20.14	4.11	3.68	4.14
N. depressive symptoms (mean)	2.48	2.90	3.06	2.89	1.92	2.02	1.92
Self-perceived health (mean)	3.09	3.17	3.30	3.16	2.99	3.18	2.98
ADL (mean)	0.18	0.20	0.14	0.21	0.15	0.16	0.15
Rural area	28.21	28.06	30.94	27.80	28.40	30.24	28.29
N	45,968	26,161	2,162	23,999	19,807	1,088	18,719

4.2. Multivariate results

Table 3 shows the estimates of different 2SLS regression models. In the first set of models, the dependent variable is the participation in at least one social activity. Models in the second group predict the number of reported activities. In both cases, models were run separately for women and men.

The results partially confirm our first hypothesis, where we expected regular grandchild care to have a negative effect on participation in social activities, in particular reducing the number of different activities in which grandparents participate. We do not find a significant effect of regular grandchild care on participation in at least one social activity. However, the results do show that regular grandchild care negatively affects the number of different social activities for women. For men, the effect of regular grandchild care, though always negative, is not statistically significant in either of the models.

Table 3: Estimates of Two-Stage Least Square models predicting participation in at least one activity or number of activities by gender.

Independent variables	At least one activity		Number of activities	
	Women	Men	Women	Men
Daily grandchild care	-0.068	-0.029	-0.366***	-0.242
	(0.057)	(0.093)	(0.101)	(0.175)
Age: (Ref. 50-55)				
56-60	0.014	-0.032**	0.011	-0.020
	(0.010)	(0.011)	(0.017)	(0.020)
61-65	0.048***	-0.001	0.062**	0.015
	(0.011)	(0.013)	(0.019)	(0.024)
66-70	0.070***	-0.005	0.089***	0.018
	(0.012)	(0.014)	(0.021)	(0.027)
71-75	0.028*	-0.030*	0.001	-0.024
	(0.012)	(0.015)	(0.022)	(0.028)
76-80	0.028*	-0.061***	-0.006	-0.091**
	(0.013)	(0.016)	(0.024)	(0.030)
81-85	-0.026	-0.106***	-0.107***	-0.193***
	(0.015)	(0.019)	(0.028)	(0.035)
Education: (Ref. low)				
middle	0.084***	0.078***	0.161***	0.150***
	(0.007)	(0.008)	(0.013)	(0.016)
high	0.234***	0.195***	0.511***	0.452***
	(0.009)	(0.010)	(0.016)	(0.018)
Not living with partner (Ref. yes)	0.009	-0.012	0.009	-0.050**
	(0.006)	(0.009)	(0.011)	(0.018)
N. children	0.008***	0.010***	0.027***	0.031***
	(0.002)	(0.003)	(0.004)	(0.005)
Job: (Ref. retired)				
working	0.064***	0.030**	0.094***	0.069***
	(0.009)	(0.011)	(0.017)	(0.020)
other	0.014	-0.054**	0.002	-0.083*
	(0.009)	(0.019)	(0.016)	(0.035)
N. of depressive symptoms	-0.006***	-0.010***	-0.010***	-0.011**
	(0.001)	(0.002)	(0.002)	(0.004)
Self-perceived health	-0.043***	-0.041***	-0.082***	-0.084***
	(0.003)	(0.004)	(0.006)	(0.00 7)
ADL	-0.023***	-0.025***	-0.027***	-0.030**
	(0.004)	(0.006)	(0.008)	(0.011)
Rural area (Ref. not)	0.048***	0.029***	0.091***	0.076***
	(0.007)	(0.008)	(0.012)	(0.015)
Constant	0.410***	0.502***	0.626***	0.735***
	(0.018)	(0.021)	(0.033)	(0.039)
N	26,161	19,807	26,161	19,807

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Country fixed effects are included in all the models (results available on request).

When looking at each activity separately (Table 4), 2SLS models show that for women, regular grandchild care has a significant negative effect on three out of the five social activities considered (i.e., voluntary or charity work, educational or training course, political or community-related organization). There is no significant effect of looking after grandchildren on participating in a sport, social, or other kind of club, or on taking part in a religious organization. For men, a significant negative effect of regular grandchild care is found only on engagement in educational or training courses. These results are in line with our second hypothesis, which we formulated arguing that those activities requiring more resources are also the most affected by competition with the provision of regular grandchild care. We will further discuss this in the conclusion (Section 5).

Table 4: Estimates of Two-Stage Least Square models predicting participation in each activity by gender.

Independent variables	Volunteering		Education		Sport or other club		Political organization		Religious organization	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Daily grandchild care	-0.108**	0.031	-0.189***	-0.119*	-0.067	-0.113	-0.049*	-0.027	0.046	-0.015
	(0.040)	(0.069)	(0.036)	(0.055)	(0.047)	(0.084)	(0.022)	(0.051)	(0.040)	(0.059)
Age: 56-60 (Ref. 50-55)	0.008	0.010	-0.008	-0.019**	-0.003	-0.016	0.003	0.004	0.009	0.002
	(0.007)	(0.008)	(0.006)	(0.006)	(0.008)	(0.010)	(0.004)	(0.006)	(0.007)	(0.007)
61-65	0.019*	0.028**	-0.011	-0.038***	0.020*	-0.002	0.010*	0.004	0.024**	0.023**
	(0.008)	(0.009)	(0.007)	(0.007)	(0.009)	(0.011)	(0.004)	(0.007)	(0.008)	(0.008)
66-70	0.023**	0.025*	-0.022**	-0.040***	0.027**	-0.001	0.007	0.015*	0.054***	0.018*
	(0.008)	(0.010)	(0.007)	(0.008)	(0.009)	(0.013)	(0.005)	(0.008)	(0.008)	(0.009)
71-75	-0.006	0.006	-0.046***	-0.050***	0.004	-0.021	-0.000	0.008	0.049***	0.033***
	(0.009)	(0.011)	(0.008)	(0.009)	(0.010)	(0.013)	(0.005)	(0.008)	(0.009)	(0.009)
76-80	-0.019*	-0.016	-0.054***	-0.059***	-0.003	-0.043**	0.003	-0.001	0.067***	0.027**
	(0.009)	(0.012)	(0.008)	(0.009)	(0.011)	(0.014)	(0.005)	(0.009)	(0.010)	(0.010)
81-85	-0.047***	-0.050***	-0.065***	-0.061***	-0.022	-0.082***	-0.013*	-0.013	0.040***	0.013
	(0.011)	(0.014)	(0.010)	(0.011)	(0.013)	(0.017)	(0.006)	(0.010)	(0.011)	(0.012)
Education: middle (Ref. low)	0.048***	0.054***	0.038***	0.030***	0.058***	0.044***	0.018***	0.029***	-0.001	-0.007
	(0.005)	(0.006)	(0.004)	(0.005)	(0.006)	(0.008)	(0.003)	(0.005)	(0.005)	(0.005)
high	0.120***	0.128***	0.170***	0.111***	0.143***	0.095***	0.045***	0.085***	0.033***	0.033***
	(0.006)	(0.007)	(0.006)	(0.006)	(0.007)	(0.009)	(0.004)	(0.005)	(0.006)	(0.006)
Not living with partner (Ref. yes)	0.001	-0.012	0.007	-0.001	0.002	-0.007	0.002	-0.012*	-0.003	-0.019**
	(0.004)	(0.007)	(0.004)	(0.006)	(0.005)	(0.008)	(0.002)	(0.005)	(0.004)	(0.006)
N. children	0.005**	0.007***	0.005***	0.005**	-0.002	-0.008**	0.002*	0.002	0.017***	0.025***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Job: working (Ref. retired)	-0.019**	-0.005	0.094***	0.055***	0.007	0.005	0.008*	0.016**	0.004	-0.002
	(0.007)	(0.008)	(0.006)	(0.006)	(0.008)	(0.009)	(0.004)	(0.006)	(0.007)	(0.007)
other	-0.006	-0.015	0.014**	0.006	-0.016*	-0.065***	-0.008*	-0.009	0.019**	-0.000
	(0.006)	(0.014)	(0.005)	(0.011)	(0.007)	(0.017)	(0.003)	(0.010)	(0.006)	(0.012)
N. depressive symptoms	-0.002*	-0.001	-0.001	0.001	-0.005***	-0.008***	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Self-perceived health	-0.016***	-0.015***	-0.017***	-0.014***	-0.041***	-0.039***	-0.004**	-0.007***	-0.005*	-0.008***
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.001)	(0.002)	(0.002)	(0.002)
ADL	-0.005	-0.009*	-0.000	-0.002	-0.011**	-0.012*	0.000	0.000	-0.010***	-0.008*

Independent variables	Volunteering		Education		Sport or other club		Political organization		Religious organization	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.005)	(0.002)	(0.003)	(0.003)	(0.004)
Rural area (Ref. not)	0.022***	0.030***	0.002	-0.004	0.024***	0.019**	0.012***	0.019***	0.031***	0.011*
	(0.005)	(0.006)	(0.004)	(0.005)	(0.006)	(0.007)	(0.003)	(0.004)	(0.005)	(0.005)
Constant	0.180***	0.197***	0.069***	0.077***	0.349***	0.390***	0.036***	0.064***	-0.008	0.006
	(0.013)	(0.015)	(0.012)	(0.012)	(0.015)	(0.019)	(0.007)	(0.011)	(0.013)	(0.013)
N	26,161	19,807	26,161	19,807	26,161	19,807	26,161	19,807	26,161	19,807

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Country fixed effects are included in all the models (results available on request).

4.3. Additional analyses and robustness checks

In Tables A1 and A2 in the Appendix we report results from additional analyses and some robustness checks on the main results presented in Section 4.2. First, we considered an alternative definition of regular grandchild care which includes weekly provision of childcare. This alternative explanatory variable takes value 1 for grandparents providing childcare on an at least weekly basis (i.e. either daily or weekly) and 0 otherwise.

Then we considered four robustness checks. Firstly, we considered an alternative instrumental variable approach based on the smallest geographical distance between the respondent and his/her child who has at least one child. In particular, four dummy variables indicate whether the respondent has at least one child with own children living 1) within 5 km; 2) between 5 and 25 km; 3) more than 25 km away; or 4) does not have grandchildren[7]. A similar instrumental variable approach was used by Compton and Pollak (2014) to estimate the effect of childcare provided by grandparents on their daughter's fertility and labour market participation.

Secondly, we considered two more restrictive sample selections. In the first case, we excluded respondents who had experienced serious illness, that is, respondents who reported ever having been diagnosed with stroke, Parkinson's disease, or cancer. Similarly to disabled respondents who, as mentioned above, were already excluded from the sample, individuals affected by serious illness may be at lower risk of regular grandchild care and participation in social activities. In the second case, we excluded from our sample grandparents who had co-resident grandchildren. Their roles and burden in terms of responsibility and time might be completely different (Hughes et al., 2007) and also more difficult to identify than for

[7] The SHARE questionnaire asks whether each child lives "in the same household", "in the same building", "less than 1 km away", "between 1 and 5 km away", "between 5 and 25 km away", "between 25 and 100 km away", "between 100 and 500 km away", "more than 500 km away", "more than 500 km away in another country". We used this information for each child who has at least one child of his/her own to build the instrumental variable described in the text, namely, the smallest geographical distance to children with own children.

grandparents who looked after their grandchildren more or less frequently, but as supplementary caregivers. It would have been interesting to run separate analyses for grandparents living with grandchildren, but there were not enough cases in our data set to do so (405 women and 190 men).

Finally, as an additional robustness check we excluded from the 2SLS regressions the three control variables measuring respondents' health conditions. Health can itself be affected by grandchild care (see e.g., Hughes et al., 2007) and it can therefore mediate the effect of grandchild care on social activities. However, mediators should not be included in a regression model as control variables.

In Table A1 we first reported the 2SLS estimates of regular grandchild care defined as daily involvement in childcare as shown in Table 3 to enable an easy comparison with the additional analyses. Using the less stringent measure of regular grandchild care, we qualitatively confirm previous results. However, and as it could be expected, the effect of grandchild care on social activity (when significant) is smaller when weekly involvement is also included. These results indicate that grandchild care has a stronger competitive effect with respect to involvement in social activities when high frequency ("almost daily") involvement is considered.

The robustness checks all confirm the main analysis: the sign and significance of the effect of regular grandchild care do not vary, and its magnitude is also quite stable.

Similarly to what we did before, in Table A2 we reported the 2SLS estimates of grandchild care on participation in each activity separately (as in Table 4). Again, when less frequent grandchild care is included in the definition of the explanatory variable, its effect is reduced, but it remains negative and significant in the same cases where daily grandchild care also was. The remaining robustness check analysis indicates that 2SLS estimates do not substantially change with respect to the main findings presented in Section 4.2.

5. Conclusion

Drawing on the active aging framework, defined by the WHO (2002) as a means for optimizing opportunities for health, participation, and security in later life, several studies tried to identify what individuals and societies can do to maintain vitality in old age (see e.g., Rowe and Kahn, 1998). It has been stressed that one of the crucial factors to guarantee active ageing is continuing engagement in social activities. In this paper we have studied whether regular provision of grandchild care negatively influences participation in five social activities among the 50-85 year olds.

Using Two-Stage Least Squares regressions on SHARE data, we found that, both for women and men, carrying out regular grandchild care has no significant effect on participating in at least one social activity. However, we did find a negative and significant effect on the number of different social activities in which grandmothers engage.

When we considered participation in the different types of social activities separately, we found that for both women and men regular grandchild care reduces the engagement in educational or training course, but only for women it does further show a negative and significant effect on voluntary or charity work and on participation in political or community-related organization. Drawing on the distinction proposed by Bukov et al. (2002) between activities that require only time and those that require special abilities and efforts, we argue that, among the five social activities we considered, volunteering and participation in education programs and political organizations are the most demanding ones. While participation in sport clubs or in religious organizations mainly requires time, being enrolled, for example, in a language course in addition requires basic language knowledge to be refreshed, homework to be done before class, and concentration during class. Volunteering and political activities may also require special competences such as social knowledge as they involve acts of decision making and the allocation of resources in a collective context.

Regular grandchild care not only reduces the time available for social activities, but it may also be tiring. Therefore, grandparents regularly involved in childcare are more likely to drop out from more demanding activities.

Our results also point to the fact that the competition effect of grandchild care is stronger for women, who are less likely than men to participate in different social activities when they regularly look after their grandchildren. The wider negative effects of grandchild care on participation in social activities that we find for grandmothers can be explained by the fact that grandchild care provided by grandfathers is likely to be partially mediated by the role of grandmothers. Indeed, Hank and Buber (2009) found that living with a partner has a significant effect on the likelihood of carrying out grandchild care in the case of men but not women, suggesting that grandfathers living in a couple are likely to declare being providers of childcare when their partner is actually doing it. If this is the case, it is likely that while grandmothers look after the grandchildren, grandfathers may still engage in other activities.

Moreover, the level of responsibility in childcare tends to be gendered. According to previous studies reviewed by Winefield and Air (2010), grandmothers are more engaged in the welfare of the child and take on a more caregiving role (e.g., feeding, changing clothing/nappies, and bathing their grandchild). Grandfathers, on the other hand, tend to be involved more in entertainment of the grandchildren, playing with them, taking them for walks, and showing them how to make things. Therefore, grandfathers are also more likely than grandmothers to be involved in more social activities done with the grandchildren.

In other words, the differential effects that we found by gender can be the result of the persistently gendered division of responsibilities across the life course. In future research, gender equality studies could take into consideration that an unequal division of chores in late life may have important consequences in terms of lower opportunities for active ageing for women. Our study is limited by a lack of information on what grandparents do when they are

with their grandchildren. This information could help explain why we found different results by gender and for the different types of activities.

Our results contribute to the debate on active ageing by highlighting the importance of considering possible competition between grandchild care and participation in social activities, that is considered as a crucial factor for guaranteeing that people age well. This study also contributes to the literature on the consequences of grandchild care for grandparents' health. Some previous studies have shown that grandchild care has beneficial effects for grandparents' cognitive functioning (Arpino and Bordone, 2014), health, and risky behaviours (Hughes et al., 2007). Our paper, however, shows that grandchild care may also produce negative indirect effects on health through a reduction in social engagement. An interesting avenue for future research is to study the conditions under which grandchild care can be cumulated with social participation in order to maximize the benefits of both.

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Appendix

Table A1: Two-Stage Least Square estimates of the effect of grandparenting on at least one activity or number of activities by gender from additional analyses and robustness checks.

		At least one activity		Number of activities	
		Women	Men	Women	Men
Alternative explanatory variables					
Daily grandchild care	b	-0.068	-0.029	-0.366***	-0.242
	se	(0.057)	(0.093)	(0.101)	(0.175)
	N	26,161	19,807	26,161	19,807
Daily or weekly grandchild care	b	-0.025	-0.009	-0.131***	-0.079
	se	(0.020)	(0.031)	(0.036)	(0.057)
	N	26,161	19,807	26,161	19,807
Alternative instrument					
Geographical distance	b	-0.075	0.038	-0.288***	-0.006
	se	(0.039)	(0.060)	(0.069)	(0.113)
	N	25,683	19,462	25,683	19,462
Alternative sample selections					
Excluding respondents with serious health problems	b	-0.101	-0.014	-0.430***	-0.190
	se	(0.059)	(0.097)	(0.105)	(0.181)
	N	23,687	18,070	23,687	18,070
Excluding respondents with co-resident grandchildren	b	-0.059	-0.013	-0.377***	-0.239
	se	(0.061)	(0.100)	(0.109)	(0.187)
	N	25,756	19,617	25,756	19,617
Excluding possible mediators					
IV model without health control variables	b	-0.081	-0.062	-0.393***	-0.311
	se	(0.057)	(0.094)	(0.102)	(0.176)
	N	26,161	19,807	26,161	19,807

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table A2: Two-Stage Least Square estimates of the effect of grandchild care on participation in each activity by gender from additional analyses and robustness checks.

		Volunteering		Education		Sport or other club		Political organization		Religious organization	
		Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Alternative explanatory variables											
Daily grandchild care	b	-0.108**	0.031	-0.189***	-0.119*	-0.067	-0.113	-0.049*	-0.027	0.046	-0.015
	se	(0.040)	(0.069)	(0.036)	(0.055)	(0.047)	(0.084)	(0.022)	(0.051)	(0.040)	(0.059)
	N	26,161	19,807	26,161	19,807	26,161	19,807	26,161	19,807	26,161	19,807
Daily or weekly grandchild	b	-0.039**	0.010	-0.068***	-0.039*	-0.024	-0.037	-0.017*	-0.009	0.017	-0.005
care	se	(0.014)	(0.023)	(0.013)	(0.018)	(0.017)	(0.028)	(0.008)	(0.017)	(0.015)	(0.019)
	N	26,161	19,807	26,161	19,807	26,161	19,807	26,161	19,807	26,161	19,807
Alternative instrument											
Geographical distance	b	-0.114***	0.013	-0.123***	-0.096**	-0.055	0.030	-0.036*	-0.000	0.040	0.048
	se	(0.027)	(0.045)	(0.024)	(0.036)	(0.032)	(0.054)	(0.015)	(0.033)	(0.028)	(0.038)
	N	25,683	19,462	25,683	19,462	25,683	19,462	25,683	19,462	25,683	19,462
Alternative sample selections											
No serious health problems	b	-0.119**	0.048	-0.214***	-0.145*	-0.073	-0.102	-0.066**	0.010	0.042	0.000
	se	(0.041)	(0.071)	(0.037)	(0.058)	(0.048)	(0.087)	(0.023)	(0.053)	(0.041)	(0.061)
	N	23,687	18,070	23,687	18,070	23,687	18,070	23,687	18,070	23,687	18,070
No co-residents	b	-0.113**	0.033	-0.193***	-0.117*	-0.065	-0.116	-0.051*	-0.026	0.045	-0.013
	se	(0.043)	(0.074)	(0.038)	(0.059)	(0.051)	(0.090)	(0.024)	(0.054)	(0.043)	(0.063)
	N	25,756	19,617	25,756	19,617	25,756	19,617	25,756	19,617	25,756	19,617
Excluding possible mediators											
IV model without health	b	-0.113**	0.019	-0.195***	-0.130*	-0.081	-0.145	-0.050*	-0.033	0.047	-0.021
control variables	se	(0.040)	(0.069)	(0.036)	(0.055)	(0.047)	(0.085)	(0.022)	(0.051)	(0.040)	(0.059)
	N	26,161	19,807	26,161	19,807	26,161	19,807	26,161	19,807	26,161	19,807

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.