Does grandparenting influence engagement in social activities?

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Prepared for the European Population Conference 2014

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Abstract

The positive effects of participation in social activities have been studied in various fields, including political science (in relation to democracy and trust), gerontology, and sociology (for its effects on physical and mental health). Against a background of rapid population ageing, the study of social integration among the elderly is of particular relevance within the framework of active ageing. Yet, whether the relationship between kin and non-kin social activities is characterized by cumulation or competition remains under-explored. In particular, grandparenting has taken a central role for the elderly due to unprecedented overlap between grandparents' and their grandchildren's lives. Grandparenting may stimulate social participation or it may impose time and energy constraints on it. This study aims to assess the effect on the participation in social activities among the elderly of providing childcare on a regular basis. Using an instrumental variable approach on data from the Survey of Health, Ageing and Retirement in Europe, we find that regular provision of childcare has 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 contribute to the debate on active ageing.

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Introduction

Given the fast increase of the elderly population, active ageing is one of the most important topics on the socio-political agenda. The World Health Organization (WHO) defines active ageing as "the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age" (WHO 2002: 12). The word "active" thus also refers to continuing participation in social, economic, cultural, spiritual, and civic affairs, and it is not limited to physical health. In this framework, involvement in social activities plays a decisive role (e.g., Agren and Berensson 2006; Sirven and Debrand 2008).

Older people have usually more time to take part in social activities due to retirement (e.g. Christoforou 2005) and because they have fewer family constraints than younger people (e.g. Bolin et al. 2003). Several studies in a wide range of fields including sociology and gerontology have analysed the effects of participation in social activities on individuals' mental health (Engelhardt et al. 2010; Hultsch et al. 1999; Scarmeas and Stern 2003) and physical health (e.g. Pynnönen et al. 2012 on the risk of mortality associated with social activity).

The role of participation in social activities has also long been the subject of political science studies on democracy, mainly departing from Putnam's thesis of a close relationship between association, civic engagement, and generalized trust as a source of positive economic and political externalities (see e.g., Putnam 1993). In this perspective, participation in (civic and political) social activities is considered as an important factor in terms of increasing social capital, strengthening sense of purpose in life and sense of community, and reducing risk of isolation (Alexander et al. 2012).

Previous studies overlooked the cumulative involvement in social and family activities (an exception being the work by Kholi et al. 2009). In particular, the effect of family obligations on engagement in social activities in later life has been understudied. In

this paper, leaving aside the consequences of social participation, we study the effect of grandparenting, an increasingly important family responsibility among the elderly, on participation in social activities, using data from the Survey of Health, Ageing and Retirement in Europe (SHARE). This survey allows us to assess the extent to which regular provision of childcare by grandparents influences 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). The next section first reviews the relevant literature on participation in social activities and grandparenting, then formulates our research questions. We next introduce the data and the empirical approach used in this study, followed by a presentation of the descriptive and multivariate findings. The final section discusses our results.

Background

Social activities

The notion that participation in social activities can facilitate the production of economic and noneconomic goods, benefiting individuals and the community, derives from longstanding theories concerning the link between democracy and social participation (Toqueville 1835; see Paxton 2002 for a discussion) popularized under the concept of *social capital* by Bourdieu (1983) and Coleman (1988). According to Putnam (1993; 1995), interactions, represented mainly by social activities, create trust, horizontal social networks, and civic engagement, and therefore social capital.

During the whole life, individuals interact with others, engaging in activities within and outside the family. The family and intimate friends form what are defined as "primary social groups" (Cooley 1912). Individuals, however, may also be members of an array of "secondary social groups", that is, clubs or organizations, and also the workplace. In later

life, older adults seem to reallocate their time from participation in secondary group to primary group activities, as the latter (including mainly partner, children, and grandchildren) often account for the majority of social ties for the elderly (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 (Cumming et al. 1960). 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 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 the individual the freedom to disengage. Along these lines some scholars have referred to old age as a roleless period (Burgess 1960).

Other scholars, such as Neugarten et al. (1968) contested this view. As the socioemotional selectivity theory elaborated in the 1990s (e.g., Carstensen 1992) emphasized, with advancing age individuals chose to reduce certain social activities, but maintain others, especially those involving the most intimate ties.

Recent socio-gerontological studies responded to the earlier image of the elderly as either victims of modernization or authors of their own isolation, concluding that ongoing integration of the elderly into family relationships (e.g. Attias-Donfut 1995) or into networks of social participation (e.g. Kohli and Kuenemund 1996) is crucial to promoting "active ageing" (Rowe and Kahn 1998; Sirven and Debrand 2008). Evidence from numerous separate studies on either intergenerational family relationships (e.g., Bordone 2009; Hank 2007) or on social participation in later life in a variety of activities (e.g. Engelhardt et al. 2010; Hank and Stuck 2008) emphasizes the ongoing integration of the elderly.

Moreover, social relationships of various kinds have been recognized as buffers of the effects of negative events in later life such as widowhood (Li 2007), or as serving as a social protection mechanism (Wall et al. 2001). Thus, 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 for a discussion).

Yet, the relationship between participation in "primary" and "secondary" social groups in later life remains understudied, mainly because information about older adults' integration into social networks is often not available (Cornwell et al. 2008). In particular, little is known about social participation among the elderly who provide grandchild care and whether the provision of childcare interferes with social activities or stimulates participation in them.

This topic is relevant, as increasing longevity has created, on the one hand, more opportunities for intergenerational relationships and on the other hand, together with an improvement in the health status of older individuals, the potential for carrying out social activities until later in life (as discussed in Erlinghagen and Hank 2006). In particular, the role of grandparents is gaining importance as the lives of children and grandparents overlap for a longer period of time than ever before.

Grandchild care

Grandparenting is a common family activity and an increasingly important source of informal childcare to help mothers participate in the labor market (Aassve et al. 2012; Arpino et al. 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 of regular provision of grandchild care varies across countries (see e.g., Bordone et al. 2012).

Grandparenting can also have a strong influence on decision-making strategies regarding household location, employment decisions, and other factors. Analyses on 22 European countries based on the European Social Survey found that becoming a grandparent is related to a decrease in employment – that is, grandparenthood speeds up retirement, especially for women (Van Bavel and De Winter 2013).

Therefore, the provision of grandchild care is more and more often the object of sociological, economic, and psychological studies on the consequences of grandchild care for the children, the parents, and the grandparents. This latter literature has often focused on caregiving grandparents, that is, grandparents who are the primary carers of their grandchildren (see Baker and Silverstein 2008; Goodman and Silverstein 2002; Minkler and Fuller-Thomson 2005), although supplementary grandchild care is far more common. Evidence tends to suggest that grandparenting has negative effects, such as a heightened risk of isolation (Fergusson et al. 2008) and depression (Silverstein 2007). Yet, the degree of responsibility associated with care provision is a key factor that must be taken into account. Coall and Hertwig (2011) hypothesized a nonlinear relationship between grandchild care and grandparents' well-being that, in their review, encompasses various positive emotions (e.g., satisfaction) and activities (e.g., spending time in company). They argue that giving increasing amounts of care enhances the grandparents' sense of purpose in life and helps to maintain their family identity (Giarrusso et al. 2001); however, being primary carers may be detrimental to grandparents' health and well-being. Recent studies focusing on supplementary grandchild care found positive effects in terms of reduced stress (Giarrusso et al. 2000), better health and health-related behaviors (Hughes et al. 2007; Muller and Litwin

2011), greater life satisfaction (Powdthavee 2011), and improved cognitive functioning (Arpino and Bordone 2014).

Research questions

Previous literature has shown that children serve as bridges to new social networks and activities for their parents through involvements at school and in clubs (Dykstra 2006; Furstenberg 2005). In this study we aim to identify the effect of grandchild care – and in particular of providing care on a regular basis – on grandparents' participation in social activities.

Starting from Coall and Hertwig's (2011) argument that supplementary grandchild care may have a positive effect on well-being, broadly defined to include also time spent with others, it could be hypothesized that looking after grandchildren has a positive effect on social participation. By stimulating grandparents' sense of purpose in life (Silverstein and Giarrusso 2013), grandparenting may also foster grandparents' engagement in social activities. Moreover, just as social network research has found a high level of interdependency between social network structure and engagement in social activities (e.g. Rotolo 2000; Wilson and Musick 1997), so we may also believe that people who are more active within their family network (e.g., those providing grandchild care) are also more likely to be involved in social activities. These arguments would favor a *cumulation hypothesis*, namely, that grandparents involved in childcare cumulate this activity with social activities.

However, one may also hypothesize a negative effect of grandparenting on participation in social activities. Engaging in grandchild care may reduce willingness, energy, and time availability and limit 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. 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. These arguments would favor a *competition hypothesis*, namely, that grandparenting has a negative effect on participation in social activities. We can expect some activities to be more affected than others by this competition effect. In fact, we may think of those activities which are available less often or subject to time constraints as being more in conflict with regular grandchild care. Moreover, activities that are more demanding in terms of commitment or mental effort are also more likely to compete with regular involvement in grandchild care.

Given the different levels of engagement in grandchild care (Hank and Buber 2009; Lee and Tang 2013) and social activities (Bukov et al. 2002) by gender, we will assess if gender differences arise in the relationship between grandchild care and participation in social activities.

Data and method

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-institutionalized population aged 50 and over in Europe (Börsch-Supan et al. 2005; see details on the sampling procedure, questionnaire contents, and fieldwork methodology in 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.[1] The third wave (2008) of SHARE is called SHARELIFE and contains only retrospective information on the respondents.

We restricted our sample to women and men with at least one child and were aged 50-85; we excluded respondents who reported being 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 we excluded respondents who reported ever having been diagnosed with stroke, Parkinson's disease, or cancer (see also Arpino and Bordone 2014; Engelhardt et al. 2010).

After application of the aforementioned selection criteria, our sample included 27,102 women and 20,354 men who answered the questions about children and grandchildren.[2] 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.

Dependent variables

The dependent variables refer to participation in social activities. The SHARE questionnaire asks: "Have you done any of these activities in the last four weeks?"[3] 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.[4]

Wollebæk and Strømsnes (2008) in a study of 13 European countries highlighted the importance of the scope of involvement in social activities, that is, participation in multiple organizations, for the development of civic competencies, civic engagement, and trust. Being member of multiple associations was also found to be positively related to higher levels of political participation (Teorell 2003) and political tolerance (Cigler and Joslyn 2002). Thus, second, we considered the number of activities in which the respondent was engaged as a dependent variable.

Respondents were also asked about the frequency of participation in the activities mentioned ("almost daily; almost every week; less often"). However, as we will show in the descriptive results, it would be difficult to capture empirically the effect of grandparenting on the frequency of participation because engagement on a daily basis is quite rare. For that reason we did not use the frequency of engagement in social activities as a dependent variable.

Putnam's study of Italy's regional governments made no distinction between types of associations. Stating that "participation in civic organizations inculcates skills of co-operation as well as a sense of shared responsibility for collective endavours" (Putnam 1993: 90), it led to the interpretation that all social activities were to be considered equally important (e.g., Alexander et al. 2012). More recently, however, research has suggested that although social participation is positively related to a broad range of social capital indicators, its effects may vary according to the type of activity (e.g. Bowler et al. 2003; Tossutti 2007). Moreover, as anticipated in the formulation of our research questions, we may expect a stronger competition effect of grandparenting on the most demanding social activities. Therefore, we considered separately, in a third set of analyses, the participation in each activity as outcome variables.

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 is "yes", a second question asks 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".[5] 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 at least one grandchild and 0 otherwise.

In additional analyses (see the robustness check section), we also considered a less stringent measure of grandparenting, including provision of childcare on a weekly basis.

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, that is, potential confounding variables. We therefore include 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 ("no partner" = 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 frequency of grandparenting and the level of social engagement. For example, Arpino and Bordone (2014) find that people with low education are more likely to perform 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 as is hinted at, 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. We measured activity status by using three dummy variables: "employed", "retired" (reference) 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 grandparenting (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 of studies showing mixed evidence). Thus, we included a dummy variable "rural" (= 1 if living in rural area; = 0 otherwise).[6]

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"), "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 grandparenting 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 (e.g., Erilghagen and Hank 2006; Kohli et al. 2009). Therefore, we included country fixed effects to catch variability across European countries.

Method

Grandparents who provide childcare (and especially those who do so regularly) could be different from other elderly people in observable and unobservable ways. For example, individual preferences and values may impact on the decision to provide childcare on a regular basis.[7] These factors could be also correlated with the propensity to participate in social activities. Moreover, we could also face a problem of reversed causality: not only may grandparenting affect participation in social activities but also previous engagement in these activities may influence the provision of grandchild care.

To deal with these endogeneity issues we implement an instrumental variable (IV) approach. 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, influencing 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; Ku et al. 2012), 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 if 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 consists of

predicting the provision of regular grandchild care. In the second stage, we subsequently regress 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 et al. 2007). We used a linear model also for binary outcomes as advocated for example by Angrist and Pischke (2009: 198-204) and Hellevik (2009), and used by many authors (e.g., Katz et al. 2001) 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.

Results

Descriptive results

Table 1 presents some descriptive statistics on the dependent variables we used in the multivariate analyses. As can be seen from the table, participation in at least one social activity was quite common among the European elderly (about 42% of respondents declared that they participated in at least one of the five social activities considered). However, participating in more than one activity was less common. In fact, the average number of memberships was 0.62 and the percentage of elderly involved in more than one activity was 15.01% (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 was participation in a sport or social club (22.45%), while participation in political organizations was the rarest (about 5%).

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

Social participation	Total	Women			Men		
		Total	Daily Grandparenting		Total	Daily Grandparenting	
			Yes	No		Yes	No
Participation (irrespectively of the frequency) in:							
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
Daily participation in:							
At least one activity	6.09	5.21	4.02	5.32	7.25	8.36	7.19
Number of activities (mean)	0.07	0.06	0.04	0.06	0.08	0.10	0.08
Voluntary or charity	2.00	1.68	1.43	1.70	2.41	2.57	2.40
Education	0.47	0.53	0.32	0.55	0.38	0.55	0.37
Sport or social club	2.91	2.36	1.48	2.44	3.63	3.95	3.61
Religious organizations	0.96	0.91	0.97	0.90	1.04	1.47	1.02
Political organizations	0.49	0.27	0.14	0.28	0.77	1.19	0.75
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

Daily participation rates were very low for almost all activities (from about 0.5% for education and political activities to 2.9% for sport or social club). As anticipated above, for this reason we did not explore the effect of grandparenting on daily engagement in social activities.

With respect to gender, we found that participation rates as well as the average number of memberships were higher for men than for women. Looking at each activity

separately, participation rates were higher for men with the exception of educational courses and religious organizations. Both for women and men, regular grandparenting (i.e., on a daily basis) was negatively associated with social participation. Participation rate in at least one activity was 35% for grandmothers regularly providing childcare against a participation rate of 41% for the others. For men these percentages were 40% versus 44%. A similar pattern can be observed if the number of 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 were not engaged in regular grandparenting and by gender. This table shows that, on average, among both women and men, the elderly regularly involved in grandparenting 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 also to be slightly worse on average for those engaged in regular grandparenting, while living in a rural area is positively associated with being a regular grandparent. Finally, we notice that age is non-linearly associated with regular grandparenting: the lowest rates of regular grandparenting are found among the youngest and oldest groups.

Table 2. Descriptive statistics on control variables by gender and grandparenting (%).

Independent variables	Total	Women			Men		
		Total	Daily grandparenting		Total	Daily grandparenting	
			Yes	No		Yes	No
Age (Mean)	64.25	64.42	63.23	64.53	64.02	65.84	63.91
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

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 females and males.

We do not find a significant effect of regular grandparenting on participation in at least one social activity. However, the results do show that regular grandchild care negatively

affects the number of social activities for women. For men, the effect of regular grandparenting, though always negative, is not statistically significant in these models.

The results of the control variables generally confirm previous studies. However, it is worth noting that the more educated are likely to be more socially active and to engage in more activities. Moreover, despite expectations of the retired having more time available, working people in our sample are more likely to participate in social activities and more likely to engage in a higher number of activities. However, we acknowledge that the coefficients of covariates do not have a causal interpretation.

When looking at each activity separately (Table 4), 2SLS models show that for women, performing 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 the activities of a religious organization. For men, a significant negative effect of regular grandparenting is found only on engagement in educational or training courses.

The results with respect to the control variables confirm the importance of education in the active ageing framework: the higher the education, the more likely engagement is in all types of social activities considered. It also emerges that working people are more likely to participate in education or training courses and in political organizations compared with their retired counterparts. This is not surprising, as firms often promote lifelong learning or refresher courses, and employees may be taking part in trade union activity.

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 grandparenting	b	-0.068	-0.029	-0.366***	-0.242
	se	(0.057)	(0.093)	(0.101)	(0.175)
Age: (Ref. 50-55)					
56-60	b	0.014	-0.032**	0.011	-0.020
	se	(0.010)	(0.011)	(0.017)	(0.020)
61-65	b	0.048***	-0.001	0.062**	0.015
	se	(0.011)	(0.013)	(0.019)	(0.024)
66-70	b	0.070***	-0.005	0.089***	0.018
	se	(0.012)	(0.014)	(0.021)	(0.027)
71-75	b	0.028*	-0.030*	0.001	-0.024
	se	(0.012)	(0.015)	(0.022)	(0.028)
76-80	b	0.028*	-0.061***	-0.006	-0.091**
	se	(0.013)	(0.016)	(0.024)	(0.030)
81-85	b	-0.026	-0.106***	-0.107***	-0.193***
	se	(0.015)	(0.019)	(0.028)	(0.035)
Education: (Ref. low)					
middle	b	0.084***	0.078***	0.161***	0.150***
	se	(0.007)	(0.008)	(0.013)	(0.016)
high	b	0.234***	0.195***	0.511***	0.452***
	se	(0.009)	(0.010)	(0.016)	(0.018)
Not living with partner (Ref. yes)	b	0.009	-0.012	0.009	-0.050**
	se	(0.006)	(0.009)	(0.011)	(0.018)
N. children	b	0.008***	0.010***	0.027***	0.031***
	se	(0.002)	(0.003)	(0.004)	(0.005)
Job: (Ref. retired)					
working	b	0.064***	0.030**	0.094***	0.069***
	se	(0.009)	(0.011)	(0.017)	(0.020)
other	b	0.014	-0.054**	0.002	-0.083*
	se	(0.009)	(0.019)	(0.016)	(0.035)
N. of depressive symptoms	b	-0.006***	-0.010***	-0.010***	-0.011**
	se	(0.001)	(0.002)	(0.002)	(0.004)

Self-perceived health	b	-0.043***	-0.041***	-0.082***	-0.084***
	se	(0.003)	(0.004)	(0.006)	(0.00 7)
ADL	b	-0.023***	-0.025***	-0.027***	-0.030**
	se	(0.004)	(0.006)	(0.008)	(0.011)
Rural area (Ref. not)	b	0.048***	0.029***	0.091***	0.076***
	se	(0.007)	(0.008)	(0.012)	(0.015)
Constant	b	0.410***	0.502***	0.626***	0.735***
	se	(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).

To save space we have not reported country fixed effects. Country coefficients (available upon request) show that elderly people in Northern and Western European countries usually have a higher likelihood of engagement in at least one social activity and tend also to participate in a higher number of activities compared with their counterparts in Southern and Eastern Europe. Once we look at the different activities separately, we notice a higher engagement in volunteering activities among the elderly in Western Europe (with the exception of Germany) and a lower participation in sport or other social clubs among Southern Europeans. Greece and Ireland show particularly high levels of engagement in religious organizations compared with the other countries considered.

Table 4. Estimates of two-stage least square models predicting participation in each activity by gender.

		volunteering		education		sport or other club		political organization		religious organization	
		Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Daily grandparenting	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)
Age: 56-60 (Ref. 50-55)	b	0.008	0.010	-0.008	-0.019**	-0.003	-0.016	0.003	0.004	0.009	0.002
	se	(0.007)	(0.008)	(0.006)	(0.006)	(0.008)	(0.010)	(0.004)	(0.006)	(0.007)	(0.007)
61-65	b	0.019*	0.028**	-0.011	-0.038***	0.020*	-0.002	0.010*	0.004	0.024**	0.023**
	se	(0.008)	(0.009)	(0.007)	(0.007)	(0.009)	(0.011)	(0.004)	(0.007)	(0.008)	(0.008)
66-70	b	0.023**	0.025*	-0.022**	-0.040***	0.027**	-0.001	0.007	0.015*	0.054***	0.018*
	se	(0.008)	(0.010)	(0.007)	(0.008)	(0.009)	(0.013)	(0.005)	(0.008)	(0.008)	(0.009)
71-75	b	-0.006	0.006	-0.046***	-0.050***	0.004	-0.021	-0.000	0.008	0.049***	0.033***
	se	(0.009)	(0.011)	(0.008)	(0.009)	(0.010)	(0.013)	(0.005)	(0.008)	(0.009)	(0.009)
76-80	b	-0.019*	-0.016	-0.054***	-0.059***	-0.003	-0.043**	0.003	-0.001	0.067***	0.027**
	se	(0.009)	(0.012)	(0.008)	(0.009)	(0.011)	(0.014)	(0.005)	(0.009)	(0.010)	(0.010)
81-85	b	-0.047***	-0.050***	-0.065***	-0.061***	-0.022	-0.082***	-0.013*	-0.013	0.040***	0.013
	se	(0.011)	(0.014)	(0.010)	(0.011)	(0.013)	(0.017)	(0.006)	(0.010)	(0.011)	(0.012)
Education: middle (Ref. low)	b	0.048***	0.054***	0.038***	0.030***	0.058***	0.044***	0.018***	0.029***	-0.001	-0.007
	se	(0.005)	(0.006)	(0.004)	(0.005)	(0.006)	(0.008)	(0.003)	(0.005)	(0.005)	(0.005)
High	b	0.120***	0.128***	0.170***	0.111***	0.143***	0.095***	0.045***	0.085***	0.033***	0.033***
	se	(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)	b	0.001	-0.012	0.007	-0.001	0.002	-0.007	0.002	-0.012*	-0.003	-0.019**
	se	(0.004)	(0.007)	(0.004)	(0.006)	(0.005)	(0.008)	(0.002)	(0.005)	(0.004)	(0.006)

N. children	b	0.005**	0.007***	0.005***	0.005**	-0.002	-0.008**	0.002*	0.002	0.017***	0.025***
	se	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Job: working (Ref. retired)	b	-0.019**	-0.005	0.094***	0.055***	0.007	0.005	0.008*	0.016**	0.004	-0.002
	se	(0.007)	(0.008)	(0.006)	(0.006)	(0.008)	(0.009)	(0.004)	(0.006)	(0.007)	(0.007)
Other	b	-0.006	-0.015	0.014**	0.006	-0.016*	-0.065***	-0.008*	-0.009	0.019**	-0.000
	se	(0.006)	(0.014)	(0.005)	(0.011)	(0.007)	(0.017)	(0.003)	(0.010)	(0.006)	(0.012)
N. depressive symptoms	b	-0.002*	-0.001	-0.001	0.001	-0.005***	-0.008***	-0.001	-0.001	-0.001	-0.001
	se	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Self-perceived health	b	-0.016***	-0.015***	-0.017***	-0.014***	-0.041***	-0.039***	-0.004**	-0.007***	-0.005*	-0.008***
	se	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.001)	(0.002)	(0.002)	(0.002)
ADL	b	-0.005	-0.009*	-0.000	-0.002	-0.011**	-0.012*	0.000	0.000	-0.010***	-0.008*
	se	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.005)	(0.002)	(0.003)	(0.003)	(0.004)
Rural area (Ref. not)	b	0.022***	0.030***	0.002	-0.004	0.024***	0.019**	0.012***	0.019***	0.031***	0.011*
	se	(0.005)	(0.006)	(0.004)	(0.005)	(0.006)	(0.007)	(0.003)	(0.004)	(0.005)	(0.005)
Constant	b	0.180***	0.197***	0.069***	0.077***	0.349***	0.390***	0.036***	0.064***	-0.008	0.006
	se	(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).

Additional analyses and robustness checks

In Tables 5 and 6 we present results from additional analyses and some robustness checks on our previous results. First, we consider an alternative definition of regular grandparenting which includes weekly provision of childcare. Therefore, this alternative explanatory variable takes value 1 for grandparents providing childcare on a daily or weekly basis and 0 otherwise.

Then we consider 4 robustness checks. Firstly, we consider an alternative instrumental variable approach based on the lowest geographical distance between respondent and his/her child who had at least one child. In particular, we consider 4 dummy variables indicating whether respondents had 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) did not have grandchildren.[8] 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 labor market participation.

Secondly, we considered two alternative, more restrictive, sample selections. In the first case, we considered a sample selection where we excluded respondents who had experienced serious illness, that is, respondents that had 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, elderly people affected by serious illness may be at lower risk of regular grandparenting and participation in social activities. In the second case, we excluded from our sample grandparents who had co-resident grandchildren because 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 the roles and responsibilities of 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.

Finally, as an additional robustness check we excluded from the 2SLS regressions the three control variables measuring respondents' health conditions. As discussed in the grandchild care section, as health can itself be affected by grandparenting, health can mediate the effect of grandparenting on social activities.

In Table 5 we first reported the 2SLS estimates of regular grandparenting defined as daily involvement in childcare as shown in Table 3 to enable them to be more easily compared with the additional analyses. Using the less stringent measure of grandparenting we qualitatively confirm previous results. However, and as expected, the effect of grandparenting on social activity (when significant) is less strong when weekly involvement is also included. These results indicate that grandparenting has a stronger competitive effect with respect to involvement in social activities especially when high frequency ("almost daily") involvement is considered.

The robustness checks all confirm the main analysis. Not only do the sign and significance of the effect of daily grandparenting not vary, but its magnitude is also quite stable.

In Table 6, as in Table 4, we report the 2SLS estimates of grandparenting on participation in each activity separately. Again, when less frequent grandparenting 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 grandparenting also was. The remaining robustness checks analysis indicates that 2SLS estimates do not substantially change with respect to the main findings in Table 4.

Table 5. 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		Number	
		Women	Men	Women	Men
Alternative explanatory variables					
Daily grandparenting	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 grandparenting	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	b	-0.101	-0.014	-0.430***	-0.190
health problems	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	b	-0.081	-0.062	-0.393***	-0.311
variables	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 6. 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.

		volunteering		education		sport or other club		political organization		religious organization	
		Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Alternative explanatory variables											
Daily grandparenting	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 grandparenting	b	-0.039**	0.010	-0.068***	-0.039*	-0.024	-0.037	-0.017*	-0.009	0.017	-0.005
	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 control	b	-0.113**	0.019	-0.195***	-0.130*	-0.081	-0.145	-0.050*	-0.033	0.047	-0.021
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: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Discussion and concluding remarks

Drawing on the active aging framework, defined by the WHO (2002) as a means for discussing how to optimize opportunities for health, participation, and security in later life, several studies (e.g., Rowe and Kahn 1998) tried to identify what individuals and societies can do to maintain vitality in old age. One of the main components identified is continuing engagement in social activities. In this paper we have studied the influence of grandparenting on participation in social activities among the elderly.

To the best of our knowledge, the only previous study focusing on the relationship between family and social activities is that by Kholi et al. (2009). These authors considered different dimensions of social connectedness: formal social relations (non-kin social relationships tied to some kind of formalized group membership), informal social relations (i.e., having received or given practical help from/to friends, neighbors, colleagues), 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). These authors found that the relationship between the various dimensions of social connectedness was cumulative rather than competitive, with the exception of the relationship between informal social relations and family relations.

We add to this isolated evidence a deeper analysis of the effect of grandparenting on several variables related to engagement in social activities, which included the scope, that is, the number of social activities that individuals are involved in, and the type of social activities. Kholi 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, on the other hand, focused on grandchild care as an important type of help given by the elderly, and we studied whether or not grandparenting interfered with participation in social activities.

Using Two-Stage Least Squares regressions on SHARE data, we found that, both for women and men, carrying out regular grandparenting had no significant effect on participating in at least one social activity. However, we did find a negative effect on the number of 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 grandparenting reduced the effect on engagement in educational or training course, but only for women did it further show a negative and significant effect on voluntary or charity work and on participation in political or community-related organization.

Previous studies showed mixed evidence on the gendered effects of grandparenting (see, for example, the studies on satisfaction reviewed by Winefield and Air 2010). Some studies only found positive effects on grandmothers' health of caring for grandchildren (see e.g., Hughes et al. 2007), while others did not find substantial differences by gender (see e.g., Arpino and Bordone (2014) on cognitive functioning).

The stronger negative effects of grandchild care on participation in social activities that we found 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. In fact, 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 child, grandfathers still may engage in other non-childcare-related activities.

Moreover, the level of responsibility in childcare is gendered and traditional gender divisions seem to exist in terms of the type of childcare that grandparents provide. According to previous studies reviewed by Winefield and Air (2010), grandmothers report that they 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 more likely to be involved in more social activities done with the grandchild than grandmothers. 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.

Drawing on the distinction proposed by Bukov et al. (2002) between activities that require only time and those that require special abilities and competences, we could 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 a sport clubs or in religious organizations mainly requires time (e.g., one hour at the gym per week or attending religious services), being enrolled, for example, in a language course also requires, in addition to time, basic language knowledge to be refreshed, homework to be done before class, and concentration during class. Volunteering and political activities also imply substantial efforts. Regular grandparenting not only reduces the time available for other activities, but it may also be physically and mentally tiring. Therefore, grandparents regularly involved in childcare are more likely to drop out of more demanding activities. As argued above, grandmothers are likely to have a higher level of responsibility and suffer more stress because of regular provision of grandchild care, and this may help explain the wider negative effects found with respect to grandmothers compared with grandfathers.

Our results contribute to different strands of the literature. First, we contribute to the literature on social capital by highlighting the importance of considering possible conflicts between participation in family and non-family activities. Second, we contribute to the

literature on the consequences of grandparenting for grandparents, hinting that the possible benefits of grandparenting can be lowered by reduced participation in other beneficial activities with relevant consequences for the debate on active ageing. Future research could further explore this issue by studying the conditions under which grandparenting can be cumulated with social participation in order to maximize the benefits of family and social integration.

Finally, we notice that the differential effects that we found by gender show the persistently gendered division of responsibilities across the life course. Gender equality studies should also take into consideration that unequal division of chores in late life may have important consequences in terms of lower opportunities for active ageing for women.

Notes

1. More specifically, we used data from the first wave (2004) and the refresher samples from the following waves for those countries that took part in the data collection in 2004 (i.e., Austria, Belgium, Denmark, France, Germany, Greece, Israel, Italy, Netherlands, Spain, Sweden, and Switzerland). We also used the second wave (2006) and the refresher sample from the fourth wave (2010) for the countries that joined SHARE in 2006 (i.e., Czech Republic, Ireland, and Poland). Finally, we used the fourth wave for countries that joined SHARE in 2010 (i.e., Estonia, Hungary, Portugal, and Slovenia).

2. In SHARE, some questionnaire modules were not presented to all respondents of the same household. For example, the questions on children and on the provision of childcare to grandchildren were answered by one randomly selected individual in each household, the so-called "family respondent".

3. In the fourth wave the time reference was the 12 months before the interview instead of the previous month.

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

5. 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.

6. 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.

7. In SHARE there is very limited information on preferences and values. For example, questions about parents’ and grandparents’ duties as well as about who should bear the responsibility for older persons in need are asked in the so-called drop-off questionnaire and therefore only a sub-sample answers them. Moreover, these questions were not repeated in the fourth wave. Using this information would have implied an overall reduction in our sample size of 65%.

8. 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 its own to build the instrumental variable described in the text, namely, the smallest geographical distance to children with their own children.

Acknowledgments

Earlier versions of this paper were presented at the SHARE Workshop within the Austrian ESFRI conference, at the Department of Sociology Seminar of the University of Oxford and at the DEMOSOC seminar at Universitat Pompeu Fabra. The authors would like to thank participants at these seminars for constructive comments. We are also grateful to Francesco Billari and Tobias Wiß for providing us with invaluable feedback. All remaining errors are the authors’ responsibility. Valeria Bordone acknowledges funding from the Austrian Science Fund (FWF): Z171-G11 and the ERC Starting Grant 241003-COHORT. This paper uses data from SHARE wave 4 release 1.1.1, as of March 28th 2013 (DOI: 10.6103/SHARE.w4.111) and SHARE wave 1 and 2 release 2.6.0, as of November 29 2013 (DOI: 10.6103/SHARE.w1.260 and 10.6103/SHARE.w2.260). The SHARE data collection has been primarily funded by the European Commission through the 5th Framework Programme (project QLK6-CT-2001-00360 in the thematic programme Quality of Life), through the 6th Framework Programme (projects SHARE-I3, RII-CT-2006-062193, COMPARE, CIT5- CT-2005-028857, and SHARELIFE, CIT4-CT-2006-028812) and through the 7th Framework Programme (SHARE-PREP, N° 211909, SHARE-LEAP, N° 227822 and SHARE M4, N° 261982). Additional funding from the U.S. National Institute on Aging (U01 AG09740-13S2, P01 AG005842, P01 AG08291, P30 AG12815, R21 AG025169, Y1-AG-4553-01, IAG BSR06-11 and OGHA 04-064) and the German Ministry of Education and Research as well

as from various national sources is gratefully acknowledged (see www.share-project.org for a full list of funding institutions).

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