**Daily grandchild care and grandparents' employment:
A comparison of four European childcare policy regimes**

Ginevra Floridi

Department of Global Health & Social Medicine, King's College London

Abstract

Having grandchildren is known to reduce individuals' labour supply. However, it is unclear whether there is a negative association between grandchild care provision and employment among grandparents. Moreover, we do not know how the magnitude of any association between the two activities may vary across countries characterised by different childcare policy regimes. Using data from the Survey of Health, Ageing and Retirement in Europe, this paper investigates the association between daily grandchild care provision and two employment outcomes for grandmothers and grandfathers aged 50–69: the probability of being employed, and the average weekly working hours. Recursive bivariate models are used to account for the potential selection of grandparents with different unobserved traits into work and family care. Estimates are compared across four country groups characterised by different childcare policy orientations: optional de-familisation, service de-familisation, supported familism and familism by default. On average, across 20 European countries, grandparents looking after grandchildren daily are no less likely to work than grandparents who do not; however, employed grandfathers work eight hours less per week if providing daily childcare. Evidence of a negative association between daily grandchild care and employment is strongest in countries with familistic approaches to childcare, with no association in countries characterised by optional de-familisation. This suggests that public support to childcare may help retain grandparents in the labour force.

Keywords: grandparenthood; labour market; welfare regimes; familism; recursive bivariate model.

Introduction

European grandparents are important providers of informal care to their grandchildren (Hank and Buber, 2009). In the 2015 round of the Survey of Health, Ageing and Retirement in Europe (SHARE) (Börsch-Supan et al., 2013), nearly half (45%) of grandparents reported looking after grandchildren, and nearly one fifth (18.5%) of those providing care reported doing so “almost daily” (author’s own calculations). Across Europe, cuts to public services to families subsequent to the financial crisis have led to the implicit expectation that grandparents will step in to fill the gap in childcare (Glaser and Hank, 2018), for instance by providing more daily care. At the same time, many European countries have recently implemented reforms to delay retirement in order to minimise the economic and budgetary costs associated with population ageing (European Commission, 2018). Daily grandchild care represents a substantial time commitment, which grandparents may find hard to combine with employment.

A growing body of research suggests that the onset of grandparenthood reduces labour supply (Backhaus and Barslund, 2019; Rupert and Zanella, 2018). However, we know little about the direct association between daily grandchild care and grandparents’ employment. Studying this association is important: first, it can help identify whether grandparenthood reduces labour supply by presenting individuals with time commitments incompatible with (full-time) work. Second, it can indicate whether and how family policies may support grandparents’ labour force participation. If daily grandchild care is associated with lower employment, increased welfare support to childcare may help retain grandparents in the labour market. In the absence of a direct association, however, additional public childcare may have little effect on grandparents’ employment.

Rates of intensive grandparental care vary across European countries (Herlofson and Hagestad, 2012). Welfare familism, defined as the degree to which social policies assume families to be responsible for the care of their dependent members (Leitner, 2003), is strongly associated with the provision of daily grandchild care at the national level (Bordone, Arpino, and Aassve, 2017; Igel and Szydlik, 2011). Still, it is unknown whether any association between daily grandchild care and grandparents’ employment varies across countries with different childcare policies. While previous research suggests that the negative relationship between grandparenthood and labour supply is independent of the country-context (Backhaus and Barslund, 2019), the

association between grandparents' employment and daily grandchild care likely depends on the childcare policy regime.

I use SHARE data for 20 European countries to study the association between daily grandchild care provision and employment among grandmothers and grandfathers aged 50–69. I make a novel contribution by testing for heterogeneity in this association across country groups characterised by different childcare policy orientations, as measured by the combination of two macro-level indicators: formal childcare service utilisation and paid parental leave. Unlike most previous research on the topic I consider daily grandchild care, rather than the presence of grandchildren, as the main explanatory variable. Focussing on such high frequency of care allows to isolate grandchild care commitments that may be difficult to combine with employment. I use a simultaneous equations approach to account for the potential selection of grandparents with different unobserved traits into work and grandchild care provision, and I investigate how daily grandchild care is associated with grandparents' employment at the extensive margin (i.e. the probability of working) and at the intensive margin (i.e. the number of weekly working hours).

Background

Grandparenthood, grandchild care and employment

A growing number of studies find a negative relationship between grandparenthood and employment, both at the extensive and at the intensive margin. In this literature, the extensive margin is operationalised as the probability of being employed or self-employed as opposed to inactive, and the intensive margin is indicated by the number of working hours. Performing survival analysis on data from the United States (US) Health and Retirement Study (HRS), Lumsdaine and Vermeer (2015) find that, among older women, the birth of the first or of an additional grandchild leads to an increase in the probability of retirement by 8.5 percent and 1.4 percent, respectively. Rupert and Zanella (2018) apply an instrumental variable (IV) approach to data from the US Panel Study of Income Dynamics (PSID) exploiting variation in the timing of becoming a grandparent by gender of the first-born adult child, as daughters tend to have children earlier than sons. They find that becoming a grandmother reduces women's working time by 30 percent, but that grandparenthood has no effect on men's employment. Asquith (2018) exploits variation in US state-by-year access to reproductive technologies to instrument grandparent status, and finds that grandfathers are 5.7 percent more likely to be

retired for each additional grandchild, while grandmothers work 120 hours less per year and are 8.4 percent less likely to work in response to each additional grandchild.

Among the European studies, Backhaus and Barslund (2019) apply the same identification strategy as Rupert and Zanella (2018) to pooled SHARE data from nine European countries. They find that being a grandmother reduces women's probability of working by 20 percent, with no effect on men. Analyses of women in Austria (Frimmel, Halla, Schmidpeter, and Winter-Ebmer, 2017) and England (Zanasi, Sieben, and Uunk, 2020) find that the birth of the first grandchild is linked with an increase in the probability of leaving the labour market. Applying survival analysis to Swedish register data, Kridahl (2017) shows that grandparents of both sexes retire earlier than non-grandparents. Studies analysing cross-national comparative data also suggest that, across Europe, being a grandparent is associated with stronger preferences towards early retirement (Hochman and Lewin-Epstein, 2013) and with women's early retirement behaviour (Van Bavel and De Winter, 2013). Collectively, these findings suggest that in Europe becoming a grandparent induces individuals to leave the labour force and/or to work fewer hours. Moreover, the negative effects of grandparenthood appear to be greater for women, with lower or no effects for men (Backhaus and Barslund, 2019). However, it remains unclear whether, among grandparents, the provision of grandchild care is linked with employment. This is important to understand in order to identify whether public childcare provision can support delayed retirement by relieving grandparents of care responsibilities.

A few studies investigate the association between grandchild care provision and employment. Using SHARE, Hank and Buber (2009) analyse the correlates of grandchild care and find that, in Europe, employed grandparents are less likely to provide it than non-employed grandparents. Using the same dataset to examine the predictors of retirement, De Preter et al. (2013) find that older workers who look after their grandchildren at least weekly are over twice as likely to retire at follow-up as those who do not. This evidence, however, is difficult to interpret, since the negative association may be explained by two non-mutually exclusive mechanisms: selection and role conflict.

Grandparents may select into paid work and family care based on both observable and unobservable characteristics. Among the observable characteristics, grandparents' health, socioeconomic status and family structure simultaneously determine their ability and necessity to work and provide childcare (Arpino and Bordone, 2017; De Preter et al., 2013).

Unobservable characteristics relate to grandparents' personality traits and preferences towards work and family care. These include family needs and attitudes towards gender roles and family obligations. In particular, the fact that some individuals are more family-oriented while others are more career-oriented may result in grandparents who provide grandchild care having lower employment rates or working hours, even in the absence of any direct association between grandchild care and employment (Lakomý and Kreidl, 2015). Lakomý and Kreidl (2015) analyse SHARE data to study how different employment statuses relate to the intensity of grandchild care. They find a positive association between being in part-time – as opposed to full-time – work and higher frequencies of grandchild care for paternal grandmothers. However, the association does not hold when controlling for time-invariant heterogeneity across grandparents using individual fixed effects, suggesting that it is mostly attributable to selection. The authors conclude that the choice between full-time and part-time work may be influenced by the same unobserved factors that also impact the frequency of grandchild care.

Accounting for selection, any direct negative association between grandchild care and employment may be explained by role conflict theory (Goode, 1960). Both working and looking after grandchildren require time and energy (Lakomý and Kreidl, 2015). Grandparents may be unable to combine the two roles and thus not engage in (or give up) either one or the other. Role conflict is most likely to arise when grandparents are faced with daily or almost-daily childcare responsibilities. As it has been shown in relation to informal caregivers of older adults (Heitmueller, 2007), net of selection, care provision is only negatively associated with labour market participation at high frequencies (i.e. over 20 hours a week). Intuitively, looking after a grandchild once a week or less often is unlikely to pose work-family reconciliation problems, as grandparents may easily combine full-time employment with grandchild care performed on weekends or days off from work. In this article, I consider grandchild care performed daily or almost daily, and test for whether it is in conflict with employment among grandparents aged 50–69. I use a simultaneous equations approach to account for the fact that grandparents may select into employment and daily grandchild care based on observed and unobserved characteristics.

Familism in childcare policies and daily grandchild care

The comparative literature on welfare regimes and intergenerational support defines familism (or familialism) as the extent to which families, rather than the state or the market, are

considered responsible for the care and financial support of their dependent members, particularly young children and non-self-sufficient older adults (Leitner, 2003; Saraceno, 2016). With respect to informal caregiving, familistic policies generally strengthen family care responsibilities (Leitner, 2003). They may do so through the absence of state- or market-provided alternatives to family care, in what has been named “familism by default” (Saraceno and Keck, 2010); or by actively supporting the family caring function through financial assistance (e.g. cash-for-care transfers) and employment protection to family caregivers (e.g. leave schemes), resulting in a model of “supported familism” (Saraceno, 2016; Saraceno and Keck, 2010). By contrast, de-familising policies are those aimed at unburdening families from their support functions (Leitner, 2003). “De-familisation” predominantly works through the provision of services, either directly by the state, or subsidised and provided via the market (Saraceno, 2016). Since the provision of services and leave schemes are not mutually exclusive, some policy patterns may also result in “optional de-familisation”, by which family caregivers can choose between outsourcing the care or providing it themselves (Herlofson and Hagestad, 2012; Saraceno and Keck, 2010).

Policies that partition responsibilities and obligations between the family, the state and the market inevitably reflect and regulate the division of responsibilities between genders (Lewis, 1992). Since care is predominantly women’s work, familism is strongly related to the gender division of roles, and to the extent to which working-age women participate in the labour market (Saraceno and Keck, 2011; Thévenon, 2011). In general, de-familisation through service provision promotes women’s employment by relieving them of care responsibilities (Saraceno and Keck, 2011). Empirical evidence shows that, in countries where childcare services are widespread and parental leave schemes are generous (usually found in Northern Europe), the prevalence of grandchild care is high, but its intensity is relatively low, with most grandparents providing care once a week or less often (Bordone et al., 2017; Igel and Szydlik, 2011). This reflects the fact that, since many mothers work, grandparents are often needed to complement formal childcare (Herlofson and Hagestad, 2012).

At the other end of the policy spectrum, familism by default is not conducive to mothers’ employment, because it does not offer alternatives to family care (Saraceno and Keck, 2011). In countries characterised by familistic childcare policies (usually in Southern Europe), relatively low female employment means that the demand for grandparental care is lower than in the North, and fewer grandparents provide any care (Di Gessa, Glaser, Price, Ribe Montserrat, and Tinker, 2016; Igel and Szydlik, 2011). However, the scarce provision of

services (often combined with low availability of part-time employment) mean that working mothers may require full-time care from the grandparents (Arpino, Pronzato, and Tavares, 2014). Thus, a large proportion of grandparents who provide care tend to do so daily (Bordone et al., 2017). The implications of long leave schemes for women's participation in the labour market are ambiguous, depending on the extent to which employment protection to family caregivers is combined with the possibility of outsourcing care (Lewis, 2006; Thévenon, 2011), as well as on the availability of part-time employment for mothers (Bordone et al., 2017). Thus, mothers' need for daily grandchild care may depend on whether services are provided in addition to generous parental leave.

Attempting to position European countries onto the familism/de-familisation spectrum is an arduous task, because every country presents a combination of different policy approaches with respect to different dimensions of intergenerational support (Saraceno and Keck, 2010). However, countries can be classified according to specific policy areas of interest. In the following analysis, I adopt a classification of European countries that is based solely on policies related to the care of young children, which are relevant to the study of grandchild care (Bordone et al., 2017) and its association with grandparents' employment. Saraceno and Keck (2010) propose two indicators for classifying countries according to their childcare policy mix: the percentage of children under the age of three enrolled in formal childcare, an indicator of de-familisation; and effective parental leave, defined as the duration of paid parental leave multiplied by the replacement rate of the leave benefit, an indicator of supported familism. Depending on the level of each indicator, countries can be grouped into four policy regimes, which differ in the share of childcare responsibilities borne by families, and in the extent to which working-age mothers participate in the labour market:

- i. *Optional de-familisation*: both childcare service utilisation and weeks of effective parental leave are high (i.e. above the across-country average). Families can easily outsource childcare to public services, but they may also choose to provide care themselves, as mothers' employment is protected through generous leave schemes.
- ii. *Service de-familisation*: childcare service utilisation is high, but the length of effective parental leave is low (i.e. below the across-country average). De-familisation occurs predominantly through service provision or subsidisation, and it promotes mothers' employment by relieving them of childcare responsibilities.
- iii. *Supported familism*: formal childcare utilisation is low, while effective parental leave is high. The welfare state encourages family care by supporting parents in taking care

of children. Long periods of leave may encourage mothers to remain in the labour market by granting job protection but, in combination with the low provision of services, they may also make it harder for them to return to work.

- iv. *Familism by default*: both childcare service utilisation and effective leave are low. Families are implicitly expected to take care of children, but not supported in this role, making it difficult for mothers to reconcile work and childcare responsibilities.

While following the policy regimes proposed by Saraceno and Keck (2010) and used by Bordone et al. (2017) in their study of grandchild care provision, this classification differs from those used by the authors in two ways. First, Saraceno and Keck (2010) identify three types of regimes (familism by default, supported familism, and de-familisation), but add that “there may also be a fourth variant that offers an option between supported familialism and de-familialisation, but this is a rare case” (p.676). I explicitly consider this fourth variant as *optional de-familisation*. Given my focus on potential role conflict between grandchild care and employment, I find it particularly important to distinguish between “*optional*” and “*service*” de-familisation. As I argue below, the two regimes may lead to different levels of need for daily grandparental care, resulting in it having different associations with employment. Leitner (2003) and Herlofson and Hagestad (2012) use the term “*optional familialism*” to refer to a childcare policy context where family care is supported through extensive leave, but can easily be outsourced to public services. I rename this cluster “*optional de-familisation*” in order to draw attention to the availability of childcare services.

Second, unlike Bordone et al. (2017), I use childcare enrolment (as opposed to “childcare coverage”) to indicate de-familisation. Following previous studies (Di Gessa et al., 2016), I select enrolment because it combines a supply-side element (the availability of services) with actual take-up rates for formal childcare, which are more strongly related to unobserved country-level factors linked to grandchild care, such as norms about family responsibilities and cultural preferences about the outsourcing of childcare (Arpino et al., 2014; Di Gessa et al., 2016). As such, I consider it a more “complete” indicator of the level of de-familisation. For comparability with Bordone et al., (2017), in Appendix 1 I present an alternative classification of countries based on childcare coverage, defined as the number of weeks of coverage available if all children were enrolled (Saraceno and Keck, 2008).

While empirical research consistently finds a North-South gradient in the prevalence and frequency of grandchild care provision in Europe (Bordone et al., 2017; Igel and Szydlik,

2011), nothing is known about whether some childcare policy regimes are more conducive than others to work-family reconciliation or role conflict among grandparents. In this study I test for heterogeneity in the relationship between daily grandchild care and grandparents' employment across the four childcare regimes described above.

In the *optional de-familisation* country cluster, grandparents are not needed nor normatively expected to act as full-time caregivers. They may select into employment or daily childcare, or combine the two roles out of personal preference. Thus, I do not expect to find evidence of role conflict in these countries. In the *service de-familisation* group, the absence of generous leave schemes (combined with high service utilisation) may impose some requests on grandparents' time, as grandparents may be needed to complement formal childcare, for instance by picking up children from nurseries. While these commitments are unlikely to result in a lower probability of working (extensive margin), employed grandparents may work fewer hours if performing such daily tasks, resulting in a negative association at the intensive margin. In the *supported familism* cluster, grandparents may act as full-time caregivers for mothers who remain in employment, and thus be less likely to work, resulting in role conflict at the extensive margin of employment. In countries characterised by *familism by default*, traditional gender roles are persistent (Leitner, 2003), with older women much less likely to work than men. Grandmothers may self-select into employment, or care for grandchildren full-time. Thus, for grandmothers, I do not expect to find role conflict at the extensive margin. However, I expect employed grandmothers who provide daily care to work substantially fewer hours than those who do not. By contrast, grandfathers are unlikely provide grandchild care or, if they do so, to combine it with employment. Thus, I expect to observe a large negative association between daily childcare and the probability of working for grandfathers, which may partly or fully be explained by selection.

Data and method

Data and sample selection

SHARE is a multidisciplinary longitudinal survey representative of the population aged 50 and over in various European countries and Israel, excluding individuals living in institutions (Börsch-Supan et al., 2013). I analyse pooled data from the first (2004–2005) to the sixth (2015) wave of SHARE. For each respondent, only information collected during the first wave at which they were interviewed is used. Thus, for respondents interviewed at all waves, only

the wave 1 observation is considered; for respondents present from wave i onwards, only the i th wave observation is considered. The third (2008–2009) and seventh (2017) waves are excluded, as the former only contains retrospective information, while the latter only contains regular modules for respondents who were previously interviewed (and retrospective modules for new respondents). Pooling first-observation data allows to retain as much information as possible while treating the sample as cross-sectional. The main focus of the study lies in differences in employment outcomes between grandparents who provide daily grandchild care and grandparents who do not, rather than in changes in employment over time within grandparents. I analyse data from the 20 European countries present in SHARE waves 1–6. These are Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovenia, Spain, Sweden, and Switzerland.

I restrict the analytic samples to grandmothers and grandfathers aged 50–69 who have at least one grandchild aged 0–14. The age range for grandparents covers the transition to retirement (Riedel and Hofer, 2013), and it is commonly used in studies of later-life employment (Pollak and Sirven, 2016). The age range for grandchildren isolates grandchild care performed when grandchildren are young, and it is similar to those used in previous research (Bordone et al., 2017; Hank and Buber, 2009). However, the two childcare policy indicators (childcare services and effective parental leave) predominantly relate to care provision to much younger children (i.e. under three). While it is not possible to restrict the samples to grandparents of very young children due to the small number of observations, I assess the sensitivity of the results to lowering the bandwidth to ages 0–10 (Bordone et al., 2017) and 0–5, which gives the smallest possible sample allowing meaningful estimation.

When studying the determinants and consequences of grandchild care provision it is essential to adopt a multigenerational perspective (Igel and Szydlik, 2011). Therefore, grandparent-parent dyads are used as the primary units of analysis. In the dataset, each grandparent has a number of dyads corresponding to the number of adult children (parents) who have children of their own (grandchildren) aged 0–14. In SHARE, the questionnaire section on grandchild care provision is only asked to the “family respondent”, the first person in a couple to start the main interview after completing the cover screen. The analyses are therefore restricted to these respondents. Since grandparents with coresident grandchildren share household consumption with them, coresidential grandchild care may motivate paid work as a source of income, and thus have a different association with grandparents’ employment than non-coresidential care

(Ho, 2015). Since this mechanism is beyond the scope of this study, observations for which the grandparent lives in the same household as any grandchild (3.9% of the sample) are excluded from the analytic sample.

The analyses of the probability of employment (extensive margin) are based on the samples of grandmothers and grandfathers aged 50–69 who report being either economically active (i.e. employed or self-employed) or economically inactive (i.e. retired or homemakers). Grandparents who are unemployed at the time of the interview (5.3% of the sample) are excluded, since unemployment has been found to have a different association from other statuses with grandparental childcare (Lakomý and Kreidl, 2015). Grandparents who report being “permanently sick or disabled” (5.5% of the sample) are also excluded, as they are unlikely to provide daily grandchild care and retaining them may confound the association.

After excluding grandparents who do not meet the inclusion criteria or have missing values on any variable of interest, the samples for the analyses of the probability of employment consist of 16,976 grandmother-parent dyads corresponding to 11,164 grandmothers; and 11,092 grandfather-parent dyads corresponding to 7,393 grandfathers. For the analyses of average weekly working hours (intensive margin), the samples are further restricted to grandmothers and grandfathers who report being employed or self-employed at the time of the interview. This results in sample sizes of 5,975 grandmother-parent dyads corresponding to 4,161 grandmothers; and 4,735 grandfather-parent dyads corresponding to 3,298 grandfathers.

Measures

The primary outcome of analysis is grandparents’ employment. To study differences in employment at the extensive margin, a binary variable indicating whether a grandparent reports being employed or self-employed (as opposed to retired or a homemaker) at the time of the interview is coded. For the intensive margin, a continuous variable is used for the self-reported number of weekly working hours among employed or self-employed grandparents.

The main explanatory variable is a binary indicator of daily grandchild care provision. Grandparents are classified as providing grandchild care for the parent in each dyad if the grandparent reports looking after any young children (0–14) of that parent “almost daily”.

A set of controls for grandparents’ characteristics are included, which have been found to correlate with both employment and grandchild care provision (Arpino and Bordone, 2017;

Igel and Szydlik, 2011; Komp, Van Tilburg, and Broese Van Groenou, 2010; Lakomý and Kreidl, 2015), all measured at the time of the interview. Grandparents' age is categorised into 5-year groups to control for non-linear decreases in labour force participation by age, and for the fact that older grandparents may be less likely to provide grandchild care (Hank and Buber, 2009). To account for joint decision-making among couples about retirement timing (Riedel, Hofer, and Wogerbauer, 2015) and for the fact that non-married grandparents are usually less likely to provide care (Hank and Buber, 2009), a variable combining marital status and partner's work status is included, categorised into whether respondents are not married, married to a partner who works for pay, and married to a partner who does not work. In addition, total household size is controlled for.

Higher-educated and wealthier individuals tend to work until later in life (Komp et al., 2010) and are generally more likely to provide grandchild care, but less likely to provide it daily (Arpino and Bordone, 2017; Igel and Szydlik, 2011). Using the International Standard Classification of Education (ISCED) 1997 codes, grandparents' educational attainment is classified into three levels: low (up to lower-secondary education, ISCED 0–2), intermediate (upper secondary education and vocational training, ISCED 3–4) and high (tertiary education, ISCED 5–6). Controls are added for household net worth, which is the sum of all household assets minus liabilities, adjusted by household size and split into five quantile groups calculated separately by country; and rural (as opposed to urban) dwelling, which has been found to be positively associated with grandchild care and negatively with employment (Arpino and Bordone, 2017; Van der Meer, 2006).

Since healthier individuals are more likely to be engaged in both grandchild care and work (Arpino and Bordone, 2017; De Preter et al., 2013), controls are added for grandparents' health status as indicated by the number of limitations with Activities of Daily Living (ADL). I control for depressive status, coded as binary using the EURO-D scale, where those reporting four or more depressive symptoms are considered "depressed". Because depression is potentially endogenous to both employment and grandchild care provision (Kim, Kang, and Johnson-Motoyama, 2017), its coefficient should be interpreted with caution. However, excluding it from the model does not change the results. Since a partner's health status may also influence the decision to work (De Preter et al., 2013), an indicator of whether the grandparent has a partner who suffers from any ADL limitations is included.

The characteristics of the parents are important determinants of grandchild care provision (Hank and Buber, 2009; Igel and Szydlik, 2011), and they may confound the association between grandchild care and employment. Given that grandparents with more adult children tend to be less likely to provide frequent grandchild care for each of them (Di Gessa et al., 2016), the total number of adult children (parents) with children of their own (grandchildren) aged 0–14 is controlled for. Among the characteristics of the parents in each dyad, controls are included for gender, as mothers are more likely to receive grandchild care; and work status, as working parents have greater need for grandparental care (Di Gessa et al., 2016; Hank and Buber, 2009). The age of the parent’s youngest child (grandchild) is split into four categories (0–2, 3–5, 6–10 or 11–14 years old) to account for varying childcare needs at different ages of the grandchild (Hank and Buber, 2009). Finally, a control variable for geographical proximity of the parent in the dyad is added. Proximity is measured in kilometres and split into four categories according to whether the parent lives in the same building as the grandparent (after excluding those living in the same household); within five kilometres; between five and 25 kilometres away; and farther than 25 kilometres away. While proximity is strongly correlated with grandchild care provision (Hank and Buber, 2009), the association should be interpreted with caution, given that grandparents and their adult children may move closer to each other for the purpose of providing or receiving grandchild care.

To control for variation across SHARE countries in the average rates of grandchild care provision (Bordone et al., 2017) as well as in older adults’ labour market participation (Riedel et al., 2015), country fixed effects (dummy variables) are included. Wave fixed effects account for demographic and socio-economic changes over time (Arpino and Bordone, 2017), and are included as dummy variables for each SHARE wave (2004–2005; 2006–2007; 2011; 2013; 2015).

In order to classify SHARE countries into the four typologies described above (*optional de-familisation*; *service de-familisation*; *supported familism*; and *familism by default*) I draw two indicators from the Multilinks (2011) database: the percentage of children aged 0–2 enrolled in formal childcare, and effective parental leave, as defined above (Saraceno and Keck, 2010). Multilinks (2011) indicators have been specifically constructed for comparative analysis of welfare regimes, and come from a theoretically-driven database (Saraceno and Keck, 2008). Unlike other policy databases, Multilinks (2011) provides single measures of composite concepts (e.g. effective leave), reducing complexity and facilitating comparisons. The data are available for 2004 and 2009. For countries first observed in SHARE waves 1 and 2 (Austria,

Belgium, Czech Republic, Denmark, France, Germany, Greece, Ireland, Italy, the Netherlands, Poland, Spain, and Sweden), I take the average value of each indicator between the two years. For countries observed from SHARE wave 4 onwards (Estonia, Hungary, Luxembourg, Portugal, and Slovenia), only the 2009 values are used. Multilinks data are not available for Switzerland and Croatia, which are dropped from the analyses by country groups.

Figure 1 plots the two indicators against each other to show how countries fare with respect to their childcare policies. The horizontal line indicates the mean percentage of children in formal childcare across the 18 countries (27.9), while the vertical line marks the cross-country average length of effective parental leave in weeks (9.3). The quadrant plot delineates four country groups that, despite some heterogeneity, share similar characteristics:

- i. *Optional de-familisation*: Denmark, France, Luxembourg, Slovenia, and Sweden;
- ii. *Service de-familisation*: Belgium, the Netherlands, Portugal, and Spain;
- iii. *Supported familism*: Austria, Czech Republic, Estonia, Germany, and Hungary;
- iv. *Familism by default*: Greece, Ireland, Italy, and Poland.

Statistical analysis

The analysis is conducted in two stages in order to handle the potential selection of grandparents into daily grandchild care and work. First, single-equation multivariate regression models of each employment outcome (y_1^*) are fitted on a binary indicator for grandchild care provision (y_2) and a set of covariates (X):

$$y_1^* = \beta_0 X + \delta_0 y_2 + \varepsilon_0$$

Probit regressions are fitted for the probability of being employed/self-employed and, for the subsamples of grandmothers and grandfathers in paid work, linear regressions are fitted for self-reported weekly working hours. As argued above, the association between grandchild care and employment may be affected by selection even after controlling for the covariates, because of unobserved characteristics associated with both employment and daily grandchild care provision. These include grandparents' preferences, family characteristics and values, as well as any changes in preferences occurred in anticipation of having to provide grandchild care. In the presence of unobserved grandparental characteristics that are correlated with participation in both roles, $\hat{\delta}_0$ is biased since it does not isolate the difference in employment or working

hours that is attributable to daily grandchild care provision from that attributable to such unobserved factors.

Second, to address the fact that employment and grandchild care may be jointly determined, the coefficients on grandchild care from single-equation models are compared to those obtained using a recursive bivariate approach (Heckman, 1978; Maddala, 1983). This is a system of equations in which employment (y_1) and grandchild care (y_2) represent two distinct outcomes regressed on a common set of covariates X . Continuous latent variables y_1^* and y_2^* are assumed to be underlying the observed binary outcomes y_1 and y_2 . The error terms of the two equations are correlated with each other to account for the potential presence of unobservable characteristics associated with participation in both activities. Within the system, grandchild care is included as an endogenous binary regressor in the equation for employment.

$$y_1^* = \beta_1 X + \delta_1 y_2 + \varepsilon_1$$

$$y_2^* = \beta_2 X + \varepsilon_2$$

where the error terms ε_1 and ε_2 follow a bivariate normal distribution with mean 0 and variance 1, and

$$\rho = \text{cov}(\varepsilon_1, \varepsilon_2).$$

For the analytic samples of grandmothers and grandfathers, a recursive bivariate probit model is fitted for the probabilities of being (self-)employed and providing daily grandchild care, controlling for the common set of covariates and including grandchild care as a binary regressor in the equation for employment. For the subsamples of grandmothers and grandfathers in paid work, hybrid (linear-probit) models are fitted, with weekly working hours treated as continuous, again including daily grandchild care as a dummy variable in the employment equation alongside the full set of covariates.

The estimated coefficient on grandchild care $\hat{\delta}_1$ represents the difference in the probability of being employed or in working hours associated with daily grandchild care provision, controlling for the full set of covariates and allowing for covariance in the latent errors. In the absence of an instrument for the endogenous variable, the system of equations does not allow to discern the direction of causality. However, it isolates the “structural” (or direct) association between grandchild care and employment from that attributable to selection (Heckman, 1978). Comparing the coefficient on grandchild care from the single equation model ($\hat{\delta}_0$) to the one

from the recursive bivariate model ($\hat{\delta}_1$) allows to assess whether unobserved confounders correlated with participation in both activities alter the association between them.

After conducting analyses on the pooled data across countries, I test for heterogeneity in the association across the four country groups described above. This is done by including an interaction term between daily grandchild care and the country group indicator in the equations for the probability of employment (bivariate probit recursive model) and weekly working hours (linear-probit recursive model).

In all sets of models, standard errors are clustered to handle the correlation of observations referring to different dyads within the same grandparent. The calibrated cross-sectional weights provided in SHARE (Börsch-Supan and Jürges, 2005) are used to address differential inclusion probabilities and non-response, dividing the weights by the number of dyads to restore representativeness with respect to individual grandparents. The recursive bivariate models are fitted using the “cmp” package in Stata 15 (Roodman, 2011; StataCorp, 2017).

Results

Descriptive sample characteristics

Table 1 presents descriptive characteristics from the analytic samples of grandmothers and grandfathers aged 50–69 at first interview. To ease interpretation, these statistics are based on individual grandparents rather than dyads. On average, 28 percent of grandmothers and 37 percent of grandfathers are employed or self-employed as opposed to retired or homemakers. Among those working, the average weekly working time is around 35 hours for grandmothers and 41 for grandfathers. χ^2 tests for the probability of working by daily grandparental care provision give an initial suggestion that the association between daily grandchild care and employment at the extensive margin is negative. Grandparents who look after their grandchildren daily are around nine percentage points less likely to be employed than grandparents who do not. However, among employed grandparents, t-tests show that average working hours do not differ significantly by daily grandchild care provision.

Looking at the distribution of the covariates, those who provide daily grandchild care have, on average, lower educational attainment than those who do not, and they live in larger households. Grandfathers who look after grandchildren daily are more likely to be married to a partner who does not work for pay, and to live in urban areas.

Results across 20 countries

The associations between daily grandchild care and each employment outcome obtained from fully-adjusted single-equation regressions are negative and statistically significant for both grandmothers and grandfathers (see Supplementary table 1). The estimated Average Marginal Effects (AMEs) represent the difference in the predicted value of the outcome between grandparents who provide daily grandchild care and grandparents who do not. These indicate that grandparents who provide daily grandchild care are seven percentage points less likely to be employed (the coefficients are -0.324 for grandmothers, and -0.385 for grandfathers). These results are not surprising given previous evidence (De Preter et al., 2013; Lakomý and Kreidl, 2015) and the fact that I am isolating high frequencies of grandchild care provision. Employed grandfathers looking after grandchildren daily work on average nearly four (3.85) hours less per week, while there is no association between daily grandchild care and working hours for grandmothers.

The single-equation estimates may be biased in the presence of selection. Tables 2 and 3 display the coefficients from the recursive bivariate models for grandmothers and grandfathers, respectively (for the coefficients on country and wave fixed-effects, see Supplementary tables 2 and 3). The results indicate that, addressing the potential selection of grandparents with different unobserved traits into work and grandchild care, there is no evidence of a direct association between daily grandchild care and employment at the extensive margin across the 20 countries considered. For both grandmothers (Table 2) and grandfathers (Table 3), allowing for correlation in the latent errors of the employment and grandchild care equations considerably increases uncertainty in the estimation of the coefficients, with neither reaching conventional levels of statistical significance (the p-values, not reported in the tables, are 0.285 for grandmothers, and 0.174 for grandfathers). The results for the intensive margin of employment confirm that, across Europe, there is no association between daily grandchild care and working hours for employed grandmothers. Employed grandfathers who look after grandchildren daily, on the other hand, seem to work on average eight hours less per week. Throughout Europe, men tend to have occupations with longer working hours than women (Eurofund, 2017). This may explain why grandfathers, rather than grandmothers, tend to work fewer hours when providing daily grandchild care.

The coefficients on the control variables are in line with previous studies on the correlates of later-life employment (De Preter et al., 2013; Komp et al., 2010) and grandchild care (Hank and Buber, 2009; Igel and Szydlik, 2011). Older grandparents with more functional limitations are less likely to work, while socioeconomically advantaged grandparents (i.e. more highly educated and living in wealthier households) are more likely to be employed (De Preter et al., 2013). Grandmothers and grandfathers have lower probabilities of working if they have a spouse who is out of the labour force, in line with previous evidence on joint retirement decisions among couples (Riedel et al., 2015).

For both sexes, the coefficients on the correlates of grandchild care confirm the importance of considering both grandparental and parental characteristics as predictors of this activity (Igel and Szydlik, 2011). Controlling for other factors, lower-educated grandmothers with fewer functional limitations and married grandfathers in their early sixties have higher probabilities of providing daily grandchild care. Grandparents are more likely to provide grandchild care daily for parents who are female, who work for pay and who have children aged 0–2 or 3–5 as opposed to 11–14. As it is reasonable to expect (Hank and Buber, 2009), grandparents are more likely to provide care the closer they live to the grandchild.

Results by country groups

Table 4 compares the two childcare policy indicators, as well as the SHARE sample percentages of grandparents employed and providing daily grandchild care, across countries and groups. Within each group, countries share similar characteristics with respect to grandparents' participation in daily grandchild care that are in line with previous findings (Bordone et al., 2017). Descriptive sample characteristics by country group are reported in Supplementary table 4.

Grandmothers and grandfathers are most likely to be employed (37% and 39% respectively) and least likely to provide daily grandchild care (10% and 7%) in the *optional de-familisation* group. As expected, the *supported familism* and *familism by default* groups show the largest gender differences in employment and daily grandchild care. However, grandparents in countries characterised by *supported familism* in childcare are much more likely to work than in countries characterised by *familism by default* (33% of grandmothers and 38% of grandfathers are employed, compared to 18% and 27% respectively). In turn, in countries characterised by *familism by default*, grandparents are most likely to provide daily childcare

(32% of grandmothers and 22% of grandfathers do so, compared with 14% and 8% respectively), which is in line with previous results (Bordone et al., 2017; Igel and Szydlik, 2011). The *service de-familisation* group performs somewhere in the middle, with average proportions of grandparents working (28% of grandmothers and 34% of grandfathers) and providing daily grandchild care (14% of grandmothers and 10% of grandfathers).

To test for heterogeneity in the association between daily grandchild care and employment across country groups characterised by different childcare regimes, the recursive bivariate models presented in tables 2 and 3 are fitted again including an interaction term between daily grandchild care and a categorical variable indicating which country group the observation belongs to (excluding observations from Croatia and Switzerland).

Table 5 reports the marginal probabilities of employment and the average weekly working hours predicted by the recursive bivariate models for grandparents who provide daily grandchild care and grandparents who do not, estimated over country typologies and separately by grandparents' sex (for the single-equation models, see Supplementary table 5). For each country group, the AME is reported in bold with corresponding statistical significance.

As expected, in countries characterised by *optional de-familisation*, there is no association between daily grandchild care provision and grandparents' employment at the extensive or intensive margin once selection is taken into account. Also in line with expectations, there is a negative association between daily grandchild care and working time among employed grandmothers (by 12 hours) and grandfathers (by seven hours) in the *service de-familisation* group. In these countries, daily grandchild care is not associated with the probability of working once selection is accounted for.

Overall, countries characterised by *supported familism* show the greatest evidence of role conflict between daily grandchild care and employment. Grandmothers in these countries are around 13 percentage points less likely to work, and work on average 13 hours less per week if providing daily grandchild care. Employed grandfathers work on average ten hours less if looking after grandchildren almost daily. This is in line with the expectation that familism creates a high need for daily grandchild care among working mothers (Herlofson and Hagestad, 2012), and such grandchild care is in conflict with grandmothers' employment.

Finally, I find evidence that in countries characterised by *familism by default* grandfathers are less likely to combine work with daily grandchild care than in other settings. Grandfathers who provide daily grandchild care are 11 percentage points less likely to work, and they work nine

hours less per week if employed. Accounting for selection, there is no evidence of a negative association for grandmothers at the extensive or intensive margin.

Sensitivity and additional analysis

I assess the sensitivity of the results to different specifications of the analytic sample. Supplementary tables 6 and 7 show results from the recursive bivariate models obtained by restricting the sample to grandparents with grandchildren aged 0–10 and 0–5. The results for the 0–10 age bandwidth are unchanged in the direction and relative size of the coefficients. However, the AMEs of daily grandchild care on number of working hours among grandmothers in the *service de-familisation* and *supported familism* groups are no longer statistically significant. Similarly, the AME of daily grandchild care on the probability of working among grandfathers in the *familism by default* group loses statistical significance. Due to small sample sizes, it was not possible to replicate the results by country group for grandparents of children aged 0–5. The pooled results across countries for the 0–5 bandwidth confirm that, across countries, there is no evidence of role conflict at the extensive margin. Moreover, the AME of daily grandchild care on the number of hours for grandfathers decreases in size and loses statistical significance.

Supplementary tables 8 and 9 show the sensitivity of results to including grandparents with coresident grandchildren in the sample. The results are very similar except for the fact that grandmothers in the *service de-familisation* group of countries no longer appear to experience role conflict at the intensive margin.

Lastly, I compare results to those obtained using an alternative country classification and definition of grandchild care. Appendix 1 shows the results obtained when grouping countries according to childcare service coverage (as opposed to utilisation) as an indicator of de-familisation (Bordone et al., 2017). While this leads to the reclassification of some of the countries in the study (Figure A1), the results across country groups are remarkably similar to those obtained above (Table A1). In Appendix 2, I replicate the analysis using grandchild care performed “almost weekly” or more often instead of “almost daily”. The results corroborate the claim that weekly care is unlikely to be in conflict with grandparents’ employment (Tables A2a-A2c).

Discussion

Recent findings from Backhaus and Barslund (2019) suggest that, across European countries, having grandchildren reduces participation in employment for women. However, it remains unclear whether daily grandchild care is directly associated with grandparents' employment. This study contributes to the literature by addressing the question of whether, accounting for the potential selection of grandparents with different traits into work and care, there is evidence of role conflict (Goode, 1960) between daily grandchild care and grandparents' employment.

The results obtained on pooled data from 20 European countries suggest that, once selection is accounted for, there is no evidence of role conflict between daily grandchild care and participation in employment for grandmothers. However, employed grandfathers looking after grandchildren daily appear to work on average eight hours less per week. Together with previous literature these findings suggest that, while grandmothers are less likely to work than non-grandmothers (Backhaus and Barslund, 2019), there is little evidence that grandchild care, even when performed daily, is in conflict with grandmothers' employment in Europe. The differences in the probability of working between grandparents and non-grandparents found in previous European research (Backhaus and Barslund, 2019; Frimmel et al., 2017; Kridahl, 2017; Zanasi et al., 2020) may be explained by the fact that becoming a grandparent marks the acquisition of a new social role, and it is likely to change individuals' preferences towards work and family care (Mahne and Motel-Klingebiel, 2012). It may be such changes, rather than conflict with daily grandchild care, that lead grandparents (and grandmothers in particular) to have lower probabilities of working than non-grandparents. However, results obtained from the pooled SHARE data are hard to interpret, because the estimates assume the association to be the same across countries, concealing substantial variation.

This study is the first to test for heterogeneity in the association between daily grandchild care and employment across groups of countries characterised by different childcare policy regimes. The findings reveal that the combination of generous childcare service provision and extensive paid parental leave (*optional de-familisation*) is the most conducive to work-family reconciliation, as grandmothers and grandfathers in these settings do not appear to experience role conflict at either the extensive or intensive margin of employment. In childcare regimes characterised by generous service provision but restricted parental leave (*service de-familisation*), I find some evidence that grandparents experience role conflict at the intensive margin. This may suggest that, in the absence of extensive paid leave for parents, grandparents

may need to perform complementary tasks to childcare services, which may in turn lead them to work fewer hours. However, sensitivity analyses conducted on the samples of grandparents with younger (0–10) grandchildren, as well as on the full samples of grandparents including those with coresident grandchildren, do not confirm this finding. Overall, the results point to the fact that childcare service provision promotes employment by relieving family members of care responsibilities (Lewis, 2006; Saraceno and Keck, 2011).

By contrast, in countries characterised by *supported familism*, I find the greatest evidence of role conflict. In these countries, explicit state support to women's caring roles in the absence of services creates the need for full-time grandparental childcare among working mothers (Bordone et al., 2017; Herlofson and Hagestad, 2012). This may generate role conflict between daily grandchild care commitments and employment, especially among grandmothers (Di Gessa et al., 2016). The results suggest that, in countries where neither services nor leave are extensive (*familism by default*), role conflict is only relevant for grandfathers. In these settings, older men are unlikely to combine work with family care, and this negative association is not completely explained by the selection of grandfathers with different characteristics into work and family care. By contrast, older women are unlikely to work and, if they work, they may be subject to stronger normative expectations to combine work and care (Leitner, 2003). This may explain why, for grandmothers in these countries, I find no evidence of role conflict.

From a policy perspective, the results highlight the importance of childcare services for work-family reconciliation. Accessible services may be especially effective if provided in combination with extensive parental leave, as in the case of *optional de-familisation*. While previous evidence has stressed the importance of public childcare for the labour market participation of mothers (Lewis, 2006; Saraceno and Keck, 2011; Thévenon, 2011), the current study shows that it may also be relevant for work-family reconciliation among grandparents. Reforms aimed at reducing childcare costs by curbing public spending may have unintended negative consequences for older adults' participation in employment, which is currently a policy priority across Europe (European Commission, 2018; Glaser and Hank, 2018).

This study has limitations that should be acknowledged. In terms of the methodological approach, the recursive bivariate model is a good way of handling selection in the absence of exogenous variation in the independent variable of interest, daily grandchild care. However, unlike IV approaches, the method does not allow to discern the direction of causality, so I cannot conclude that daily grandchild care affects employment. The estimates represent the

difference in the probability of working (or working hours) between grandparents who provide daily childcare and grandparents who do not, net of potential self-selection of grandparents into work and family care. Like in other regression-based methods, the validity of results depends on functional form assumptions, in particular that of bivariate normality in the error terms, which is untestable (Heckman, 1978).

The country classification is based on Multilinks (2011) indicators from the two years in which data are available, 2004 and 2009. However, since SHARE data cover the period 2004–2015, reforms may have caused some countries to change groups in ways not captured in this study. As shown in Figure 1, there is considerable heterogeneity in childcare services and parental leave within country clusters. This reflects the difficulties related to classifying countries into policy regimes (Saraceno and Keck, 2010, 2011). Besides childcare policies, many other contextual-level characteristics are likely to influence the association between daily grandchild care and grandparents' employment. An important one not considered in this study is the pension system. One can hypothesise that grandparents in countries with higher pension replacement rates or fewer disincentives to early labour market exit may be more likely to retire and provide daily grandchild care than grandparents in countries with less generous pension systems (Saraceno and Keck, 2010). Moreover, over the time of the survey, pension reforms may have differently affected retirement timing across countries (Riedel and Hofer, 2013).

In this study, the choice of grandparents as the relevant population for inference is substantive and aimed at filling a research gap, as most previous literature on the topic has focussed on the effect of grandparenthood for individuals' labour supply (Backhaus and Barslund, 2019; Rupert and Zanella, 2018). However, it worth emphasising that the results are only generalisable to grandparents aged 50–69, who tend to have different characteristics from individuals of the same age without grandchildren (see Supplementary table 10). Since grandparenthood potentially changes individuals' preferences (Mahne and Motel-Klingebiel, 2012), grandparents may also differ from non-grandparents in their unobserved propensity to work and provide care. As pointed out above, for sample size reasons I cannot restrict the analyses to grandparents of very young children, who are the most affected by the policies used here to classify countries.

The cross-sectional analyses are carried out on a sample of grandparents born between 1935 and 1965, which refers to a large and heterogenous population group. We know that women's employment changed dramatically across cohorts born in the 1930s to the 1960s (Jaumotte,

2003), and this is also reflected in the SHARE sample (see Supplementary table 11). Thus, there may be cohort differences in grandmothers' participation in employment and, relatedly, family care that are not fully addressed by including controls for age group and year of interview in the models.

Finally, this study does not distinguish between part-time and full-time employment and between different types of grandparents' occupations. I do not have information on how many hours grandparents spend with their grandchildren per day, nor on what activities they perform together. Integrating this information would contribute to giving a clearer picture of the association between daily grandchild care and employment (Hank, Cavrini, Di Gessa, and Tomassini, 2018).

Across Europe, pension reforms are leading to longer working lives (European Commission, 2018), which implies that many grandparents will remain in the labour force until advanced ages. The shrinking of European welfare states suggests that grandparents may increasingly have to juggle care responsibilities with work. While non-intensive grandchild care provision is usually associated with positive health outcomes (Di Gessa, Glaser, and Tinker, 2016), having to combine work with daily childcare may result in role strain (Goode, 1960), with potential negative implications for grandparents' health and wellbeing. Across Europe, policy reforms should acknowledge grandparents' role as intensive childcare providers and aim to minimise role conflict by promoting flexible working arrangements and by engaging in de-familisation through the provision of affordable childcare services.

Table 1. Weighted sample characteristics (grandparents aged 50-69 with grandchildren aged 0-14), by sex and grandchild care provision. Unemployed and permanently sick or disabled grandparents are excluded from the sample.

	Grandmothers				Grandfathers			
	Total	Daily grandchild care			Total	Daily grandchild care		
		No	Yes	z-test <i>p</i>		No	Yes	z-test <i>p</i>
Employed	27.99	29.99	21.09	0.004	36.90	38.23	28.90	0.013
Weekly working hours* (mean)	35.04	35.20	34.15	0.564	40.94	41.29	38.03	0.270
Age (mean)	59.98	59.99	59.93	0.886	61.06	60.96	61.65	0.076
Household size (mean)	2.21	2.13	2.46	< 0.001	2.46	2.41	2.81	< 0.001
Marital status: not married	39.87	39.97	39.52		15.71	17.44	5.25	
Married (partner works for pay)	12.28	13.00	9.83		16.53	17.35	11.56	
Married (partner does not work)	47.86	47.03	50.65	0.245	67.76	65.22	83.19	< 0.001
Education: Low (ISCED 0-2)	62.86	59.54	74.22		51.99	50.22	62.89	
Intermediate (ISCED 3-4)	27.77	29.46	21.97		33.36	34.04	29.14	
High (ISCED 5-6)	9.37	11.00	3.81	< 0.001	14.65	15.73	7.97	< 0.001
Wealth group: 1 st (lowest)	22.60	22.67	22.35		18.44	19.10	14.37	
2 nd	18.46	18.85	17.14		21.73	21.32	24.23	
3 rd	18.76	18.64	19.15		20.56	19.96	24.24	
4 th	19.27	19.15	19.68		18.69	18.87	17.60	
5 th (highest)	20.91	20.69	21.67	0.949	20.58	20.75	19.55	0.308
Rural dwelling	28.91	28.15	31.47	0.257	28.92	29.78	23.77	0.069
ADL limitations (mean)	0.11	0.11	0.09	0.323	0.12	0.12	0.11	0.815
1+ ADL limitations	6.38	6.67	5.38	0.322	6.82	6.77	7.12	0.832
Depressive status	39.17	39.49	40.49	0.320	21.11	20.62	24.12	0.253
Has partner with ADL limitations	2.85	2.76	3.18	0.626	3.73	3.82	3.14	0.537
No. of children with own children aged 0-14 (mean)	1.54	1.54	1.53	0.814	1.46	1.46	1.48	0.619
n	12,601	10,632	1,969		8,280	7,416	864	

*Average weekly working hours are only calculated for the subsample of working grandparents

Table 2. Grandmothers: Coefficients from recursive bivariate models for a) probability of work and grandchild care (all grandmothers) and b) weekly hours worked and grandchild care (working grandmothers). Country and wave fixed-effects not shown

	a) Employment model (all grandmothers)		b) Hours model (working grandmothers)	
	Pr(employment) Coef. (SE)	Pr(grandchild care) Coef. (SE)	Weekly hours Coef. (SE)	Pr(grandchild care) Coef. (SE)
Grandchild care	- 0.316 (0.295)		- 5.823 (9.047)	
Average marginal effect	- 0.068 (0.063)		- 5.823 (9.047)	
Grandmother				
Age (ref: 50-54)				
55-59	- 0.587 (0.077) ***	0.117 (0.113)	- 3.020 (1.116) **	0.024 (0.144)
60-64	- 1.555 (0.090) ***	0.091 (0.112)	- 5.567 (1.510) ***	0.262 (0.179)
65-69	- 2.789 (0.132) ***	0.077 (0.121)	- 16.74 (2.189) ***	0.184 (0.278)
Household size	- 0.015 (0.041)	- 0.022 (0.041)	0.378 (0.600)	- 0.065 (0.085)
Marital status (ref: not married)				
Married (partner works)	- 0.146 (0.101)	- 0.208 (0.124) ~	- 0.852 (1.483)	0.199 (0.231)
Married (partner not working)	- 0.267 (0.074) ***	0.000 (0.071)	- 1.794 (1.196)	0.247 (0.147) ~
Education (ref: low)				
Intermediate	0.244 (0.070) ***	- 0.279 (0.086) ***	2.148 (1.131) ~	- 0.349 (0.133) **
High	0.470 (0.114) ***	- 0.544 (0.118) ***	4.511 (1.584) **	- 0.703 (0.205) ***
Wealth group (ref: lowest)				
2 nd	0.148 (0.097)	- 0.035 (0.103)	0.548 (1.634)	0.026 (0.183)
3 rd	0.058 (0.098)	0.011 (0.115)	2.231 (1.881)	- 0.306 (0.205)
4 th	0.171 (0.100) ~	0.006 (0.109)	1.400 (1.722)	- 0.058 (0.204)
5 th (highest)	0.259 (0.108) *	0.084 (0.103)	1.350 (1.805)	0.130 (0.220)
Rural dwelling	- 0.059 (0.066)	0.087 (0.080)	- 0.212 (1.066)	- 0.007 (0.172)
ADL limitations	- 0.288 (0.070) ***	- 0.180 (0.060) **	- 1.132 (0.977)	0.021 (0.127)
Depressive status	0.012 (0.066)	0.047 (0.071)	- 1.187 (0.966)	- 0.111 (0.135)
ADL-impaired partner	- 0.301 (0.139) *	0.004 (0.171)	7.098 (4.049) ~	- 0.944 (0.422) *
Number of children with own children aged 0-14	- 0.043 (0.040)	- 0.198 (0.050) ***	0.307 (0.800)	- 0.257 (0.100) **
Adult child				
Female	0.124 (0.057) *	0.570 (0.072) ***	0.038 (0.821)	0.314 (0.154) *
Works for pay	0.222 (0.071) **	0.491 (0.086) ***	0.436 (1.077)	0.415 (0.162) **
Youngest child (ref: 0-2)				
3-5	- 0.043 (0.068)	0.177 (0.083) *	1.630 (0.836) *	0.060 (0.201)
6-10	- 0.095 (0.063)	- 0.118 (0.077)	1.571 (1.186)	- 0.057 (0.155)
11-14	- 0.154 (0.091) ~	- 0.366 (0.108) ***	2.376 (1.831)	- 0.475 (0.289) ~
Proximity (ref: same building)				
Within 5km	- 0.059 (0.147)	- 0.670 (0.100) ***	0.068 (3.346)	- 1.168 (0.189) ***
5-25km	- 0.059 (0.165)	- 1.301 (0.112) ***	- 1.107 (3.596)	- 1.736 (0.202) ***
Farther than 25km	- 0.068 (0.172)	- 2.041 (0.122) ***	- 0.419 (3.909)	- 2.317 (0.234) ***
n (grandparents)	11,164		4,161	
n (dyads)	16,976		5,975	
Correlation (ρ)	0.004 (p = 0.974)		0.114 (p = 0.702)	

*** p <0.001; ** p<0.01; * p<0.05; ~ p<0.10

Table 3. Grandfathers: Coefficients from recursive bivariate models for a) probability of work and grandchild care (all grandfathers) and b) weekly hours worked and grandchild care (working grandfathers). Country and wave fixed-effects not shown

	a) Employment model (all grandfathers)		b) Hours model (working grandfathers)	
	Pr(employment) Coef. (SE)	Pr(grandchild care) Coef. (SE)	Weekly hours Coef. (SE)	Pr(grandchild care) Coef. (SE)
Grandchild care	- 0.492 (0.362)		- 7.924 (3.697) *	
Average marginal effect	- 0.089 (0.066)		- 7.924 (3.697) *	
Grandfather				
Age (ref: 50-54)				
55-59	- 0.945 (0.149) ***	0.359 (0.152) *	0.010 (0.947)	0.225 (0.147)
60-64	- 2.322 (0.154) ***	0.406 (0.152) **	- 3.395 (1.343) *	0.128 (0.172)
65-69	- 3.558 (0.170) ***	0.269 (0.149) ~	- 13.52 (1.864) ***	- 0.048 (0.238)
Household size	0.148 (0.048) **	0.058 (0.049)	1.045 (0.514) *	0.123 (0.068) **
Marital status (ref: not married)				
Married (partner works)	- 0.008 (0.124)	0.179 (0.176)	0.916 (1.192)	- 0.261 (0.205)
Married (partner not working)	- 0.418 (0.104) ***	0.447 (0.146) **	- 0.519 (1.142)	- 0.046 (0.186)
Education (ref: low)				
Intermediate	0.335 (0.080) ***	- 0.053 (0.098)	0.317 (1.108)	- 0.185 (0.157)
High	0.402 (0.101) ***	- 0.100 (0.125)	1.767 (1.242)	- 0.108 (0.205)
Wealth group (ref: lowest)				
2 nd	- 0.140 (0.125)	0.086 (0.144)	- 1.245 (1.652)	- 0.079 (0.238)
3 rd	- 0.068 (0.117)	0.201 (0.142)	- 1.298 (1.593)	0.422 (0.239) ~
4 th	0.021 (0.126)	0.137 (0.149)	2.573 (1.727)	- 0.086 (0.230)
5 th (highest)	0.249 (0.130) ~	0.247 (0.150) ~	3.823 (1.779) *	0.122 (0.256)
Rural dwelling	- 0.029 (0.074)	- 0.032 (0.084)	1.143 (1.006)	0.043 (0.134)
ADL limitations	- 0.280 (0.077) ***	0.006 (0.057)	0.472 (1.275)	0.269 (0.160) ~
Depressive status	- 0.241 (0.103) *	0.083 (0.100)	- 0.435 (1.251)	- 0.140 (0.175)
ADL-impaired partner	0.006 (0.134)	0.024 (0.160)	0.575 (3.124)	0.363 (0.255)
Number of children with own children aged 0-14	- 0.065 (0.048)	- 0.170 (0.052) ***	0.690 (0.612)	0.028 (0.078)
Adult child				
Female	0.045 (0.063)	0.544 (0.079) ***	0.248 (0.729)	0.691 (0.126) ***
Works for pay	- 0.226 (0.085) **	0.497 (0.096) ***	- 0.513 (0.894)	0.548 (0.150) ***
Youngest child (ref: 0-2)				
3-5	0.005 (0.071)	0.038 (0.091)	- 0.420 (0.807)	- 0.054 (0.137)
6-10	- 0.060 (0.077)	- 0.089 (0.096)	- 0.442 (1.060)	- 0.018 (0.157)
11-14	- 0.195 (0.102) ~	- 0.368 (0.129) **	- 0.124 (1.744)	- 0.210 (0.232)
Proximity (ref: same building)				
Within 5km	- 0.131 (0.179)	- 0.749 (0.123) ***	- 0.576 (2.338)	- 0.662 (0.200) ***
5-25km	- 0.299 (0.189)	- 1.237 (0.143) ***	0.394 (2.476)	- 1.287 (0.234) ***
Farther than 25km	- 0.392 (0.197) *	- 2.008 (0.164) ***	- 0.696 (2.397)	- 2.273 (0.271) ***
n (grandparents)		7,393		3,298
n (dyads)		11,092		4,735
Correlation (p)	0.061 (p = 0.720)		0.175 (p = 0.105)	

*** p <0.001; ** p<0.01; * p<0.05; ~ p<0.10

Table 4. Childcare policy indicators and sample percentages of grandparents employed / looking after grandchildren daily, by country group.

Country	% children 0-2 in formal childcare in 2009	Effective parental leave (weeks) in 2009	SHARE sample: % grandparents 50-69 employed or self-employed		SHARE sample: % grandparents 50-69 providing daily grandchild care	
			Grandmothers	Grandfathers	Grandmothers	Grandfathers
Optional de-familisation:						
Denmark	73	11.7	47.0	54.1	2.0	0.8
France	41	13	34.5	31.2	8.6	4.6
Luxembourg	34	10.6	24.2	25.2	18.7	16.0
Slovenia	31	11.9	18.2	22.8	24.4	18.5
Sweden	63	9.6	50.8	50.8	3.1	1.5
Group average	48.4	11.4	37.2	38.7	9.8	6.6
Service de-familisation:						
Belgium	33	4.6	32.0	36.6	14.1	10.8
Netherlands	49	7	28.7	34.3	4.6	2.6
Portugal	36	5.2	22.5	22.1	24.2	18.0
Spain	36	3.7	23.5	33.4	22.9	18.0
Group average	38.5	5.1	28.1	33.9	14.7	10.8
Supported familism:						
Austria	9	9.8	21.7	25.6	12.1	7.8
Czech Republic	3	17.9	24.2	34.8	16.0	9.6
Estonia	25	17.6	54.1	56.2	10.0	4.9
Germany	19	12.6	36.7	38.2	12.2	8.7
Hungary	7	20.5	20.5	24.2	20.1	12.1
Group average	12.6	15.7	33.0	37.7	13.6	8.3
Familism by default:						
Greece	11	4.1	17.8	30.1	32.4	19.5
Ireland	20	2.7	29.9	42.5	18.5	11.0
Italy	25	4.6	14.3	21.7	31.6	24.2
Poland	2	4.1	21.0	26.7	33.5	24.5
Group average	14.5	3.9	18.0	26.7	31.5	22.2

Table 5. Predictive margins from the recursive bivariate model for a) the probability of being employed and b) weekly working hours by daily grandchild care provision with corresponding Average Marginal Effects (AME), over country groups and separately by sex.

Country group	Grandmothers		Grandfathers	
	Pr(employment)	Weekly hours	Pr(employment)	Weekly hours
Optional de-familisation				
Daily GC care: no	0.409 (0.012)	34.21 (0.710)	0.389 (0.010)	40.01 (0.545)
Daily GC care: yes	0.331 (0.080)	27.51 (5.872)	0.388 (0.095)	39.95 (3.872)
AME	- 0.078 (0.083)	- 6.705 (6.042)	- 0.001 (0.097)	- 0.055 (3.941)
Service de-familisation				
Daily GC care: no	0.282 (0.016)	31.21 (1.149)	0.346 (0.015)	39.17 (1.264)
Daily GC care: yes	0.219 (0.054)	19.70 (5.095)	0.303 (0.072)	32.01 (3.680)
AME	- 0.063 (0.062)	- 11.51 (5.530) *	- 0.043 (0.079)	- 7.156 (4.113) ~
Supported familism				
Daily GC care: no	0.368 (0.013)	33.01 (0.935)	0.433 (0.013)	39.92 (0.729)
Daily GC care: yes	0.234 (0.057)	19.64 (6.824)	0.401 (0.072)	29.53 (4.579)
AME	- 0.134 (0.062) *	- 13.38 (7.123) ~	- 0.031 (0.075)	- 10.39 (4.723) *
Familism by default				
Daily GC care: no	0.247 (0.023)	37.31 (1.615)	0.303 (0.018)	43.61 (1.323)
Daily GC care: yes	0.194 (0.041)	32.15 (4.084)	0.191 (0.048)	34.64 (3.193)
AME	- 0.053 (0.054)	- 5.161 (4.929)	- 0.111 (0.058) ~	- 8.961 (3.627) *
n (grandparents)	10,733	3,993	7,040	3,116
n (dyads)	16,357	5,739	10,591	4,474

*** p < 0.001; ** p < 0.01; * p < 0.05; ~ p < 0.10

Figure 1. Classification of SHARE countries into four groups based on childcare service utilisation and effective parental leave in 2004–2009. Horizontal and vertical lines indicating cross-country average values for childcare utilisation and parental leave, respectively.

Source: Multilinks (2011) data

References

- Arpino, B., and Bordone, V. (2017). Regular provision of grandchild care and participation in social activities. *Review of Economics of the Household*, **15**, 135-174.
- Arpino, B., Pronzato, C., and Tavares, L. P. (2014). The effect of grandparental support on mothers' labour market participation: An instrumental variable approach. *European Journal of Population*, **30**, 369-390.
- Asquith, B. J. (2018). The grandparenthood effect: Labor force attachment responses and trends among older workers. *NBER Working Paper*, 21/02/2018.
- Backhaus, A., and Barslund, M. (2019). The effect of grandchildren on grandparental labour supply: Evidence from Europe. *SHARE Working Paper Series*, 34-2019.
- Bordone, V., Arpino, B., and Aassve, A. (2017). Patterns of grandparental child care across Europe: The role of the policy context and working mothers' needs. *Ageing & Society*, **37**, 845-873.
- Börsch-Supan, A., Brandt, M., Hunkler, C., Kneip, T., Korbmacher, J., Malter, F., Schaan, B., Stuck, S., and Zuber, S. (2013). Data resource profile: The Survey of Health, Ageing and Retirement in Europe (SHARE). *International Journal of Epidemiology*, **42**, 992-1001.
- Börsch-Supan, A., and Jürges, H. (2005). *The Survey of Health, Ageing and Retirement in Europe - Methodology*. Mannheim: Mannheim Research Institute for the Economics of Ageing (MEA).
- De Preter, H., Van Looy, D., and Mortelmans, D. (2013). Individual and institutional push and pull factors as predictors of retirement timing in Europe: A multilevel analysis. *Journal of Aging Studies*, **27**, 299-307.
- Di Gessa, G., Glaser, K., Price, D., Ribe Montserrat, E., and Tinker, A. (2016). What drives national differences in intensive grandparental childcare in Europe? *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **71**, 141-153.
- Di Gessa, G., Glaser, K., and Tinker, A. (2016). The impact of caring for grandchildren on the health of grandparents in Europe: A lifecourse approach. *Social Science & Medicine*, **152**, 166-175.
- Eurofund. (2017). *Working time patterns for sustainable work*. Luxembourg: Publications Office of the European Union.
- European Commission. (2018). *The 2018 ageing report: Economic and budgetary projections for the 28 EU member states (2016-2070)*. Luxembourg: Publications Office of the European Union.
- Frimmel, W., Halla, M., Schmidpeter, B., and Winter-Ebmer, R. (2017). Grandmothers' labor supply. *Institute for Social and Economic Research, Working Paper No. 2017-11*.
- Glaser, K., and Hank, K. (2018). Grandparenthood in Europe. *European Journal of Ageing*, **15**, 221-223.
- Goode, W. J. (1960). A theory of role strain. *American Sociological Review*, **25**, 483-496.
- Hank, K., and Buber, I. (2009). Grandparents Caring for Their Grandchildren: Findings from the 2004 Survey of Health, Ageing and Retirement in Europe. *Journal of Family Issues*, **30**, 53-73.

- Hank, K., Cavrini, G., Di Gessa, G., and Tomassini, C. (2018). What do we know about grandparents? Insights from current quantitative data and identification of future data needs. *European Journal of Ageing*, **15**, 225-235.
- Heckman, J. J. (1978). Dummy endogenous variables in a simultaneous equation system. *Econometrica*, **46**, 931-959.
- Heitmueller, A. (2007). The chicken or the egg? Endogeneity in labour market participation of informal carers in England. *Journal of Health Economics*, **26**, 536-559.
- Herlofson, K., and Hagestad, G. O. (2012). Transformations in the role of grandparents across welfare states. In S. Arber and V. Timonen (Eds.), *Contemporary grandparenting: Changing family relationships in global contexts*. Bristol: Policy Press.
- Ho, C. (2015). Grandchild care, intergenerational transfers, and grandparents' labour supply. *Review of Economics of the Household*, **13**, 359-384.
- Hochman, O., and Lewin-Epstein, N. (2013). Determinants of early retirement preferences in Europe: The role of grandparenthood. *International Journal of Comparative Sociology*, **54**, 29-47.
- Igel, C., and Szydlik, M. (2011). Grandchild care and welfare state arrangements in Europe. *Journal of European Social Policy*, **21**, 14.
- Jaumotte, F. (2003). Female labour force participation: Past trends and main determinants in OECD countries. *OECD Economics Department Working Papers No. 376*.
- Kim, H.J., Kang, H., and Johnson-Motoyama, M. (2017). The psychological well-being of grandparents who provide supplementary grandchild care: A systematic review. *Journal of Family Studies*, **23**, 118-141.
- Komp, K., Van Tilburg, T., and Broese Van Groenou, M. (2010). Paid work between age 60 and 70 years in Europe: A matter of socioeconomic status? *International Journal of Ageing and Later Life*, **5**, 45-75.
- Kridahl, L. (2017). Retirement timing and grandparenthood in Sweden: Evidence from population-based register data. *Demographic Research*, **37**, 957-994.
- Lakomý, M., and Kreidl, M. (2015). Full-time versus part-time employment: Does it influence frequency of grandparental childcare? *European Journal of Ageing*, **12**, 321-331.
- Leitner, S. (2003). Varieties of familialism: The caring function of the family in comparative perspective. *European Societies*, **5**, 22.
- Lewis, J. (1992). Gender and the development of welfare regimes. *Journal of European Social Policy*, **2**, 159-173.
- Lewis, J. (2006). Work/family reconciliation, equal opportunities and social policies: The interpretation of policy trajectories at the EU level and the meaning of gender equality *Journal of European Public Policy*, **13**, 420-437.
- Lumsdaine, R. L., and Vermeer, S. J. C. (2015). Retirement timing of women and the role of care responsibilities for grandchildren. *Demography*, **52**, 433-454.
- Maddala, G. S. (1983). *Limited-dependent and qualitative variables in Economics*. New York: Cambridge University Press.

- Mahne, K., and Motel-Klingebiel, A. (2012). The importance of the grandparent role - A class specific phenomenon? Evidence from Germany. *Advances in Life Course Research*, **17**, 145-155.
- Multilinks. (2011). *Multilinks database on intergenerational policy indicators, version 2.0*. Multilinks Project and Wissenschaftszentrum Berlin für Sozialforschung. Available online at <http://multilinks-database.wzb.eu>
- Pollak, C., and Sirven, N. (2016). Active ageing beyond the labour market: Evidence on the role of intrinsic and extrinsic rewards at work. *Review of Social Economy* **74**, 248-274.
- Riedel, M., and Hofer, H. (2013). Determinants of the transition from work into retirement. *NEUJOBS working paper No. 17.1*.
- Riedel, M., Hofer, H., and Wogerbauer, B. (2015). Determinants for the transition from work into retirement in Europe. *IZA Journal of European Labor Studies*, **4**, 1-19.
- Roodman, D. (2011). Estimating fully observed recursive mixed-process models with cmp. *Stata Journal*, **11**, 159-206.
- Rupert, P., and Zanella, G. (2018). Grandchildren and their grandparents' labor supply. *Journal of Public Economics*, **159**, 89-103.
- Saraceno, C. (2016). Varieties of familialism: Comparing four Southern European and East Asian welfare regimes. *Journal of European Social Policy*, **26**, 314-326.
- Saraceno, C., and Keck, W. (2008). *Multilinks project report. The insitutional framework of intergenerational family obligations in Euope: A conceptual and methodological overview*. Berlin: Wissenschaftszentrum Berlin für Sozialforschung.
- Saraceno, C., and Keck, W. (2010). Can we identify intergenerational policy regimes in Europe? *European Societies*, **12**, 675-696.
- Saraceno, C., and Keck, W. (2011). Towards an integrated approach for the analysis of gender equity in policies supporting paid work and care responsibilities. *Demographic Research*, **25**, 371-405.
- StataCorp. (2017). *Stata Statistical Software: Release 15*. College Station, Texas: StataCorp LP.
- Thévenon, O. (2011). Family policies in OECD countries: A comparative analysis. *Population and Development Review*, **37**, 58-87.
- Van Bavel, J., and De Winter, T. (2013). Becoming a grandparent and early retirement in Europe. *European Sociological Review*, **29**, 1295-1308.
- Van der Meer, M. (2006). Productivity among older people in the Netherlands: variations by gender and the socio-spatial context in 2002-2003. *Ageing & Society*, **26**, 901-923.
- Zanasi, F., Sieben, I., and Uunk, W. (2020). Work history, economic resources, and women's labour market withdrawal after the birth of the first grandchild. *European Journal of Ageing*, **17**, 109-118.

Supplementary table 1. Coefficients from single-equation probit and linear regression models for self-reported employment and average working hours, by sex. Country and wave fixed-effects not shown.

	Grandmothers		Grandfathers	
	Pr(employment) Coef. (SE)	Weekly hours Coef. (SE)	Pr(employment) Coef. (SE)	Weekly hours Coef. (SE)
Grandchild care	- 0.324 (0.103) **	- 2.906 (1.965)	- 0.385 (0.133) **	- 3.580 (1.693) *
Average marginal effect	- 0.069 (0.022) **		- 0.069 (0.024) **	
Grandparent				
Age (ref: 50-54)				
55-59	- 0.586 (0.078) ***	- 3.015 (1.123) **	- 0.950 (0.146) ***	- 0.105 (0.956)
60-64	- 1.555 (0.090) ***	- 5.625 (1.499) ***	- 2.329 (0.150) ***	- 3.529 (1.351) **
65-69	- 2.789 (0.132) ***	- 16.78 (2.170) ***	- 3.562 (0.167) ***	- 13.57 (1.869) ***
Household size	- 0.015 (0.041)	0.414 (0.608)	0.147 (0.048) **	0.992 (0.518) ~
Marital status (ref: not married)				
Married (partner works)	- 0.147 (0.101)	- 0.940 (1.541)	- 0.008 (0.123)	1.030 (1.188)
Married (partner not working)	- 0.267 (0.074) ***	- 1.895 (1.191)	- 0.422 (0.102) ***	- 0.482 (1.138)
Education (ref: low)				
Intermediate	0.244 (0.069) ***	2.268 (1.045) *	0.336 (0.080) ***	0.381 (1.100)
High	0.469 (0.114) ***	4.692 (1.529) **	0.403 (0.101) ***	1.747 (1.231)
Wealth group (ref: lowest)				
2 nd	0.148 (0.097)	0.543 (1.657)	- 0.142 (0.126)	- 1.211 (1.665)
3 rd	0.058 (0.098)	2.335 (1.933)	- 0.072 (0.118)	- 1.505 (1.604)
4 th	0.171 (0.100) ~	1.452 (1.770)	0.018 (0.127)	2.590 (1.741)
5 th (highest)	0.260 (0.108) *	1.267 (1.802)	0.245 (0.130) ~	3.800 (1.791) *
Rural dwelling	- 0.059 (0.066)	- 0.222 (1.059)	- 0.028 (0.074)	1.159 (1.014)
ADL limitations	- 0.288 (0.070) ***	- 1.149 (0.960)	- 0.281 (0.077) ***	0.314 (1.274)
Depressive status	0.012 (0.066)	- 1.154 (0.973)	- 0.242 (0.103) *	- 0.406 (1.259)
ADL-impaired partner	- 0.301 (0.139) *	7.320 (4.023) ~	0.005 (0.134)	0.442 (3.179)
Number of children with own children aged 0-14	- 0.043 (0.039)	0.398 (0.796)	- 0.062 (0.048)	0.685 (0.610)
Adult child				
Female	0.125 (0.054) *	- 0.041 (0.783)	0.038 (0.060)	- 0.021 (0.716)
Works for pay	0.222 (0.068) ***	0.339 (1.084)	- 0.233 (0.083) **	- 0.698 (0.896)
Youngest child (ref: 0-2)				
3-5	- 0.043 (0.067)	1.578 (0.842) ~	0.005 (0.071)	- 0.352 (0.808)
6-10	- 0.095 (0.063)	1.564 (1.204)	- 0.059 (0.077)	- 0.432 (1.07)
11-14	- 0.154 (0.091) ~	2.521 (1.777)	- 0.191 (0.101) ~	0.022 (1.752)
Proximity (ref: same building)				
Within 5km	- 0.061 (0.133)	1.045 (2.393)	- 0.108 (0.159)	0.041 (2.299)
5-25km	- 0.062 (0.136)	0.070 (2.322)	- 0.268 (0.159) ~	1.297 (2.378)
Farther than 25km	- 0.071 (0.141)	0.840 (2.513)	- 0.357 (0.161) *	0.330 (2.279)
n (grandparents)	10,977	4,161	7,278	3,298
n (dyads)	16,697	5,975	10,930	4,735

*** p < 0.001; ** p < 0.01; * p < 0.05; ~ p < 0.10

Supplementary table 2. Grandmothers: Coefficients on country and wave fixed-effects from recursive bivariate models for a) probability of work and grandchild care (all grandmothers) and b) weekly hours worked and grandchild care (working grandmothers).

	a) Employment model (all grandmothers)		b) Hours model (working grandmothers)	
	Pr(employment) Coef. (SE)	Pr(grandchild care) Coef. (SE)	Weekly hours Coef. (SE)	Pr(grandchild care) Coef. (SE)
Grandchild care	- 0.316 (0.295)		- 5.823 (9.047)	
Average marginal effect	- 0.068 (0.063)		- 5.823 (9.047)	
Country fixed-effects				
Country (ref: Austria)				
Germany	0.663 (0.125) ***	0.171 (0.152)	0.353 (2.666)	- 0.165 (0.261)
Sweden	1.407 (0.129) ***	- 0.452 (0.164) **	3.902 (2.466)	- 0.497 (0.270) ~
Netherlands	0.593 (0.123) ***	- 0.595 (0.162) ***	- 4.451 (2.529) ~	- 0.672 (0.291) *
Spain	0.346 (0.161) *	0.360 (0.150) *	3.114 (3.180)	0.288 (0.309)
Italy	- 0.031 (0.162)	0.655 (0.151) ***	5.421 (2.929) ~	0.516 (0.284) ~
France	0.503 (0.110) ***	0.017 (0.133)	2.002 (2.362)	- 0.090 (0.249)
Denmark	1.068 (0.122) ***	- 0.568 (0.209) **	0.825 (2.422)	- 0.458 (0.311)
Greece	0.104 (0.164)	0.661 (0.152) ***	14.06 (3.767) ***	0.081 (0.296)
Switzerland	1.186 (0.163) ***	- 0.218 (0.199)	- 0.181 (2.830)	- 0.509 (0.358)
Belgium	0.452 (0.112) ***	0.242 (0.131) ~	- 1.828 (2.538)	0.066 (0.241)
Czech Republic	0.211 (0.136)	0.162 (0.140)	6.070 (2.378) *	0.045 (0.257)
Poland	0.052 (0.183)	0.827 (0.197) ***	6.887 (3.592) ~	0.896 (0.341) **
Ireland	0.924 (0.234) ***	0.741 (0.266) **	- 3.860 (4.035)	0.982 (0.435) *
Luxembourg	0.249 (0.175)	0.481 (0.213) *	4.936 (3.126)	0.362 (0.410)
Hungary	0.293 (0.166) ~	0.052 (0.177)	7.549 (2.625) **	- 0.139 (0.378)
Portugal	0.741 (0.250) **	0.254 (0.241)	10.13 (5.587) ~	0.766 (0.468)
Slovenia	- 0.185 (0.138)	0.248 (0.132) ~	4.951 (2.907) ~	- 0.171 (0.300)
Estonia	1.354 (0.133) ***	0.220 (0.151)	7.152 (2.247) ***	0.090 (0.263)
Croatia	- 0.328 (0.300)	0.438 (0.262) ~	8.444 (3.744) *	- 0.316 (0.540)
Wave fixed-effects				
wave (ref: w1: 2004)				
w2: 2006-07	- 0.039 (0.106)	- 0.173 (0.112)	- 2.636 (1.782)	0.000 (0.229)
w4: 2010-11	0.264 (0.084) **	0.024 (0.117)	- 2.579 (1.359) ~	0.004 (0.176)
w5: 2013	0.471 (0.088) ***	- 0.074 (0.103)	- 3.336 (1.412) *	0.036 (0.205)
w6:2015	0.553 (0.205) **	- 0.106 (0.173)	- 4.364 (2.015) *	- 0.053 (0.255)
n (grandparents)	11,164		4,161	
n (dyads)	16,976		5,975	
Correlation (p)	0.004 (p = 0.974)		0.114 (p = 0.702)	

*** p <0.001; ** p<0.01; * p<0.05; ~ p<0.10

Supplementary table 3. Grandfathers: Coefficients on country and wave fixed-effects from recursive bivariate models for a) probability of work and grandchild care (all grandfathers) and b) weekly hours worked and grandchild care (working grandfathers).

	a) Employment model (all grandmothers)		b) Hours model (working grandmothers)	
	Pr(employment) Coef. (SE)	Pr(grandchild care) Coef. (SE)	Weekly hours Coef. (SE)	Pr(grandchild care) Coef. (SE)
Grandchild care	- 0.492 (0.362)		- 7.924 (3.697) *	
Average marginal effect	- 0.089 (0.066)		- 7.924 (3.697) *	
Country fixed-effects				
Country (ref: Austria)				
Germany	0.778 (0.156) ***	- 0.123 (0.176)	- 3.489 (2.174)	- 0.368 (0.329)
Sweden	1.396 (0.155) ***	- 0.872 (0.223) ***	- 3.508 (2.225)	- 1.081 (0.352) **
Netherlands	0.892 (0.155) ***	- 0.958 (0.204) ***	- 6.389 (2.231) **	- 1.390 (0.387) ***
Spain	0.939 (0.193) ***	0.294 (0.181)	- 2.472 (3.254)	0.077 (0.329)
Italy	0.381 (0.169) *	0.365 (0.168) *	- 1.005 (2.649)	- 0.196 (0.331)
France	0.181 (0.138)	- 0.036 (0.170)	- 5.417 (2.075) **	- 0.228 (0.310)
Denmark	1.227 (0.153) ***	- 1.110 (0.293) ***	- 5.296 (2.143) *	- 1.249 (0.475) **
Greece	0.761 (0.189) ***	0.515 (0.194) **	5.407 (3.127) ~	0.182 (0.357)
Switzerland	1.549 (0.181) ***	- 0.233 (0.203)	- 1.458 (2.885)	- 0.568 (0.377)
Belgium	0.460 (0.137) ***	0.146 (0.154)	- 3.683 (2.131) ~	- 0.006 (0.296)
Czech Republic	0.470 (0.165) **	- 0.171 (0.193)	- 3.195 (2.533)	- 0.425 (0.348)
Poland	- 0.079 (0.212)	0.313 (0.223)	- 2.845 (2.530)	- 0.191 (0.369)
Ireland	1.376 (0.322) ***	0.222 (0.299)	- 1.478 (3.652)	- 0.377 (0.515)
Luxembourg	- 0.109 (0.217)	0.246 (0.235)	- 3.591 (2.706)	0.166 (0.440)
Hungary	0.142 (0.228)	0.364 (0.292)	- 10.10 (3.645) **	0.472 (0.437)
Portugal	0.257 (0.281)	- 0.007 (0.244)	- 19.63 (6.706) **	0.050 (0.511)
Slovenia	- 0.266 (0.164)	0.449 (0.189) *	- 5.097 (2.462) *	0.074 (0.386)
Estonia	1.258 (0.236) ***	0.001 (0.313)	- 2.972 (2.126)	- 0.241 (0.304)
Croatia	0.089 (0.305)	0.915 (0.345) **	- 5.282 (3.175) ~	- 0.060 (0.557)
Wave fixed-effects				
wave (ref: w1: 2004)				
w2: 2006-07	- 0.071 (0.129)	0.081 (0.134)	- 0.457 (1.207)	0.406 (0.215) ~
w4: 2010-11	0.129 (0.093)	0.043 (0.112)	- 1.173 (1.239)	- 0.012 (0.189)
w5: 2013	0.406 (0.107) ***	0.081 (0.130)	- 2.968 (1.424) *	0.075 (0.207)
w6:2015	0.531 (0.163) ***	- 0.563 (0.184) ***	- 0.083 (1.645)	- 0.356 (0.310)
n (grandparents)	7,393		3,298	
n (dyads)	11,092		4,735	
Correlation (p)	0.061 (p = 0.720)		0.175 (p = 0.105)	

*** p <0.001; ** p<0.01; * p<0.05; ~ p<0.10

Supplementary table 4. Weighted sample characteristics (grandparents aged 50-69 with grandchildren aged 0-14), by sex and country group

	Grandmothers				Grandfathers			
	Optional de-fam.	Service de-fam.	Support. familism	Fam. by default	Optional de-fam.	Service de-fam.	Support. familism	Fam. by default
Employed	37.22	28.09	33.00	18.04	38.67	33.92	37.65	26.70
Weekly working hours* (mean)	35.00	33.21	36.65	36.20	41.30	39.83	41.08	42.91
Providing daily grandchild care	9.78	14.74	13.60	31.51	6.63	10.76	8.28	22.22
Age (mean)	59.37	60.83	59.91	59.78	59.76	61.76	60.46	61.97
Household size (mean)	1.97	2.35	2.01	2.33	2.40	2.57	2.31	2.51
Marital status: not married	44.36	33.95	50.32	37.09	20.39	13.89	21.47	10.03
Married (partner works for pay)	13.33	10.82	14.00	12.09	25.56	13.03	20.17	9.05
Married (partner does not work)	42.30	55.23	35.68	50.82	54.05	73.08	58.36	80.92
Education: Low (ISCED 0-2)	46.93	78.58	36.23	72.37	34.65	67.87	26.25	67.84
Intermediate (ISCED 3-4)	37.65	10.41	51.76	23.94	46.35	15.46	54.86	25.44
High (ISCED 5-6)	15.42	11.00	12.01	3.69	19.00	16.66	18.89	6.71
Wealth group: 1 st (lowest)	27.78	19.04	21.34	23.37	16.98	18.38	13.71	22.19
2 nd	15.38	23.29	19.45	16.84	25.73	20.95	21.02	19.02
3 rd	19.12	17.77	19.90	18.82	23.36	21.02	23.58	16.16
4 th	16.40	20.30	20.85	19.73	15.61	19.69	20.68	19.57
5 th (highest)	23.31	19.60	18.46	21.24	18.32	19.97	21.01	23.06
Rural dwelling	29.37	13.12	27.62	39.01	35.15	14.66	26.55	35.51
ADL limitations (mean)	0.07	0.15	0.08	0.12	0.12	0.17	0.08	0.10
1+ ADL limitations	5.15	7.84	4.85	6.69	9.80	7.47	4.29	4.75
Depressive status	40.78	41.71	31.64	36.74	25.88	16.75	13.97	23.78
Has partner with ADL limitations	2.58	3.13	2.01	3.15	4.13	4.58	3.17	2.95
No. of children with own children aged 0-14 (mean)	1.63	1.64	1.43	1.46	1.57	1.47	1.47	1.34
n	3,302	2,622	4,136	1,886	2,418	1,821	2,525	1,019

*Average weekly working hours are only calculated for the subsample of working grandparents

Supplementary table 5. Predictive margins from the single-equation model for a) the probability of being employed and b) weekly working hours by daily grandchild care provision with corresponding Average Marginal Effects (AME), over country groups and separately by sex.

Country group	Grandmothers		Grandfathers	
	Pr(employment)	Weekly hours	Pr(employment)	Weekly hours
Optional de-familisation				
Daily GC care: no	0.408 (0.011)	34.23 (0.685)	0.388 (0.009)	39.88 (0.554)
Daily GC care: yes	0.346 (0.050)	34.64 (3.461)	0.382 (0.061)	44.16 (2.896)
AME	- 0.062 (0.051)	0.404 (3.492)	- 0.005 (0.062)	4.279 (2.932)
Service de-familisation				
Daily GC care: no	0.279 (0.014)	30.99 (1.129)	0.346 (0.014)	39.77 (1.230)
Daily GC care: yes	0.229 (0.034)	27.60 (3.528)	0.300 (0.047)	35.36 (2.464)
AME	- 0.051 (0.037)	- 3.291 (3.778)	- 0.047 (0.050)	- 4.407 (2.907)
Supported familism				
Daily GC care: no	0.363 (0.012)	32.90 (0.860)	0.430 (0.013)	39.92 (0.725)
Daily GC care: yes	0.243 (0.028)	30.86 (2.630)	0.395 (0.040)	33.65 (3.149)
AME	- 0.119 (0.030) ***	- 2.042 (2.563)	- 0.035 (0.042)	- 6.268 (3.198) *
Familism by default				
Daily GC care: no	0.224 (0.017)	36.18 (1.353)	0.300 (0.015)	43.79 (1.253)
Daily GC care: yes	0.183 (0.025)	35.66 (2.406)	0.187 (0.027)	39.21 (2.512)
AME	- 0.042 (0.031)	- 0.520 (2.730)	- 0.113 (0.031) ***	- 4.494 (2.773) ~
n (grandparents)	10,733	3,993	7,040	3,116
n (dyads)	16,357	5,739	10,591	4,474

*** p <0.001; ** p<0.01; * p<0.05; ~ p<0.10

Supplementary table 6. Sensitivity of the results to using different age groups for the grandchildren, recursive bivariate models pooling all countries.

	Grandmothers		Grandfathers	
	Pr(employment) AME (SE)	Weekly hours Coef. (SE)	Pr(employment) AME (SE)	Weekly hours Coef. (SE)
Grandchildren aged 0-14				
Daily grandchild care	- 0.068 (0.063)	- 5.823 (9.047)	- 0.089 (0.066)	- 7.924 (3.697) *
Correlation (ρ)	0.004 (p = 0.974)	0.114 (p = 0.702)	0.061 (p = 0.720)	0.175 (p = 0.105)
n(grandparents)	11,164	4,161	7,393	3,298
n(dyads)	16,976	5,975	11,092	4,735
Grandchildren aged 0-10				
Daily grandchild care	- 0.050 (0.068)	- 1.296 (26.59)	- 0.060 (0.078)	- 8.305 (3.654) *
Correlation (ρ)	- 0.043 (p = 0.764)	- 0.051 (p = 0.960)	- 0.074 (p = 0.706)	0.201 (p = 0.060)
n(grandparents)	10,119	3,945	6,836	3,154
n(dyads)	14,444	5,462	9,754	4,364
Grandchildren aged 0-5				
Daily grandchild care	- 0.106 (0.090)	3.648 (6.670)	- 0.067 (0.088)	- 5.532 (3.809)
Correlation (ρ)	0.078 (p = 0.655)	- 0.212 (p = 0.444)	- 0.062 (p = 0.775)	0.144 (p = 0.234)
n(grandparents)	5,526	2,212	4,405	1,676
n(dyads)	7,620	3,111	5,919	2,383

*** p <0.001; ** p<0.01; * p<0.05; ~ p<0.10

Supplementary table 7. Sensitivity of the results to restricting the samples to grandparents of grandchildren aged 0-10, recursive bivariate models with interactions.

Country group	Grandmothers		Grandfathers	
	Pr(employment)	Weekly hours	Pr(employment)	Weekly hours
Optional de-familisation				
Daily GC care: no	0.441 (0.013)	34.37 (0.741)	0.411 (0.010)	40.15 (0.553)
Daily GC care: yes	0.363 (0.088)	29.31 (7.590)	0.456 (0.109)	39.58 (3.815)
AME	- 0.078 (0.091)	- 5.063 (7.814)	0.045 (0.112)	- 0.0571 (3.883)
Service de-familisation				
Daily GC care: no	0.299 (0.017)	31.37 (1.237)	0.365 (0.017)	38.67 (1.120)
Daily GC care: yes	0.234 (0.060)	20.45 (6.406)	0.367 (0.091)	31.31 (3.691)
AME	- 0.065 (0.068)	- 10.92 (6.986)	0.003 (0.099)	- 7.356 (4.026) ~
Supported familism				
Daily GC care: no	0.410 (0.015)	33.07 (0.944)	0.470 (0.015)	40.44 (0.760)
Daily GC care: yes	0.273 (0.066)	21.19 (8.407)	0.453 (0.086)	29.38 (4.807)
AME	- 13.73 (0.072) ~	- 11.89 (8.868)	- 0.017 (0.092)	- 11.06 (4.943) *
Familism by default				
Daily GC care: no	0.260 (0.025)	36.43 (1.853)	0.315 (0.021)	43.81 (1.391)
Daily GC care: yes	0.224 (0.045)	33.59 (4.758)	0.235 (0.061)	34.41 (3.182)
AME	- 0.036 (0.060)	- 2.839 (6.009)	- 0.080 (0.074)	- 9.406 (3.657) **
n (grandparents)	9,737	3,788	6,505	2,980
n (dyads)	13,921	5,248	9,298	4,121

*** p <0.001; ** p<0.01; * p<0.05; ~ p<0.10

Supplementary table 8. Sensitivity of the results to including grandparents who live with a grandchild, recursive bivariate models pooling all countries.

	Grandmothers		Grandfathers	
	Pr(employment) AME (SE)	Weekly hours Coef. (SE)	Pr(employment) AME (SE)	Weekly hours Coef. (SE)
Excluding coresident grandparents				
Daily grandchild care	- 0.068 (0.063)	- 5.823 (9.047)	- 0.089 (0.066)	- 7.924 (3.697) *
Correlation (ρ)	0.004 (p = 0.974)	0.114 (p = 0.702)	0.061 (p = 0.720)	0.175 (p = 0.105)
n(grandparents)	11,164	4,161	7,393	3,298
n(dyads)	16,976	5,975	11,092	4,735
Including coresident grandparents				
Daily grandchild care	- 0.084 (0.061)	- 5.694 (9.189)	- 0.095 (0.057) ~	- 6.423 (3.622) ~
Correlation (ρ)	0.027 (p = 0.849)	0.086 (p = 0.780)	0.087 (p = 0.543)	0.125 (p = 0.236)
n(grandparents)	11,435	4,259	7,583	3,387
n(dyads)	17,613	6,177	11,479	4,906

*** p <0.001; ** p<0.01; * p<0.05; ~ p<0.10

Supplementary table 9. Sensitivity of the results to including grandparents who live with a grandchild, recursive bivariate models with interactions.

Country group	Grandmothers		Grandfathers	
	Pr(employment)	Weekly hours	Pr(employment)	Weekly hours
Optional de-familisation				
Daily GC care: no	0.415 (0.012)	34.24 (0.704)	0.390 (0.010)	39.96 (0.547)
Daily GC care: yes	0.336 (0.078)	28.56 (5.654)	0.401 (0.081)	40.60 (3.605)
AME	- 0.079 (0.081)	- 5.677 (5.844)	0.011 (0.083)	0.641 (3.698)
Service de-familisation				
Daily GC care: no	0.280 (0.016)	31.30 (1.210)	0.351 (0.015)	39.45 (1.254)
Daily GC care: yes	0.227 (0.054)	22.62 (4.952)	0.347 (0.076)	33.34 (3.313)
AME	- 0.053 (0.062)	- 8.681 (5.488)	- 0.004 (0.082)	- 6.112 (3.851)
Supported familism				
Daily GC care: no	0.368 (0.014)	32.98 (0.961)	0.438 (0.013)	39.97 (0.714)
Daily GC care: yes	0.236 (0.056)	18.70 (6.403)	0.408 (0.062)	31.45 (4.620)
AME	- 0.132 (0.062) *	- 14.28 (6.764) *	- 0.030 (0.065)	- 8.512 (4.768) ~
Familism by default				
Daily GC care: no	0.262 (0.024)	38.37 (1.866)	0.317 (0.018)	43.50 (1.356)
Daily GC care: yes	0.189 (0.037)	33.81 (3.839)	0.188 (0.039)	36.18 (3.243)
AME	- 0.073 (0.054)	- 4.559 (5.034)	- 0.129 (0.049) **	- 7.312 (3.742) *
n (grandparents)	10,994	4,086	7,220	3,199
n (dyads)	16,977	5,934	10,964	4,637

*** p <0.001; ** p<0.01; * p<0.05; ~ p<0.10

Supplementary table 10. Weighted sample characteristics comparing grandparents to non-grandparents (individuals aged 50-69), by sex

	Women				Men			
	Total	Grandparent status			Total	Grandparent status		
		No	Yes	z-test <i>p</i>		No	Yes	z-test <i>p</i>
Employed	42.06	57.96	27.28	<0.001	62.27	76.47	38.89	<0.001
Weekly working hours* (mean)	35.26	35.27	35.30	0.972	41.99	42.64	41.59	0.202
Age (mean)	57.98	55.23	60.17	<0.001	57.77	55.37	60.82	<0.001
Household size (mean)	2.42	2.60	2.21	<0.001	2.72	2.95	2.46	<0.001
Marital status: not married	39.21	39.41	39.03		20.59	22.65	17.19	
Married (partner works for pay)	17.97	24.14	12.31		24.67	28.77	17.93	
Married (partner does not work)	42.83	36.46	48.66	<0.001	54.74	48.58	64.88	<0.001
Education: Low (ISCED 0-2)	52.95	42.24	62.79		43.20	37.34	52.83	
Intermediate (ISCED 3-4)	31.68	35.51	28.16		38.09	41.38	32.69	
High (ISCED 5-6)	15.37	22.25	9.05	<0.001	18.71	21.28	14.48	<0.001
Wealth group: 1 st (lowest)	21.29	19.98	22.49		16.43	14.88	18.97	
2 nd	18.89	19.22	18.58		22.45	23.05	21.48	
3 rd	18.95	18.56	19.30		21.51	22.34	20.15	
4 th	19.92	20.68	19.23		19.36	19.86	18.54	
5 th (highest)	20.96	21.56	20.41	0.400	20.25	19.87	20.86	0.036
Rural dwelling	26.60	23.99	28.97	0.003	28.32	28.64	27.81	0.667
ADL limitations (mean)	0.97	0.76	0.12	0.006	0.79	0.65	0.11	0.006
1+ ADL limitations	5.75	4.87	6.57	0.121	4.25	2.95	6.38	<0.001
Depressive status	37.12	35.89	38.26	0.167	17.32	15.48	20.36	<0.001
Has partner with ADL limitations	2.32	1.61	2.97	0.001	2.40	1.59	3.74	<0.001
No. of children with own children aged 0-14 (mean)	0.50	0.01	1.29	<0.001	0.31	0.01	1.17	<0.001
n	25,508	10,373	15,135		20,262	10,392	9,870	

*Average weekly working hours are only calculated for the subsample of working individuals

Supplementary table 11. Probability of being employed or self-employed for women across cohorts in the SHARE sample (includes grandmothers and non-grandmothers)

Birth cohort	% employed aged 50-54	% employed aged 55-59	% employed aged 60-64	% employed aged 65-69
1935-39				2.95
1940-44			16.94	4.23
1945-49		41.49	17.39	5.97
1950-54	60.37	49.90	27.79	
1955-59	69.85	58.57		
1960-64	73.02			

Appendix 1: Results from alternative country classification using childcare coverage as opposed to enrolment

Figure A1. Classification of SHARE countries into four groups based on childcare service coverage and effective parental leave in 2004–2009. Horizontal and vertical lines indicating cross-country median values for childcare coverage and parental leave, respectively.

Source: Multilinks (2011) data.

Note: median values (instead of mean) used to divide countries since the distribution of childcare coverage is highly skewed.

Table A1. Predictive margins from the recursive bivariate model for a) the probability of being employed and b) weekly working hours by daily grandchild care provision with corresponding Average Marginal Effects (AME), over country groups and separately by sex.

Country group	Grandmothers		Grandfathers	
	Pr(employment)	Weekly hours	Pr(employment)	Weekly hours
Optional de-familisation				
Daily GC care: no	0.412 (0.010)	34.25 (0.621)	0.392 (0.008)	40.03 (0.463)
Daily GC care: yes	0.352 (0.083)	28.45 (6.453)	0.391 (0.093)	40.04 (3.848)
AME	- 0.060 (0.086)	- 5.806 (6.671)	- 0.001 (0.096)	0.007 (3.933)
Service de-familisation				
Daily GC care: no	0.337 (0.012)	29.68 (1.015)	0.367 (0.010)	38.05 (0.796)
Daily GC care: yes	0.357 (0.084)	19.05 (5.939)	0.359 (0.063)	29.68 (3.400)
AME	0.021 (0.089)	- 10.62 (6.412) ~	- 0.007 (0.066)	- 8.373 (3.664) *
Supported familism				
Daily GC care: no	0.363 (0.012)	32.91 (0.842)	0.430 (0.011)	39.91 (0.640)
Daily GC care: yes	0.244 (0.059)	19.98 (7.411)	0.406 (0.069)	29.41 (4.482)
AME	- 0.120 (0.065) ~	- 12.93 (7.774) ~	- 0.024 (0.073)	- 10.50 (4.626) *
Familism by default				
Daily GC care: no	0.238 (0.018)	36.57 (1.267)	0.304 (0.015)	43.04 (1.090)
Daily GC care: yes	0.188 (0.039)	31.01 (4.450)	0.211 (0.044)	34.67 (2.735)
AME	- 0.050 (0.052)	- 5.567 (5.265)	- 0.093 (0.054) ~	- 8.371 (3.118) **
n (grandparents)	10,733	3,993	7,040	3,116
n (dyads)	16,357	5,739	10,591	4,474

*** p < 0.001; ** p < 0.01; * p < 0.05; ~ p < 0.10

Appendix 2: Results for grandchild care performed at least “almost weekly”

Table A2a. Grandmothers: Coefficients from recursive bivariate models for a) probability of work and grandchild care (all grandmothers) and b) weekly hours worked and grandchild care (working grandmothers). Country and wave fixed-effects not shown.

	a) Employment model (all grandmothers)		b) Hours model (working grandmothers)	
	Pr(employment) Coef. (SE)	Pr(grandchild care) Coef. (SE)	Weekly hours Coef. (SE)	Pr(grandchild care) Coef. (SE)
Grandchild care	- 0.338 (0.780)		15.84 (3.086) ***	
Average marginal effect	- 0.073 (0.169)			
Grandmother				
Age (ref: 50-54)				
55-59	- 0.578 (0.077) ***	0.097 (0.071)	- 3.365 (1.061) **	0.141 (0.087)
60-64	- 1.541 (0.098) ***	0.040 (0.073)	- 6.389 (1.327) ***	0.178 (0.104) ~
65-69	- 2.769 (0.148) ***	0.005 (0.079)	- 17.71 (1.766) ***	0.262 (0.197)
Household size	- 0.015 (0.034)	0.011 (0.029)	0.390 (0.570)	- 0.003 (0.051)
Marital status (ref: not married)				
Married (partner works)	- 0.141 (0.091)	- 0.041 (0.082)	- 1.188 (1.559)	0.056 (0.121)
Married (partner not working)	- 0.254 (0.075) ***	0.130 (0.052) *	- 2.993 (1.098) **	0.224 (0.092) *
Education (ref: low)				
Intermediate	0.252 (0.062) ***	- 0.053 (0.058)	2.440 (1.003) *	- 0.012 (0.090)
High	0.474 (0.109) ***	- 0.138 (0.079) ~	5.220 (1.293) ***	- 0.074 (0.113)
Wealth group (ref: lowest)				
2 nd	0.153 (0.083) ~	0.075 (0.076)	0.038 (1.589)	0.103 (0.130)
3 rd	0.057 (0.082)	0.025 (0.076)	2.864 (1.793)	- 0.126 (0.136)
4 th	0.194 (0.095) *	0.231 (0.075) **	0.179 (1.646)	0.291 (0.130) *
5 th (highest)	0.280 (0.113) *	0.292 (0.074) ***	- 0.354 (1.689)	0.291 (0.132) *
Rural dwelling	- 0.072 (0.057)	- 0.090 (0.053) ~	0.304 (0.953)	- 0.100 (0.089)
ADL limitations	- 0.290 (0.067) ***	- 0.138 (0.045) **	- 1.175 (1.017)	0.017 (0.112)
Depressive status	0.009 (0.057)	0.033 (0.051)	- 1.163 (0.906)	0.039 (0.083)
ADL-impaired partner	- 0.311 (0.128) *	- 0.091 (0.137)	8.453 (4.051) *	- 0.305 (0.233)
Number of children with own children aged 0-14	- 0.049 (0.044)	- 0.166 (0.029) ***	0.947 (0.584)	- 0.118 (0.05) *
Adult child				
Female	0.146 (0.104)	0.452 (0.049) ***	- 1.718 (0.936) ~	0.374 (0.082) ***
Works for pay	0.232 (0.096) *	0.325 (0.060) ***	- 1.400 (1.294)	0.358 (0.098) ***
Youngest child (ref: 0-2)				
3-5	- 0.045 (0.071)	0.055 (0.060)	1.327 (0.883)	0.034 (0.090)
6-10	- 0.106 (0.068)	- 0.167 (0.058) **	2.218 (1.409)	- 0.185 (0.101) ~
11-14	- 0.205 (0.170)	- 0.722 (0.079) ***	6.539 (2.256) **	- 1.077 (0.165) ***
Proximity (ref: same building)				
Within 5km	- 0.045 (0.184)	- 0.490 (0.098) ***	7.482 (3.131) *	- 1.258 (0.196) ***
5-25km	- 0.072 (0.306)	- 0.980 (0.100) ***	8.972 (3.498) ***	- 1.657 (0.202) ***
Farther than 25km	- 0.155 (0.498)	- 2.028 (0.103) ***	13.76 (3.924) ***	- 2.606 (0.200) ***
n (grandparents)	11,164		4,161	
n (dyads)	16,976		5,975	
Correlation (p)	0.163 (p = 0.730)		- 0.656 (p = 0.000)	

*** p < 0.001; ** p < 0.01; * p < 0.05; ~ p < 0.10

Table A2b. Grandfathers: Coefficients from recursive bivariate models for a) probability of work and grandchild care (all grandfathers) and b) weekly hours worked and grandchild care (working grandfathers). Country and wave fixed-effects not shown.

	a) Employment model (all grandfathers)		b) Hours model (working grandfathers)	
	Pr(employment) Coef. (SE)	Pr(grandchild care) Coef. (SE)	Weekly hours Coef. (SE)	Pr(grandchild care) Coef. (SE)
Grandchild care	- 0.430 (0.282)		- 3.010 (2.232)	
Average marginal effect	- 0.078 (0.052)			
Grandfather				
Age (ref: 50-54)				
55-59	- 0.930 (0.132) ***	0.338 (0.107) **	- 0.044 (0.901)	0.217 (0.114) ~
60-64	- 2.301 (0.142) ***	0.382 (0.103) ***	- 3.400 (1.173) **	0.287 (0.127) *
65-69	- 3.522 (0.159) ***	0.370 (0.106) ***	- 13.42 (1.662) ***	0.260 (0.160)
Household size	0.135 (0.042) ***	- 0.050 (0.037)	0.892 (0.463) ~	- 0.069 (0.051)
Marital status (ref: not married)				
Married (partner works)	0.066 (0.113)	0.845 (0.110) ***	1.537 (1.067)	0.717 (0.144) ***
Married (partner not working)	- 0.351 (0.103) ***	0.876 (0.098) ***	0.004 (1.036)	0.753 (0.138) ***
Education (ref: low)				
Intermediate	0.359 (0.071) ***	0.132 (0.065) *	0.521 (0.976)	0.086 (0.103)
High	0.422 (0.088) ***	0.125 (0.080)	1.875 (1.114) ~	0.123 (0.124)
Wealth group (ref: lowest)				
2 nd	- 0.143 (0.105)	- 0.039 (0.102)	- 1.144 (1.352)	0.032 (0.157)
3 rd	- 0.088 (0.099)	- 0.048 (0.095)	- 1.606 (1.292)	0.083 (0.152)
4 th	0.026 (0.109)	0.110 (0.097)	2.695 (1.459) ~	0.131 (0.156)
5 th (highest)	0.247 (0.110) *	0.139 (0.098)	3.855 (1.457) **	0.139 (0.156)
Rural dwelling	- 0.021 (0.064)	0.005 (0.058)	1.191 (0.868)	0.019 (0.093)
ADL limitations	- 0.287 (0.071) ***	- 0.064 (0.047)	0.318 (1.069)	0.178 (0.152)
Depressive status	- 0.238 (0.088) **	0.044 (0.071)	- 0.369 (1.160)	- 0.049 (0.124)
ADL-impaired partner	- 0.003 (0.119)	- 0.104 (0.117)	0.368 (2.897)	0.034 (0.189)
Number of children with own children aged 0-14	- 0.077 (0.038) *	- 0.209 (0.034) ***	0.607 (0.434)	- 0.093 (0.056) ~
Adult child				
Female	0.056 (0.071)	0.421 (0.055) ***	0.052 (0.739)	0.397 (0.089) ***
Works for pay	- 0.225 (0.085) **	0.324 (0.071) ***	- 0.663 (0.852)	0.246 (0.106) **
Youngest child (ref: 0-2)				
3-5	0.023 (0.073)	0.109 (0.065) ~	- 0.257 (0.817)	0.044 (0.095)
6-10	- 0.064 (0.079)	- 0.101 (0.070)	- 0.531 (1.064)	- 0.156 (0.114)
11-14	- 0.235 (0.111) *	- 0.588 (0.092) ***	- 0.297 (1.494)	- 0.666 (0.165) ***
Proximity (ref: same building)				
Within 5km	- 0.074 (0.159)	- 0.379 (0.126) **	0.274 (2.000)	- 0.239 (0.200)
5-25km	- 0.270 (0.176)	- 0.836 (0.130) ***	1.324 (2.078)	- 0.717 (0.205) ***
Farther than 25km	- 0.430 (0.213) *	- 1.862 (0.135) ***	- 0.041 (2.137)	- 1.669 (0.209) ***
n (grandparents)	7,393		3,298	
n (dyads)	11,092		4,735	
Correlation (ρ)	0.130 (p = 0.421)		0.108 (p = 0.131)	

*** p <0.001; ** p<0.01; * p<0.05; ~ p<0.10

Table A2c. Predictive margins from the recursive bivariate model for a) the probability of being employed and b) weekly working hours by daily grandchild care provision with corresponding Average Marginal Effects (AME), over country groups and separately by sex.

Country group	Grandmothers		Grandfathers	
	Pr(employment)	Weekly hours	Pr(employment)	Weekly hours
Optional de-familisation				
Daily GC care: no	0.427 (0.050)	29.24 (0.958)	0.395 (0.013)	40.88 (0.559)
Daily GC care: yes	0.344 (0.139)	49.04 (2.420)	0.362 (0.046)	36.35 (2.169)
AME	- 0.084 (0.188)	19.81 (3.017) ***	- 0.033 (0.055)	- 4.532 (2.456) ~
Service de-familisation				
Daily GC care: no	0.311 (0.066)	24.69 (1.433)	0.359 (0.020)	39.31 (1.234)
Daily GC care: yes	0.216 (0.089)	41.11 (2.687)	0.304 (0.041)	36.99 (2.234)
AME	- 0.095 (0.153)	16.42 (3.554) ***	- 0.055 (0.057)	- 2.316 (2.794)
Supported familism				
Daily GC care: no	0.386 (0.063)	27.58 (1.198)	0.448 (0.018)	40.19 (0.751)
Daily GC care: yes	0.297 (0.112)	41.28 (2.421)	0.384 (0.042)	36.73 (2.233)
AME	- 0.089 (0.174)	13.70 (3.122) ***	- 0.063 (0.056)	- 3.464 (2.598)
Familism by default				
Daily GC care: no	0.267 (0.081)	28.52 (1.917)	0.324 (0.025)	43.42 (1.246)
Daily GC care: yes	0.198 (0.070)	44.96 (1.920)	0.213 (0.033)	40.38 (2.715)
AME	- 0.069 (0.148)	16.44 (3.334) ***	- 0.110 (0.052) *	- 3.036 (3.184)
n (grandparents)	10,733	3,993	7,040	3,116
n (dyads)	16,357	5,739	10,591	4,474

*** p < 0.001; ** p < 0.01; * p < 0.05; ~ p < 0.10