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# The effect of grandchildren on grandparental labour supply

## Evidence from Europe

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# The effect of grandchildren on grandparental labour supply: Evidence from Europe*

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*Abstract:* Grandparents spend a considerable amount of time taking care of their grandchildren. For grandparents still at working-age, these time transfers might imply relevant economic trade-offs with regard to the participation in the labour market. Using an instrumental variable strategy and multiple waves of the Survey on Health, Ageing and Retirement in Europe, we estimate the causal effect of grandparenthood on the labour supply of working-age grandparents in nine European countries. In our preferred specification, we find a large negative impact of grandparenthood on the labour force participation of women aged 55 to 64. By contrast, the intensive margin in terms of hours worked is unaffected. Male labour supply does not significantly adjust in response to grandparenthood. Complementary to their time transfers, grandmothers also transfer more gifts to their descendants than women who do not have grandchildren.

*Keywords:* Labour Supply, Grandparents, Child Care

*JEL Codes:* D19, J13, J14, J22

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## 1. Introduction

Being a grandparent is a common characteristic of European populations during the final decade of their working life. Averaging across nine European countries and the time period 2004-2015, 40% of women at age 55 are already grandmothers. Till age 64, this share rises to 69%. Over the same age span, the share of grandfathers rises from 28% to 60%.

In turn, a large share of grandparents spend a considerable amount of time taking care of their grandchildren (Table 1). Almost one out of four grandmothers (23%) state that they take care of at least one of their grandchildren on a daily basis, while an additional 34% do so on a weekly basis. A smaller fraction (16%) of grandfathers care daily for at least one of their grandchildren, but additional 33% of them care weekly.

Grandparents of working age who commit to regular caretaking of their grandchildren may find themselves more time-constrained regarding other activities than grandparents who do not commit in a similar fashion or individuals who are not grandparents. Reductions in leisure time and formal labour supply are natural candidates for freeing up temporal resources. Indeed, while 48% of women and 58% of men who are not grandparents between age 55 and 64 supply a positive amount of working hours at the formal labour market, the labour force participation rates among grandparents of the same age group are 12 percentage points (pp) lower for both men and women.

Table 1: Characteristics of grandparents and non-grandparents aged 55-64 years

| | Grandparents | | Not Grandparents | |
|---|---|---|---|---|
| | Women | Men | Women | Men |
| Share who care daily | 0.23 | 0.16 | - | - |
| Share who care weekly (w/o daily) | 0.34 | 0.33 | - | - |
| Labour force participation rate | 0.37 | 0.46 | 0.48 | 0.58 |

*Notes: The table reports summary statistics on the intensity of care taking for grandchildren and the labour force participation by grandparent status and by gender. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals aged between 55 and 64 years. Calibrated individual weights are applied.*

These differences in labour supply could be driven by numerous observable and unobservable characteristics which differ between grandparents and non-grandparents and which influence lifetime labour supply decisions. For example, grandparents are on average 1.2 years older than non-grandparents even within this relatively narrow age bracket and labour force participation is known to decrease steeply towards retirement age. However, grandparenthood itself as a potential determinant of labour supply particularly in this late stage of working life has only recently received more attention in empirical research.

The limited, but growing evidence accumulated by this literature suggests that the labour supply of grandparents and grandmothers in particular is not orthogonal to the arrival of grandchildren. Rupert & Zanella (2018) find that on average, working women in the US reduce their labour supply by about 30% when they become grandmothers, relative to women who are not yet grandmothers. Grandfathers, in turn, do not show a significant response. The results of Asquith (2018), who also exploits US data, suggest that grandmothers are 8.5% more likely to be retired in response to a grandchild, while they reduce their labour supply by 120 hours per year on the intensive margin (equivalent to 14% of annual hours worked). Frimmel et al. (2017) estimate from Austrian data that becoming a grandmother increases the probability of exiting the labour market by approximately 8.5 percent.

These recent studies differ from earlier important contributions such as Hagestad (2006) and Ho (2015) in the sense that the former put greater emphasis on identifying the *causal* effect of the arrival of grandchildren on the labour supply of the grandparents. They propose instrumental variable strategies

for dealing with the potential endogeneity of grandparental labour supply and the presence of grandchildren. The endogeneity problem arises from the conjecture that the arrival of grandchildren might depend on labour market characteristics of grandparents if the latter were taken into account by the grandchildren's parents. Rupert & Zanella (2018) instrument the grandparenthood status with the gender of the grandparents' first-born child. Their reasoning is that on average, women become mothers earlier than men become fathers, which is the case according to their data. A female first-born child hence increases the probability that this child reaches reproductive age and in turn has children while its parents are still of working age. Asquith (2018) exploits state-year variation in access to various contraceptives to instrument fertility patterns in the US. Frimmel et al. (2017) combine a timing-of-events design with a twin-birth instrument.

Identifying the causal effect of grandparenthood on labour market participation is important for the design and implementation of public policies towards parental leave, provision of child care and, in some countries, prospective labour supply of women at grandparent age in particular. Extensive involvement of grandparents in the rearing of grandchildren may explain why some studies find a relatively little impact of more generous child care policies on parental labour supply (Havnes & Mogstad, 2011; Bick, 2016). Making child care policies more accessible may substitute for both mothers' *and* grandmothers' child care. A similar effect may play out for subsidized parental leave.

In addition, if the labour supply response of grandparents to grandparenthood is large in an economic sense (as our results below suggest), changes in fertility patterns and childlessness may have substantial effects on the labour supply of older cohorts of workers with a long time lag. While we do not observe a change in the share of women being grandparents (at a given age) over our sample period 2004-2015, such changes will occur for a number of European countries over the coming decade due to a sustained increase in childlessness among women since around 1950 (Sobotka, 2017). Hence, demographic forces would ceteris paribus increase the labour supply of older cohorts in the future via a reduced number of grandchildren.

In this study, we estimate the causal effect of grandparenthood on grandparental labour supply in the European context. We use data from several waves of the Survey of Health, Ageing and Retirement in Europe (SHARE) (Börsch-Supan et al., 2013). The survey provides representative information on labour supply, parenthood and grandparenthood status of individuals in later age across European countries. With regard to the various instrumentation strategies suggested by the literature, the SHARE data are not spatially disaggregated enough to construct an instrument in the spirit of Asquith (2018) that exploits subnational spatial variation in different years. Further, the data do not contain sufficiently many twin birth cases to replicate the approach of Frimmel et al. (2017). Hence, we follow the approach of Rupert & Zanella (2018) and instrument the grandparenthood status with the gender of the first-born child. We present evidence that the First Child Female instrument is highly relevant for explaining grandparenthood at any given age in our European sample. We then estimate that grandparenthood has a negative, sizeable and significant effect on the extensive margin of grandmothers' labour force participation. The intensive margin, in turn, remains unaffected. We find no evidence that grandchildren cause any adjustment in the labour supply of grandfathers. Complementary to their time transfers, grandmothers also transfer more gifts to their descendants than women who do not have grandchildren.

## 2. Data

We use waves 1, 2, 4, 5 and 6 of SHARE (Börsch-Supan, 2018a-e), which span the periods 2004-2007 and 2011-2015. Wave 3, disseminated also as SHARELIFE, is not sufficiently comparable to the other waves and lacks information on grandchildren, which is why we omit it.

More countries are added to SHARE in later waves. In order to maintain a consistent sample over time, we use only observations from the nine countries that have been surveyed since wave 1. These countries

are Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, and Sweden. We keep observations from the Netherlands despite the country not having been surveyed in wave 6.

The harmonized data structure of SHARE allows us to merge the different waves into one dataset. However, due to its relatively short coverage time span, SHARE features fewer repeated observations over time than the PSID core sample used by Rupert & Zanella (2018). While 151,713 total observations in the latter originate from 12,519 individuals, 160,060 total observations in our SHARE sample originate from 69,255 unique individuals. This is not a concern given that the identification strategy does not rely on within-individual variation in grandparenthood.

Further, SHARE focuses on individuals in later stages of their working lives or in retirement. Consequently, 96% of the individuals in our sample are at least 50 years old and the average individual is eleven years older than in the PSID core sample.

SHARE records whether an individual is active in the labour market and the individual hours worked. Hence, we can examine the impact of grandparenthood on both the extensive and the intensive margin of labour supply; as do Rupert & Zanella (2018).

Table 2 presents summary statistics on our sample. Individual age is restricted to less than 80 years and the individual must have at least one child aged 14 or older; i.e. the individual is a potential grandparent. While SHARE reports gender and year of birth of the children of the survey participants, it does not generally report the year of birth of the grandchildren. However, it reports the age of birth of the youngest grandchild. Hence, we are able to elicit the age at which an individual initially becomes a grandparent for grandparents that have only one grandchild at a given point in time. This imputation is based on only 7,857 unique grandparents instead of the total 46,209 unique grandparents in our sample. The age of initially becoming a grandparent is not relevant for our identification strategy.

Table 2: Summary statistics by grandparent status and gender

| | All individuals | Grandparents | Grandmothers | Grandfathers |
|---|---|---|---|---|
| Age | 63.4 | 66.0 | 65.4 | 66.7 |
| Male | 0.45 | 0.43 | 0 | 1 |
| Cohabiting | 0.76 | 0.79 | 0.73 | 0.87 |
| Low education | 0.43 | 0.47 | 0.51 | 0.42 |
| Medium education | 0.33 | 0.32 | 0.30 | 0.34 |
| High education | 0.24 | 0.21 | 0.19 | 0.24 |
| Total fertility | 2.17 | 2.61 | 2.61 | 2.61 |
| Age became parent | 25.9 | 24.6 | 23.6 | 26.1 |
| Ever grandparent | 0.7 | 1 | 1 | 1 |
| Total no. of grandchildren | - | 3.8 | 3.8 | 3.7 |
| Age became grandparent | - | 54.8 | 53.6 | 56.4 |
| Employment rate | 0.33 | 0.24 | 0.22 | 0.25 |
| Individuals | 69,255 | 46,209 | 25,847 | 20,362 |
| Observations | 137,953 | 86,306 | 49,115 | 37,191 |

*Notes: The table reports summary statistics on the sample population by grandparent status and gender. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals younger than 80 who have at least one child who is 14 or older. Calibrated individual weights are applied.*

## 3. Identification strategy

Rupert & Zanella (2018) motivate their empirical analysis by a theoretical investigation into the intergenerational mechanisms between 'Seniors' (the potential grandparents) and 'Juniors' (the children of the Seniors) with regard to producing and taking care of 'Babies' (the grandchildren). Both Juniors

and Seniors derive utility from consumption and spending time with a Baby, while both also experience disutility from working. In addition, Seniors care about the utility of the Juniors: Seniors can influence Juniors' utility by either transferring monetary assets or by providing time for the care-taking of the Baby.

The first important insight that emerges is that the labour supply response of Seniors in reaction to the arrival of a Baby is theoretically ambiguous. In equilibrium, this response depends on the marginal utility of grandparenting and on the strength of the Seniors' intergenerational altruism. If the marginal utility of grandparenting is sufficiently large and intergenerational altruism is sufficiently weak, then the Seniors will reduce their labour supply. In the opposite case, however, the Seniors' may care more about the well-being of the Juniors and less about spending time with the Baby, in which case they would prefer monetary over time transfers. Within the framework of the model, this implies also an increase in grandparental labour supply to finance the monetary transfers. The main results of Rupert & Zanella (2018) and our study provide indirect evidence on the occurrence of time transfers from Seniors to Juniors, as implied by reductions in the labour supply of Seniors upon the arrival of grandchildren. In addition, we also consider the possibility of monetary transfers from Seniors to Juniors in the form of gifts in Section 6.

The second relevant result of the theoretical considerations is the source of the endogeneity problem faced by the empirical analysis of the effect of grandparenthood on grandparental labour supply: The decision of the Juniors to produce a Baby at a given point in time depends on the time that the Seniors are willing to provide for taking care of the Baby. A more generous grandparenting profile hence increases the probability that a Senior will actually become a grandparent. A Senior's grandparenthood status and the same Senior's labour supply response to becoming a grandparent are therefore endogenously determined.

As a consequence, Rupert & Zanella (2018) propose instrumenting the grandparenthood status with the gender of the Senior's first child. The reasoning is that on average, women have children earlier than men. Having a female first child hence increases the likelihood of becoming a grandparent at any given age. In addition, the gender of the first child can be credibly assumed to exert no direct effect on labour supply in later working life.

Given that the SHARE data provide the necessary information, we utilize the same identification strategy. Assuming CRRA preferences over consumption and leisure, Rupert & Zanella (2018) show that reduced form equations for the labour supply of potential grandparents can be obtained for both the extensive and the intensive margin of labour supply. We estimate the extensive margin effect in a linear probability model (LPM) using the binary individual employment status as the outcome variable:

$$work_{it} = \beta g_{it} + \boldsymbol{\gamma x_{it}} + \delta a_{it} + \theta_j + \mu_t + \varepsilon_{it} \qquad (1)$$

The estimating equation for the intensive margin, measured in terms of the weekly hours worked by an individual who is active in the labour market, reads as:

$$\ln hours_{it} = \beta g_{it} + \boldsymbol{\gamma x_{it}} + \delta a_{it} + \theta_j + \mu_t + \varepsilon_{it} \qquad (2)$$

$g_{it}$ is a binary indicator equal to 1 if individual $i$ is a grandparent in year $t$. The vector $\boldsymbol{x_{it}}$ contains a constant and a vector of covariates (polynomial in age, self-reported health status, educational attainment, cohabitation status, total number of children, and the birth year of the first child). The majority of these covariates control for characteristics of the Seniors that directly affect their labour supply. The total number of children, however, controls for the increase in the probability of being a grandparent simply due to having more children that in turn can become parents. Further, the birth year of the first child controls for cohort-specific characteristics of the first-born Junior. $a_{it}$ denotes the household net worth in year $t$ valued in 2004 Euros. Rupert & Zanella (2018) explicitly control for the initial consumption expenditure of the household as a consequence of their theoretical model. The

SHARE data do not provide as detailed consumption information as the PSID data, but we proxy this information with the data on the household's net worth, which is moreover available for every sample period. In any case, Rupert & Zanella (2018) point out that their estimates are largely invariant to the initial consumption control variable. The same applies to the sensitivity of our results reported below to the household net worth control. Finally, the country fixed effects $\theta_j$ control for unobserved time-constant heterogeneity between the sample countries, while $\mu_t$ captures year-specific macroeconomic shocks to all countries.

It is worth pointing out, as Rupert & Zanella (2018) do, that the local average treatment effect (LATE) identified by instrumenting the grandparenthood status with the First Child Female instrument is rather specific: The compliers, in this case, are composed of (1) those individuals who have a female first child and who are grandparents and (2) those individuals who have a male first child and who are not (yet) grandparents. Among female grandparents, the LATE therefore applies most likely to maternal grandmothers. The latter are known to provide more care time than parental ones, which is why our estimates will reflect this (comparatively) strong mother-daughter bond.

Rupert & Zanella (2018) support the relevance of their proposed instrument by a series of descriptive statistics and first stage regression results. We are able to reproduce most of the corresponding statistics and regressions using the SHARE data.

Table 3 reports cohort-averages of the age at which women and men become parents. Due to the focus of SHARE on older individuals compared to the PSID core sample, we report the averages for cohorts born between 1940 and 1959, while Rupert & Zanella (2018) focus on the birth years 1950-1979. However, the implications from calculating the difference between the ages when women and men first have children are the same: On average, women in our European sample have children considerably earlier than men. The age gap of more than three years for every cohort in the European data is even larger than the age gap found by Rupert & Zanella (2018) in their US sample.

Table 3: Age at which women and men first have children by cohorts

| | Year of birth | | | |
|---|---|---|---|---|
| | 1940-1944 | 1945-1949 | 1950-1954 | 1955-1959 |
| Women | 24.5<br>*N = 2,844* | 24.5<br>*N = 3,399* | 24.7<br>*N = 3,502* | 25.0<br>*N = 2,194* |
| Men | 27.6<br>*N = 2,485* | 27.7<br>*N = 2,870* | 28.2<br>*N = 2,925* | 28.7<br>*N = 1,662* |
| Difference | - 3.1 | - 3.2 | - 3.5 | - 3.7 |

*Notes: The table reports average ages at which different cohorts of women and men first become parents, together with the underlying numbers of unique individual observations and the difference in the average ages. Sample: SHARE waves 1, 2, 4, 5, 6. Calibrated individual weights are applied.*

Further, Figure 1 displays the probability mass function of the age at which individuals in our sample become grandparents by gender and by gender of their first child. A first-born female child shifts the distribution to the left for both genders of the grandparents, while the shift is less pronounced than in the data of Rupert & Zanella (2018). Recall, however, that our depiction is based on a much smaller number of grandparent observations than we use in the following estimations, due to the lack of information on the years of birth of all grandchildren in the SHARE data.

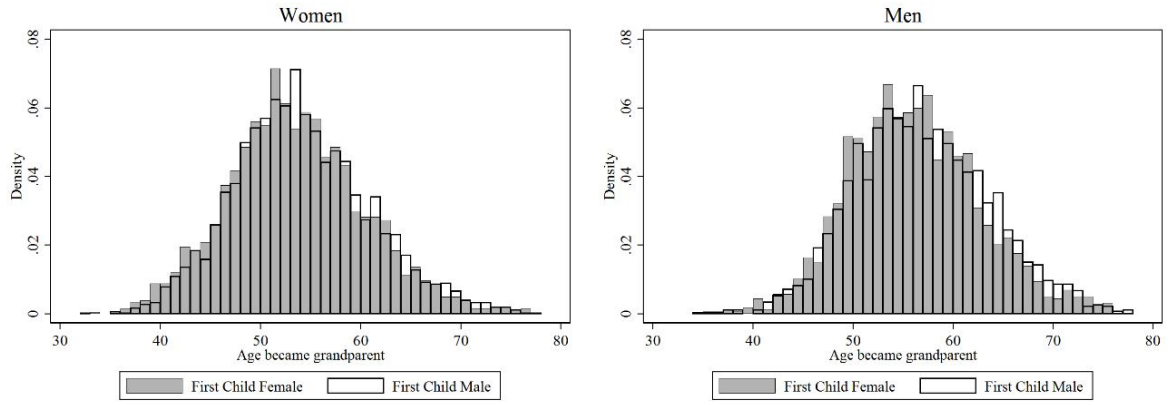


*Figure 1: Distribution of the age when individuals become grandparents. SHARE waves 1, 2, 4, 5, 6. Individuals younger than 80 who have at least one child who is 14 or older.*

If we disregard the exact age at which an individual becomes a grandparent and focus instead on the fraction of individuals that are grandparents at any given age, we find that this fraction is consistently higher for both women and men if their first child is female compared to if their first child is male (Figure 2).

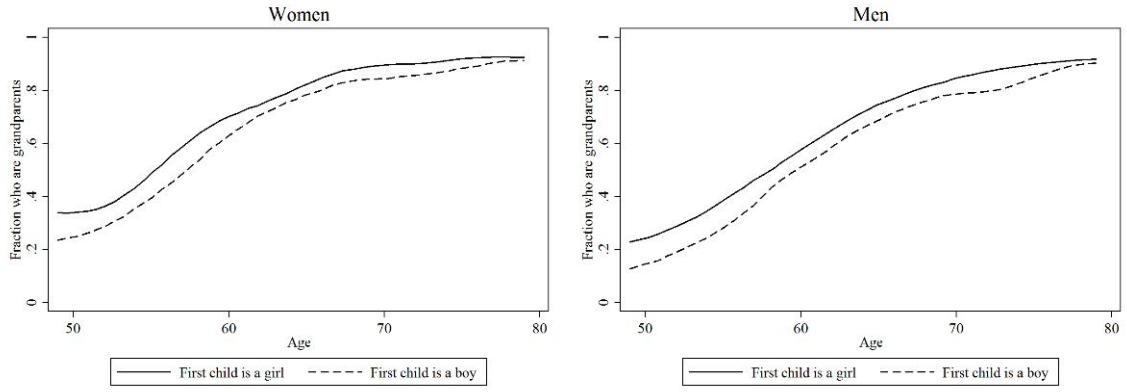


*Figure 2: Fraction of individuals who are grandparents at a given age. SHARE waves 1, 2, 4, 5, 6. Individuals younger than 80 who have at least one child who is 14 or older. Calibrated individuals weights are applied.*

In addition, we regress the age of becoming a grandparent, the total fertility and the cohabitation status on the First Child Female instrument. As expected, having a female first child is strongly negatively associated with the age of becoming a grandparent (Table 4): On average, women with a female first child become grandmothers 1.3 years earlier than women with a male first child (column 1), while the corresponding groups of men even differ by 1.6 years (column 2). Reassuringly, the instrument is not associated with the total fertility or the cohabitation status of the individuals regardless of their gender (columns 3-6). Hence, having a female first child does not appear to have affected either the fertility choices or the cohabitation patterns of the individuals earlier in their lives. These results suggest that it is unlikely that the First Child Female instrument affects the (lifetime) labour supply profile of the individuals aside from its purported effect on the grandparenthood status.

Table 4: Effect of instrument on age of becoming grandparent, fertility and marital instability

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Age becomes GP | | Total fertility | | Cohabiting | |
| | Women | Men | Women | Men | Women | Men |
| First Child is Female | -1.311** | -1.643** | 0.0056 | -0.0003 | -0.0063 | 0.0051 |
| | (0.212) | (0.235) | (0.0160) | (0.0178) | (0.006) | (0.0054) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Observations | 4060 | 3145 | 22809 | 18303 | 22809 | 18303 |

*Notes: The table reports the coefficients from linear regressions of the age of becoming a grandparent on the First Child Female instrument (columns 1-2), total fertility (columns 3-4) and the cohabitation status (columns 5-6). A constant is included in all regressions. Only one observation per individual is used. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals younger than 80 who have at least one child who is 14 or older. Robust standard errors in parentheses. * p<0.05, ** p<0.01*

Panel A in Table 5 presents the first stage results from regressing the grandparenthood indicator on the First Child Female instrument. The sample consists of women younger than 80 years who have at least one child and whose oldest child is at least 14 years old. These conditions correspond exactly to those chosen by Rupert & Zanella (2018). Every regression includes the fourth-order polynomial in the individual's age, as well as country and year fixed effects. The second and third columns additionally control for the individual's self-reported health status, the individual's educational attainment, its cohabitation status, and the household's net worth in year 2004 Euros. Finally, the third column also adds the total number of the individual's children and the birth year of the first child to the first stage.
Across all specifications, the effect of the instrument on the grandparenthood status is positive and highly significant. The estimated coefficient from using the full set of controls implies that the probability of being a grandmother will be 5 percentage points higher if the first child is female. This is consistent with the (unconditional) average distance between the lines in the left panel of Figure 2. While the magnitude is smaller than the 9 percentage points reported by Rupert & Zanella (2018), the large first stage F statistics underline the relevance of the instrument.
Panel B in Table 5 displays the first stage estimates if we consider potential grandfathers instead. The magnitude of the estimates is slightly larger than in the female sample, while sign and statistical significance are alike.

Table 5: First stage estimates for individuals aged less than 80 years

| | (1)<br>Is a Grandparent | (2)<br>Is a Grandparent | (3)<br>Is a Grandparent |
|---|---|---|---|
| **Panel A: Women** | | | |
| First Child Female | 0.0554** | 0.0552** | 0.0543** |
| | (0.00535) | (0.00527) | (0.00464) |
| F excluded instrument | 107.6 | 109.5 | 136.4 |
| Observations | 45735 | 45735 | 45735 |
| **Panel B: Men** | | | |
| First Child Female | 0.0617** | 0.0622** | 0.0593** |
| | (0.00614) | (0.00608) | (0.00529) |
| F excluded instrument | 100.8 | 104.7 | 125.7 |
| Observations | 33967 | 33967 | 33967 |
| Country & Year FE | Yes | Yes | Yes |
| Covariates | No | Yes | Yes |
| Fertility controls | No | No | Yes |

*Notes: The table reports first stage estimates of the effect of the first child being female on the grandparenthood indicator. All regressions include a constant, country dummies, year dummies and a fourth-order polynomial in age. In column 2, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth are added to the regressions. In column 3, the birth year of the first child and the total number of children are added to the regressions. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals younger than 80 who have at least one child who is 14 or older. Robust standard errors clustered at the individual level in parentheses. * p<0.05, ** p<0.01*

Panel A in Table 6 reports the first stage estimates when we constrain our sample of potential grandmothers to women within the age group 55 to 64. This choice is motivated by the fact that labour force participation above age 65 is very low across European countries. We therefore expect that reducing the maximum age in our sample improves the signal-to-noise ratio, which is particularly important for the inference of the 2SLS estimates. Our restriction reduces our sample size by 62%. The estimated coefficient of the instrument remains highly significant and increases in magnitude, suggesting now that a female first-born child increases the probability of becoming a grandmother between age 55 and 64 by 7 percentage points. The reduction in sample size is similar in terms of potential grandfathers, while the estimated effect of the instrument increases likewise, as shown in Panel B of the same table.

Table 6: First stage estimates for individuals aged 55-64 years

| | (1)<br>Is a Grandparent | (2)<br>Is a Grandparent | (3)<br>Is a Grandparent |
|---|---|---|---|
| **Panel A: Women** | | | |
| First Child Female | 0.0716**<br>(0.00899) | 0.0724**<br>(0.00880) | 0.0728**<br>(0.00742) |
| F excluded instrument | 63.40 | 67.59 | 96.32 |
| Observations | 17356 | 17356 | 17356 |
| **Panel B: Men** | | | |
| First Child Female | 0.0833**<br>(0.0105) | 0.0829**<br>(0.0104) | 0.0792**<br>(0.00851) |
| F excluded instrument | 62.72 | 63.93 | 86.64 |
| Observations | 12794 | 12794 | 12794 |
| Country FE, Year FE | Yes | Yes | Yes |
| Covariates | No | Yes | Yes |
| Fertility controls | No | No | Yes |

*Notes: The table reports first stage estimates of the effect of the first child being female on the grandparenthood indicator. All regressions include a constant, country dummies, year dummies and a third-order polynomial in age. In column 2, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth are added to the regressions. In column 3, the birth year of the first child and the total number of children are added to the regressions. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals aged 55-64 who have at least one child who is 14 or older. Robust standard errors clustered at the individual level in parentheses. * p<0.05, ** p<0.01*

## 4. Results

Panel A in Table 7 presents results for the effect of being a grandmother on the labour market status of women in the age group 55 to 64. Column 1 contains the OLS estimates, disregarding the potential endogeneity of grandparenthood. Being a grandmother is associated with, on average, a 7 percentage point lower probability of working. Instrumenting the grandparenthood status by the First Child Female instrument raises the absolute magnitude of the coefficient considerably (columns 2-4). Being a grandmother now reduces the probability of being active in the labour force by more than 20 percentage points. Without the set of covariates, the effect is weakly significant (p-value = 0.06). The estimates become statistically significant at the 5% level when the covariates (self-reported health status, educational attainment, cohabitation status, household net worth) and the fertility controls (total fertility, year of birth of the oldest child) are added to the regressions. The 2SLS estimates hence suggest a substantial negative effect of grandparenthood on the extensive margin of the labour supply of grandmothers.

Grandfathers in the age between 55 and 64 do not significantly adjust their labour supply on the extensive margin. Panel B in Table 6 shows that while the OLS estimate is negative and significant (column 1), the effect of grandparenthood on the probability of being active in the labour market is small and insignificant once the grandparenthood status is instrumented (columns 2-4).

Table 7: Second stage estimates for labour force participation at age 55-64

| | (1)<br>Is working | (2)<br>Is working | (3)<br>Is working | (4)<br>Is working |
|---|---|---|---|---|
| **Panel A: Women** | | Employment rate: 0.427 | | |
| Is a Grandparent | -0.0719**<br>(0.00910) | -0.225<br>(0.120) | -0.263*<br>(0.114) | -0.263*<br>(0.113) |
| Observations | 17356 | 17356 | 17356 | 17356 |
| **Panel B: Men** | | Employment rate: 0.521 | | |
| Is a Grandparent | -0.0668**<br>(0.00982) | -0.0436<br>(0.113) | -0.0868<br>(0.107) | -0.0903<br>(0.111) |
| Observations | 12794 | 12794 | 12794 | 12794 |
| Instrumented | No | Yes | Yes | Yes |
| Country FE, Year FE | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes |
| Fertility controls | No | No | No | Yes |

*Notes: The table reports coefficients from linear regressions of an indicator for labour force participation on the grandparenthood indicator. All regressions include a constant, country dummies, year dummies and a fourth-order polynomial in age. Column 1 reports OLS estimates. Columns 2-4 report second stage estimates when the grandparenthood indicator is instrumented with the First Child Female dummy. In column 3, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth are added to the regressions. In column 4, the birth year of the first child and the total number of children are added to the regressions. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals aged 55-64 who have at least one child who is 14 or older. Calibrated individuals weights are applied to produce sample means of the dependent variable. Robust standard errors clustered at the individual level in parentheses. * p<0.05, ** p<0.01*

The results of the impact of grandparenthood on the intensive margin of grandmothers' labour force participation are reported in Panel A in Table 8. The OLS estimate (column 1) is negative and significant, implying a reduction in hours worked by 5%. However, the coefficients are positive if instrumented in the 2SLS estimations (columns 2-4). Further, none of them is significant in statistical terms, suggesting no intensive margin effect of grandchildren for grandmothers.

Regarding the hours worked for men (Panel B in Table 8), the OLS estimate is negative, but insignificant (column 1). Same as for grandmothers, the coefficients obtained from the 2SLS estimations are positive, small and insignificant (columns 2-4).

Table 8: Second stage estimates for weekly hours worked at age 55-64

| | (1)<br>Log hours | (2)<br>Log hours | (3)<br>Log hours | (4)<br>Log hours |
|---|---|---|---|---|
| **Panel A: Women** | | Mean weekly hours: 31.3 | | |
| Is a Grandparent | -0.0538**<br>(0.0150) | 0.0992<br>(0.206) | 0.0539<br>(0.199) | 0.0532<br>(0.198) |
| Observations | 7506 | 7506 | 7506 | 7506 |
| **Panel B: Men** | | Mean weekly hours: 39.3 | | |
| Is a Grandparent | -0.0200 | 0.0238 | 0.00449 | 0.00575 |

| | (0.0137) | (0.167) | (0.167) | (0.169) |
|---|---|---|---|---|
| Observations | 6794 | 6794 | 6794 | 6794 |
| Instrumented | No | Yes | Yes | Yes |
| Country FE, Year FE | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes |
| Fertility controls | No | No | No | Yes |

*Notes: The table reports coefficients from linear regressions of log weekly hours worked conditional employment on the grandparenthood indicator. All regressions include a constant, country dummies, year dummies and a fourth-order polynomial in age. Column 1 reports OLS estimates. Columns 2-4 report second stage estimates when the grandparenthood indicator is instrumented with the First Child Female dummy. In column 3, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth are added to the regressions. In column 4, the birth year of the first child and the total number of children are added to the regressions. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals aged 55-64 who have at least one child who is 14 or older. Calibrated individuals weights are applied to produce sample means of the dependent variable. Robust standard errors clustered at the individual level in parentheses. * p<0.05, ** p<0.01*

## 5. Robustness

Table 9 reports the outcomes of a series of robustness checks. Column 1 displays our previous results on the effect of grandparenthood on the extensive margin of labour supply for both women (Panel A) and men (Panel B) obtained by instrumenting the grandparenthood status by the First Child Female instrument and using our full set of controls. In column 2, we control for the effect of age by including dummies for each year of age in both the first and the second stages instead of the fourth-order polynomial. The results are not affected by this fully flexible control for the effect of age. In column 3, we allow the effects of the year dummies to vary at the country level by interacting them with the country dummies while still controlling for both fixed effects separately. Again, this more flexible specification does not impact neither size nor significance of the results. In column 4, we cluster the standard errors at the level of country-year of birth cells. Hence, we allow the errors to be correlated within cohorts within countries. While this procedure considerably reduces the number of clusters to about 200, the standard errors remain essentially unchanged. In order to control for the potential effects of country-specific retirement ages, we further interact the age dummies with the country fixed effects. As reported in column 5, these interactions only increase the size of the estimate for grandmothers.

Table 9: Robustness of second stage estimates for labour force participation at age 55-64

| | (1)<br>Is working | (2)<br>Is working | (3)<br>Is working | (4)<br>Is working | (5)<br>Is working |
|---|---|---|---|---|---|
| **Panel A: Women** | | | Employment rate: 0.427 | | |
| Is a Grandparent | -0.263* | -0.265* | -0.252* | -0.263* | -0.3* |
| | (0.113) | (0.113) | (0.112) | (0.111) | (0.115) |
| Observations | 17356 | 17356 | 17356 | 17356 | 17356 |
| **Panel B: Men** | | | Employment rate: 0.521 | | |
| Is a Grandparent | -0.0903 | -0.0919 | -0.0957 | -0.0903 | -0.102 |
| | (0.111) | (0.111) | (0.112) | (0.111) | (0.112) |
| Observations | 12794 | 12794 | 12794 | 12794 | 12794 |
| Instrumented | Yes | Yes | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes | Yes | Yes |
| Fertility controls | Yes | Yes | Yes | Yes | Yes |
| Country & Year FE | Yes | Yes | Yes | Yes | Yes |
| Age FE | No | Yes | No | No | Yes |
| Country x Year FE | No | No | Yes | No | No |

| | | | | | |
|---|---|---|---|---|---|
| Country x Cohort clusters | No | No | No | Yes | No |
| Country x Age FE | No | No | No | No | Yes |

*Notes: The table reports coefficients from linear regressions of an indicator for labour force participation on the grandparenthood indicator. All coefficients are second stage estimates when the grandparenthood indicator is instrumented with the First Child Female dummy. All regressions include a constant, country dummies, year dummies, an indicator of educational attainment, the self-reported health status, the cohabitation status, a grouped indicator of the household's net worth, the birth year of the first child and the total number of children. Columns 1, 3 and 4 control for age by a fourth-order polynomial. Column 2 controls for age by age dummies. In column 3, country-year FE interactions are added. Column 4 clusters standard errors at the country-cohort level. Column 5 adds interactions of age and country fixed effects. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals aged 55-64 who have at least one child who is 14 or older. Calibrated individuals weights are applied to produce sample means of the dependent variable. Robust standard errors clustered at the individual level except in column 4 in parentheses. * p<0.05, ** p<0.01*

We perform the same series of robustness checks with regard to the effect of grandparenthood on the intensive margin of labour supply. As reported in Table 10, the coefficients remain similarly unaffected in terms of both magnitude and significance as in the case of the extensive margin.

Table 10: Robustness of second stage estimates for hours worked at age 55-64

| | (1) Log hours | (2) Log hours | (3) Log hours | (4) Log hours | (5) Log hours |
|---|---|---|---|---|---|
| **Panel A: Women** | Mean weekly hours: 31.3 | | | | |
| Is a Grandparent | 0.0532 | 0.0537 | 0.0610 | 0.0532 | 0.035 |
| | (0.198) | (0.198) | (0.196) | (0.185) | (0.195) |
| Observations | 7506 | 7506 | 7506 | 7506 | 7506 |
| **Panel B: Men** | Mean weekly hours: 39.3 | | | | |
| Is a Grandparent | 0.00575 | 0.00958 | -0.00576 | 0.00575 | 0.02 |
| | (0.169) | (0.169) | (0.172) | (0.173) | (0.169) |
| Observations | 6794 | 6794 | 6794 | 6794 | 6794 |
| Instrumented | Yes | Yes | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes | Yes | Yes |
| Fertility controls | Yes | Yes | Yes | Yes | Yes |
| Country & Year FE | Yes | Yes | Yes | Yes | Yes |
| Age FE | No | Yes | No | No | Yes |
| Country x Year FE | No | No | Yes | No | No |
| Country x Cohort clusters | No | No | No | Yes | No |
| Country x Age FE | No | No | No | No | Yes |

*Notes: The table reports coefficients from linear regressions of log weekly hours worked conditional employment on the grandparenthood indicator. All coefficients are second stage estimates when the grandparenthood indicator is instrumented with the First Child Female dummy. All regressions include a constant, country dummies, year dummies, an indicator of educational attainment, the self-reported health status, the cohabitation status, a grouped indicator of the household's net worth, the birth year of the first child and the total number of children. Columns 1, 3 and 4 control for age by a fourth-order polynomial. Column 2 controls for age by age dummies. In column 3, country-year FE interactions are added. Column 4 clusters standard errors at the country-cohort level. Column 5 adds interactions of age and country fixed effects. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals aged 55-64 who have at least one child who is 14 or older. Calibrated individuals weights are applied to produce sample means of the dependent variable. Robust standard errors clustered at the individual level except in column 4 in parentheses. * p<0.05, ** p<0.01*

We further extend the age interval of our sample by five years to individuals aged 50-64. On the one hand, this extension obviously increases our sample size and a considerable number of individuals

become grandparents already between age 50 and age 54. On the other hand, we expect the effect of grandchildren to be weaker in the enlarged sample, given that exiting the labour market into early retirement is easier the closer an individual is to the official retirement age.
Table 11 reports the first stage estimates for women (Panel A) and men (Panel B). The effect of the instrument on grandparenthood remains highly significant and the first stage F statistics increase substantially in size in comparison to the first stage results reported in Table 6.

Table 11: First stage estimates for individuals aged 50-64

| | (1)<br>Is a Grandparent | (2)<br>Is a Grandparent | (3)<br>Is a Grandparent |
|---|---|---|---|
| **Panel A: Women** | | | |
| First Child Female | 0.0748**<br>(0.00796) | 0.0747**<br>(0.00774) | 0.0738**<br>(0.00643) |
| F excluded instrument | 88.24 | 92.97 | 131.7 |
| Observations | 24464 | 24464 | 24464 |
| **Panel B: Men** | | | |
| First Child Female | 0.0835**<br>(0.00905) | 0.0835**<br>(0.00888) | 0.0799**<br>(0.00731) |
| F excluded instrument | 85.22 | 88.58 | 119.5 |
| Observations | 17496 | 17496 | 17496 |
| Country FE, Year FE | Yes | Yes | Yes |
| Covariates | No | Yes | Yes |
| Fertility controls | No | No | Yes |

*Notes: The table reports first stage estimates of the effect of the first child being female on the grandparenthood indicator. All regressions include a constant, country dummies, year dummies and a fourth-order polynomial in age. In column 2, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth are added to the regressions. In column 3, the birth year of the first child and the total number of children are added to the regressions. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals aged 50-64 who have at least one child who is 14 or older. Robust standard errors clustered at the individual level in parentheses. * p<0.05, ** p<0.01*

Table 12 reports the effect of grandparenthood on the probability of participating in the labour force for the enlarged sample. Being a grandmother still significantly decreases the probability of working by about 20 pp (Panel A). This effect is still substantial in magnitude, but smaller than the coefficient estimated from the sample of older individuals, as expected. Same as before, any association between being a grandfather and labour force participation disappears as soon as the grandparenthood status is instrumented (Panel B).

Table 12: Second stage estimates for labour force participation at age 50-64

| | (1)<br>Is working | (2)<br>Is working | (3)<br>Is working | (4)<br>Is working |
|---|---|---|---|---|
| **Panel A: Women** | Employment rate: 0.507 | | | |
| Is a Grandparent | -0.0792**<br>(0.00786) | -0.176<br>(0.101) | -0.201*<br>(0.0960) | -0.202*<br>(0.0969) |
| Observations | 24464 | 24464 | 24464 | 24464 |
| **Panel B: Men** | Employment rate: 0.620 | | | |
| Is a Grandparent | -0.0728**<br>(0.00865) | -0.00712<br>(0.0957) | -0.0464<br>(0.0882) | -0.0444<br>(0.0920) |
| Observations | 17496 | 17496 | 17496 | 17496 |

| | | | | |
|---|---|---|---|---|
| Instrumented | No | Yes | Yes | Yes |
| Country FE, Year FE | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes |
| Fertility controls | No | No | No | Yes |

*Notes: The table reports coefficients from linear regressions of an indicator for labour force participation on the grandparenthood indicator. All regressions include a constant, country dummies, year dummies and a fourth-order polynomial in age. Column 1 reports OLS estimates. Columns 2-4 report second stage estimates when the grandparenthood indicator is instrumented with the First Child Female dummy. In column 3, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth are added to the regressions. In column 4, the birth year of the first child and the total number of children are added to the regressions. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals aged 50-64 who have at least one child who is 14 or older. Calibrated individuals weights are applied to produce sample means of the dependent variable. Robust standard errors clustered at the individual level in parentheses. * p<0.05, ** p<0.01*

The previous findings that grandparenthood has no intensive margin effect on labour force participation in the European context prove to be similarly robust to the sample extension. As reported in Table 13, once the grandparenthood status is instrumented, all estimated coefficients for both women and men are small in magnitude and statistically insignificant.

Table 13: Second stage estimates for weekly hours worked at age 50-64

| | (1) Log hours | (2) Log hours | (3) Log hours | (4) Log hours |
|---|---|---|---|---|
| **Panel A: Women** | | Mean weekly hours: 31.9 | | |
| Is a Grandparent | -0.0462** | 0.00920 | -0.0130 | -0.0147 |
| | (0.0115) | (0.143) | (0.142) | (0.140) |
| Observations | 12458 | 12458 | 12458 | 12458 |
| **Panel B: Men** | | Mean weekly hours: 39.9 | | |
| Is a Grandparent | -0.0220* | -0.0314 | -0.0478 | -0.0473 |
| | (0.0105) | (0.119) | (0.118) | (0.121) |
| Observations | 10737 | 10737 | 10737 | 10737 |
| Instrumented | No | Yes | Yes | Yes |
| Country FE, Year FE | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes |
| Fertility controls | No | No | No | Yes |

*Notes: The table reports coefficients from linear regressions of log weekly hours worked conditional employment on the grandparenthood indicator. All regressions include a constant, country dummies, year dummies and a fourth-order polynomial in age. Column 1 reports OLS estimates. Columns 2-4 report second stage estimates when the grandparenthood indicator is instrumented with the First Child Female dummy. In column 3, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth are added to the regressions. In column 4, the birth year of the first child and the total number of children are added to the regressions. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals aged 50-64 who have at least one child who is 14 or older. Calibrated individuals weights are applied to produce sample means of the dependent variable. Robust standard errors clustered at the individual level in parentheses. * p<0.05, ** p<0.01*

Hence, enlarging our sample by the age group 50-54, which comprises a considerable number of grandparents, does not prompt a reconsideration of our previously obtained findings. Grandparenthood still exerts a negative and significant effect on the labour force participation of grandmothers, while it does not affect the labour supply of grandfathers along any of the two dimensions examined here.

Finally, we investigate whether our results might be driven by only one or a few countries in our sample. Hence, we estimate the effect of grandparenthood separately for each of the nine sample countries. The

results on the probability of labour force participation for females are displayed in Table A1 in the appendix. As a consequence of the relatively low number of observations per country, the effect is imprecisely estimated for every country except Italy, where it is significant at the 5% level. However, the coefficient is negative for every country except the Netherlands, suggesting that the negative association between female grandparenthood and female labour force participation is not driven by a particular country or set of countries.

The country-by-country regressions further do not prompt a reconsideration of the previously detected absence of an intensive margin effect on female labour supply. As reported in Table A2, sign and magnitude of the estimated effects differ strongly across countries. The large standard errors and the unreasonably large magnitudes for some countries suggest that this pattern does not point to a heterogeneity of the effect, but rather to a failure to produce a stable series of estimates from the small samples. Similar conclusions can be drawn from the two sets of country-by-country regressions for potential grandfathers reported in Table A3 and Table A4.

## 6. Gift transfers

In light of the theoretical model of Rupert & Zanella (2018), the results presented in the previous section indicate on average a positive time transfer from female Seniors to Juniors as a result of the arrival of a Baby and at the expense of the female Seniors' labour force participation, while the labour supply of male Seniors remains unaffected. The theoretical model by Rupert & Zanella (2018) also considers the possibility of a monetary transfers from Seniors to Juniors if the Seniors' intergenerational altruism is high and their utility from spending time with the Baby is low. Our data allow us to investigate the relevance of these monetary transfers, as we have information on whether a Senior transfers at least one (monetary or nonmonetary) gift worth more than 250€ to any Junior in a given year. Such a gift transfer is indicated by 20% of our sample observations. 2.7% further report a gift transfer directly to a grandchild, but as the data do not specify the respective grandchild's parent in this case, we are unable to exploit this information. As a consequence, our estimates presented below are likely to underestimate the magnitude of gift transfers from grandparents to their offspring. By instrumenting the grandparenthood status again by the First Child Female indicator, we are able to test whether the presence of grandchildren increases the occurrence of intergenerational gift transfers from Seniors to Juniors.

Surprisingly, while we find evidence for increased gift transfers, there is no significant evidence that grandfathers offset their abstinence from time transfers with gift transfers. Instead, only grandmothers engage in increased gift transfers. As reported in Panel A of Table 14, the likelihood that they carry out the latter significantly increases by 20 pp in the presence of grandchildren. The estimated coefficient for grandfathers is half this size and statistically insignificant (Panel B).

Table 14: Second stage estimates of gift transfers from individuals aged 55-64

| | (1)<br>Gives gift | (2)<br>Gives gift | (3)<br>Gives gift | (4)<br>Gives gift |
|---|---|---|---|---|
| **Panel A: Women** | | Share who gives gifts: 0.187 | | |
| Is a Grandparent | -0.0345**<br>(0.00689) | 0.203*<br>(0.0911) | 0.198*<br>(0.0866) | 0.196*<br>(0.0848) |
| Observations | 17629 | 17629 | 17629 | 17629 |
| **Panel B: Men** | | Share who gives gifts: 0.220 | | |
| Is a Grandparent | -0.0206*<br>(0.00801) | 0.0937<br>(0.0948) | 0.0981<br>(0.0930) | 0.101<br>(0.0963) |
| Observations | 13312 | 13312 | 13312 | 13312 |

| | | | | |
|---|---|---|---|---|
| Instrumented | No | Yes | Yes | Yes |
| Country FE, Year FE | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes |
| Fertility controls | No | No | No | Yes |

*Notes: The table reports coefficients from linear regressions of an indicator for an effected gift transfer on the grandparenthood indicator. All regressions include a constant, country dummies, year dummies and a fourth-order polynomial in age. Column 1 reports OLS estimates. Columns 2-4 report second stage estimates when the grandparenthood indicator is instrumented with the First Child Female dummy. In column 3, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth are added to the regressions. In column 4, the birth year of the first child and the total number of children are added to the regressions. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals aged 55-64 who have at least one child who is 14 or older. Calibrated individuals weights are applied to produce sample means of the dependent variable. Robust standard errors clustered at the individual level in parentheses. * p<0.05, ** p<0.01*

Reassuringly, there is no evidence that the gift transfers from female Seniors to Juniors are offset by corresponding transfers from Juniors to Seniors. Table 15 reports that neither grandmothers nor grandfathers are more likely to receive gift transfers from any of their children as a consequence of grandchildren.

Table 15: Second stage estimates of gift transfer to individuals aged 55-64

| | (1)<br>Receives gift | (2)<br>Receives gift | (3)<br>Receives gift | (4)<br>Receives gift |
|---|---|---|---|---|
| **Panel A: Women** | | Share who receives gifts: 0.018 | | |
| Is a Grandparent | 0.00557*<br>(0.00229) | 0.0184<br>(0.0285) | 0.0161<br>(0.0280) | 0.0159<br>(0.0279) |
| Observations | 17629 | 17629 | 17629 | 17629 |
| **Panel B: Men** | | Share who receives gifts: 0.012 | | |
| Is a Grandparent | 0.00563**<br>(0.00203) | 0.0386<br>(0.0234) | 0.0377<br>(0.0235) | 0.0382<br>(0.0243) |
| Observations | 13312 | 13312 | 13312 | 13312 |
| Instrumented | No | Yes | Yes | Yes |
| Country FE, Year FE | Yes | Yes | Yes | Yes |
| Covariates | No | No | Yes | Yes |
| Fertility controls | No | No | No | Yes |

*Notes: The table reports coefficients from linear regressions of an indicator for a received gift transfer on the grandparenthood indicator. All regressions include a constant, country dummies, year dummies and a fourth-order polynomial in age. Column 1 reports OLS estimates. Columns 2-4 report second stage estimates when the grandparenthood indicator is instrumented with the First Child Female dummy. In column 3, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth are added to the regressions. In column 4, the birth year of the first child and the total number of children are added to the regressions. Sample: SHARE waves 1, 2, 4, 5, 6. Individuals aged 55-64 who have at least one child who is 14 or older. Calibrated individuals weights are applied to produce sample means of the dependent variable. Robust standard errors clustered at the individual level in parentheses. * p<0.05, ** p<0.01*

## 7. Conclusion

This paper contributes to the growing evidence that grandparenthood and grandparental labour supply are not orthogonal to each other, at least for grandmothers.

Our results imply an economically and statistically significant negative effect of grandparenthood on the extensive margin of grandmothers' labour force participation in Europe. The intensive margin,

measured in terms of hours worked, is not affected by grandparenthood. While Rupert & Zanella (2018) also find a negative effect of grandparenthood on the labour force participation of US-American grandmothers, the latter appear to rather reduce their hours worked instead of dropping out of the labour market entirely. We conjecture that institutional differences in the social security and retirement systems between continental Europe and the US are responsible for the grandparenthood effect operating at different margins. The European systems tend to allow early retirement more easily than the US-American one. In addition, while labour force participation of both men and women drops sharply in our nine European sample countries around age 65, extended episodes of labour force participation are not uncommon in the US.

Methodologically, our results support the identification strategy proposed by Rupert & Zanella (2018). The First Child Female instrument produces highly significant and relevant first stage estimates across specifications. In the second stage, the instrumentation then corrects a substantial upward bias in the extensive margin effect for grandmothers. Rupert & Zanella (2018) assess that a bias in the same direction exists in their OLS estimate at the intensive margin.

The US and the European sample countries have in common that on average, the labour supply of grandfathers is not affected by the presence of grandchildren. We further find that in addition to time transfers, also transfers of other resources, such as gifts, will more likely take place from grandmothers to their children if the latter produce grandchildren. In turn, there is no evidence that grandfathers transfer more gifts to potentially compensate their insignificant time transfers. Though, with the data available, we cannot rule out that the decisions on gift transfers are taken at the household level, with the grandmothers simply being more likely to carry out the act of giving.

The determinants of this gender gap between grandparents remain the subject of future research. It should be kept in mind, however, that the identification strategy of instrumenting the grandparenthood status with the gender of the first child results in an overrepresentation of maternal grandmothers among the compliers. Our findings of a large and negative causal effect of grandparenthood on the labour supply of grandmothers hence does not extend to the entirety of the grandmother population.

While our estimates of the extensive margin effect of becoming a grandmother are not directly comparable to the ones reported by Frimmel et al. (2017), who consider the impact on the duration to labour market exit, their findings of a negative effect of grandchildren on grandmothers' labour supply in the Austrian data appear to generalize across more European countries. Together with the trends towards fewer children and hence fewer grandchildren mentioned in the introduction of our study and the continuing expansion of public child care, female labour force participation rates in later working-age can be expected to rise further when the low-fertility cohorts will reach grandparenting age.

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**Appendix**

Table A 1: Second stage estimates for women aged 55-64

| Country | OLS<br>Is working | 2SLS<br>Is working | Observations |
|---|---|---|---|
| Austria | -0.0191<br>(0.0282) | -0.289<br>(0.250) | 1768 |
| Germany | -0.0329<br>(0.0275) | -0.141<br>(0.301) | 1887 |
| Sweden | 0.0146<br>(0.0277) | -0.335<br>(0.357) | 1737 |
| Netherlands | -0.0294<br>(0.0321) | 0.0224<br>(0.367) | 1628 |
| Spain | -0.00775<br>(0.0297) | -0.202<br>(0.220) | 1951 |
| Italy | -0.0185<br>(0.0247) | -0.530*<br>(0.256) | 2062 |
| France | -0.530*<br>(0.256) | -0.591<br>(0.673) | 2220 |
| Denmark | -0.00277<br>(0.0349) | -0.0438<br>(0.497) | 1564 |
| Belgium | 0.0145<br>(0.0274) | -0.247<br>(0.378) | 2539 |
| Instrumented | No | Yes | |
| Country FE, Year FE | Yes | Yes | |
| Covariates | Yes | Yes | |

| | | |
|---|---|---|
| Fertility controls | Yes | Yes |

*Notes: The table reports coefficients from country-by-country linear regressions of an indicator for labour force participation on the grandparenthood indicator. All regressions include a constant, year dummies, a fourth-order polynomial in age, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth, the birth year of the first child and the total number of children. Column 1 reports OLS estimates. Columns 2 reports second stage estimates when the grandparenthood indicator is instrumented with the First Child Female dummy. Sample: SHARE waves 1, 2, 4, 5, 6. Women aged 55-64 who have at least one child who is 14 or older. Robust standard errors clustered at the individual level in parentheses. * p<0.05, ** p<0.01*

Table A 2: Second stage estimates for women aged 55-64

| Country | OLS<br>Log hours | 2SLS<br>Log hours | Observations |
|---|---|---|---|
| Austria | -0.127<br>(0.0760) | -0.837<br>(1.200) | 557 |
| Germany | -0.0217<br>(0.0528) | -0.361<br>(0.421) | 1029 |
| Sweden | 0.0682<br>(0.0369) | 0.0324<br>(0.394) | 1282 |
| Netherlands | -0.138<br>(0.0822) | 0.494<br>(0.773) | 683 |
| Spain | 0.0114<br>(0.0502) | 0.112<br>(0.504) | 646 |
| Italy | -0.0626<br>(0.0514) | 0.226<br>(0.625) | 542 |
| France | 0.00979<br>(0.0500) | -0.187<br>(0.564) | 906 |
| Denmark | -0.0626<br>(0.0353) | 0.607<br>(0.594) | 935 |
| Belgium | 0.00207<br>(0.0511) | 0.954<br>(0.908) | 926 |
| Instrumented | No | Yes | |
| Country FE, Year FE | Yes | Yes | |
| Covariates | Yes | Yes | |
| Fertility controls | Yes | Yes | |

*Notes: The table reports coefficients from country-by-country linear regressions of log weekly hours worked conditional employment on the grandparenthood indicator. All regressions include a constant, year dummies, a fourth-order polynomial in age, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth, the birth year of the first child and the total number of children. Column 1 reports OLS estimates. Columns 2 reports second stage estimates when the grandparenthood indicator is instrumented with the First Child Female dummy. Sample: SHARE waves 1, 2, 4, 5, 6. Women aged 55-64 who have at least one child who is 14 or older. Robust standard errors clustered at the individual level in parentheses. * p<0.05, ** p<0.01*

Table A 3: Second stage estimates for men aged 55-64

| Country | OLS<br>Is working | 2SLS<br>Is working | Observations |
|---|---|---|---|
| Austria | -0.0115<br>(0.0335) | -0.367<br>(0.254) | 1190 |
| Germany | -0.0842**<br>(0.0315) | -0.0638<br>(0.734) | 1334 |
| Sweden | -0.0315<br>(0.0285) | -0.437<br>(0.283) | 1393 |
| Netherlands | -0.0364<br>(0.0374) | -0.127<br>(0.322) | 1163 |

| | | | |
|---|---|---|---|
| Spain | -0.0505<br>(0.0388) | -0.172<br>(0.281) | 1234 |
| Italy | -0.0220<br>(0.0324) | 0.270<br>(0.350) | 1274 |
| France | 0.0152<br>(0.0262) | 0.551<br>(0.376) | 1752 |
| Denmark | 0.0608*<br>(0.0291) | -0.137<br>(0.515) | 1283 |
| Belgium | -0.00634<br>(0.0284) | -0.423<br>(0.367) | 2171 |
| Instrumented | No | Yes | |
| Country FE, Year FE | Yes | Yes | |
| Covariates | Yes | Yes | |
| Fertility controls | Yes | Yes | |

*Notes: The table reports coefficients from country-by-country linear regressions of an indicator for labour force participation on the grandparenthood indicator. All regressions include a constant, year dummies, a fourth-order polynomial in age, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth, the birth year of the first child and the total number of children. Column 1 reports OLS estimates. Columns 2 reports second stage estimates when the grandparenthood indicator is instrumented with the First Child Female dummy. Sample: SHARE waves 1, 2, 4, 5, 6. Men aged 55-64 who have at least one child who is 14 or older. Robust standard errors clustered at the individual level in parentheses. * p<0.05, ** p<0.01*

Table A 4: Second stage estimates for men aged 55-64

| Country | OLS<br>Log hours | 2SLS<br>Log hours | Observations |
|---|---|---|---|
| Austria | -0.113<br>(0.0634) | -0.209<br>(0.827) | 440 |
| Germany | -0.0154<br>(0.0572) | 17.54<br>(103.5) | 784 |
| Sweden | -0.0265<br>(0.0393) | -0.241<br>(0.352) | 1092 |
| Netherlands | 0.0539<br>(0.0573) | -0.428<br>(0.336) | 686 |
| Spain | -0.0434<br>(0.0529) | 0.567<br>(0.649) | 602 |
| Italy | -0.0370<br>(0.0508) | 0.269<br>(0.673) | 584 |
| France | 0.0118<br>(0.0354) | 0.451<br>(0.451) | 703 |
| Denmark | 0.0106<br>(0.0374) | 0.165<br>(0.425) | 951 |
| Belgium | 0.0388<br>(0.0494) | -1.346<br>(0.787) | 952 |
| Instrumented | No | Yes | |
| Country FE, Year FE | Yes | Yes | |
| Covariates | Yes | Yes | |
| Fertility controls | Yes | Yes | |

*Notes: The table reports coefficients from country-by-country linear regressions of log weekly hours worked conditional employment on the grandparenthood indicator. All regressions include a constant, year dummies, a fourth-order polynomial in age, an indicator of educational attainment, the self-reported health status, the cohabitation status and a grouped indicator of the household's net worth, the birth year of the first child and the total number of children. Column 1 reports OLS estimates. Columns 2 reports second stage estimates when the grandparenthood indicator is instrumented with the First Child Female dummy. Sample: SHARE waves 1, 2, 4, 5, 6. Men aged 55-64 who have at least one child who is 14 or older. Robust standard errors clustered at the*

*individual level in parentheses. * p<0.05, ** p<0.01*

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