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Documento de Trabajo 2013-25

December 2013

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ISSN:1696-750

Informal Care and intergenerational transfers in European Countries[✉]

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September 2013

Abstract:

In a world in which the welfare state is under pressure, understanding the dynamic effects of money transfers from parents to adult children and their relationship with informal care can be relevant for policy purposes. We use the first two waves of the Survey of Health and Retirement in Europe (SHARE) to estimate a double-hurdle model for a parental decision to provide financial support for adult children and the amount involved, taking into account the potential endogeneity of informal caregiving. We find that informal caregivers receive less frequent transfers and less generous amounts than non-caregivers. This offers support for the idea of a form of sophisticated altruistic behavior, according to which caregiving costs are outweighed by the parent's benefits. Regarding public policies, we find that while increased unemployment benefits would not generate any crowding-out effect in parental transfers, a reduction in long-term public care benefits has a negative multiplier effect on parental transfers.

JEL Codes: D03, D14, D64

Keywords: inter vivos transfers, informal care, money transfers, panel data, SHARE

[✉] Financial help from projects ECO2011-30323-C03-02 and ECO2011-2850 from the Spanish Ministry of Science and Technology is gratefully acknowledged

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1. Introduction

The confluence of unfavorable macroeconomic conditions (i.e., higher unemployment and negative GDP growth rate) and negative demographic trends in recent years has exerted increasing pressure on the government's Social Protection expenditure budget. According to Eurostat, the welfare expenditure per capita for EU-27 countries increased from €5,853 in 2005 to €6,907 in 2010. At the same time, the government's deficit increased from 2.5% in 2005 to a peak of 6.9% in 2009. Although the enforcement of strict budgetary cutbacks has reduced the average deficit to 4% in 2012, Social Protection expenditure is still under serious pressure. The recent trends in long-term care expenditure in Southern Europe are dramatic. For example, in the Spanish case, long-term public expenditure has been reduced by more than 30%. Within this context, understanding the relationship between informal care (IC) and intergenerational transfers may be important because they can help to sustain a sufficient level of care for dependent older individuals.

Several authors have recognized the role of the family as an insurance mechanism against different risks or misadventures (Altonji et al., 2007). This hypothesis gains strength given that the percentage of people aged 29-54 at risk of poverty or social exclusion increased from 22.4% in 2008 to 24% in 2011, whereas it decreased from 23.3% to 20% for the cohort of those aged 65 and over. Better knowledge of the criteria used by families, and especially parents, to provide financial support for their adult children would improve decision-makers' ability to design effective social programs that improve the quality of life of more vulnerable individuals.

Intergenerational transfers may be relevant from a policymaker's perspective if there are crowding-out effects. When family members are linked by altruistic ties, they tend to pool their resources, and we find that Ricardian equivalence holds because public transfers are neutralized by within-family transfers (Becker, 1974; Barro, 1974)¹. In a world characterized by a shrinking welfare state, understanding the dynamic effects of money transfers from parents to adult children and their relationship with informal care may have important implications for policy formation. However, this is by no means an easy task, since they are likely to be jointly determined. If financial support is given as a consequence of the amount of informal care received, then potential caregivers may base their decision to look after their parents on their expectations of a future reward. Another argument is that the preferences of both parents and children may be influenced by unobserved characteristics, such as generosity, making parental transfers and an offspring's informal caregiving, which are likely to be determined jointly.

Many of the previous studies have focused on the relationship between informal care and the probability of receiving a money transfer (Bernheim et al., 1985; Cox and Rank, 1992; McGarry and Schoeni, 1997; Norton and Van Houtven, 2006). However, considering money transfers to be a simple binary problem ignores information that may be relevant for the outcome of interest. In this work, in addition to the previous question, we also analyze the relationship between care provisions and the amount of the money transfer. In this context, it is likely that time-varying shocks affecting the decision to provide financial support to offspring, (i.e., pessimistic expectations of finding a new job due to a higher unemployment rate or reduction in the amount of public formal care received by parents) could have an impact on the provision

¹ Several authors have tested the effect of a dollar increase in social policies over private charitable contributions. Results are rather mixed: from a reduction of 28% in Abrams and Schmitz (1978) to one of 71% in Andreoni (1993).

of informal care by adult children. Norton et al. (2013) is one of the few studies that have analyzed the relationship between inter vivos transfers and informal care using two waves from the National Longitudinal Survey of Mature Women. They propose different two-stage models for the probability of receiving transfers from a mother and their amount, taking into account the potential endogeneity of informal care.

In this work we apply Cragg's double-hurdle model (Cragg, 1971) to the analysis of the relationship between intergenerational transfers and informal care in a set of European countries using the first two waves of SHARE. To our knowledge, no previous study has used a panel data double-hurdle model to deal with inter vivos transfers and informal caregiving, while explicitly accounting for the potential endogeneity of caregiving behavior and controlling for the potential correlation between unobserved heterogeneity and the model's variables. The double-hurdle model stresses the fact that the decision to provide financial support and its amount may be determined by different processes. Our empirical strategy follows a sequential procedure: we first estimate a pooled Tobit regression with correlated random effects for the number of informal caregiving hours; and second, we estimate a double-hurdle model with correlated random effects, introducing first-stage residuals of the informal care equation as an additional explanatory variable.

Among other results, we find that the provision of informal care is determined jointly with intergenerational transfers. However, informal caregivers receive less frequent and less generous transfers than non-caregivers. This unexpected result is explained by the "Selective Investment Theory" (Brown and Brown, 2006), which implies that an adult child is more focused on a parent's well-being than on caregiving costs. Under these circumstances, the child considers caregiving as a long-term investment, and prefers to devote a potential transfer's resources to improving the parent's health. We also find that receiving long-term public care benefits increases both the probability of receiving a transfer and its amount, but paying for private formal care decreases both of them.

The rest of the paper is organized as follows. Section 2 describes the sample construction. Section 3 presents the econometric strategy. The results obtained are discussed in Section 4. Concluding comments are presented in Section 5.

2. Sample construction and descriptive statistics

We analyze the determinants of money transfers from older parents to adult children and the provision of informal care in ten European countries, using data from the Survey of Health, Ageing and Retirement in Europe (SHARE).² We use the first two waves of this survey corresponding to 2004 and 2006. We cannot use data from waves 3 or 4 because of a lack of comparability between them and previous ones.³ We restrict the analysis to countries with valid data in both waves: Austria, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden and Switzerland.

² This paper uses data from SHARE waves 1 and 2 release 2.5.0, as of May 24th 2011. The SHARE data collection has been primarily funded by the European Commission through the 5th Framework Programme (project QLK6-CT-2001-00360 in the thematic programme Quality of Life), through the 6th Framework Programme (projects SHARE-I3, RII-CT-2006-062193, COMPARE, CIT5-CT-2005-028857, and SHARELIFE, CIT4-CT-2006-028812), and through the 7th Framework Programme (SHARE-PREP, No. 211909, SHARE-LEAP, No. 227822 and SHARE M4, No. 261982).

³ The questionnaire for wave 3 (SHARELIFE) is totally different to previous ones. Wave 4 tells us whether parents have provided financial support, but we are unaware of the transfer's recipient and its amount.

The initial sample of respondents contains 36,124 (wave 1) and 48,770 (wave 2) observations. Our sample responds to four sample selection criteria: (1) we select the subsample of respondents who appear in both waves (25,619 observations); (2) we discard respondents who do not have children; (3) we transform parent-level data into child-level data to determine the total number of offspring (35,878 in W1 and 24,004 in W2); (4) we discard children who co-reside with parents or with missing variables for age or sex. The reason for excluding adult children living with their older parents is that available data do not allow us to evaluate the nature, direction and magnitude of all intra-household transfers (McGarry, 1999; Van Houtven and Norton, 2006; Bonsang, 2006)⁴. The sample of adult children who are not co-residing contains 29,488 observations in W1 and 20,637 observations in W2. (5) Finally, we select children appearing in both waves (13,754 observations in W1 and W2). Figure 1 summarizes the different combinations between receiving (or not) parental transfers and being (or not) an informal caregiver, for both waves. See the Web Appendix for descriptive statistics.

3. Empirical strategy and specification

This paper's Web Appendix develops a model similar to the one posited by Kuhn and Nuscheler (2007), where we derive a testable hypothesis regarding parental transfers that can be compared with the data. Our empirical approach considers a sample of N children observed for T years. For each adult child and year, we know whether they have received a parental transfer. These transfers are explained by a set of observable variables (sociodemographic characteristics of the offspring and parent, general economic conditions...), and can be expressed using the following censored-type model:

$$T_{it}^* = X_{it}\beta_1 + IC_{it}\beta_2 + \varepsilon_{it} \quad (12)$$

$$T_{it} = \begin{cases} T_{it}^* & \text{if } X_{it}\beta_1 + IC_{it}\beta_2 + \varepsilon_{it} > 0, i = 1, \dots, N; t = 1, \dots, T \\ 0 & \text{otherwise} \end{cases}$$

where T_{it} denotes the amount of money the child has received over the past year from the parent (in logs), and T_{it}^* represents a latent variable for the amount of the money transfer regardless of the participation decision. In addition, X_{it} is a vector of variables affecting the amount of the transfer and IC_{it} is the number of informal caregiving hours per week that the child provides the parent (in logs). We assume that the error term ε_{it} has two components, $\varepsilon_{it} = c_i + v_{it}$, where c_i represents time-constant unobservable variables affecting the decision on the amount of the transfer (i.e., importance that family places on money, family closeness), and v_{it} represents a time varying shock (i.e., ability to achieve financial success).

The vector of regressors includes the following groups of variables: (i) parental characteristics (age, gender, nationality, education, marital status, relationship with economic activity, health status, income and wealth-related variables, type and amount of formal care received, total number of children); (ii) characteristics of the child receiving the transfer (age, gender, being a stepchild, marital status, education, relationship with economic activity, number of children,

⁴See Byrne et al. (2009) for a review of family bargaining and living arrangements. Moreover, recent evidence has shown that co-residence with a child can impair parents' health, compared to living without a child (Maruyama, 2012). Adult children living with older parents incur a co-residence burden (reduced privacy, loss of leisure) and this disutility of the child provides the parents with a disincentive to invest in their own health. In this circumstance, the parent may want to alleviate the incremental child's burden either through financial compensation or by reducing the remaining years of life.

distance with respect to parent's house; (iv) transfer motives; (iii) macroeconomic indicators (see Table WA4 in the Web Appendix) ; (iv) and dummies for wave 1 and for countries.

As is well know, the estimation by LS using either the full observed sample (with zeros) or the selected sample generally gives biased estimators of the model's parameters. A common estimation alternative is the Tobit model (Tobin, 1958). However, the Tobit model has several potential shortcomings due to the nature of the assumptions made (see Jones, 1989, Garcia and Labeaga, 1996, or Long, 1996).

3.1. The double-hurdle model

When considering both the decision to provide financial support and its amount as a joint decision process, the double-hurdle model proposed by Cragg (1971) may be more appropriate. The model's main feature is that it allows the factors influencing both decisions to be different or, alternatively, it allows the same factor to affect both decisions differently. As the name "double-hurdle" suggests, individuals must "scale" two hurdles in order to provide their adult children with financial assistance.

In the first hurdle, the parent decides to make a money transfer, as a result of the utility maximization process, when the utility of providing a child with financial support is higher than the utility of not giving it (see the Web Appendix). However, we cannot observe utility directly, but instead use a binary variable ES_{it} , which takes the value 1 if the parent gives the transfer and 0 otherwise. The binary variable is related to utility as follows:

$$ES_{it} = \begin{cases} 1 & \text{if } W_{it}\gamma_1 + IC_{it}\gamma_2 + \mu_{it} > 0, i = 1, \dots, N; t = 1, \dots, T \\ 0 & \text{otherwise} \end{cases} \quad (13)$$

where W_{it} is the vector of explanatory variables that determine the willingness to provide financial support for adult children, γ_1 is the vector of corresponding parameters, and $\mu_{it} = d_i + \zeta_{it}$ ⁵, where both terms are assumed to have a normal distribution.

The second hurdle, which determines the transfer amount, is given by (12). However, we observe a transfer solely in the following case:

$$T_{it} = \begin{cases} T_{it}^* & \text{if } X_{it}\beta_1 + IC_{it}\beta_2 + \varepsilon_{it} > 0 \text{ and } ES_{it} = 1, i = 1, \dots, N; t = 1, \dots, T \\ 0 & \text{otherwise} \end{cases}$$

Given that the inclusion of the same set of regressors in each hurdle may hinder the identification of the model (although it is guaranteed by the model's non-linearities), we impose certain exclusion restrictions. Hence, the first hurdle includes the instrumental variable (IV) "charity work", which is a binary variable that takes the value 1 if the respondent has devoted time to voluntary or charity work or to help friends or neighbors. This variable is a measure of generosity or philanthropic sentiment, and there is little reason to believe that after conditioning on other covariates, the variable IV would be correlated with other time-varying factors in the error term.

Cragg's original model assumed that the errors of both hurdles (ε_{it} and μ_{it}) are normally distributed and independent ($cov(\varepsilon_{it}, \mu_{it}) = 0$). If these assumptions hold, the first hurdle can be estimated using a probit, and the second hurdle can be estimated using a truncated normal regression model.

⁵ For example, in the case of having several offspring, ζ_{it} may reflect a parent's aversion to inequality; that is, a parent's wish to treat all their children on an equitable basis and not give financial support to one child and not the others (See the "Fairness model" in Nyborg and Rege, 2003).

In order to obtain consistent estimates, we need to address two additional issues: (1) the explanatory variables must be independent of unobserved heterogeneity (c_i), and (2) the unobserved factors affecting economic transfers can also affect the provision of informal care, IC_{it} . The first problem can be solved by estimating the model assuming correlated random effects (CRE).⁶ In this context, we assume c_i and d_i are given as follows:

$$\begin{aligned} d_i &= Y + \bar{W}_i\gamma_3 + \omega_{1i}, \quad \omega_{1i}|W_i \sim N(0, \sigma_\omega^2) \\ c_i &= Y + \bar{X}_i\gamma_3 + \omega_{2i}, \quad \omega_{2i}|W_i \sim N(0, \sigma_\omega^2) \end{aligned} \quad (14)$$

where \bar{W}_i and \bar{X}_i represent, respectively, the mean of the first and second stage vectors of the explanatory variables. We then estimate a pooled CRE probit for the first hurdle, and a pooled truncated regression for the second one.

$$ES_i = Y + W_{it}\gamma_1 + IC_{it}\gamma_2 + \bar{W}_i\gamma_3 + \omega_{1i} + \mu_{it} \quad (15)$$

$$T_{it}^* = Y + X_{it}\beta_1 + IC_{it}\beta_2 + \bar{X}_i\beta_3 + \omega_{2i} + \varepsilon_{it} \quad (16)$$

3.2 Endogeneity of informal care

To address the issue of the potential endogeneity of informal care, we use a control function (CF) approach (Vella, 1993; Rivers and Vuong, 1998). Following Papke and Wooldridge (2008), the CF approach is a two-step procedure that both controls and tests for endogeneity in our double-hurdle model. First, we estimate a reduced form equation for our potential endogenous variable (IC_{it}) using a pooled Tobit regression with correlated random effects.

$$IC_{it} = \Pi_{it}\alpha_1 + \bar{\Pi}_i\alpha_2 + \varepsilon_{it} \quad (17)$$

where Π_{it} is a vector of explanatory variables affecting IC_{it} , $\bar{\Pi}_i$ represents the means of these variables, and ε_{it} is the error term. The vector Π_{it} includes: (i) parental characteristics (number of chronic illnesses, PADL disabilities and IADL disabilities, and number of daughters); child's characteristics (age, gender, being the eldest child, stepchild, the distance with respect to parent's house)⁷, and long-term care characteristics (homecare expenditure to GDP and number of nursing beds per 100,000 inhabitants). In order to reinforce identification, the last two variables are not included in the double-hurdle model. We consider that homecare expenditure might influence the reception of public formal care, whereas the number of nursing beds could affect the trade-off between receiving long-term care at home or in an institution. There is little reason to believe that these variables would directly affect the dependent variables in the double-hurdle model.

In the second step, we factor in the estimated residuals $\hat{\varepsilon}_{it}$ as an explanatory variable in the probit model for the decision on providing financial support (equation 15 or hurdle 1) and in the truncated regression for the amount of the money transfer (equation 16 or hurdle 2). A significant coefficient for $\hat{\varepsilon}_{it}$ indicates that IC_{it} is endogenous in a parental decision process to provide financial support for adult children.

4. Results

⁶ Fixed effects are not appropriate, given the "incidence parameters problem", and standard random effects are not robust for serial correlation.

⁷ As in Bolin et al. (2008) and Norton et al. (2013) we use the age and gender of the elder adult child as well as the number of sisters.

In this section, we present the key findings obtained from the analysis. We proceed sequentially, and present the test results first. We then present the first-stage results regarding informal care. Finally, we present the results regarding the double-hurdle model. Instead of presenting coefficients that are sometimes hard to interpret, we present Average Partial Effects (APE)⁸.

4.1. Validation of the model

Before testing the suitability of the double-hurdle model, we must ensure that the models to be compared satisfy the required assumptions. The Tobit model requires that the errors are normally distributed and homoskedastic.⁹ To validate these distributional assumptions, we perform an LR test for homoskedasticity and a moment-based test for the normality of the Tobit and double-hurdle models. We cannot accept the assumption of normality and homoskedasticity for all the models. To account for heteroskedasticity, we specify the standard deviation as a function of the continuous variables in the univariate and bivariate specifications.

After the model diagnostic phase, we turn to the choice of the most appropriate model. As the double-hurdle model with dependent errors nests the other specifications, we firstly estimate this model. The estimation of the Cragg model with dependent errors reveals that, on the one hand, our exclusion restriction is valid,¹⁰ and on the other hand, we cannot reject the hypothesis of zero-correlation between the errors in both equations.¹¹ Furthermore, an LR test rejects the null hypothesis (at the 1% level) that the Tobit and independent Cragg models are statistically equivalent.¹² Consequently, the double-hurdle model with independent errors is our preferred model.¹³

4.2. First stage IC result

Table 1 shows the results of the estimation of the pooled Tobit regression for IC_{it} in equation (17). Parents with more chronic illnesses, and more IADL disabilities, receive more informal caregiving hours. Being a stepchild, the eldest child or having other sisters does not have a significant influence on the number of informal caregiving hours. By contrast, living in the same building increases caregiving by 1.16 hours/week, whereas each additional adult child reduces caregiving by 1 hour/week. This last finding constitutes evidence against the “demonstration effect”, and proves the difficulties faced by “sandwich caregivers” to reconcile childcare and informal care.

⁸ The standard errors of the APE have been obtained by bootstrap with 100 iterations.

⁹ In this paper, we check this assumption using the conditional moment test proposed by Drukker (2002), where critical values are obtained after 500 bootstrap iterations.

¹⁰ To test the suitability of the excluded instrument, we have used an IV test adapted to non-linear models (Baum et al., 2003; Lochner and Moretti, 2001). Both tests indicate that the instrument is valid.

¹¹ The estimated correlation coefficient is -0.002158 and is not significant, implying that errors in both equations are independent.

¹² LR test = $-2 * (\log-L \text{ Tobit} - \log-L \text{ DH}) = -2 * (-18,632.78 + 16,258.41) = 4,748.74$, which exceeds the critical value [$\chi^2(79) = 111.14$] at the 1% significance level.

¹³ In addition to that, we have checked that our results are robust to attrition by comparing them with those using inverse probability weights (Wooldridge, 2011). Using inverse probability weights does not significantly alter the estimated results (the complete set of results is available upon request).

The number of nursing beds or homecare expenditure is significant at 1% and negative. An increase by 100 beds per 100,000 inhabitants or an increase by 0.05% in homecare expenditure would reduce informal caregiving hours by one hour per week.

4.3. Double-hurdle model results

This section presents the estimation results obtained from the double-hurdle model with independent errors.

Endogeneity of informal care and its effect

Table 2 shows that the residuals obtained from the first-stage regressions $\hat{\epsilon}_{it}$ are significant for both hurdles, confirming that informal care is an endogenous variable in our model. As a consequence, these results are preferred to those estimated under the assumption of exogeneity of the informal care variable (the complete set of results is available upon request).

¹⁴Once the endogeneity of informal care is taken into account, we find that each informal caregiving hour reduces a parental transfer by 1.485 (4.415 PPP). By multiplying this coefficient by the average number of caregiving hours per week (in logs) and considering that the average transfer received by informal caregivers is 6.085 (in logs and PPP), we realize that being an informal caregiver reduces the average transfer by 10.18%.

Norton and Van Houtven (2013) have found no significant relationship between caregiving and all types of transfers (including gifts). When they restricted themselves to money transfers, there was a negative relationship between the provision of transfers and caregiving behavior, but a positive one between caregiving hours and the transfer amount. They explain this apparently contradictory result by suggesting that it was the combination of “persistently generous mothers” (they concentrated only on mothers), who provided transfers regardless of care, and other mothers who rewarded the very intensive care received from adult children. We propose an additional explanation, based on the positive aspects of caregiving (personal satisfaction, discovery of new abilities), for which SHARE data do not provide information, but which undoubtedly condition the parent-child relationship. It might be that parents (care receivers) would like to provide financial support for their adult child (caregiver), but the latter would prefer their parent saved it or spent it on themselves.¹⁵

The effect of sociodemographic variables

Fathers provide more financial support than mothers, although the transfer probability and amount decrease as they get older. Regarding a parent’s financial situation, higher income, real estate income or being a house-owner all have a positive effect for both hurdles, with the impact being more intense for “house-owner” (increasing first hurdle by 31.2.3 pp.). Parents with very good/good health or fewer PADL/IADL disabilities also provide more transfers and are more generous than parents in bad health. Similar results have been found by McGarry (1999) and McGarry and Schoeni (1997), but only for the decision to make money transfers.

¹⁴ In the preferred model, the coefficient of the number of informal caregiving hours is lower than the coefficient when assuming exogeneity, indicating that informal care has a significant and negative effect over parental transfers even after controlling for endogeneity.

¹⁵ As we have not analyzed a caregiver’s inclusion in the parent’s life insurance policies or bequests, we cannot anticipate qualifying their behavior as purely altruistic.

Finally, devoting time to charity or helping other acquaintances increases the probability of transfer by 2 pp.

As our theoretical model predicts, more expensive formal care decreases the probability of parental transfers and their amount (an expenditure of 1000 PPP decreases the first hurdle by 6.1 pp. and the second hurdle by 990.05 PPP). Receiving more hours of formal personal care decreases parental support (100 hours of personal formal care decreases the first hurdle by 1.4 pp. and the second hurdle by 89.67 PPP). However, there is no significant relationship between overnight stays in a nursing home, meals-on-wheels and formal care for domestic tasks and parental transfers. Receiving a disability/long-term care benefit does not affect the probability of transfers when IC is treated as exogenous (data available upon request), but increases both the probability and amount when we control for endogeneity. This constitutes evidence of the “crowding-out” effect. However, this statement has to be tempered because parents who receive disability benefits have an average of 3.63 chronic illnesses, 0.74 PADL disabilities and 1.38 IADL disabilities, with these variables having a negative effect over transfer probability and amount.

Receiving care from a private care provider has a negative effect over both decisions. The estimated coefficients for both hurdles corresponding to “disability benefit” and “private formal care” have almost the same magnitude. Therefore, the average partial effect when receiving both types of care simultaneously would be cancelled out (-0.0017 (p-value: 0.482) for the first hurdle; -0.0011 (p-value: 0.633) for the second hurdle).

The number of grandchildren increases both the transfer probability and its amount. To some extent, this result may indicate the existence of dynastic objectives in intergenerational giving, as the grandparents recognize that larger families have more financial needs. Finally, an adult child’s unemployment increases the probability of receiving a transfer and its amount. Note that the transfer motive “help with unemployment” records the second highest estimated coefficient for transfer amount (after “help with divorce”).

The effect of macroeconomic conditions and the economic environment

We find that a higher regional unemployment rate reduces the probability of receiving a transfer and its amount. This result may seem striking, as we might suppose that in an economically disadvantaged region more adult children would be unemployed or be in need of cash, and would therefore require parental help. In this respect, Altonji et al. (1997) found that the probability of receiving a parental transfer decreases if there was uncertainty about an adult child’s future income. By contrast, unemployment benefits do not have a significant effect on either of the two hurdles. Therefore, more generous unemployment benefits neither increase nor decrease parental transfer rates (no evidence of crowding-out effect).

We have re-estimated the double-hurdle model with independent errors, introducing interactions between country variables and the informal caregiving hours variable (in logs). Using the average partial effects and the mean caregiving hours for each country and year, we have computed the average reduction in transfer amount experienced by caregivers and compared it with the average transfer amount received by non-caregivers for the same country and year. The results for this experiment are shown in Table 3. All the figures for the estimated average partial effect (APE) are significant at 1%. In absolute terms, the sharpest decrease in transfer amount corresponds to Switzerland (2004), and France and the Netherlands (2006). In comparison with the average transfer received by non-caregivers, the

biggest decrease corresponds to Sweden (39.25%), the Netherlands (31.76%) in 2004, and the Netherlands (42.17%) and France (24.11%) in 2006.

Average Partial Effects by quintiles

Table 4 shows the APE of the unemployment rate and parental income when dividing the sample by quintiles. The negative effect of the unemployment rate over parental transfers is more severe in regions with a lower unemployment rate (-0.0058), as opposed to regions with the highest unemployment rate (-0.0039). Consequently, parental support is 56% less intense for the 20% of parents living in regions with the most favorable employment conditions than it is for the 20% of parents living in regions with the most unfavorable employment conditions. Higher parental income increases parental transfers, with the effect being stronger as we move from the lowest quintile (0.035) to the highest one (0.057). Therefore, parental support is 62% stronger for the 20% of parents with the highest income than it is for the 20% of parents with the lowest income.

4.4. The dynamic effects of informal caregiving

Previous results regarding the effect of informal care over parental transfers should not be interpreted as a parent's refusal to help their caregivers, or that adult children who provide informal care receive an unequal treatment with respect to non-caregivers. Our estimations deal only with the current effect of informal care over parental transfers because SHARE data only provide information on transfers made over the last year. There could be an infrequency problem, and we cannot rule out that informal caregivers received money transfers more than one year ago.¹⁶

Within the scope of our research, the only way of introducing lagged-effects is to define a variable "lagged informal caregiving hours" as the number of caregiving hours that the parent received from that child in a previous wave (clearly, this variable can only be defined for 2006). By re-estimating the CRE double-hurdle model, we observe that the residual term generated by equation (17) is statistically significant in both waves (0.198 (p-value: 0.000) in the first hurdle and 1.515 (p-value: 0.000) in the second one) and the effect of having received informal care in the past wave is significant and positive in both waves (0.008 (p-value: 0.055) in the first hurdle and 0.004 (p-value: 0.000) in the second one). An additional caregiving hour provided in the past wave increases a current transfer by 0.0037 (in logs and PPP). By multiplying this coefficient by the average lagged informal caregiving hours (in logs) and taking into account the average transfer received by caregivers in wave 2, we find that having been an informal caregiver in the past wave increases current parental transfers by only 0.027%.¹⁷

Finally, the effect of contemporaneous informal care is still significant and negative (-0.213 (p-value: 0.000) in the first hurdle and -1.567 (p-value: 0.004) in the second one). The total effect (current + lagged) of informal caregiving hours is statistically significant and negative (-0.209 (p-value: 0.021) for the first hurdle, and -1.516 (p-value: 0.000) for the second one).

5. Conclusions

¹⁶See Deaton and Irish (1984) and Blundell and Meghir (1987) for an analysis of infrequency in panel data.

¹⁷Norton et al. (2013) also observed that mothers were more prone to give their children transfers in 2003 if they had received informal care in the past.

In this work we have analyzed the relationship between intergenerational transfers and the provision of informal care from adult children to older parents. Our results indicate that the probability of receiving parental transfers and their amount is lower for caregivers as compared to non-caregivers. This evidence provides support for the “Selective Investment Theory” (Brown and Brown, 2006), according to which a caregiver is more focused on the parent’s well-being and less on the costs entailed. In this context, the relationship between caregiving and transfer amount may be negative.

Regarding the implications for policymakers, we distinguish between labor policies and long-term care policies. In the former case, an adult child’s unemployment situation and regional unemployment rate have contrasting effects over parental behavior. The probability of a parental transfer and its amount increase when the child is unemployed, but higher regional unemployment rates decrease both probabilities. Although the magnitude of the first effect is higher than the second one, the negative influence of the unemployment rate over parental transfers could be interpreted as an increase in precautionary savings or a sign of transfer rationing to safeguard resources for the future.

With respect to long-term care policies, the analysis is more complicated because we need to differentiate between economic/in-kind benefits, personal care/domestic tasks and public/private providers. The probability of making a transfer and its amount decrease when the parent receives personal care, but there is no significant effect for domestic tasks, meals-on-wheels and overnight stays in a nursing home. Receiving a public financial benefit increases both probabilities, whereas if the parent has to pay for private formal care, both the probability of providing financial support and its amount decrease. Therefore, only public economic benefits (not in-kind benefits) generate crowding-out effects.

Perhaps unexpectedly, we have found evidence to show that the simultaneous provision of informal care decreases the probability of receiving a transfer and its amount, although lagged caregiving has a small, but positive, effect. This result begs the question of what a parent’s and an adult child’s reaction would be if (informal) long-term care benefits were substituted by formal care (in particular, homecare). Given that both variables have opposite effects on parental transfers, we could avoid the crowding-out effect without undermining parental well-being.

References

- Abrams BA, Schmitz MA. (1978). The ‘crowding-out’ effect on government transfers on private charitable contributions. *Public Choice* 33, 29-39.
- Albertini M, Kohli M, Vogel C. (2007). Intergenerational transfers of time and money in European families: common patterns - different regimes? *Journal of European and Social Policy* 17(4), 319-334.
- Altonji JG, Hayashi F, Kotlikoff LJ. (1997). Parental altruism and inter-vivos transfers: theory and evidence. *Journal of Political Economy* 105(6), 1121-1166.
- Andreoni J. (1993). An experimental test of the public goods crowding-out hypothesis. *American Economic Review* 83, 1317-1327.
- Becker S. (1991). *A treatise of the family*. Cambridge, MA: Harvard University Press.
- Barro RJ. (1974). Are government bonds net wealth? *Journal of Political Economy* 82(6), 1095-1117.
- Baum C, Schaffer, M., Stillman, S. (2003) Instrumental variables and GMM: Estimation and testing. *Stata Journal*, 3(1).

- Bernheim BD, Schleifer A, Summers H. (1985). The strategic bequest motive. *Journal of Political Economy* 93, 1045-1076.
- Blundell R, Meghir C. (1987). Bivariate alternatives to the Tobit model. *Journal of Econometrics* 34, 179-200.
- Bolin K, Lindgren B, Lundborg P. 2008. Your next of kin or your new career? Caring and working among the 50+ of Europe. *Journal of Health Economics* 27(3), 718-738.
- Bonsang E. (2006). How do middle-aged children allocate time and money transfers to their older parents in Europe? CREP, HEC-Management School. University of Liege. WP No. 2006/02.
- Brandt M. (2011). Intergenerational help and public assistance in Europe. A case of specialization? Mannheim Research Institute for Economics of Aging. WP 236-2011.
- Brown S, Brown R. (2006). Selective investment theory: recasting the functional significance of close relationships. *Psychological Inquiry* 17(1), 1-29.
- Byrne D, Goeree M, Hiedemann B, Stern S. (2009). Formal home health care, informal care and family decision making. *International Economic Review* 50(4), 1205-1242.
- Callegaro L, Pasini G. (2007). Social interaction effects in an inter-generational model of informal caregiving. University of Ca' Foscari of Venice. Department of Economics. WP 10/WP/2007.
- Cameron AC, Trivedi PK. (2009). *Microeconometrics using STATA*. StataCorp LP.
- Charles K, Sevak P. (2005). Can family caregiving substitute for nursing home care? *Journal of Health Economics* 24(6), 1174-1190.
- Cox D. (1987). Motives for private income transfers. *Journal of Political Economy* 95(3), 508-546.
- Cox D, Rank M. (1992). Inter-vivos transfers and intergenerational exchange. *Review of Economics and Statistics* 74(2), 305-314.
- Cox D, Stark O. (1996). Intergenerational transfers and the "Demonstration Effect". Boston College. Working Paper No. 329.
- Cragg JG. (1971) Some Statistical Models for Limited Dependent Variables with Application to the Demand for Durable Goods. *Econometrica* 39(5), 829-844
- Deaton A, Irish M. (1984), A statistical model for zero expenditures in household budgets. *Journal of Public Economics* 23, 59-80.
- Drukker DM. (2002). Bootstrapping a conditional moment test for normality after tobit estimation. *The Stata Journal* 2(2), 125-139.
- García J, Labeaga JM., (1996). Alternative approaches to modeling zero expenditure: an application to Spanish demand for tobacco. *Oxford Bulletin of Economics and Statistics* 58, 489-503.
- Gersovitz M. (1988). Savings and development. In H. Chenery and T. Srinivasan, *Handbook of developmental economics*, vol. 1. North Holland Press: Amsterdam.
- Henretta JC, Hill MS, Li W, Soldo BJ, Wolf DA. (1997). Selection of children to provide care: the effect of earlier parental transfers. *The Journal of Gerontology Series B*, 52B, 110-119.
- Jones AM. (1989). A double-hurdle model of cigarette consumption. *Journal of Applied Econometrics* 4(1), 23-39.
- Knoef M, Kooreman P. (2011). The effects of cooperation: a structural model of siblings' caregiving interactions. IZA DP 5733.
- Kohli M, Albertini M. (2007). The impact of welfare and family regimes on transfers between older parents and their adult children. *Journal of European and Social Policy* 17, 319-334.
- Kuhn M, Nuscheler R. (2007). Optimal public provision of nursing homes and the role of information. Rostock Center DP 13.
- Litwak E. (1985). *Helping the elderly. Complementary roles of informal networks and formal systems*. New York: Guildford Press.
- Lochner L, Moretti E. (2011). Estimating and testing non-linear models using instrumental variables. NBER WP 17039.
- Long JS. (1996). *Regression models for categorical and limited dependent variables*. Newbury Park, CA, USA: SAGE Publications.
- MacDonald M, Koh S. (2003). Consistent motives for inter-family transfers. *Journal of Family and Economic Issues* 24, 73-97.
- Maruyama S. (2012). Inter vivos health transfers: final days of Japanese elderly parents. University of New South Wales. Australian School of Business RP No. 2012-20.

- McGarry K, Schoeni RF., (1995). Transfers behavior in the Health and Retirement Study: measurement and the redistribution of resources within the family. *The Journal of Human Resources* 30S, 184-226.
- McGarry D, Schoeni RF. (1997). Transfer behavior within the family: results from the Asset and Health Dynamics Study. *The Journal of Gerontology* 52B, 82-92
- McGarry K. (1999). Inter vivos transfers and intended bequests. *Journal of Public Economics* 73, 321-351.
- Moffat PG. (2005). Hurdle models of loan default. *Journal of the Operational Research Society* 56, 1063-1071.
- Norton EC, Nicholas LH, Huang S. (2013). Informal care and inter-vivos transfers: results from the National Longitudinal Survey of Mature Women. NBER WP 18948.
- Nyborg K, Rege M. (2003). Does public policy crowd out private contributions to public goods? *Public Choice* 115, 397-418.
- Papke LE, Wooldridge JM. (2008). Panel data methods for fractional response variables with an application to test pass rates. *Journal of Econometrics* 145, 121-133.
- Pezzin L, Schone B. (1997). The allocation of resource in intergenerational households: adult children and their elderly parents. *American Economic Review* 87(2), 460-464.
- Rainer H, Siedler T. (2009). O brother, where art you? The effects of having a sibling on geographic mobility and labor market outcomes. *Economica* 76, 528-556.
- Rivers D, Vuong QH. (1988). Limited information estimators and exogeneity tests for simultaneous probit models. *Journal of Econometrics* 39, 347-366.
- Schenk N, Dykstra P, Maas I. (2010). The role of European welfare states in intergenerational money transfers: a micro level perspective. *Ageing & Society* 30, 1315-1342.
- Sloan FA, Hoerger TJ, Picone, G. (1996). Public subsidies, private provision of care and living arrangements of the elderly. *Review of Economics and Statistics* 78(3), 428-440.
- Sloan FA, Picone G., Hoerger TJ. (1997). The supply of children's time to disabled elderly parents. *Economic Inquiry* 35(2), 295-308.
- Sloan FA, Zhang HH, Wang J. (2002). Upstream intergenerational transfers. *Southern Economic Journal* 69(2), 363-380.
- Tobin J. (1958). Estimation of relationships for limited dependent variables. *Econometrica* 26(1), 24-36.
- Van Houtven CH, Norton EC. (2004). Informal care and health care use of older adults. *Journal of Health Economics* 23(6), 1159-1180.
- Van Houtven CH, Norton EC. (2006). Inter-vivos transfers and exchange. *Southern Economic Journal* 73(1), 157-172.
- Vella F. (1993). A simple estimator for simultaneous models with censored endogenous regressors. *International Economic Review* 34(2), 441-457.
- Wooldridge J. (2011). *Econometric analysis of cross sections and panel data*. MIT Press. Cambridge

Figure 1. Distribution of adult children according to the reception of transfers (T) and the provision of informal care (IC) for waves 1 and 2 of SHARE.

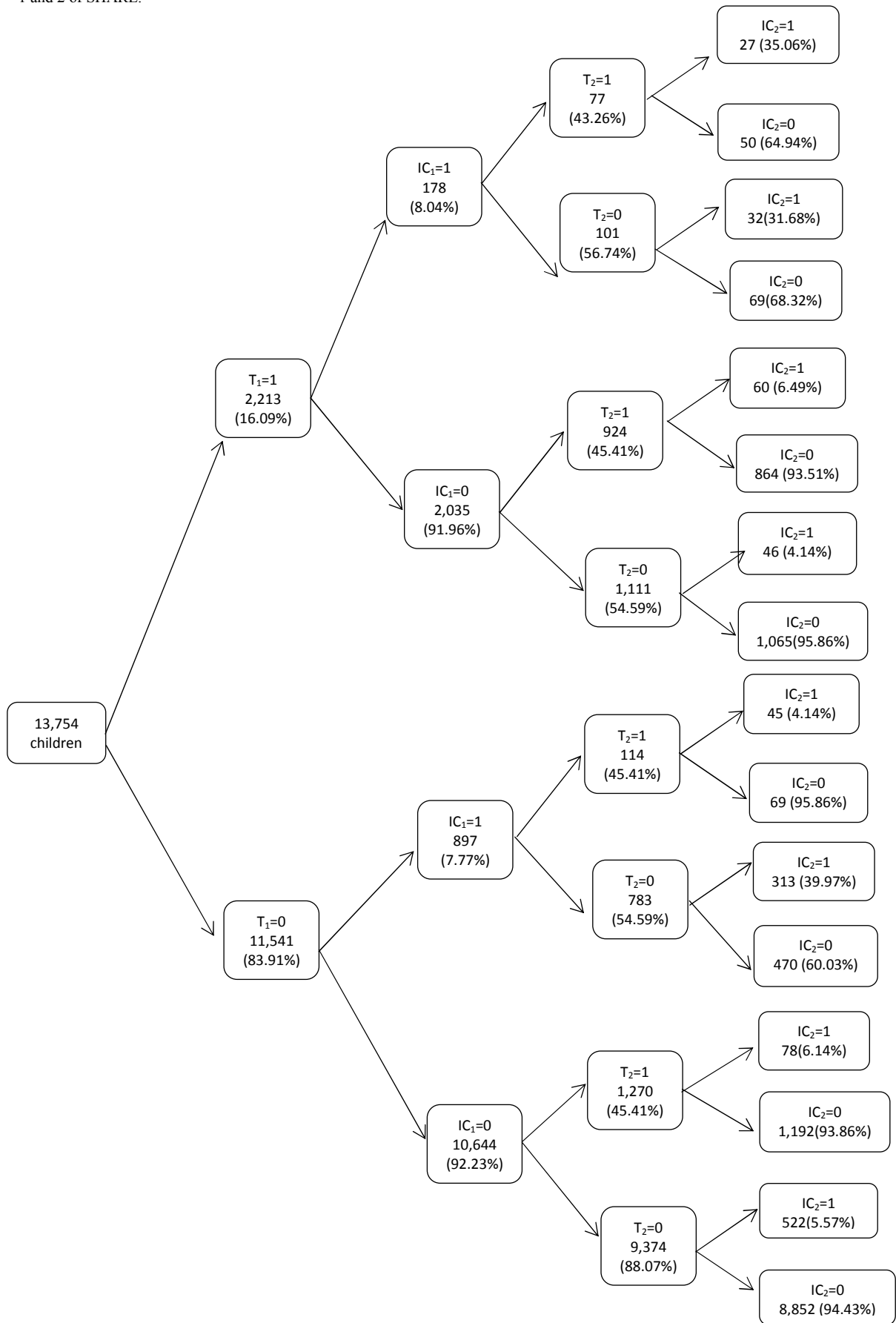


Table 1. CRE Tobit for number of informal caregiving hours (in logs). Average Partial Effects.

	Coef.	Std. Error
Parent		
Number of chronic illness	0.005	0.002
Number of PADL disabilities	-0.007	0.006
Number of IADL disabilities	0.049	0.004
Child		
Age	0.000014	0.000
Woman	0.023	0.005
Stepchild	0.001	0.036
Other sisters	-0.005	0.003
Eldest child	0.040	0.054
Distance with respect to parent		
Same building	0.156	0.053
Less than 5 Km	0.084	0.051
Between 5 and 25 Km	0.067	0.051
More than 25 Km	0.062	0.051
Number of children	-0.004	0.002
Long-term care indicators		
Nursing beds per 100,000 inhabitants	-0.000013	0.000
Homecare expenditure (%GDP)	-0.020	0.008
Year 2004	0.013	0.005
Constant	-0.098	0.075
N		27,508
Log likelihood		-21625.127
Wald test		$\chi^2(16) = 1234.55$
Pseudo-R ²		0.0278

Omitted due to space constraints: country variables

Table 2. Double-hurdle model (informal caregiving hours treated as endogenous). Average Partial Effects.

	Has received parental transfer		Amount of parental transfer	
	Coef.	Std. Error	Coef.	Std. Error
Residual ($\hat{\epsilon}_{it}$)	0.191	0.073	1.453	0.352
Parent				
Income (PPP) in log	0.047	0.005	0.007	0.000
Real estate income (PPP) in log	0.065	0.007	0.009	0.001
House-owner	0.312	0.035	0.043	0.006
Owing money (PPP) in logs	0.011	0.005	0.002	0.001
Formal care cost (PPP) in logs	-0.061	0.022	-0.010	0.003
Male	0.220	0.032	0.033	0.005
Age	-0.022	0.002	-0.003	0.000
National	-0.024	0.124	-0.003	0.020
Self-reported health				
Very good	0.230	0.079	0.033	0.012
Good	0.141	0.083	0.021	0.009
Regular	0.003	0.079	0.001	0.010
Bad	-0.088	0.098	-0.014	0.012
Number of chronic illnesses	-0.002	0.002	0.004	0.011
Number of PADL disabilities	-0.011	0.005	-0.057	0.028
Number of IADL disabilities	-0.013	0.004	-0.086	0.021
Level of education				
None	-0.965	0.109	-0.146	0.019
Elementary	-0.450	0.079	-0.065	0.008
High School	-0.126	0.082	-0.020	0.011
College	-0.021	0.056	-0.008	0.008
Marital status				
Married	-0.053	0.092	-0.005	0.011
Separated	-0.207	0.109	-0.022	0.020
Single	-0.184	0.155	-0.023	0.023
Widowed	-0.098	0.067	-0.012	0.019
Relation with economic activity				
Retired	0.124	0.075	0.013	0.012
Employed	0.207	0.083	0.029	0.011
Unemployed	0.049	0.106	0.007	0.018
Homemaker	0.114	0.115	0.009	0.014
Charity work	0.020	0.004		
Formal care				
Personal care (hours/year)	-0.014	0.006	-0.109	0.040
Domestic tasks (hours/year)	-0.040	0.025	-0.006	0.004
Weeks receiving nursing care	0.002	0.001	0.024	0.021
Meals-on-wheels	0.036	0.145	0.002	0.027

Long-term care/disability benefit	0.035	0.012	0.240	0.120
Receives private care	-0.037	0.022	-0.241	0.111
Total number of children	-0.222	0.015	-0.032	0.003
Child				
Male	-0.018	0.006	-0.062	0.022
Age	-0.004	0.001	-0.024	0.004
Stepchild	0.037	0.028	0.286	0.107
Distance with respect to parent				
Same building	0.007	0.013	0.045	0.070
Less than 5 Km	-0.009	0.004	-0.069	0.045
Between 5 and 25 Km	-0.007	0.006	-0.042	0.029
More than 25 Km	0.014	0.003	0.099	0.036
Level of education				
None	-0.059	0.143	-0.006	0.017
Elementary	-0.061	0.042	-0.005	0.006
High school	-0.102	0.058	-0.011	0.009
College	0.106	0.041	0.016	0.005
Marital status				
Married/co-habiting	0.580	0.171	0.084	0.039
Separated/divorced	0.720	0.300	0.106	0.034
Single	0.819	0.134	0.120	0.038
Widowed	0.652	0.295	0.089	0.059
Relation with economic activity				
Employed	0.015	0.079	0.008	0.015
Unemployed	0.249	0.092	0.046	0.020
Studying	0.762	0.134	0.115	0.017
Retired	0.101	0.151	0.013	0.020
Homemaker	-0.043	0.143	-0.001	0.024
Disabled for work	0.010	0.107	0.013	0.018
Children (parent's grandchildren)	0.027	0.009	0.004	0.001
Informal care (hours per week)	-0.198	0.042	-1.485	0.451
Transfer motive				
Meet basic needs			2.487	0.067
Buy/furnish house			2.438	0.082
Help with large item of expenditure			2.682	0.043
Major family event			2.846	0.122
Help with divorce			2.954	0.349
Help following bereavement/illness			2.575	0.201
Help with unemployment			2.840	0.383
Macroeconomic indicators				
Unemployment rate	-0.052	0.007	-0.008	0.001
Unemployment growth rate	0.002	0.002	0.000	0.000
GDP growth rate	0.028	0.012	0.003	0.002
Unemployment benefits (PPP)	0.000	0.000	0.000	0.000
Gift tax rate	-0.054	0.136	-0.008	0.017
Interest rate (loans to households)	0.038	0.108	0.006	0.019
Year 2004	-0.101	0.102	-0.013	0.012
Countries (omitted: Switzerland)	0.000	0.000	0.000	0.000
Austria	-0.202	0.399	-0.033	0.071
Germany	0.048	0.751	-0.002	0.139
Sweden	0.099	0.323	0.064	0.042
Netherlands	0.068	0.441	-0.002	0.057
Spain	-0.691	1.558	-0.124	0.195
Italy	0.372	0.597	0.068	0.076
France	-0.012	1.131	-0.020	0.148
Denmark	-0.424	0.451	-0.038	0.084
Belgium	-0.668	0.917	-0.137	0.111
N	27.508			
Log likelihood	-16231.65			
σ	1.200 (p-value: 0.000)			
Wald test	$\chi^2(79) = 2318.87$ (p-value: 0.000)			

Standard errors obtained by bootstrap after 100 iterations.

Table 3. Estimated reduction in annual transfer amount for caregivers by country and year (in PPP)

	2004			2006		
	p-value of the APE for the interaction country*hours	Estimated reduction	% with respect to transfers received by non-caregivers	p-value of the APE for the interaction country*hours	Estimated reduction	% with respect to transfers received by non-caregivers
Austria	0.000	281.91	7.22	0.025	184.39	6.24
Belgium	0.000	634.58	13.58	0.029	460.51	4.89
Denmark	0.000	59.53	20.89	0.000	63.42	13.21
France	0.000	559.64	12.57	0.000	1,233.19	24.11
Germany	0.001	456.33	16.05	0.000	89.67	2.36
Italy	0.001	399.09	6.93	0.005	315.70	6.32
Netherlands	0.000	680.39	31.76	0.008	2,403.58	42.17

Spain	0.003	73.10	1.49	0.000	123.35	5.05
Sweden	0.015	53.48	39.25	0.011	73.51	21.28
Switzerland	0.001	730.15	16.45	0.000	352.15	6.61

Assuming that the caregiver provides the reported number of caregiving hours per week throughout the year.

Table 4. Average partial effects of unemployment rate and parent's income (by quintiles) over the first hurdle.

	Coef.	Std. Error	p-value	Mean value for each quintile
Regional unemployment rate				Mean unemployment rate (%)
1 (Lowest)	-0.058	0.009	0.000	4.2
2	-0.051	0.008	0.000	5.2
3	-0.052	0.007	0.000	7.3
4	-0.050	0.007	0.000	10.2
5 (Highest)	-0.039	0.004	0.000	17.9
Income (PPP) in log				Mean income in logs (in PPP between parentheses)
1 (Lowest)	0.035	0.003	0.000	4.807 (122.384)
2	0.048	0.003	0.000	7.700 (2,209.660)
3	0.046	0.004	0.000	9.206 (9,959.996)
4	0.046	0.006	0.000	9.862 (19,199.989)
5 (Highest)	0.057	0.006	0.000	13.033 (457,393.797)

Estimation by CRE including the residual from the pooled Tobit for the regression of informal caregiving hours.

Web Appendix (not for publication):

A. A Model of informal care and transfers

In this section, we develop a model similar to the one formulated by Kuhn and Nuscheler (2007), where the parent (P) has only one child (CH) who can provide informal care. In addition, parents can receive formal care (private or public).¹⁸ In this model, we propound testable hypotheses regarding parental transfers that can be compared with the data. Parents may decide to provide financial support for their adult children. Financial support from parents may alleviate times of economic hardship in the case of under-developed money markets (Gersovitz, 1988) or in a period of lending constraints (i.e., between 2007 and 2010, the success rate for bank-loan applications fell from 87.3% to 59.1% in Spain, and from 91.8% to 59.8% in Denmark; Eurostat Statistics).

The budgetary constraint for parents is given by equation (1), where parental income (Y^P) is distributed among parental consumption (C^P), money transfers to adult children (TR^P) and the purchase of formal long-term care (FC), where p is the relative price of formal care with respect to parental consumption.

$$Y^P = C^P + TR^P + pFC \quad (A1)$$

On the other hand, an adult child's income (Y^{CH}) may come from parental transfers (TR^P) or from their own work, given the number of hours of paid employment (E^{CH}) and market wage with respect to private consumption (w)¹⁹. For the sake of simplicity, we assume that an adult child's total income is spent on market consumption (C^{CH}) (i.e., there is no credit market).

$$Y^{CH} = wE^{CH} + TR^P \quad (A2)$$

$$Y^{CH} = C^{CH} \quad (A3)$$

The total amount of an adult child's available time (T) has to be shared among leisure (L^{CH}), paid employment (E^{CH}) and informal caregiving for their parents (IC^{CH}). When an adult child lives far from the parent's house and needs to invest a certain amount of time in displacement²⁰, $(1+\delta)$ is the time cost required to provide one unit of informal care. Therefore, the price of informal care is higher than the price of leisure:

$$T = L^{CH} + E^{CH} + (1 + \delta)IC^{CH} \quad (A4)$$

Parental utility depends on three arguments: their own consumption (C^P), their level of health (H^P) and the amount of the adult child's consumption (C^{CH}). This utility function reveals parental concern for an adult child's ability to buy goods and services that guarantee an

¹⁸ Alternatively, we could have assumed that there are other adult children, who could also provide informal care. However, this could trigger a problem of strategic behavior among siblings when the parent's health is considered a common good, and given the amount of care provided by other children, one child can decide to free ride. See Rainer and Siedler (2005) and Callegaro and Pasini (2007) for an analysis of interactions among siblings.

¹⁹ We consider that wage rates are exogenous. Also using SHARE data, Bolin et al. (2008) did not find any significant wage effects in the provision of informal care.

²⁰ Following Charles and Sevak (2005), we consider that the variable "distance between parents and children" is exogenous.

acceptable level of well-being. With respect to parental health, we assume that this variable is the result of the combination of informal care provided by adult children (IC^{CH}), and of the formal care (FC) that the parent can buy in the long-term care market. We also assume that both types of care may record different marginal productivities²¹ (i.e., formal care may be more technological or involve specialized tasks), and in this respect, α denotes the marginal productivity of IC^{CH} with respect to FC :

$$U^P = U^P(C^P, H^P, C^{CH}) \quad (A5)$$

$$H^P = \lambda IC^{CH} + FC \quad (A6)$$

An adult child's utility depends on four arguments: their level of consumption (C^{CH}), the time devoted to leisure (L^{CH}), the time devoted to informal care (IC^{CH}) and parental health²² (H^P).

$$U^{CH} = U^{CH}(C^{CH}, L^{CH}, IC^{CH}, H^P) \quad (A7)$$

A family (parents + adult child) maximizes the weighted sum of (5) and (7) subject to the constraints (1)-(4). We assume that U^P and U^{CH} are concave and increasing with $U^{P'}(0)=U^{CH'}(0) = \infty$. The parameter κ ($0 < \kappa < 1$), is a measure of the parental degree of benevolence:

$$U^{Family} = U^P + \kappa U^{CH} \quad (A8)$$

The first-order conditions of the utility maximization problem are given by (9)-(11). The sub-index indicates the variable for which the partial derivative²³ has been computed, and as per standard practice we assume that $U_{C^P}^P > 0$, $U_{C^{CH}}^P > 0$, $U_{H^P}^P > 0$ and $U_{C^{CH}}^{CH} > 0$, $U_{H^P}^{CH} > 0$, $U_{L^{CH}}^{CH} > 0$, $U_{IC^{CH}}^{CH} < 0$:

$$\frac{\kappa}{w} U_{L^{CH}}^{CH} = U_{C^P}^P \quad (A9)$$

$$\frac{\kappa}{w} U_{L^{CH}}^{CH} = \frac{1}{p} (U_{H^P}^{CH} + \lambda U_{H^P}^P) \quad (A10)$$

$$\kappa(1 + \delta) U_{L^{CH}}^{CH} = U_{IC^{CH}}^{CH} + \lambda (U_{H^P}^P + \beta U_{H^P}^{CH}) \quad (A11)$$

To determine the effect of parental and adult child characteristics over the amount of parental transfers, we compute the total derivatives of the first-order conditions and the restrictions, and solve the system of equations.

²¹ Kuhn and Nuscheler (2007) assumed there may be a productivity difference between formal and informal care. Technological tasks requiring some degree of medical or specific knowledge are more likely to be performed by social services or formal caregivers, whereas informal caregivers tend to be focused on care-receiver's needs and wishes (Litwak, 1985).

²² Adult children's concern about parental health may be informed by altruistic motives, but it may be also enforced by law. In France, article 207 of the Civil Code states that adult children are obliged to provide for aging parents who are unable to look after themselves.

²³ We assume that the marginal utility of informal care is negative. Results reported by Byrne et al. (2009) show that adult children provide informal care for their parents because they care about their parent's health (altruistic motivation), but also that the provision of informal care generates distortions in adult children's life (labor, leisure...), which are usually denoted as "caregivers' burden".

Parental transfers are positively correlated with parental income. In this case, both altruism and exchange hypotheses predict the same effect. By contrast, an adult child's wage exerts an indeterminate influence over transfers. To explain this result, we have to realize that parental transfers involve two components: (1) the decision of whether or not to provide financial support, and (2) in the event of an affirmative response, the amount of support given to the child. With respect to the first decision, if the parent behaves in an altruistic manner, an increase in an adult child's income (approximated by the child's wage) reduces the parental marginal utility derived from providing financial support; consequently, the higher the adult child's income, the lower the probabilities of receiving a transfer. On the other hand, if there is an exchange relationship between the parent and the child, an increase in the adult child's income will reduce the probabilities of receiving a parental transfer, because the opportunities of mutually beneficial intergenerational exchange are lower. Therefore, both the altruistic and the exchange model predict the same effect of an adult child's income over the parental decision on providing financial support.

In relation to the amount of the transfer, and following the same argument as before, an altruistic parent will decide to reduce the provision of financial support. By contrast, an increase in the adult child's wage may raise the conditions under which the child can receive (or borrow) from their parent. Therefore, the altruistic model predicts a negative relationship between an adult child's wage and transfers, as opposed to the exchange model that predicts a positive relationship. A well-known result stated by Altonji et al. (1997) is that under the altruistic hypothesis, an increase of €1 in an adult child's income would be met by a decrease of €1 in any parental transfer. We are unable to test this hypothesis because SHARE provides detailed information on parental income, but not on adult children's income. However, we do know about the relationship with the economic activity of the adult child who has received the transfer and the reason for the transfer. These variables will allow us to test the relationship between (i) transfer amount and "child being unemployed", and (ii) transfer amount and "motive: help with a situation of unemployment"²⁴. If the sign is positive, it would provide evidence in favor of the altruistic hypothesis, but if it is negative, it would confirm the exchange hypothesis.

Regarding the relationship between transfer and informal care, equation (B.7) reveals that the sign of the derivative is indeterminate. Both the exchange and the altruistic hypotheses predict a positive relationship. However, we could expect a negative sign for adult children whose marginal utility with respect to parental health decreases at a slower rate. This result is consistent with the "Selective Investment Theory" because the child attributes a higher value to parental wealth.

The model also implies a negative relationship between the transfer amount and the price of formal care. More expensive formal care reduces the amount of the transfer, under both the altruistic and exchange hypotheses. It is interesting to note that the effect of the formal care price over parental transfer depends on the Arrow-Pratt risk aversion coefficient (applied to parental consumption instead of parental wealth). More risk-averse parents will have a more negative attitude, revealing that the preservation of their own consumption in an environment

²⁴ When the motive of the transfer is to help out with an unemployment situation, this "situation" could affect not only the child, but also the child's partner (and thus, lead to a drop in household income for the child's own family).

of higher formal care costs will reduce the probability and the amount of any parental transfer. Lastly, we find a positive relationship between the transfer amount and the distance between parent and child (informal caregiver).

B. Technical Appendix

To verify that the result of this maximization problem is indeed a maximum, we assume that (i) the utility functions are additively separable in the variables $C^P, C^{CH}, L^{CH}, IC^{CH}$ and H^P ; (ii) the second-order derivatives are negative; and (iii) the cross derivatives are zero. We obtain the total derivatives of the first-order conditions (9)–(11) and of the constraints (1)–(4), and compute the determinant of the coefficient matrix (Π).

$$\Pi * \begin{bmatrix} dC^P \\ dTR^P \\ dIC^{CH} \\ dFC \\ dC^{CH} \\ dL^{CH} \\ dE^{CH} \end{bmatrix} = \Lambda * \begin{bmatrix} d\lambda \\ d\kappa \\ d\delta \\ dw \\ dp \\ dY^P \\ dY^{CH} \\ dT \end{bmatrix} \quad (B.1)$$

$$\Pi = \begin{bmatrix} -pU_{C^P C^P}^P & 0 & \lambda(U_{H^P H^P}^P + \kappa U_{H^P H^P}^{CH}) & U_{H^P H^P}^P + \kappa U_{H^P H^P}^{CH} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & w(U_{C^{CH} C^{CH}}^P + \kappa U_{C^{CH} C^{CH}}^{CH}) & -\kappa U_{L^{CH} L^{CH}}^{CH} & 0 & 0 \\ 0 & 0 & \lambda^2(U_{H^P H^P}^P + \kappa U_{H^P H^P}^{CH}) & \lambda(U_{H^P H^P}^P + \kappa U_{H^P H^P}^{CH}) & 0 & -\kappa(1 + \delta)U_{L^{CH} L^{CH}}^{CH} & 0 & 0 \\ 1 & 1 & 0 & p & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & w \\ 0 & 0 & (1 + \delta) & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \end{bmatrix}$$

$$\Delta = \begin{bmatrix} 0 & -U_{H^P}^{CH} & 0 & 0 & U_{C^P}^P & 0 & 0 & 0 \\ 0 & U_{L^{CH} L^{CH}}^{CH} - wU_{C^{CH} C^{CH}}^{CH} & 0 & -(U_{C^{CH}}^P + \kappa U_{C^{CH}}^{CH}) & 0 & 0 & 0 & 0 \\ -U_{H^P}^P - \kappa U_{H^P}^{CH} & (1 + \delta)U_{L^{CH} L^{CH}}^{CH} - \lambda U_{H^P}^{CH} & \kappa U_{L^{CH} L^{CH}}^{CH} & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & -FC & 0 & 0 & 0 \\ 0 & 0 & 0 & -E^{CH} & 0 & 0 & 1 & 0 \\ 0 & 0 & -IC^{CH} & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

$$|\Pi| = \lambda \kappa p U_{C^P C^P}^P U_{L^{CH} L^{CH}}^{CH} (U_{H^P H^P}^P + \kappa U_{H^P H^P}^{CH}) [w(1 + \delta) - \lambda p] < 0 \quad (B.2)$$

The determinant is negative if $p < \frac{w(1+\delta)}{\lambda}$, which implies that the price of one unit of formal care is lower than the adult child's wage weighted by the distance from the parents and the productivity of informal care. This condition is easily satisfied because $0 < \lambda < 1$ and $\delta > 0$ (we ignore adult children who co-reside with parents).

By applying Cramer's rule, we can analyze the relationship between parental transfers and other variables. In particular, and given the information available in SHARE data, we can

compute the relationship between transfers and parental income (B.3), the wage earned by adult children (B.4), the price of formal care (B.5), the distance between parents and their children (B.6), and informal care (B.7).

$$\frac{\partial TR^P}{\partial Y^P} = \frac{1}{|\Pi|} [\lambda \kappa p w U_{C^P C^P}^P U_{L^C H^C L^C H^C}^{CH} (U_{H^P H^P}^P + \kappa U_{H^P H^P}^{CH})] = \frac{w}{w(1+\delta) - \lambda p} > 0 \quad (B.3)$$

$$\begin{aligned} \frac{\partial TR^P}{\partial w} &= \frac{U_{C^P C^P}^P + \kappa U_{C^P C^P}^{CH}}{\lambda p - w(1+\delta)} \cdot \left(\frac{\lambda p}{\kappa U_{L^C H^C L^C H^C}^{CH}} + \frac{w(1+\delta)^2}{\lambda p U_{C^P C^P}^P} + \frac{p}{\lambda \kappa (U_{H^P H^P}^P + \kappa U_{H^P H^P}^{CH})} \right) \\ &\quad - \frac{\alpha^2 p E^{CH}}{\lambda p - w(1+\delta)} \geq 0 \quad (B.4) \end{aligned}$$

$$\begin{aligned} \frac{\partial TR^P}{\partial p} &= \frac{1}{|\Pi|} [\lambda \kappa (1+\delta) w U_{L^C H^C L^C H^C}^{CH} (U_{H^P H^P}^P + \kappa U_{H^P H^P}^{CH}) (U_{C^P}^P - p FC U_{C^P C^P}^P)] \\ &= \frac{(1+\delta)w}{p[\lambda p - w(1+\delta)]} \cdot \left(p FC - \frac{U_{C^P}^P}{U_{C^P C^P}^P} \right) = \frac{(1+\delta)w}{p[\lambda p - w(1+\delta)]} \cdot \left(p FC - \frac{1}{R_{AP}} \right) \\ &< 0 \quad (B.5) \end{aligned}$$

$$\frac{\partial TR^P}{\partial \delta} = \frac{1}{|\Pi|} [\lambda^2 \kappa p^3 w U_{C^P C^P}^P U_{L^C H^C L^C H^C}^{CH} (U_{H^P H^P}^P + \kappa U_{H^P H^P}^{CH})] = \frac{\lambda p^2}{w(1+\delta) - \lambda p} > 0 \quad (B.6)$$

where R_{AP} is the Risk Aversion coefficient of Arrow-Pratt ($R_{AP} = \frac{U_{C^P C^P}^P}{U_{C^P}^P}$)

$$\frac{\partial IC}{\partial TR^P} = \frac{-\kappa U_{L^C H^C}^{CH}}{\lambda p^2} \left[\frac{1}{\lambda p U_{C^P C^P}^P} + \frac{\kappa}{\lambda (U_{H^P H^P}^P + \kappa U_{H^P H^P}^{CH})} + w IC \right] \quad (B.7)$$

(A.7) is negative if $\frac{1}{\lambda p U_{C^P C^P}^P} + \frac{\kappa}{\lambda (U_{H^P H^P}^P + \kappa U_{H^P H^P}^{CH})} < w IC$. This implies that children whose marginal utility with respect to their parent's health decreases at a slower rate are more prone to observe a negative relationship between informal care and transfer amount.

C. Descriptive statistics

Table WA1 shows the characteristics of parents and offspring according to a parental transfer provision for the two waves. Regarding the financial situation, there are significant differences between parents who give transfers (TR) and parents who do not (NTR). The average income of NTR parents is higher compared to the income of TR parents (2.44 times higher in 2004; 15.92 times higher in 2006). The percentage of parents who receive a real estate income is higher for TR parents, but the average annual rent (in purchasing power parity - PPP) is higher for NTR parents. The percentage of parents who pay for formal care is higher among TR parents. However, the average cost of formal care has increased by 80.12% for NTR parents, but has decreased by 63.66% for TR parents. The percentage of parents providing financial support for children increased from 16.09% in 2004 to 17.34% in 2006. The average transfer (in PPP) has increased by 43.11% (from 2,561.95 in 2004 to 3.666,49 in 2006).

Table WA2 shows the characteristics of parental transfers by country and wave. The percentage of children who receive transfers is highest in Sweden (24.27% in 2004; 27.06% in 2006), although the average transfer (in PPP) is the lowest of all the countries (143.02 and 373.37, respectively). The percentage of transfers peaks in Spain (4.71% in 2004; 3.82% in 2006), but in 2004 Spanish parents provided the most generous transfers of all countries (6,574.83). Transfers represented 33.37% of per capita GDP in Spain (2004) and 39.94% in Belgium (2006).

Table WA3 analyzes the relationship between the likelihood and amount of transfers and caregiving hours in 2004 and 2006. Around one in five caregivers has received a parental transfer in Germany and Sweden (2004), and Austria, Denmark, Italy and Sweden (2006). The most intensive caregivers are the Italians and Spanish who do not receive transfers²⁵. For these caregivers, the number of caregiving hours has significantly decreased between both waves (from 22.18 to 13.44 in Italy; from 19.38 to 11.53 in Spain). Nevertheless, the number of caregiving hours in 2006 was 7.55 (8.08) times higher for Italian (Spanish) caregivers who did not receive transfers, as compared to those who did. We have computed the hourly transfer as the ratio between the transfer received and total caregiving hours. The highest hourly transfer corresponds to Austria (2004) and France (2006), and it is significantly higher than the minimum wage (for countries that have a legal minimum wage) in the Netherlands (2004, 2006) and France and Belgium (only in 2006).

Table 1. Descriptive statistics (Total sample: 13,754)

	2004		2006	
	With transfers	Without transfers	With transfers	Without transfers
N	2.213	11.541	2,385	11,369
Distribution (%)	16.09	83.91	17.34	82.66
Parent				
Male (%)	51.78	41.34	53.12	40.90
Female (%)	48.22	58.66	46.88	59.10
Age (years)	62.43	66.75	64.74	68.75
Nationality (%)				
Foreign	1.81	2.30	0.00	0.04

²⁵ Similar results regarding differences in caregiving hours across countries have been found in Albertini et al. (2007) and Brandt (2011).

Not foreign	98.19	97.70	100.00	99.96
Level of education (%)				
None	0.85	5.72	0.72	5.83
Elementary	32.30	43.79	31.19	44.19
High school	8.52	5.61	8.17	5.62
College	52.37	32.83	53.20	32.35
Missing	5.96	12.05	6.72	12.01
Marital status (%)				
Married/co-habiting	70.67	59.63	70.67	59.63
Separated/divorced	12.34	11.56	12.34	11.56
Single	1.81	1.14	1.81	1.14
Widowed	15.18	27.67	15.18	27.67
Health status (%)				
Very good	22.73	14.00	15.22	9.29
Good	34.75	29.37	23.65	16.43
Regular	31.31	35.94	34.88	36.61
Bad	8.81	16.51	20.67	28.48
Very bad	2.40	4.18	5.58	9.19
Number of chronic illnesses				
With a chronic illness (%)	66.02	73.36	63.20	73.59
Average number of chronic illnesses	1.78	2.12	1.90	2.10
Disabilities for PADL				
With a disability (%)	7.55	10.35	5.70	12.71
Average number of disabilities	1.39	1.74	1.58	1.92
Disabilities for IADL				
With a disability (%)	9.26	16.85	9.11	21.20
Average number of disabilities	1.44	1.94	1.60	2.31
Formal care				
Receives private formal care (%)	0.77	1.11	0.96	0.91
Receives public formal care (%)	4.93	8.73	5.53	11.07
Personal care (hours/year)	53.38	126.09	25.90	118.16
Domestic tasks (hours/year)	102.37	336.40	132.14	225.25
Weeks receiving nursing care	3.10	7.87	5.05	5.05
Meals-on-wheels (%)	0.59	1.43	0.75	1.73
Long-term care/disability benefit (%)	6.28	7.75	7.34	6.74
Relation with economic activity (%)				
Retired	48.22	58.54	56.10	62.49
Employed	39.49	19.85	30.69	15.69
Unemployed	3.39	3.12	2.22	2.05
Disabled for work	2.21	2.93	2.47	3.03
Homemaker	6.42	14.96	6.46	13.75
Other	0.27	0.60	2.06	2.99
Charity work	54.82	38.87	50.17	39.42
Economic situation				
Owns own house (no mortgage) (%)	39.36	40.58	43.82	40.87
Annual income (PPP) ♣	38,087.06	93,308.22	21,059.53	335,262.30
Rent from real estate (PPP)				
Receives rent (%)	7.33	2.99	7.30	2.38
Average annual rent (PPP)	9,348.90	10,258.13	7,954.93	9,361.38
Owing money				
With debt (%)	21.38	13.69	12.06	11.37
Average amount (PPP)	20,729.47	21,967.32	13,714.23	15,348.68
Transfer to child (PPP)	2,561.95	0.00	3,666.49	0.00
Transfer motive (%)				
Meet basic needs	19.53		16.29	
Buy/furnish house	15.75		15.81	
Help with other large item of expenditure	12.99		12.45	
Major family event	12.24		13.50	
Help with divorce	2.71		2.35	
Help following bereavement/illness	2.23		1.72	
Help with unemployment	1.70		1.34	
Formal care cost				
Pays for formal care (%)	1.27	3.08	1.26	3.32
Average annual amount (PPP)	862.23	720.19	313.27	1,297.27
Average number of children	2.46	3.02	2.47	3.01
Number of sons	1.21	1.50	1.20	1.50
Number of daughters	1.24	1.51	1.26	1.50
Child				
Male (%)	46.90	49.64	46.83	49.70
Female (%)	53.10	50.36	53.17	50.30
Age (years)	33.95	42.04	34.63	42.02
Stepchild/foster/adopted (%)	0.45	0.54	0.67	0.55
Distance with respect to parent (%)				
Same building	2.49	3.29	2.89	3.26
Less than 5 Km	29.46	34.48	28.85	32.99
Between 5 and 25 Km	24.04	24.93	24.40	25.58
More than 25 Km	44.01	37.09	43.77	37.89

Missing distance	0.00	0.21	0.09	0.28
Level of education (%)				
None	1.31	1.88	0.92	1.53
Elementary	22.27	29.57	20.27	29.31
High school	10.12	9.73	7.55	7.27
College	57.26	41.90	59.39	48.38
Missing	9.04	16.92	11.87	13.51
Marital status (%)				
Married/co-habiting	53.23	66.89	60.00	69.09
Separated/divorced	6.82	8.05	8.39	8.72
Single	39.22	23.26	30.86	20.49
Widowed	0.41	0.96	0.59	1.13
Missing marital status	0.32	0.84	0.16	0.57
Relation with economic activity (%)				
Employed	75.69	81.55	81.72	82.46
Unemployed	4.79	3.59	3.77	3.32
Studying	12.83	2.87	7.17	1.79
Retired	2.03	0.98	1.26	0.84
Disabled for work	0.77	1.24	0.92	1.40
Homemaker	3.75	6.11	3.69	6.05
Missing economic activity	0.14	3.66	1.47	4.14
Children (grandchildren)				
With children (%)	51.64	66.50	61.05	71.77
Average number of children	1.92	2.00	1.95	2.03
Informal caregiver (%)	8.04	7.77	8.81	8.03
Hours per week of informal caregiving	3.31	6.58	2.71	5.96

◆ Income: sum of annual earnings after taxes (from employment or self-employment), annual income from public pensions (old-age pensions; old-age supplementary pension; early retirement pension; main public disability/sickness benefit; secondary public disability/sickness benefit; unemployment benefit; main survivor pension; secondary survivor pension; war pension); pensions provided by the employer (occupational old-age pension from last job, from second job, from third job, occupational early retirement pension; occupational disability insurance; occupational survivor pension); other regular payments (regular life insurance payments; private personal pension payments; alimony; regular payment from charities; long-term care insurance payments from private insurance companies).

Table 2. Transfer characteristics by country and year

	N	2004				2006			
		% receive transfers	Transfer amount			% receive transfers	Transfer amount		
			Mean	Std. Dev.	% respect to GDPpc		Mean	Std. Dev.	% respect to GDPpc
AU	1.089	16.44	3,980.43	18,190.87	13.87%	18.64	3,158.67	6,171.00	10.09%
BL	2.337	12.97	6,061.56	21,067.92	21.65%	14.08	12,060.95	42,973.96	39.94%
DK	1.230	18.94	312.37	784.07	0.86%	20.08	507.79	693.98	1.26%
FR	1.743	15.38	5,575.24	12,033.84	21.04%	14.17	6,214.96	9,645.28	21.88%
GE	1.126	19.01	2,901.61	6,964.98	10.91%	21.76	4,022.10	7,427.33	14.31%
IT	1.129	10.98	6,370.46	18,522.14	26.54%	16.92	4,876.10	17,170.41	19.27%
NL	1.579	15.45	2,551.08	3,588.71	8.45%	14.00	6,679.79	16,336.50	20.18%
SP	785	4.71	6,574.83	9,133.37	33.37%	3.82	3,244.03	4,168.29	14.48%
SW	2.114	24.27	143.02	240.44	0.44%	27.06	372.37	1,076.14	1.06%
SZ	622	15.76	4,978.20	15,549.35	12.32%	16.08	5,462.31	12,237.14	12.79%

Transfer amount and GDPpc in PPP (Reference: Germany 2005).

Table 3. Characteristics of adult children who provide informal care

	2004					2006				
	Do not receive transfers		Receive transfers			Do not receive transfers		Receive transfers		
	%	Hours/week	%	Hours/week	Hourly transfer*	%	Hours/week	%	Hours/week	Hourly transfer*
AU	81.25	4.05	18.75	1.59	95.88	74.75	6.11	25.25	1.04	34.71
BL	90.69	4.28	9.31	3.50	6.83 [7.93]	90.95	4.40	9.05	2.54	56.07 [8.18]
DK	80.28	3.01	19.72	3.19	7.80	74.02	1.46	25.98	0.34	17.80
FR	96.97	5.00	3.03	2.75	15.57 [7.89]	94.17	5.98	5.83	6.06	529.30 [8.01]
GE	71.03	5.58	28.97	2.85	32.92	78.20	5.28	21.80	0.56	83.00
IT	94.74	22.18	5.26	2.25	34.56	74.19	13.44	25.81	1.78	59.71
NL	84.15	2.73	15.85	4.28	62.15 [8.51]	83.54	1.87	16.46	15.12	176.99 [8.74]
SP	96.43	19.38	3.57	0.32	0.41 [4.22]	97.22	11.53	2.78	0.54	19.60 [4.91]
SW	73.16	2.95	26.84	3.12	2.53	72.00	3.74	28.00	4.29	10.55
SZ	80.00	3.92	20.00	4.52	43.02	90.63	4.75	9.38	2.18	150.10

AU: Austria; BL: Belgium; DK: Denmark; FR: France; GE: Germany; IT: Italy; NL: Netherlands; SP: Spain; SW: Sweden; SZ: Switzerland

*Informal caregiver: binary variable that takes the value 1 if a child helps their parent with personal care (dressing, bathing or showering, eating, getting in or out of bed, using the toilet), and/or provides practical household help (home repairs, gardening, transportation, shopping, household chores)

*The hourly transfer is the “price” corresponding to one hour of informal care in terms of total annual transfer. For comparison purposes, between parentheses we show the hourly minimum wage for countries where there is a minimum wage. There is no statutory national minimum wage in Denmark, Italy, Austria, Sweden and Switzerland. Germany has statutory minimum wages that do not apply to all or the vast majority of employees, but are restricted to specific groups. Minimum wages are expressed in PPP. Source of minimum wages (Eurostat Statistics)

Table 4. Macroeconomic indicators

	2004	2006
Unemployment rate (%) At regional level (NUTS2)	7.36% Min: Tirol (2.6%) Max: Extremadura (17.9%)	6.86% Min: Tirol (2.6%) Max: Hainaut (14.4%)
Unemployment growth rate (%) At regional level (NUTS2)	7.21% Min: Midi-Pyrénées (-40.40%) Max: Drenthe (71.88%)	-9.07% Min: Groningen (-24.24%) Max: Midi-Pyrénées (18.31%)
GDP growth rate (%) At regional level (NUTS2)	4.26% Min: Abruzzo (0.06%) Max: Andalucía (8.41%)	5.45% Min: Liguria (3.08%) Max: Groningen (12.81%)
Unemployment benefits (PPP)	561.33 Min: Italy (115.03) Max: Belgium (907.42)	536.13 Min: Italy (126.68) Max: Belgium (950.31)
Interest rate (loans to households)	9.15% Min: Netherlands (6.58%) Max: Belgium (10.52%)	8.72% Min: Sweden (5.64%) Max: Germany (11.27%)
Gift tax: 0: no tax 1: tax with exemptions for certain amounts of gifts 2: tax without exemptions	0: AU, IT, SZ 1: BL; DK, GE, NL, SW 2: FR, SP	0: AU, IT, SW, SZ 1: BL; DK, GE, NL 2: FR, SP
Homecare expenditure (percentage of GDP)	0.53% Min: Spain (0.12%) Max: Denmark (1.29%)	0.55% Min: Spain (0.16%) Max: Denmark (1.32%)
Long-term care nursing beds per 100,000 inhabitants At regional level (NUTS2)	929.48 Min: Campania (27.2) Max: Sweden (1569.2)	970.50 Min: Campania (34) Max: Sweden (1494.4)

Source: Eurostat Statistics for all indicators with the exception of “Gift tax regime” from International State and Inheritance Tax Guide (<http://www.ey.com/GL/en/Services/Tax/International-Estate-and-Inheritance-Tax-Guide---Country-list>) and “Homecare expenditure” from WHO/Europe’s web (www.euro.who.int)

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