The strategic bequest motive: evidence from SHARE*

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Abstract

This paper examines whether the empirical evidence supports the strategic bequest motive, as opposed to pure altruism, using data on eleven European countries from the Survey of Health, Ageing and Retirement in Europe. At issue is whether parents try to influence their children's behaviour by threatening to disinherit them. The availability of internationally comparable data allows exploiting the cross-country variability in inheritance laws and cultural backgrounds to identify the operation of a strategic bequest motive determining the attention that adult children provide to their elderly parents.

JEL classification: D12, J14.
Keywords: intergenerational transfers, exchange model, inheritance laws, multiple imputation.

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1 Introduction

The modelling of bequests is crucial in understanding capital accumulation and family behaviour. Two main theories have been proposed to explain intergenerational transfers: altruism and exchange. Family relations may be driven not only by altruism or blood ties but also by exchange considerations. According to *altruism*, parents care about their children and plan to leave an inheritance independently of any reciprocating help (Becker, 1974). In the *exchange* model, parents are still altruistic in that they care about their children's well-being but at the same time they try to influence their children's actions and induce them to provide more services by threatening to withhold a bequest (Bernheim *et al.*, 1985). Distinguishing between the altruistic and the strategic bequest motive has important policy implications: the effectiveness of government redistribution to tackle inequalities across or within families, transmission behaviour and family relations all depend on the nature and extent of intergenerational transfers (Altonji *et al.*, 1997).

The aim of this paper is to examine whether the empirical evidence supports the exchange model, as opposed to pure altruism, using data from the first wave of the Survey of Health, Ageing and Retirement in Europe (SHARE) on eleven continental European countries. As long as in the market there are no substitutes for attention provided by children to their parents, the exchange model can be tested empirically. The test is based on a significant and positive effect of the bequeathable wealth held by the parents on the amount of attention they receive from their children, when controlling for several individual and household characteristics.

Previous studies based on US (Bernheim *et al.*, 1985; Sloan *et al.*, 1997; Perozek, 1998) and Japanese data (Yamada, 2006) have found mixed empirical evidence on the validity of the exchange model. To the best of my knowledge, this is the first paper to investigate the strategic bequest motive using a European dataset. The study complements the existing literature in two other ways. First, this paper distinguishes between the effects of real and financial wealth on the attention provided by children to their elderly parents and offers a possible explanation to why the elderly are not likely to decumulate housing wealth, contrary to the predictions of the life-cycle model of consumption and saving (see Venti and Wise, 2004, for the US and Chiuri and Jappelli, 2006, for Europe). Second, internationally comparable data, as in SHARE, allow exploiting the cross-country variability in inheritance laws and cultural backgrounds to identify the operation of the strategic bequest motive. Continental Europe is interesting because parents are not allowed to completely disown their adult children.

The plan of the paper is as follows. Section 2 reviews the theoretical model. Section 3 describes the data used in the analysis. Section 4 and 5 present the econometric specification and the empirical results. Finally, section 6 concludes.

2 The theoretical model

In the exchange model there is a testator who is *imperfectly* altruistic. On the one hand, she cares about her beneficiaries; on the other hand, she cares also about some action that the beneficiaries might take (in this case the amount of attention they provide). More formally, the utility of the benefactor U_P depends on her own consumption c_P, the attention and services provided by each of her N beneficiaries $a^{(1)}$, $a^{(2)}, ..., a^{(N)}$ and their beneficiaries' utilities $U_K^{(1)}$, $U_K^{(2)}, ..., U_K^{(N)}$:

$$U_P\left(c_P, a^{(1)}, a^{(2)}, ..., a^{(N)}, U_K^{(1)}, U_K^{(2)}, ..., U_K^{(N)}\right)$$

On the contrary, beneficiaries are selfish and care only about their own consumption c_K and the attention they provide to their benefactors. Therefore, the utility function of beneficiary i can be represented as:

$$U_K^{(i)}\left(c_K^{(i)}, a^{(i)}\right)$$

The assumptions of the model are that U_K increases with a only for low levels of attention but then decreases, while U_P always increases with the level of attention but might decrease for too high level of a.

First, the testator commits to the total size of the bequest and to a bequest rule that depends on the behaviour of the beneficiaries. Then, each beneficiary chooses the optimal level of attention $a^{(i)}$. Finally, the estate is divided according to the rule. Note that there must be no market substitutes for the attention that the beneficiaries provide, otherwise the benefactor would not pose the threat. Bernheim et al. (1985) apply this model to parent-child relationships and show that parents manage to elicit attention from their children by committing to a bequest rule according to which each child will be disinherited in favour of her siblings or other beneficiaries if she does not provide at least a certain amount of services. Therefore, in this context bequests arise from a bargaining process where all the decision power is assigned to the parents, so that any surplus generated from the interaction with the beneficiaries will accrue to the testator.

The implication of the model is that bequeathable wealth per child will have a positive and significant effect on the amount of attention that children provide to their elderly parents if the threat of disinheritance is credible. In order for the threat to be credible, two conditions must be satisfied. First, there must be at least two potential beneficiaries - the testator cannot credibly threaten universal disinheritance. Second, parents must credibly commit themselves to the total size of the bequest. One way to make a commitment to the total size of the bequest is by holding wealth in illiquid form, such as durables or housing, especially if transaction costs of selling a house are high and the mortgage market is not well developed. Housing differs from financial wealth also in that it is usually the most conspicuous asset in household portfolios and its value and trading can be easily verified by children. Therefore, I expect to find differences between financial and real wealth with respect to the effect they have on the amount of attention that children provide to their parents. If this result holds, it might help explain one of the empirical puzzles in the consumption and housing literature: contrary to the predictions of the life-cycle model, the elderly do not reduce housing equity by moving from owning to renting, trading down or using equity line schemes.

3 Data and sample selection

This study uses data from the 2004 Survey of Health, Ageing and Retirement in Europe (SHARE) on eleven European countries: Austria (AT), Belgium (BE), Denmark (DK), France (FR), Germany (DE), Greece (GR), Italy (IT), Netherlands (NL), Spain (ES), Sweden (SE) and Switzerland (CH). SHARE collects extensive information on health, socioeconomic status and family interactions of individuals aged 50 and over. The respondents are the elderly parents. In each household the family respondent, who is randomly selected in SHARE, provides basic data on all living children (gender, age and proximity), whereas more detailed information relevant for this study (frequency of contact between the child and the parent, marital status and number of kids) is only asked for up to four children. When there are more than four children, the program sorts them in ascending order by minor, proximity and birth year, where minor is defined as 0 for all children aged 18 and over and 1 for all others, and then selects the first four. In this context, the non-randomness of the sample does not cause the estimates to be inconsistent because individuals are selected according to a fixed and known rule that involves only exogenous variables (Wooldridge, 2002, pp. 552-556). I use the data to construct a child-level file where the unit of observation is the child. The advantage is that this approach allows including child characteristics in the analysis that, as documented in Perozek (1998) and Börsch-Supan et al. (1992), are important determinants of attention.

The analysis will focus only on children whose parents are married and are both still alive. The reason behind it is that one of the implications of the exchange model is that the use of bequests to obtain attention should be more effective when there is only one parent; therefore, if the empirical results support the exchange model for the sample of children whose parents are married, then the evidence should be even stronger for children with single parents. The sample is further restricted to non-cohabiting children aged 18 or over because for co-resident children the concept of attention is difficult to define. Other authors have excluded from the analysis only children. Their underlying hypothesis is that offspring are the only credible beneficiaries. However, this might not be true in reality. Therefore, I assume that as long as the law allows the testator to disown at least partially her children in favour of other beneficiaries (such as other relatives, charities, NPOs) the threat of disinheritance is always credible. The final sample contains $16,528$ observations.

4 The econometric specification

Empirically, the implication of the model is that the amount of attention that each child K provides to her elderly parents is a function of parental wealth per child. As Perozek (1998), I estimate the following equation:

$$contact_K = \beta_0 + \beta_1 wealth_P + \boldsymbol{\gamma}' X_K + \boldsymbol{\delta}' Z_P + \varepsilon_K \tag{1}$$

where X_K and Z_P are vectors of individual characteristics of the child and the parent, respectively, that I employ as control variables and ε_K is the error term. I measure attention as the number of contacts between the child and her parents. In SHARE respondents report frequency of contacts[1], which I translate into number of contacts as follows: never - 0, less than once a month - 3, about once a month - 12, about every two weeks - 26, about once a week - 52, several times a week - 156, daily - 312. The variable is then normalised to be equal to 1 if the child provides the maximum amount of attention possible (daily contacts). Other authors (Callegaro and Pasini, 2007; Norton and van Houvten, 2006) have used the help with personal care as a proxy for the services that children provide to their parents. However, the theoretical model relies on the assumption that there are no market substitutes for attention. While informal care has a close market substitute (formal care), contacts between children and their parents have none. Therefore, the frequency of contacts seems to be the most meaningful definition of attention in this context. Furthermore, parents in good health conditions (62.5% of our sample) do not need any help with care from their children.

One issue is that observations belonging to the same family or household are not cross-sectional

[1] Any kind of contact, either in person, by phone or mail.

independent. This correlation does not cause the estimates to be inconsistent but implies that standard errors are calculated incorrectly. For this reason, I use a variance-covariance matrix that is robust assuming that observations on individuals drawn from the same family (cluster) are correlated with each other but observations on individuals from different families are not. The estimator adopted allows for any form of intra-cluster correlation (Baum et al., 2003).

Table 1 reports the description and summary statistics of all variables included in the estimation.

[TABLE 1 ABOUT HERE]

The controls included in the regression related to the characteristics of the respondent parent are: the macro-area where she lives to account for differences in cultural backgrounds, a quadratic in age and dummies for whether the parent is female, retired, in bad health, and suffers from depression. I also control for several child characteristics that are likely to influence attention: in addition to age, I include dummies for whether the child is female, in full-time employment, married, has kids, for the number of siblings, the highest level of education attained and for the distance from the parental house. One might argue that in this model distance is endogenous: children who do not get along with their parents will tend to live farther away from them. However, many other authors assume proximity to be an exogenous determinant of contact (Greenwell and Bengtson, 1997; Hank, 2007; Perozek, 1998): the argument is that location decisions are usually independent of a child's relationship with her parents and are determined by other external factors, such as job market opportunities. Furthermore, controlling for distance allows taking into account the cost of contacts.

Wealth is PPP-adjusted and is defined as household net worth, which is the sum of real and net financial assets:

- *Net financial wealth* is equal to gross financial assets (bank accounts, government and corporate bonds, stocks, mutual funds, individual retirement accounts, contractual savings for housing and life insurance policies) minus financial liabilities;

- *Real wealth* is the sum of the value of the primary residence net of the mortgage, the value of other real estate, owned share of own business and owned cars.

Missing values for both real and financial wealth are filled in using multiple imputations as described in Christelis *et al.* (2005). Multiple imputation is a Monte Carlo technique in which missing values are replaced by a few simulated versions, five in this case (Little and Rubin, 2002). In what follows, each of the simulated datasets is analysed by standard methods and the results are combined to produce estimates and confidence intervals that incorporate missing-data uncertainty. In particular, the coefficients are computed as the mean of the within imputation coefficients over the five imputations and the standard errors account for within and between variability of the estimates[2].

4.1 The effect of inheritance laws

One of the assumptions of the exchange model is that parents can disinherit their children if they wish. However, in reality this is not possible in most continental European countries or, at least, it is possible just up to some extent. Usually children and the surviving spouse are reserved a statutory share of the estate, independently of the deceased's will. A greater testamentary freedom of the parent implies that the threat of disinheritance is more credible and this, in turn, should increase the number of contacts between children and their parents for a given level of wealth. Thus, I introduce in the model an indicator of the testamentary freedom allowed by law, measured as the fraction of wealth of which the individual can dispose. To understand how this indicator is constructed, let us consider the example of Italy. Table 2 reports the different inheritance laws across Europe. In Italy, if the deceased leaves a widow and one child, they can elect against the will and take one third of the estate each: in this case the total statutory share amounts to two-thirds of the estate. If there

[2]See the appendix for details on how to analyse multiply-imputed datasets.

is more than one child, the surviving spouse is reserved by law one-fourth of the estate while the children share one-half of the deceased's wealth: the statutory reserve is, then, three-quarters of the estate. Table 2 reports also the intestacy because in some countries (Austria, Denmark, Germany, Greece and Sweden) the statutory share depends on the intestacy, which establishes how assets must be divided if the person dies without a will. The fraction of wealth of which the individual can dispose is the complement to one of the statutory reserve. Table 3 reports the disposable share by country when there is at least one child and a surviving spouse.

[TABLES 2 AND 3 ABOUT HERE].

5 Empirical results

The OLS estimates of the relevant parameters are presented in table 4. The first column confirms that wealth has a significant and positive effect on the amount of attention that children provide to their parents, thus supporting the exchange model. Column (2) disentangles the effects of the two components of net worth: net financial and real wealth. Interestingly, only real wealth is found to be positive and significant. The implication is that parents manage to influence their children's behaviour only by holding a substantial amount of real wealth, which is mainly housing, whereas financial wealth has no effect. Two reasons might explain this result. First, by holding wealth in illiquid form, the parent commits herself to the total size of the bequest, thus making the threat credible. This is particularly true in countries where the transaction costs involved with selling a house are particularly high and where the mortgage market is less developed. Second, real estate is a visible asset. While a parent could easily hide from her child transactions in financial assets, it is more difficult to sell a house without some publicity. Therefore, one of the reasons why the elderly do not trade down in their housing stock may be that it serves as a promise of future bequests to induce children to provide more attention.

The behaviour of the control variables is in general consistent with the literature on contacts between children and parents. In particular, Southern European countries exhibit the closest family bonds while in Northern and Central Europe family links appear to be weaker (Hank, 2007). Gender seems to be a significant determinant of contacts: daughters tend to provide more attention than their male counterparts and female parents are more likely to receive it. This effect is not negligible: *ceteris paribus*, daughters have 32 more contacts a year with their mothers than sons with their fathers. Furthermore, as a child ages and gets married she becomes less able to provide attention to her parents. However, if the child has children of her own, the number of contacts is higher, possibly because she might take advantage of grandparents for help with child care and visit them more frequently. As expected, retired parents have more contacts with their children and children in full-time employment provide less attention. Contacts decrease as the number of siblings increases. One possible explanation for this result is that in large families parents might not have time to have contacts with all of their children. A poor self-perceived health status of the elderly parent seems to have a positive effect on the attention received from children, whereas suffering from symptoms of depression tend to decrease the number of contacts. Finally, as expected, geographical distance is very strongly correlated with the frequency of child-parent contacts. The last two columns show that the testamentary freedom allowed by law is highly and positively correlated with the attention that children provide to their elderly parents: for a given level of wealth, a higher disposable share increases the number of contacts. This result holds for all the specifications.

[TABLE 4 ABOUT HERE]

In this model wealth is likely to be endogenous. Unobserved factors related to individual preferences might influence both the amount of attention provided by children and the bequeathable wealth held by the parents. In fact, in the exchange model the parent's optimal wealth accumulation depends partly on the preferences of her children, which are captured also by the error term ε_K. The sign of the bias is ambiguous. Previous studies address this issue by adopting a 2SLS estimator, where the additional instruments are life-time earnings in Bernheim et al. (1985) and the socio-economic index in Perozek (1998). Given the unavailability of these variables for my data, wealth is instrumented with the highest number of years of education attained by parents, the median income in the NUTS-area where the parents live, in addition to food expenditure as a proxy for permanent income. The choice of the instruments is motivated as follows. Several sociological studies (Greenwell and Bengston, 1997; Kalmijn, 2006) show that the education of the parents is not correlated with the relationship they have with their children. It is the education of the child that matters: the highly educated are likely to leave farther away from their parents because of job market opportunities and have less spare time. However, the regression controls for the education and job market status of the child, as well as for the distance between the house of the parent and that of the child. On the other hand, the education of the parents is clearly correlated with their wealth. The same is true for the median income of the area where the parents live, which is arguably a good proxy for their standard of living: more affluent people tend to live in richer areas. As regards food expenditure, many studies have shown that it is a better proxy of permanent income than is, for example, current income. One might argue that if children visit their parents very often, the parents might spend more on food. However, it is important to keep in mind that the measure of attention used in this paper includes any kind of contact (telephone calls, e-mails, text messages) and not only visits. Furthermore, as a robustness check, I re-estimate the model only on the sample of children who live 500 km away or farther from their parents, for whom contacts are likely to be by phone and not in person, and the results are qualitatively unchanged. Therefore, even though there might be some correlation between the instrument and the error term, this is likely to be negligible. Formal tests confirm the relevance and validity of the instruments. Table 6 reports the F-test for the joint significance of the instruments in the first stage regression and the Hansen-J statistics for the validity of instruments.

The 2SLS estimates are presented in table 5.

[TABLES 5 AND 6 ABOUT HERE]

The results qualitatively confirm what has already been discussed for the OLS regression. However, the magnitude of the coefficients on the wealth variables is much larger when accounting for their endogeneity. The difference between the two estimates can be tested formally. The Hausman test (6) confirms that the wealth variables cannot be treated as exogenous in this model and this is consistent with the exchange model where wealth and attention are simultaneously determined. Moreover, in surveys wealth is usually measured with error and this might lead to attenuation bias in the OLS estimates. One might argue that also in the presence of altruism the correlation between attention and wealth might be spurious. In particular, it has been suggested that if children get along well with their parents, the parents will accumulate more wealth because they want to leave a larger inheritance and the children will provide more attention simply out of filial love. However, in this case the OLS estimates should be biased upward, which is the opposite of what is observed. An alternative interpretation of the results is that wealthy parents might pay for travel expenses or phone calls to their children and, therefore, stay close. However, this explanation is hard to reconcile with the empirical evidence that only illiquid wealth holdings are significant determinants of attention, whereas liquid financial assets have no effect. Table 7 shows that the results qualitatively do not change if I estimate the model excluding the top and bottom two percent of the distribution of wealth, since outliers can affect the estimation.

[TABLE 7 ABOUT HERE]

Since the dependent variable takes a limited number of values, it is possible to assess the size of the effect of wealth on attention: if real wealth per child increased by about €110,000[3], the child would visit or call her parent once a month rather than just three times a year. Note that financial wealth has no significant effect.

[3] Wealth is PPP-adjusted.

6 Conclusion

This paper analyses the bequest motive for saving and investigates whether the empirical evidence supports the exchange model, as opposed to pure altruism, using data from the 2004 Survey of Health, Ageing and Retirement in Europe (SHARE) on eleven European countries. At issue is whether parents try to influence their children's behaviour by threatening to disinherit them. The availability of internationally comparable data, as in SHARE, allows exploiting the cross-country variability in inheritance laws and cultural backgrounds to identify the operation of a strategic bequest motive determining attention provided by children to their elderly parents.

The empirical results seem to support the hypothesis that bequests are partly used by parents to induce their children to provide more attention: contacts between parents and children are positively correlated with the amount of wealth held by the testator. In addition, I introduce in the model an indicator of the testamentary freedom allowed by law in different European countries and I find it to have a positive and significant effect on the amount of attention that children provide.
Interestingly, when distinguishing between the effects of financial and real wealth, only the latter is found to be a significant determinant of the attention that children provide to their parents. I argue that this result might help explain why individuals do not tend to reduce housing equity in old age, contrary to the predictions of the standard life-cycle model of consumption and saving. However, this explanation is only partial and further work is needed to understand this puzzle. In particular, the strategic bequest motive alone does not seem sufficient to explain the behaviour of a substantial fraction of households who are "income poor and house rich" and do not release equity from the house although they would benefit from it. In this context the scope for future research is extremely broad. Understanding whether the elderly perceive home equity as a non-tradable asset to leave as a bequest to their children or as a mean to finance non-housing retirement consumption is relevant for the more general discussion on whether individuals save enough for retirement.

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A Analysing multiply-imputed data sets

In SHARE missing values for both real and financial wealth are replaced by five simulated versions using multiple imputation techniques. This appendix show how to analyse multiply-imputed data sets (see also Schafer, 1997, and Rubin, 1987). In general, with m imputations it is possible to obtain m different estimated vectors of coefficients $\widehat{\boldsymbol{\theta}}^{(1)}$, $\widehat{\boldsymbol{\theta}}^{(2)}$... $\widehat{\boldsymbol{\theta}}^{(m)}$ and m variance-covariance matrices $\widehat{V}^{(1)}$, $\widehat{V}^{(2)}$... $\widehat{V}^{(m)}$. According to Rubin's rule, the multiple imputation estimate for θ is simply computed as the mean of the within-imputation coefficients:

$$\overline{\boldsymbol{\theta}} = \frac{1}{m}\sum_{i=1}^{m}\widehat{\boldsymbol{\theta}}^{(i)} \tag{2}$$

and the standard errors account for both within and between variability. Define the within imputation variance-covariance matrix as:

$$\overline{V} = \frac{1}{m}\sum_{i=1}^{m}\widehat{V}^{(i)}$$

and the between imputation variance-covariance matrix as:

$$B = \frac{1}{m-1}\sum_{i=1}^{m}\left(\widehat{\boldsymbol{\theta}}^{(i)} - \overline{\boldsymbol{\theta}}\right)\left(\widehat{\boldsymbol{\theta}}^{(i)} - \overline{\boldsymbol{\theta}}\right)^{T}$$

Then the total variance is:

$$T = \overline{V} + \left(1 + \frac{1}{m}\right)B \tag{3}$$

A.1 A cautionary note

It should be noted that, as Schafer (1997, p. 109) points out, "with multiple imputation, just as with complete data, it is good practice to perform the analysis on a scale for which the asymptotic normal approximation is likely to work well; for example, with a correlation coefficient, it is advisable to apply the Fisher's transformation" to the coefficients:

$$z^{(i)} = \frac{1}{2}\log\left(\frac{1+\rho^{(i)}}{1-\rho^{(i)}}\right)$$

combine them using Rubin's rule and then report the result back to the original metric. A similar reasoning should apply also to the R^2 of a regression.

A.2 Hypothesis testing

Suppose one wants to test the null hypothesis that $\boldsymbol{\theta} = \boldsymbol{\theta}_0$. From standard inference theory, it follows that the associated Wald statistic is:

$$W_1\left(\boldsymbol{\theta}_0, \overline{\boldsymbol{\theta}}\right) = \frac{\left(\overline{\boldsymbol{\theta}} - \boldsymbol{\theta}_0\right)^T T^{-1}\left(\overline{\boldsymbol{\theta}} - \boldsymbol{\theta}_0\right)}{k}$$

where k is the number of restrictions to be tested. Unfortunately, it is not easy to derive the distribution of this statistic since with a small number of imputations, B is likely to be a not very precise estimate of the corresponding population quantity. However, it can be shown that under certain assumptions a less noisy estimate of the total variance-covariance matrix is:

$$\widetilde{T} = (1 + r_1)\overline{V}$$

where

$$r_1 = \left(1 + \frac{1}{m}\right) tr \left(\frac{B\overline{V}^{-1}}{k}\right)$$

Li et al. (1991) have proved that

$$W_2\left(\boldsymbol{\theta}_0, \overline{\boldsymbol{\theta}}\right) = \frac{\left(\overline{\boldsymbol{\theta}} - \boldsymbol{\theta}_0\right)^T \widetilde{T}^{-1}\left(\overline{\boldsymbol{\theta}} - \boldsymbol{\theta}_0\right)}{k} \sim F_{k,\nu_1}$$

with

$$\begin{aligned} v_1 &= 4 + [k(m-1) - 4]\left[1 + \left(1 - \frac{2}{k(m-1)}\right)\frac{1}{r_1}\right]^2 && \text{if } k(m-1) > 4 \\ &= (k-1)\frac{m}{2}\left(1 + \frac{1}{k}\right)\left(1 + \frac{1}{r_1}\right)^2 && \text{if } k(m-1) \leq 4 \end{aligned}$$

A.2.1 Applications: relevance of instruments and endogeneity test

The test for the relevance of instruments can be carried out as follows. First, compute the multiple imputation estimates of the parameters from the first stage regression of the endogenous variable on all the exogenous instruments. Next, calculate the Wald statistic corresponding to the null hypothesis:

$$H_0 : \ \overline{\boldsymbol{\theta}} = 0$$

where $\overline{\boldsymbol{\theta}}$ is the vector of coefficients on the excluded instruments.

A similar methodology can be applied to the endogeneity test using the regression based version of the test (Wu-Hausman).

A.3 Test of overidentifying restrictions

An alternative to computing the multiple imputation version of the Wald statistic form the estimated coefficients and variance-covariance matrix is to combine directly the m Wald statistics obtained from the m implicates. This method can be easily applied to the Hansen-J test.

Suppose that $J^{(1)}$, $J^{(2)}$... $J^{(m)}$ are the Hansen-J statistics calculated separately from the m imputed data sets. Then, their multiple imputation version (see Li et al., 1991) is:

$$J = \frac{\overline{J}/k - r_2(m-1)/(m+1)}{1 + r_2}$$

where

$$\overline{J} = \frac{1}{m}\sum_{i=1}^{m} J^{(i)}$$

and

$$r_2 = \left(1 + \frac{1}{m}\right)\left[\frac{1}{m-1}\sum_{i=1}^{m}\left(\sqrt{J^{(i)}} - \sqrt{\overline{J}}\right)^2\right]$$

If k is the number of overidentifying restrictions, then

$$J \sim F_{k,\nu_2}$$

where

$$\nu_2 = k^{-3/m}(m-1)\left(1 + \frac{1}{r_2}\right)^2$$

B Tables

Table 1: Description of the variables included in the regressions

Wealth of the parents			
wealth	wealth per child/10^6	0.195	0.611
finwealth	net financial wealth per child/10^6	0.031	0.106
realwealth	real wealth per child/10^6	0.164	0.595
Characteristics of the respondent parent			
age	age of the parent/100	0.647	0.089
age2	(age of the parent/100)^2	0.426	0.118
pfemale	dummy=1 if the parent is female	0.460	0.498
pretired	dummy=1 if the parent is retired	0.531	0.499
bad_health	dummy=1 if the parent is in less than good health	0.375	0.484
depression	dummy=1 if the parent suffers from depression	0.215	0.411
North	dummy=1 if the parent lives in Northern Europe (DK, NL, SE)	0.376	0.484
Central	dummy=1 if the parent lives in Central Europe (AT, FR, DE, BE, CH)	0.347	0.476
South	Reference group, not included (Southern Europe: GR, IT, ES)		
Characteristics of the child			
kage	age of the child/100	0.364	0.084
kfemale	dummy=1 if the child is female	0.510	0.500
kmarried	dummy=1 if the child is married	0.677	0.468
khaskid	dummy=1 if the child has children of her own	0.610	0.488
kfull	dummy=1 if the child works full-time	0.640	0.480
kCollege	dummy=1 if the child has a post-secondary degree	0.294	0.456
kHighSchool	dummy=1 if the highest educational attainment of the child is a high school degree	0.457	0.499
kCompulsory	reference group, not included (the child did not complete high school)		
dist_0to1	reference group, not included (the child lives at less than 1 km from the parent)		
dist_1to5	dummy=1 if the distance is between 1 and 5 km	0.199	0.399
dist_5to25	dummy=1 if the distance is between 5 and 25 km	0.234	0.424
dist_25to100	dummy=1 if the distance is between 25 and 100 km	0.154	0.361
dist_100to500	dummy=1 if the distance is between 100 and 500 km	0.142	0.349
dist_over500	dummy=1 if the distance is over 500 km or the child lives abroad	0.080	0.271
only_child	dummy=1 if the child has no siblings	0.074	0.262
one_sibling	dummy=1 if the child has only one sibling	0.388	0.487
two_siblings	dummy=1 if the child has two siblings	0.298	0.456
three_siblings	reference group, not included (K has three or more siblings)		

Table 2: Inheritance laws Sources: European Commission, Council of Europe (2003), Zoppini (2002)

Country	**Benef.**	**Statutory reserve**	**Intestacy**
AT	children	1/2 of the share under intestacy	2/3 if there is a surviving spouse, 1 otherwise
	spouse	1/2 of the share under intestacy	1/3 if there are descendants, 2/3 otherwise
BE	descendants	1/2 if one, 2/3 if two, 3/4 if three or more	Nude property of the whole estate
	spouse	Usufruct in 1/2 of the property of the estate	Usufruct of the property of the estate
DK	descendants	1/2 of the share under intestacy	2/3 if there is a surviving spouse, 1 otherwise
	spouse	1/2 of the share under intestacy	1/3 if there are descendants, 1 otherwise
FR	descendants	1/2 if one, 2/3 if two, 3/4 if three or more	Either 3/4 or nude property of the whole estate
	spouse	1/4 only if there are neither descendants nor ascendants	If there are descendants: either 1/4 of the property or usufruct of the whole estate. If there are no descendants but only ascendants: 1/2 of the property
DE	descendants	1/2 of the share under intestacy (Pflichtteil). This is not a share of the estate but a money compensation in lieu of inheritance	1 if there is no surviving spouse, 3/4 (under separate and community property) or 1/2 (under zugewinngemeinschaft)
	spouse	1/2 of the share under intestacy (Pflichtteil). This is not a share of the estate but a money compensation in lieu of inheritance.	Under separate and community property: 1/4 if there are relatives in the first erbklassen (descendants), 1/2 if there are only relatives in the second order (parents, siblings and their descendants), 1 otherwise. Under zugewinngemeinschaft: 1/2, 3/4 and 1 respectively.
GR	descendants	1/2 of the share under intestacy	3/4 if there is a spouse, 1 otherwise
	spouse	1/4 if there are descendants, 1/2 if there are no descendants but only the parents.	1/4 if there are descendants, 1/2 if there are no descendants but only the parents, 1 otherwise
IT	descendants	With spouse: 1/3 if one, 1/2 if more than one. With no spouse: 1/2 if one, 2/3 if more than one	With spouse: 1/2 if one, 2/3 if two or more With no spouse: 1
	spouse	1/2 if there are no descendants, 1/3 if there is one child, 1/4 if more than one	1/2 if there is one descendant, 1/3 if more than one. If there are no descendants but only ascendants or siblings, the spouse obtains 2/3.
NL	descendants	The spouse receives the whole estate and the children receive their share in the form of a non-payable claim (1/2 of the property of the estate)	The surviving spouse is in the same position as the children and they take equal shares.
ES	descendants	2/3	The children inherit the whole estate but the surviving spouse obtains the usufruct of 1/3 of the property.
	spouse	Usufruct of 1/3 of the property of the estate if there are descendants, 1/2 if there are no descendants but only ascendants, 2/3 if there are only other relatives.	Usufruct in 1/3 of the property of the estate if there are descendants, 1/2 if there are no descendants but only ascendants, 2/3 if there are only other relatives.
SE	descendants	1/2 of the share under intestacy. Note that the surviving spouse is not entitled to a forced share.	The surviving spouse obtains all assets. At the death of the surviving spouse, children obtain half of the property. If there is no surviving spouse, the whole estate goes to the descendants.
CH	descendants	3/4 of the share under intestacy	1/2 if there is a spouse, 1 otherwise
	spouse	1/2 of the share under intestacy	1/2 if there are descendants, 3/4 otherwise

Table 3: The testamentary freedom allowed by law in SHARE countries when there are at least one child and a surviving spouse

	Legal base	Disposable share
AT	Allgemeines Bürgerliches Gesetzbuch	1/2
BE	Code Civil	1/2 if one chid,1/3 if two 1/4 if three or more
DK	Arveloven	1/2
FR	Code Civil	1/2 if one chid,1/3 if two 1/4 if three or more
DE	Bürgerliches Gesetzbuch	1/2
GR	*Αστικος Κωδικας*	3/8
IT	Codice Civile	1/3 if one child, 1/4 if more than one
NL	Burgerlijk Wetboek, Boek 4	1/2
ES	Código Civil	1/3
SE	Ärvdabalk (1958:637)	3/4
CH	Schweizerisches Zivilgesetzbuch	3/8

Table 4: Contact equation - OLS estimates

	(1)	(2)	(3)	(4)
wealth	.015**		.016**	
	(.004)		(.004)	
finwealth		-.009		-.005
		(.027)		(.027)
realwealth		.016**		.017**
		(.004)		(.004)
disp_share			.084**	.084**
			(.029)	(.029)
age	-.878**	-.872**	-.912**	-.907**
	(.424)	(.431)	(.423)	(.430)
age2	.716**	.713**	.740**	.737**
	(.312)	(.318)	(.311)	(.317)
pfemale	.026**	.026**	.025**	.025**
	(.006)	(.006)	(.006)	(.006)
pretired	.012	.012	.012	.012
	(.008)	(.008)	(.008)	(.008)
bad_health	.012*	.011*	.011*	.011
	(.006)	(.007)	(.006)	(.007)
depression	-.014*	-.014*	-.013*	-.013*
	(.008)	(.008)	(.008)	(.008)
kage	-.617**	-.617**	-.618**	-.618**
	(.057)	(.058)	(.057)	(.058)
kfemale	.079**	.079**	.079**	.079**
	(.005)	(.005)	(.005)	(.005)
kmarried	-.012**	-.012*	-.013**	-.013**
	(.006)	(.006)	(.006)	(.006)
khaskid	.015**	.015**	.016**	.016**
	(.006)	(.006)	(.006)	(.006)
kfull	-.029**	-.029**	-.029**	-.029**
	(.005)	(.006)	(.005)	(.005)
kHighSchool	.030**	.030**	.029**	.028**
	(.007)	(.007)	(.007)	(.007)
kCollege	.029**	.029**	.031**	.031**
	(.008)	(.008)	(.008)	(.008)
dist_1to5	-.195**	-.195**	-.195**	-.195**
	(.008)	(.008)	(.008)	(.008)
dist_5to25	-.283**	-.283**	-.283**	-.283**
	(.008)	(.008)	(.008)	(.008)
dist_25to100	-.373**	-.373**	-.372**	-.372**
	(.009)	(.009)	(.009)	(.009)
dist_100to500	-.412**	-.411**	-.413**	-.413**
	(.009)	(.009)	(.009)	(.009)
dist_over500	-.490**	-.490**	-.490**	-.490**
	(.010)	(.010)	(.010)	(.010)
only_child	.113**	.115**	.108**	.109**
	(.011)	(.011)	(.011)	(.011)
one_sibling	.093**	.094**	.091**	.091**
	(.008)	(.008)	(.008)	(.008)
two_siblings	.051**	.051**	.050**	.050**
	(.008)	(.009)	(.008)	(.009)
north	-.165**	-.164**	-.188**	-.187**
	(.008)	(.008)	(.011)	(.012)
central	-.207**	-.206**	-.215**	-.215**
	(.008)	(.008)	(.009)	(.009)

Note: Cluster-robust standard errors in parentheses, ** p-value<0.05, * p-value<0.1

Table 5: Contact equation - 2sls estimates

	(1)	(2)	(3)	(4)
wealth	.142** (.052)		.146** (.053)	
finwealth		-.292 (.557)		-.557 (.550)
realwealth		.211** (.107)		.262** (.113)
disp_share			.119** (.033)	.105** (.038)
age	-1.403** (.473)	-1.490** (.513)	-1.467** (.477)	-1.617** (.545)
age2	1.078** (.344)	1.154** (.376)	1.123** (.346)	1.251** (.398)
pfemale	.030** (.007)	.029** (.007)	.030** (.007)	.028** (.008)
pretired	.027** (.010)	.031** (.012)	.027** (.010)	.034** (.013)
bad_health	.020** (.007)	.018** (.008)	.019** (.007)	.016** (.008)
depression	-.016** (.008)	-.016* (.008)	-.014* (.008)	-.014* (.009)
kage	-.599** (.060)	-.609** (.066)	-.600** (.060)	-.616** (.070)
kfemale	.079** (.005)	.080** (.005)	.079** (.005)	.080** (.006)
kmarried	-.014** (.006)	-.017** (.007)	-.015** (.006)	-.019** (.007)
khaskid	.018** (.007)	.019** (.007)	.019** (.007)	.020** (.007)
kfull	-.026** (.006)	-.025** (.006)	-.026** (.006)	-.024** (.007)
kHighSchool	.027** (.007)	.025** (.008)	.025** (.007)	.022** (.008)
kCollege	.017* (.009)	.019* (.010)	.019** (.009)	.021** (.010)
dist_1to5	-.197** (.009)	-.198** (.009)	-.196** (.009)	-.198** (.010)
dist_5to25	-.284** (.008)	-.283** (.009)	-.283** (.008)	-.282** (.009)
dist_25to100	-.372** (.009)	-.368** (.011)	-.371** (.009)	-.365** (.011)
dist_100to500	-.409** (.009)	-.404** (.012)	-.411** (.009)	-.402** (.012)
dist_over500	-.492** (.011)	-.492** (.011)	-.493** (.011)	-.494** (.012)
only_child	.079** (.018)	.085** (.022)	.069** (.020)	.081** (.024)
one_sibling	.077** (.010)	.080** (.012)	.072** (.011)	.077** (.013)
two_siblings	.047** (.009)	.048** (.009)	.045** (.009)	.046** (.010)
north	-.164** (.008)	-.150** (.020)	-.196** (.012)	-.170** (.025)
central	-.209** (.008)	-.200** (.015)	-.221** (.009)	-.205** (.016)

Note: Cluster-robust standard errors in parentheses, ** p-value<0.05, * p-value<0.1

Table 6: 2SLS tests

	(1)	(2)	(3)	(4)
Relevance of instruments				
F-test (wealth):	11.76^{**}		12.03^{**}	
F-test (finwealth):		14.24^{**}		15.46^{**}
F-test (realwealth):		9.00^{**}		9.03^{**}
Test of overidentifying restrictions				
Hansen-J test (p-value)	0.20	0.43	0.20	0.33
Endogeneity test				
Wu-Hausman statistic	-0.13^{**}	3.72^{**}	-0.13^{**}	4.38^{**}

t-test in (1) and (3), F-test in (2) and (4)

Table 7: Contact equation - 2SLS estimates excluding the top and bottom 2 percent of the distribution of wealth

	(1)	(2)	(3)	(4)
wealth	.292**		.274**	
	(.113)		(.112)	
finwealth		-1.514		-2.122
		(1.330)		(1.415)
realwealth		.976*		1.207**
		(.516)		(.566)
disp_share			.111**	.101**
			(.033)	(.046)
age	-1.171**	-1.110**	-1.213**	-1.130*
	(.449)	(.565)	(.448)	(.630)
age2	.903**	.896**	.933**	.921**
	(.329)	(.413)	(.327)	(.461)
pfemale	.024**	.016*	.023**	.013
	(.006)	(.009)	(.006)	(.010)
pretired	.017**	.015	.016*	.014
	(.008)	(.010)	(.008)	(.011)
bad_health	.020**	.017*	.019**	.015
	(.007)	(.009)	(.007)	(.010)
depression	-.018**	-.015	-.016**	-.012
	(.008)	(.010)	(.008)	(.011)
kage	-.565**	-.561**	-.571**	-.562**
	(.063)	(.074)	(.062)	(.081)
kfemale	.078**	.080**	.077**	.081**
	(.005)	(.006)	(.005)	(.007)
kmarried	-.013**	-.015*	-.014**	-.016*
	(.006)	(.008)	(.006)	(.008)
khaskid	.018**	.018**	.018**	.019**
	(.007)	(.008)	(.007)	(.009)
kfull	-.028**	-.025**	-.028**	-.024**
	(.006)	(.007)	(.006)	(.008)
kHighSchool	.029**	.022**	.027**	.017
	(.007)	(.010)	(.007)	(.011)
kCollege	.016*	.013	.019**	.014
	(.009)	(.012)	(.009)	(.013)
dist_1to5	-.194**	-.189**	-.194**	-.186**
	(.009)	(.011)	(.009)	(.012)
dist_5to25	-.284**	-.282**	-.283**	-.281**
	(.008)	(.010)	(.008)	(.011)
dist_25to100	-.376**	-.367**	-.375**	-.364**
	(.009)	(.012)	(.009)	(.014)
dist_100to500	-.411**	-.398**	-.413**	-.395**
	(.009)	(.015)	(.009)	(.016)
dist_over500	-.494**	-.492**	-.494**	-.492**
	(.011)	(.013)	(.011)	(.014)
only_child	.070**	.067**	.066**	.059*
	(.021)	(.027)	(.022)	(.032)
one_sibling	.072**	.076**	.070**	.074**
	(.011)	(.014)	(.012)	(.016)
two_siblings	.041**	.039**	.040**	.037**
	(.009)	(.011)	(.009)	(.012)
north	-.165**	-.108**	-.195**	-.117**
	(.008)	(.042)	(.012)	(.048)
central	-.211**	-.176**	-.222**	-.174**
	(.009)	(.028)	(.009)	(.030)

Note: Cluster-robust standard errors in parentheses, ** p-value<0.05, * p-value<0.1