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ABSTRACT

Effects of Intergenerational Transfers on Elderly Coresidence with Adult Children: Evidence from Rural India*

The present paper argues that intergenerational transfers between elderly parents and adult children are important determinants of any coresidency arrangement though generally overlooked in the existing literature. In this respect the paper distinguishes between exchange of both financial and other kinds of transfers between elderly parents and adult children and then examines the effects of these transfers on coresidency taking account of the inherent endogeneity of these transfers to coresidency decision. There is evidence that the effects of transfers on coresidency arrangements could be biased if one does not correct for the endogeneity bias. The corrected estimates derived from a system of correlated and recursive system of transfers and coresidency equations suggest that the probability of coresidence is generally lower among the better off elderly; the likelihood is also lower for the older and female elderly without a spouse and also those with poor health, thus necessitating social protection for these disadvantaged elderly.

JEL Classification: H55, I31, J14

Keywords: co-residence with children, intergenerational transfers, elderly health and wealth effects, simultaneity bias, correlated recursive model

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1. INTRODUCTION

Population is ageing in most countries today though the implications of ageing are more serious for developing countries like India where a majority of elderly do not have any regular earnings[1] after retirement, where there are problems of earning from assets in old age, where credit and insurance markets are poorly developed. In the absence of any extra-familial welfare institutions, it is common among the elderly persons in India to coreside with adult children. While demographic (Visaria, 1998; Rajan et al. 1999) and some sociological (Dandekar, 1996; Prakash, 1999) aspects of aging in India have received some attention in the recent literature, little is known about the nature of and limits to the coresidency arrangements among a growing number of elderly in India, partly reflecting the fact that they are being well cared for by their immediate families. There are however anecdotal evidence to indicate the shortcomings of the existing system, especially in the face of changing economic and social structure in India (e.g., see Bhat and Dhrubarajan, 2001). The present paper aims to fill in this gap of the literature and examines the nature of and possible limits to coresidency arrangements in rural India where the majority of the elderly resides.

Existing literature is diverse and yet limited, especially for the low-income countries.[2] First, population and development theorists emphasize the fertility motive for old age security whereby children are the main source of old age security in low-income countries. This

[1] Majority of the older people in India work outside the formal sector and lack the capacity to save. Only 1 in 10 Indian workers participates in some pension schemes (World Bank, 1994).

[2] There is some literature for the developed countries though that tends to identify resources of the elderly including income (Englehardt et al. 2002), wealth, health (Mutchler and Burr, 1991) and kinship status to be important factors affecting living arrangement choices. Association between change in functional ability, or marital status on the one hand and living arrangements on the other is also documented in the literature (e.g., Worobey and Angel, 1990; Spitze et al, 1992).

literature suggests substitutability between children and parental wealth as old age security (Raut, 1996) and also how wealthy parents can induce greater assistance from children (Hoddinott, 1992). A second strand of the literature argues that intergenerational transfers are dominated by the financial support from adult children to elderly parents where justifications for the financial transfers include, among others, returns to parental investment in education of young children (Lillard and Willis, 1997). A third strand of the literature directly examines the determinants of elderly coresidency with adult children in Indonesia and, among other things, highlight the role of parental income (e.g., see Da Vanzo and Chan, 1994) on coresidency with children while some others (e.g., see Cameron, 2000) report only small effects of these economic variables on elderly coresidency arrangements. Finally, there are also studies that links elderly labour supply to financial transfers in Pakistan (Kochar, 2000) and coresidency arrangements in Indonesia (Cameron and Clark, 2007).

We integrate these various strands of the literature to examine the factors determining elderly coresidency with adult children. We argue that the decision to coreside is a joint decision and depends on the comparison of each agent's (elderly parent and adult child) utility levels when living alone and when coresiding. Given that we only observe the cases of actual coresidency (from the pool of all potential ones), we assume that utility each agent (elderly parent and adult child) derives from coresidency must be higher than their utility in isolation. An important aspect of coresidency (as opposed to living in isolation) is the mutual sharing of responsibilities involving intergenerational transfers of services between elderly parents and adult children, which has generally been overlooked not only in the transfer literature but also in the direct determination of coresidency arrangements. While an important aspect of these intergenerational transfers relates to financial transfers, there are important non-financial transfers (e.g., personal care provided by coresident children or elderly contributing to daily household chores including looking after the grand children) as well, though again overlooked in the existing literature (that generally emphasizes the role of financial transfers from adult children to elderly parents and/or

elderly wealth and financial contributions). The present analysis distinguishes between both financial and non-financial contributions of elderly parents as well as adult children and accordingly, examines the effects of these intergenerational transfers on coresidency arrangements in India. This exercise allows us to identify the factors where coresidency arrangement may fail to provide sufficient old age security. This is an important exercise in the Indian context because coresidency with adult children is often the only viable option for the elderly persons, especially for the disadvantaged (widowed, female and older elderly who are often less wealthier than others). Thus identifying the factors that may discourage coresidency could help the public authorities to target the particularly disadvantaged elderly for possible social protection. Unless policies and social protection schemes specifically address the issues of the old age poverty,[3] Millennium targets for poverty reduction will not be achieved.

The empirical analysis is based on the 52nd round National Sample Survey (NSS) data collected from the rural sectors of the Indian states. This is a special round of the NSS that collects additional information on the elderly members of sample households living in different Indian states. We choose to focus on the rural households because almost 8 out of 10 elderly in India live in rural areas. Moreover a majority of rural Indians tend to work in the informal sector where there is no provision of regular income after retirement. Unlike their urban counterparts, many rural elderly lack financial assets and/or property and are thus susceptible to greater poverty and vulnerability.

The paper is novel in a number of ways. We depart from the existing literature to argue that an elderly person's coresidence with children is an important aspect of intergenerational transfers[4], involving transfers not only in terms of housing consumption, but also other financial and non-financial exchanges between elderly parents and adult children in a mutually beneficial way. This in turn allows us to examine the effects of inter-generational transfers on elderly

[3] There are no official data on the income of the elderly in India.
[4] Generally home sharing arrangement is considered to be an important part of family redistributive efforts.

coresidence with adult children. Secondly, subject to the data limitations (see further discussion in section 2), our analysis distinguishes between (a) financial and non-financial assistance from adult children and also (b) financial and non-financial assistance from elderly parents (see further discussion in section 2.2 on choice of variables). Incorporation of non-financial transfers is an important aspect of the present study as it has been overlooked in most existing studies. Finally, assessing the effects of intergenerational transfers (e.g., financial and non-financial contributions of children and elderly members of the household) on coresidency is far from being straightforward. For one thing, there are serious self-selection issues to be sorted out (as in many of the existing studies) – otherwise estimates of single coresidency equation in terms of financial and non-financial contributions of adult children and elderly parents will be biased. For example, an elderly person who has wealth and who requires family care is not a random subset of all elderly members coresiding with children; similarly, coresident adult children who may assist elderly parents financially and yet receive important household contributions from elderly parents are not a random subset of all adult children coresiding with elderly parents. Traditional approach to solve this kind of endogeneity problem would be to identify the relevant instruments for these variables (e.g., elderly person's financial dependence on children or his/her ownership of wealth) and then estimate the coresidence equation using instrumental variable method. It is however not so simple to find appropriate instruments for these decisions, especially in single cross-section data-set (that do not contain information on past behaviour of household members). Our approach to solve this problem has been to use a *correlated recursive* system of equations (corresponding to various transfers and coresidency equations), using a technique that has been used successfully elsewhere (e.g., Brien and Lillard, 1994; Lillard and Willis, 1994; Panis and Lillard, 1994; Makepeace and Pal, 2007). This is because the correlation between any pair of unobserved error terms in these relevant decisions (corresponding to transfers and coresidency) is likely to be non-zero. We thus allow for the cross-correlations between these decisions (which are the sources of endogeneity) in the relevant equations to correct for the possible endogeneity, which otherwise

could seriously bias the estimates.[5] Our results highlight the extent of the bias if we do not address the endogeneity issues. Corrected results suggest that demographic characteristics of the elderly are important in that older elderly, female elderly and also those without a spouse are less likely to coreside. Intergenerational transfers are important too and we note, quite alarmingly, that elderly persons requiring personal care in our sample are less likely to coreside irrespective of whether they are financially dependent or not.

The paper is developed as follows. Section 2 describes the data and section 3 explains the methodology. Section 4 analyses the results and the final section concludes.

2. DATA

We use the fifty-second round NSS data from the rural sector of different states and union territories in India collected in 1995-96. This particular round of NSS data provides additional information on the elderly members of the sample households, aged sixty years and above. In particular, we observe living arrangements, state of economic dependence, ownership/management of financial assets and/or properties, actual health problems of the elderly as well as their participation in daily household chores and social/religious matters. We also observe the essential characteristics of other members of the household.

2.1. Nature of living arrangements in rural India

The data-set includes elderly members aged sixty or above of different marital status living in the rural sector of different states in India. We have excluded the never married elderly members from our analysis as none of them had any children in our sample. The sample of elderly

[5] These correlated estimates would also be better than the fixed effects single equation logit estimates of coresidency in terms of elderly wealth, participation in household work, financial dependence on children and intensity of health problems, among other possible covariates. Although the fixed effects estimates take account of family fixed effects

members consists of household head, his/her spouse, parents or parents-in-law and other relations or non-relations of the head of the household. We however choose to consider the head and his/her spouse aged sixty or above as we can identify the characteristics of their children (that feature prominently in our analysis of old age security), which is not possible for other elderly members.[6] This gives rise to a sample size of 13810 elderly members.

Information on co-residence with children is obtained from the pattern of living arrangements. We can identify if someone is living with spouse and children or with children only (without the spouse). The latter is closely related to the marital status of the elderly persons: while a majority of currently married elderly members with children co-reside with spouse and children, a majority of widowed/separated elderly members with children co-reside with children only. However, a majority of currently married elderly members *without children* co-reside with spouse only. Other types of living arrangements are also observed, e.g., whether someone is living on his/her own, or in an old home or living with other relations or even non-relations, though the proportions of cases are not that significant in our sample. Compared to all elderly members in the sample, a clearer residency pattern is found when we distinguish between elderly persons *with/without* children. As high as 80% of both married and widowed elderly members *with children* tend to coreside with children (with or without the spouse).[7] In contrast, considering the elderly members *without children*, about 95% of currently married men and women live with spouse only; 68% widowed women and 47% widowed men live on their own or in an old home while others tend to live with other relations or non-relations. Thus in the absence of any extra familial traditions of old age security, elderly men and women *without children* are more vulnerable than those with children and co-residing with children (with or without spouse) though

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(something like the unobserved heterogeneity terms in our model), it does not allow for non-zero correlations between each pair of unobserved heterogeneity terms.

[6] Compared to the non-household head elderly members (34% of the full sample comprising of parents/parents-in-law and other types of relatives), this may be a sample of better-off elderly. We needed to focus on this group of elderly heads and their spouses as we needed information on *all* their children. We however intend to study the case of non-household head elderly in a separate paper.

for the obvious reason we shall in this paper focus only on elderly men and women with children.

Table 1[8] compares some selected characteristics of elderly members with children in three different modes of living arrangements: (a) those living with children (with or without spouse), (b) those living with spouse only and (c) those living alone, in old home or with other non-relations.[9] Clearly, a higher proportion of elderly persons living with children tend to own properties and financial assets while a slightly lower proportion of them have made provision of regular income (as indicated earlier, the overall proportion of elderly with regular income after retirement is rather low for all elderly). Secondly, a lower proportion of elderly members living with children tend to suffer from chronic illness, physical disability or immobility. While we do not observe the personal family care given to all elderly with some health problems, we observe it for the immobile elderly. On an average similar proportion of elderly living with children and living with spouse (without the children)[10] tend to get personal care from the family members (we do not observe if the help comes from the spouse or from children only). It thus follows from the comparison of living arrangements that coresidence with children is particularly beneficial for personal care. Thirdly, compared to other living arrangements, proportion of elderly members participating in daily household chores is slightly lower among those living with children; the latter could perhaps reflect the fact that adult children (and their family) cooperate with the elderly in doing daily household chores so that the elderly needs to participate less.

3. AN EMPIRICAL ANALYSIS OF CORESIDENCE WITH CHILDREN

In view of our findings in section 2**,** we argue that coresidency is a mutually advantageous arrangement involving two-way flow of services (both financial and others) between elderly

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[7] We note that more than 90% of these elderly members have at least one son coresiding with them. So it is highly likely that most of them tend to coreside with sons.
[8] All figures are adjusted by sample weights.
[9] Only a third of the elderly living on their own has children or relatives living in the same village/town.
[10] This could be provided by the spouse only or by the adult children living nearby.

parents and adult children.

This could be rationalised in terms of a cooperative bargaining framework. Elderly parents and the child may either live independently or they may collude to form a joint household when each benefits from the exchange of intergenerational transfers (both financial and others). We suppose that in isolation, the parent and the child simultaneously make their own decisions (i.e., each will maximise individual utility subject to own budget constraint), taking the decision of the other to be given (corresponding to a Cournot-Nash equilibrium, for example). The latter would yield two reaction functions, which in turn will determine the optimal levels of indirect utility (μ^C, μ^P, for example for the child C and the parent P) that each will enjoy in isolation. In case they decide to coreside, they will benefit from the mutual exchange of sharing of responsibilities (i.e., transfers)[11] involved in any coresidency arrangement; in this case each will jointly maximise the product of individual gain (relative to their respective threat points μ^C, μ^P in isolation) subject to the joint budget constraint (corresponding to a Nash bargaining solution, for example). Consequently, the coresidency decision will be determined in terms of intergenerational transfers shared by coresident elderly and adult children.

We consider a static one period framework and posit, without much loss of generality, that current coresidence with adult children would among other factors be determined by the financial and other contributions of the elderly person and his/her adult children. This allows us to abstract from the dynamics of family formation as well as life-cycle consumption and labour market decisions.

Although we attempt to highlight the two-way flow of services between elderly parents and co-resident adult children, we are constrained by the availability of relevant information. While we directly observe if elderly parents are financially dependent on children, we do not observe the personal care offered by the family to all elderly; we, however, observe (a) an elderly

[11] For example, they can share the same house and can look after each other (financially and otherwise) in times of necessity.

person's intensity of actual health problems that could be used as an indirect measure of their dependence on coresident children for personal/medical care.[12] In particular, we derive a composite health indicator (HLTHPR) from indicators of actual health problems.[13] (i) chronic illness (e.g., heart problem, blood pressure, diabetes etc.) and (ii) physical disability (e.g., hearing, vision, speech etc.).[14] The resultant variable HLTHPR is a categorical one: it takes a value 1 if the elderly person suffers from one of these problems, 2 if the elderly person suffers from two of these problems and zero otherwise. In other words, the health status variable is a measure of intensity of health problems faced by the elderly person, which could be used as an instrument of the personal care offered by coresident children. (b) Although we do not observe specific family care provided to all elderly, we observe whether any family care (HOMECARE) is offered to an immobile elderly who are confined to bed/home. In the absence of any better information,[15] we use this measure as an alternative index of personal care in the coresidency equation.

Next we attempt to identify the contributions of an elderly person to the family. In this case, we observe (a) if the elderly person owns any property[16] and/or financial assets (PROPFA); the variable PROPFA takes a value 1 if the elderly person owns any property[17] and financial assets and zero otherwise. Thus PROPFA could be taken as a measure of elderly wealth in our analysis. (b) We also observe if the elderly person directly provides any financial support to other family members (FINSUP) and use it as an alternative indicator of financial transfer from the

[12] While one can argue that this is not an ideal indicator because poor health of the elderly may well reflect the lack of support from the coresident children. We try to address this endogeneity problem in our estimation.

[13] It is worth emphasizing here that the indicators of health used in our analysis are measures of actual health problems, rather than the instrumental activities of daily living. Hence, we do not need to treat health as a latent immeasurable variable.

[14] We also observe if an elderly is physically immobile (confined to bed or home) – but found that it is often the result of health problems (i) and (ii); so do not treat it as a separate category of illness.

[15] Note however that we cannot identify if the personal care was provided by the spouse or adult children.

[16] Note that ownership of property often indicates the ownership of the residential house and sharing of the house owned by the elderly person along with adult children could reasonably be taken to be an important contribution of the elderly towards the family. Also an elderly person's savings as well as interest earnings from it is naturally inherited by the children; so even if it is not enjoyed by coresident children in the current period, they remain the ultimate beneficiaries.

[17] While we do not specifically know if the family house is owned by the elderly, an elderly person's ownership of property could be taken to be a measure of his/her ownership of family house.

elderly person to the family. Non-financial contribution, on the other hand, can directly be measured by an elderly person's participation in daily household chores (HWORK).[18]

In addition, we control for other individual/household and regional dummies to explain coresidency– these are explained in the following sub-section.

3.1. Modelling Coresidency

The primary variable of our interest is the coresidence with children.

CORESIDE = 1 if an elderly lives with children (with/without spouse)

= 0 otherwise

Thus for an elderly person i from a household j, the decision to coreside is given by:

$$CORESIDE_{ij} = \beta X_c + \eta_{cj} + u_{cij} \qquad \textbf{(1)}$$

where X_c is a set of observable individual/household-level characteristics explaining coresidence. η_c (family-specific) and u_c (individual-specific) capture residual variation (see further discussion below).

Specification of X_C : Co-residence with children depends not only on age (whether the elderly person is aged 75 or more, i.e., AGE75)[19], gender (MALE), schooling (primary or higher) and marital status (i.e., whether has a spouse of not, WIDSEP) of the elderly person, but also on measures of financial (FINDEP) and personal (HLTHPR or HOMECARE) dependence on children, financial (PROPFA or FINSUP) and other contribution of the elderly (HWORK) to the family. We also control for the regional variation in the pattern of elderly living arrangements by including a number of regional dummies (EAST, NORTH1, NORTH2, SOUTH).[20] These regional dummies would account for the inter-state variation in socio-economic set-up and/or public assistance offered to the elderly (e.g., see Pal and Palacios, 2006).

[18] Some may argue that participation is not quite the same as effectively contributing to these chores; in the absence of any better indicator, we argue that there are some elderly in the data-set who cannot even participate.

[19] We identify older elderly aged 75 or more from all elderly (aged 60 and above) as Pal and Palacios (2006) suggest that compared to all elderly (60+) labour market participation rate declines sharply among older elderly (75+).

It is also likely that the household-level unobserved heterogeneity could be significant in explaining coresidence with children in our sample. For example, we do not observe the life cycle income or consumption profile of the elderly person or wealth of other members of the household, though the latter could affect living arrangements significantly. In our analysis this household/family specific unobserved heterogeneity is accounted for by η_c where $\eta_c \sim N\left(0, \sigma_c^2\right)$ is assumed to be uncorrelated with other covariates.[21] All other individual-level residual variation is captured by u_C: $u_C \sim IIDN(0,1)$.

3.2. Endogeneity issues

Addressing endogeneity is a difficult problem in our analysis where an elderly person's coresidence with their children depends, among others, on financial and other contributions of the elderly and adult children. Even if we assume marital status, education and past employment of the elderly person to be given within a static one-period framework, we need to address the possible bias generated by the correlations between elderly person's coresidence with children on the one hand, and different components of intergenerational transfers (FINDEP, FINSUP or PROPFA, HLTHPR or HOMECARE and HWORK) on the other. Ignoring this simultaneity is likely to bias our estimates. To redress this problem, we determine the coresidency decision jointly with wealth, health, participation in household chores and financial dependence on children as a recursive correlated system of equations. This is explained below.

Firstly, a possible source of simultaneity arises from the inclusion of financial dependence on children (FINDEP). On the one hand, financial dependence on children may induce an elderly to coreside. On the other, coresidence with children may entail implications for the financial dependence of the elderly. So the equation that we estimate here is as follows:

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[20] For definitions of these variables, see note to Table 3.
[21] This is a standard assumption in random effects panel data model of this type.

$$FINDEP_{ij} = \beta_D X_D + \eta_{Dj} + u_{Dij} \quad (2)$$

where X_D refers to a vector of explanatory variables (see Table 3A), η_D captures family-specific unobserved heterogeneity and u_D captures any other residual variation: $\eta_D \sim N(0, \sigma_D^2)$ and is uncorrelated with all other covariates while $u_D = IIDN(0,1)$.

A second possible simultaneity arises with respect to the personal care offered by adult children to the elderly parents. On the one hand, given the health problems, an elderly person may decide to coreside with children. On the other hand, there is some literature suggesting that choice of residential location may affect health (e.g., Borsch Supan et al., 1996). Given this possibility of simultaneity between co-residence and health problems (or personal care provided by the family), we estimate the following equation for the i-th elderly living in j-th household:

$$HLTHPR_{ij} = \beta_H X_H + \eta_{Hj} + u_{Hij} \quad (3)$$

where X_H refers to a vector of household/individual specific explanatory variables (see Table 3A), η_H captures unobserved heterogeneity (family-specific) and u_H captures any other residual variation such that $\eta_H \sim N(0, \sigma_H^2)$ and is uncorrelated with all other covariates and $u_H = IIDN(0,1)$. In an alternative formulation similar equation is estimated for the alternative index HOMECARE.

Elderly person's financial contribution to the family (e.g., current wealth as measured by the ownership of financial assets and/or properties or direct financial support to family members) could be a further source of simultaneity. This is because an elderly person's current financial situation is a form of old age insurance and may compete with children as an alternative form of insurance, thus generating implications for coresidence with children. In an attempt to address this problem, we estimate the following equation for the i-th elderly living in the j-th household:

$$PROPFA_{ij} = \beta_W x_W + \eta_{Wj} + u_{Wij} \quad (4)$$

where X_W refers to a vector of explanatory variables affecting wealth, η_W captures family/household-level unobserved heterogeneity and u_F captures any other residual variation where $\eta_W \sim N(0, \sigma_W^2)$ and is uncorrelated with all other covariates and $u_W = IIDN(0,1)$. In an alternative formulation, we also replace PROPFA to estimate FINSUP, which is a direct measure of the elderly person's financial contribution to the family, using similar specification.

Finally, an elderly person's participation in daily household chores (HWORK) could also generate some simultaneity bias in the estimates of coresidency as there could be a two-way causality between the two. In an attempt to redress this, we estimate the following participation equation:

$$HWORK_{ij} = \beta_P x_P + \eta_{Pj} + u_{Pij} \quad (5)$$

As before X_P refers to a vector of explanatory variables affecting participation, η_P captures unobserved household-level heterogeneity and u_P any other residual variation: $\eta_P \sim N(0, \sigma_P^2)$ and is uncorrelated with all other covariates while $u_P = IIDN(0,1)$.

Most of the relevant decision variables including coresidence, financial (FINSUP or PROPFA) or non-financial (HWORK) contribution of the elderly, and financial (FINDEP) or non-financial (HOMECARE) contributions of the adult children are binary in nature; only exception is the intensity of the health problem variable (HLTHPR); this is a categorical variable assuming values 0, 1, 2 depending on whether the elderly person suffers from 0, 1, 2 health problems. Accordingly, we need to use a multinomial logit model to estimate this HLTHPR variable while we use univariate probit models to estimate the other transfer or coresidency equations.

Given the alternative indices of financial contribution of the elderly and the personal care offered by the adult children towards the elderly, we estimate two alternative system of equations (1)-(5):

(I) CORESIDE jointly with FINDEP, PROPFA, HLTHPR and HWORK

(II) CORESIDE jointly with FINDEP, FINSUP, HOMECARE and HWORK

In either case, it is important to ensure the identification of this five equation system (I) or (II).

We propose a recursive structure for our model, ensuring identification in the presence of the common fixed factor (See Chamberlain and Griliches, 1975; Maddala, 1982 pp. 117-125). In particular, we assume that the decision to coreside depends on both financial and non-financial contributions of the elderly and adult children coresiding together; but we do not allow for any interdependence between/among financial dependence (FINDEP), health (HLTHPR), wealth (PROPFA), and participation (HWORK) in the other four auxiliary equations. Although we do not allow any of the transfer equations to interact with each other, we include some interactive intergenerational transfer terms in the coresidency equation. [22]

In addition, there naturally arise some identifying restrictions by the very nature of the particular decision. For example, an elderly person's financial dependence on children is likely to be contingent upon whether s/he has sons or daughters. Traditionally, elderly in India depend on the contributions made by sons (and not daughters who are married of to a different family). The variable is however not important in any other intergenerational transfer decisions used here.[23] Ideally, use of various health inputs would be identifying variables in the health equation. In the absence of any better indicator, we take predicted value of average per capita monthly consumer expenditure (APCE)[24] as the proxy for various health inputs in the health equation. We also include access to modern toilet (TOILET) in the house to be a useful identifying variable, not relevant for the other decisions; this is particularly important for those immobile and requiring

[22] There could also be some interaction between various transfer variables used in the coresidency decision. We particularly account for the interaction between financial dependence on children and the personal care offered by children or elderly contribution to household chores; we also consider the possible interaction between elderly financial independence and the personal care required in case of immobility. These are discussed in section 4. We however could not include all possible interaction terms between the four transfer variables as there were problems of convergence of the complex log-likelihood function.

[23] One could also think about presence of educated sons to be an identifying variable in this decision though its inclusion is likely to give rise to further endogeneity problem; so we refrain from doing so.

personal care from the coresident children. We include a binary variable indicating whether an elderly has ever been economically active (ONCEACT) to be an important variable to determine elderly person's financial contribution to the family in old age.[25] Finally, presence of grand children aged five or below (GCHILD) has been used as an identifying variable in the participation equation of the elderly. This is because looking after the young grand children is often considered to be a traditional role of coresident grand parents in India.

While specifications of system equations (1)-(5) to be estimated are summarised in Table 2, the means and standard deviations of various regression variables are summarised in Table 3.

3.3. Correction for Endogeneity Bias: Correlated Estimates

The main reason for the joint estimation is the simultaneity and the implicit self-selection: elderly persons who contribute to the family (financially and/or otherwise) and elderly persons who choose to coreside with their children are not necessarily a random subset of all elderly persons in the sample. Similarly, adult children who provide financial and other kinds of assistance and decide to coreside are not a random subset of all adult children. By modelling this aspect of the data generation as a common fixed effect (note that the fixed effect has different impacts on different equations), we are able to remove the implicit bias resulting from the correlation. All these essentially mean that the pair-wise correlation between the family-specific unobserved heterogeneity terms in the coresidency equation on the one hand and that in any of the four auxiliary transfer equations corresponding to the contributions of the elderly and adult children coresiding together on the other could be non-zero: i.e., $Cov(\eta_i, \eta_j) \neq 0$, $i,j = C, D, W, H, P, i \neq j$. However conditional on all the heterogeneity terms, the equations are independent and the conditional joint likelihood can be obtained by simply multiplying the individual likelihoods.

[24] Since average per capita monthly consumer expenditure depends on household structure and earnings, it too could suffer from simultaneity bias. Hence we use the value of average per capita consumer expenditure (APCE) predicted by various household composition variables as well as the characteristics of the head of the Household.

Thus inclusion of the source of endogeneity (i.e., non-zero cross-correlations) in the relevant equations allows us to correct for the endogeneity bias.

The joint marginal likelihood function can be written as:

$$\int_{\eta_c}\int_{\eta_W}\int_{\eta_D}\int_{\eta_H}\int_{\eta_P}\left[\prod L^C(\eta_C)\prod L^W(\eta_W)\prod L^D(\eta_D)\prod L^H(\eta_H)\prod L^P(\eta_P)\right]$$

$$f(\eta_c,\eta_W,\eta_D,\eta_H,\eta_P)d\eta_c\,d\eta_W\,d\eta_D\,d\eta_H\,d\eta_P$$

where $f(\eta_C,\eta_W,\eta_D,\eta_H,\eta_P)$ is the joint distribution of the unobserved heterogeneity components. Here $f(\eta_C,\eta_W,\eta_D,\eta_H,\eta_P)$ is a five dimensional normal distribution characterised as follows:

$$\begin{pmatrix}\eta_C\\ \eta_W\\ \eta_D\\ \eta_H\\ \eta_P\end{pmatrix} \sim N\left[\begin{pmatrix}0\\0\\0\\0\\0\end{pmatrix}, \begin{pmatrix}\sigma_C^2 & & & & \\ (\rho_{WC}\sigma_C\sigma_W) & (\sigma_W^2) & & & \\ (\rho_{DC}\sigma_D\sigma_C) & (\rho_{DW}\sigma_D\sigma_W) & \sigma_D^2 & & \\ (\rho_{HC}\sigma_H\sigma_C) & (\rho_{HW}\sigma_H\sigma_W) & (\rho_{HD}\sigma_H\sigma_D) & \sigma_H^2 & \\ (\rho_{PC}\sigma_P\sigma_P) & (\rho_{PW}\sigma_P\sigma_W) & (\rho_{PD}\sigma_P\sigma_D) & (\rho_{PH}\sigma_P\sigma_H) & \sigma_P^2\end{pmatrix}\right]$$

The complete correlated recursive model is then estimated using Full Information Maximum Likelihood (FIML) Method.

4. ESTIMATES OF CORESIDENCE

Our analysis of coresidence is developed in different stages. (a) We start with the simplest model of coresidency, where all transfer variables are assumed to be exogenous.[26] These estimates are

[25] Whether an elderly person has once been economically active is also likely to be endogenous to coresidency decisions. For the purpose of this paper, we shall however abstract from previous labour market decisions and treat it to be exogenously given within a static one-period framework.

[26] We started with pooled regressions with a gender dummy. However, since the gender dummy was significant in all equations, we included all the gender interaction terms with included explanatory variables in each equation. The final specifications shown in Tables 4A, 4B and Appendix Tables A1-A4 are obtained by excluding the insignificant terms and thus represent the most parsimonious specifications of these equations.

summarised in column (1)-(4) of Appendix Table A1. Note that columns 1 and 2 show the uncorrected estimates of coresidence *without* any unobserved heterogeneity; these two sets of estimates correspond to system specifications (I) and (II) and differ with respect to the choice of transfer variables, especially with respect to elderly person's financial contribution to the family (FINSUP or PROPFA) and adult children's contribution to provide personal care to elderly parents (HLTHPR and HOMECARE). Columns (3)-(4) show the corresponding estimates *with* household-level unobserved heterogeneity. Note however that both these estimates (with and without heterogeneity) are likely to suffer from endogeneity bias as there could be non-zero correlations between coresidence and various transfer variables as discussed above.

Corrected estimates of coresidence are shown in columns (1)-(8) of Table 4; the corresponding estimates of unobserved heterogeneity are shown in Table 5. A comparison of the corrected (Table 4) and the uncorrected (Appendix Table A1) estimates indicate the presence of the bias in our estimates. It also follows from Table 5 that the estimated unobserved heterogeneity terms as well as all the pair-wise correlation coefficients are highly significant. Finally, Table 6 allows for the interaction between different transfer items in the coresidency equation that is not allowed in the estimates presented in Table 5.

4.1. Corrected estimates of elderly coresidence with adult children

Our discussion in the rest of the paper therefore focuses on the corrected correlated estimates. As before, we develop the analysis is stages. We first allow for the possibility that an elderly person's coresidence with children may be correlated with adult children's contributions (both financial FINDEP and non-financial HLTHPR or HOMECARE while other transfer variables are assumed exogenous). In particular, we jointly estimate coresidence with elderly financial dependence on children and health problems (or home care). These estimates are summarised in columns (1) and (2) of Table 4. Clearly the effects seem to depend on the particular specification. Financial dependence on children is insignificant while elderly health problems significantly

enhance the possibility of coresidence. If however, we replace elderly health problems by a more direct measure of homecare (column 2), we find that both financial dependence and home care enhance the likelihood of coresidence.

Next we allow for the non-zero cross-correlations between coresidence on the one hand and elderly person's contributions (financial PROPFA or FINSUP and others HWORK, assuming contributions of adult children to be exogenous) on the other. These estimates are presented in columns 3 and 4 of Table 4. When elderly wealth is considered to be an indicator of elderly financial contribution (column 3), it has a negative effect on the probability of coresidence which elderly participation in household chores enhances the possibility of coresidence. If however we consider direct financial transfer from the elderly, the effect is insignificant. In other words, ceteris paribus, financially able elderly are not particularly likely to coreside with adult children.

Third, columns 5 and 6 of Table 4 allow for the possibility that coresidence can be correlated with both parties' financial transfers (assuming other transfers to be exogenous though). In this case too we find that wealthy elderly are less likely to coreside (column 5) while elderly financially dependent on children or elderly providing financial services to children as well as those obtaining home care (in case they are immobile) are more likely to coreside. Elderly participation in daily household chores tends to enhance the probability of coresidence in all specifications (1)-(6).

As we compare the effects of transfers across various specifications, there is some evidence of simultaneity bias. For example, effects of health problem are negative if we do not account for its endogeneity (e.g., see columns 1 and 5). Similarly elderly wealth effects could be positive (e.g., compare columns 1 and 2 with columns 3 and 5) if we do not correct for the underlying endogeneity bias. Accordingly, we consider the completely correlated model that accounts for the all the possible underlying cross correlations between intergenerational transfers and coresidence; these estimates are summarised in columns (7) and (8) of Table 4

(corresponding to the system of equations I and II in section 3). Clearly financial transfers from adult children as well as those from the elderly parents are significant determinants of coresidence and both tend to enhance the probability of coresidence. Effects of non-financial transfers (both home care offered to elderly parents and elderly contribution to daily household chores) turn out to be insignificant. Effects of age, gender and marital status of the elderly seem to be quite robust across different specifications (1)-(8). In particular, older elderly aged 75 or more, female elderly and widowed elderly are less likely to coreside.

So far, we have not allowed for any interaction between the transfer terms in the coresidence equation and have only focussed on the direct effects of a particular type of transfer on elderly coresidence. One would however need to account for the interaction between different transfer variables and thus account for the indirect effects of transfers on coresidency arrangements as well. We experiment with a number of possible interaction variables with a view to ascertain the importance of both financial and non-financial transfer of services between elderly parents and adult children:

IFDHCARE = 1 if the elderly is financially dependent and also needs personal care;

IFDHWORK = 1 if the elderly is financially dependent, but contributes to house work;

IFIHCARE = 1 if the elderly is financially independent, but requires personal care;

We experiment with these interaction terms in the completely correlated model specification (II) and as before try to include one interaction term at a time because of the problem of convergence as we included all the interaction terms together[27]. The results shown in Table 6 are revealing: while financial dependence on children or home care individually enhances the probability of coresidence, elderly requiring both financial support and home care are less likely to coreside (column 1 of Table 5). Second, financially dependent elderly who are able to contribute to daily household chores are less likely to coreside (column 2 of Table 5). Finally, financially

[27] Note however that our efforts in this respect was restricted by the non-convergence of some of the complex log-likelihood functions. Also see footnote 20.

independent elderly who require personal care are also less likely to coreside (column 3 of Table 5).

These results could provide valuable insights to formulating policies for social protection of the elderly in India. Unlike many existing studies, our results identify the importance of both financial and non-financial transfers (two-ways) between adult children and elderly parents in explaining coresidence and in this context, highlight the limits of coresidency arrangements in India. First, much in line with the demographic literature (e.g., see Raut, 1996), wealthy elderly parents are less likely to coreside with children, after controlling for all other factors, thus reflecting the substitutability between children and elderly wealth as alternative forms of old age security. More importantly, these results identify groups of disadvantaged elderly (e.g., female and older elderly and also those who do not have any spouse) who are less likely to coreside.[28] Finally, there is evidence that financially dependent or independent elderly who are unable move freely (thus requiring personal care) are less likely to coreside. In the absence of any extra-familial welfare institutions, the state needs to come forward to protect the interests of the vulnerable elderly members who lack health, wealth or disadvantaged in other ways.

5. CONCLUDING COMMENTS

Little is known about the living conditions of a growing number of elderly in India most of whom tend to coreside with their children. The lack of research in this area partly reflects the general belief that these elderly are well looked after by their children. This is also a result of the fact that relevant data to analyse these issues are scarce. Using the recent NSS data we make an attempt here to examine the effects of inter-generational transfers on elderly coresidency arrangements in

[28]Some could argue that even non-coresident elderly parents could obtain financial and other support from their children. But the available information from our data set is not very encouraging in this respect: only 20% of non-coresident elderly parents with children obtain some financial assistance from their children. Similarly, only about a third of these elderly have children living in the same village so that they could get immediate medical/personal care.

rural India.

We argue that an elderly person's coresidence with adult children is a mutually advantageous arrangement where both parties tend to contribute financially and/or otherwise (relative to a situation when each live in isolation). Accordingly, we distinguish between financial and other kinds of transfer of services involved in a coresidency arrangement and examine the possible effects of these transfers on elderly coresidence with children. This however necessitates us to resolve the complex simultaneity problems inherent in this modelling. We adopt a unique approach to estimate the probability of coresidence jointly with various intergenerational transfers, after allowing for possible pair-wise correlation between coresidence on the one hand and transfers on the other. In other words, our approach to solve the simultaneity problem has been to include the source of simultaneity (i.e., the pair-wise cross-correlations) into the coresidence equation. While coresidency with children is a social convention in India till today, there is indication that coresidence with children cannot by itself be regarded as sufficient means of old age insurance. In particular, the corrected estimates raise concern for the disadvantaged elderly persons, who are female, older, have no spouse and also who lack health, wealth or both in a society with no tradition of extra-familial welfare institutions. There is thus a role for the government to target the disadvantaged elderly while formulating policies for the social protection of the elderly.

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Table 1. Welfare Characteristics of Various Living Arrangements

	Living arrangements		
Characteristics of the elderly	Alone or with other relations/non-relations	With spouse only	**With children (with/without spouse)**
Owns financial assets (%)	60	61	67
Owns properties (%)	72	73	78
Owns financial assets & properties (%)	60	60	66
Provides financial support to children (%)	23	35	37
Financially dependent on children (%)	23	20	41
Provision of regular income (%)	4.3	5.2	3
Physical disability (%)	41	37	34
Chronic illness (%)	54	51	51
Physical disability or chronic illness (%)	36	38	38
Physical disability and chronic illness (%)	30	25	24
Physical immobility (%)	10	10	8
Receiving home care (%)	4	5	5
Able to participate in daily household work (%)	90	88	84
No of observations	971	1766	10952

Note: All figures are adjusted by sample weights.

Table 2. Intergenerational Transfers and Elderly Coresidence with Children: Model Specification

		Contribution of the elderly		Contribution of adult children towards elderly parents	
	Coresidency	Elderly wealth *or* elderly support to others	Participation in various household chores	Financial transfer to elderly parents	Home care *or* intensity of elderly health problem
Intercept	√	√	√	√	√
Age>=75	√	×	√	√	√
Male	√	√	√	√	√
Widow/Separated	√	√	√	√	√
Agricultural labour	×	√	×	√	×
Other labour	×	√	×	√	×
Primary schooling	×	√	√	√	√
Higher schooling	×	√	√	√	√
Presence of daughters	×	×	×	√	×
Scheduled caste/Scheduled tribe	×	√	×	×	×
Once economically active	×	√	×	×	×
Presence of young grand children	×	×	√	×	×
Per capita expenditure (predicted)	×	×	×	×	√
Access to modern toilet facilities					√
Elderly wealth/financial transfer to family	√	×	×	×	×
Elderly participation in daily household chores	√	×	×	×	×
Health Problem/home care	√	×	×	×	×
Financial dependence on children	√	×	×	×	×
Regional dummies	√	√	√	√	√
Family-specific unobserved heterogeneity	√	√	√	√	√

Note: Regional dummies: dummies for eastern, northern and southern states in India. In particular, NORTH1: Rajasthan, UP and MP. NORTH2: Punjab and Haryana; EAST: Bihar, Orissa, WB; SOUTH: AP, Kerala, Karnataka and Tamil Nadu.

Table 3. Means and Standard Deviations of Regression Variables

Variable	Mean	Std Dev
Older elderly (age>=75)	0.0800869	0.2714375
Male	0.645402	0.478409
No spouse	0.199204	0.399416
Primary schooling	0.0907314	0. 2872371
Higher schooling	0.0719044	0.2583389
Scheduled caste/scheduled tribe		
Once economically active	0.27357	0.445807
Agricultural labour		
Other labour		
Presence of daughters	0.2309196	0.4214364
Presence of young grand children	0.4601014	0.4984236
APCE/1000	0.372062	0.093868
Low caste	0.280956	0.449482
Elderly wealth	0.773642	0.418488
Elderly financial support to others	0.3537292	0.4781437
Financial dependence on children	0.3713251	0.4831767
Intensity of health problems	0.626358	0.483788
Elderly receiving family care	0.0486604	0.2151648
Participation in household chores	0.8480087	0.3590255
Coresidence with children	0.7930485	0.4051351
EAST	0.211658	0.408499
NORTH1	0.269515	0.443724
NORTH2	0.073642	0.261197
SOUTH	0.211079	0.408089
No. of observations	13810	13810

Table 4. Corrected Estimates of Coresidency

	1 findep & hlth	2 findep & homecare	3 propfa & hwork	4 finsup&hwork	5 findep & propfa	6 findep & finsup	7 All endo.	8 All endo.
Intercept	5.6075 ***	7.1332 ***	3.5091 ***	3.3034 ***	7.0457 ***	5.1759 ***	15.8270 ***	11.5713 ***
	0.4209	0.4782	0.7919	1.0282	0.4183	0.6369	1.7378	1.0598
AGE>75	-0.8025 **	-0.9368 ***	-0.8803 ***	-1.2232 ***	-0.5181 **	-0.6851 **	-0.8029 **	-0.8718 **
	0.3177	0.2868	0.2727	0.2692	0.2523	0.3175	0.3839	0.3909
Male	0.6431 ***	0.8346 ***	1.2612 ***	0.9472 ***	1.0908 ***	0.8574 ***	0.5224 ***	0.5944 ***
	0.1302	0.1294	0.1389	0.1652	0.1357	0.1619	0.1753	0.2092
No spouse	-2.7037 ***	-3.0702 ***	-2.8981 ***	-2.8823 ***	-2.6683 ***	-3.0262 ***	-6.3834 ***	-5.7112 ***
	0.2204	0.2518	0.2266	0.2334	0.1979	0.3263	0.6925	0.4992
Financially dependent on children	0.3425	0.9054 ***	4.9511 ***	5.5377 ***	0.7548 ***	3.8501 ***	0.8900 **	4.2206 ***
	0.289	0.2335	0.2089	0.2318	0.2569	0.2552	0.3745	0.3118
Elderly wealth	0.4851 ***	0.5084 ***	-0.4740 **		-0.6662 ***		0.3287	
	0.1671	0.1603	0.2226		0.1767		0.2688	
Elderly financially supporting others				0.2976		0.8526 ***		0.5314 *
				0.2084		0.2157		0.2884
Elderly health problems	0.2999 ***		-0.2236 ***		-0.1538 *		0.3270 **	
	0.1006		0.0837		0.0901		0.153	
Elderly receiving home careP		1.8683 ***		0.3315		0.4590 **		-0.1154
		0.2928		0.2491		0.2201		0.3429
Elderly participating in household work	0.7587 ***	0.3504 ***	1.4986 ***	1.4855 ***	0.2243 **	0.1684	-0.1295	0.1411
	0.1286	0.1295	0.1327	0.1471	0.1099	0.1193	0.1853	0.2145
Region dummies	yes	yes	yes	yes	yes	yes	yes	yes

Asymptotic standard errors are shown below the estimates; Significance: '*'=10%; '**'=5%; '***'=1%.

Table 5. Structure of unobserved heterogeneity

	1 findep & hlth	2 findep & homecare	3 propfa & hwork	4 finsup&hwork	5 findep & propfa	6 findep & finsup	7 All endo.	8 All endo.
SIGU1	2.6159 ***	2.8120 ***			2.7669 ***	2.4098 ***	2.8205 ***	2.4143 ***
	0.1034	0.149			0.1371	0.056	0.1532	0.0558
SIGU2			2.0419 ***	1.2888 ***	1.4101 ***	1.9641 ***	2.1841 ***	2.0855 ***
			0.1315	0.0703	0.0914	0.0803	0.1248	0.0897
SIGU3	1.6194 ***	1.3201 ***					1.9859 ***	1.6841 ***
	0.0691	0.0851					0.0757	0.1195
SIGU4			1.7820 ***	1.5842 ***			1.5193 ***	2.1672 ***
			0.1015	0.0952			0.0922	0.149
SIGU5	8.3161 ***	8.8619 ***	8.2460 ***	8.6205 ***	7.8213 ***	7.0723 ***	17.5546 ***	13.9297 ***
	0.4449	0.4522	0.9536	1.2004	0.4007	0.4851	2.0537	1.0771
RHO12					-0.1498 ***	-0.9497 ***	-0.1414 ***	-0.9343 ***
					0.0193	0.0075	0.0171	0.0076
RHO13	0.3708 ***	0.3572 ***					0.3337 ***	0.3805 ***
	0.0195	0.0288					0.0187	0.0273
RHO14							-0.2406 ***	-0.2189 ***
							0.0242	0.0228
RHO15	0.3532 ***	0.3004 ***			0.3256 ***	0.1152 ***	0.2662 ***	0.1735 ***
	0.0245	0.0174			0.0217	0.0279	0.0197	0.0201
RHO23							-0.0889 ***	-0.2690 ***
							0.0238	0.0364
RHO24			0.5365 ***	0.3588 ***			0.5378 ***	0.1517 ***
			0.0215	0.028			0.0241	0.0254
RHO25			0.0930 ***	0.1289 ***	0.2951 ***	0.0292	0.0955 ***	-0.0288
			0.0201	0.0251	0.0182	0.027	0.0134	0.0186

Table 5 continued …

	1 findep & hlth	2 findep & homecare	3 propfa & hwork	4 finsup&hwork	5 findep & propfa	6 findep & finsup	7 All endo.	8 All endo.
RHO34							-0.1755 ***	-0.5085 ***
							0.0328	0.0307
RHO35	-0.1650 ***	-0.1970 ***					-0.0792 ***	-0.0282
	0.0163	0.0182					0.0136	0.0251
RHO45			-0.2494 ***	-0.2806 ***			0.2612 ***	0.1632 ***
			0.029	0.043			0.0232	0.0253
ln-L	-26925.19	-15007.01	-14335.2	-15042.28	-18666.85	-17518.34	-35840.01	-22939.82

Asymptotic standard errors are shown below the estimates; Significance: '*'=10%; '**'=5%; '***'=1%. Columns (1)-(8) correspond to columns (1)-(8) in Table 4.

SIGU1: Heterogeneity in FINDEP;
SIGU2: heterogeneity in FINSUP/PROPFA;
SIGU3: heterogeneity in HLTHPR/HOMECARE;
SIGU4: heterogeneity in HWORK;
SIGU5: heterogeneity in CORESIDE.

Where FINDEP: elderly financial dependence on children; FINSUP/PROPFA: elderly providing financial support to the family; HLTHPR/HOMECARE: elderly in need of personal care from the family; HWORK: Elderly contributing to daily household chores; CORESIDE: elderly coresiding with children (with/without the spouse). RHO(i,j), i, j=1,..,5, is the correlation between any pair of heterogeneity terms corresponding to equations FINDEP, FINSUP/PROPFA, HLTHPR/HOMECARE, HWORK and CORESIDE respectively.

Table 6. Correlated estimates of coresidency with interactions between transfer terms

	(1)	(2)	(3)	(4)
Intercept	10.7171 ***	10.5860 ***	12.2172 ***	10.5456 ***
	0.8917	1.6775	1.5202	1.5643
AGE>=75	-0.8743 **	-0.8215 *	-1.3078 ***	-0.9607 **
	0.3837	0.449	0.4669	0.4356
MALE	0.5962 ***	0.4917 **	0.4523 *	0.4966 **
	0.2161	0.2359	0.2488	0.2224
Widow/separated	-5.6759 ***	-5.8351 ***	-6.4241 ***	-6.0080 ***
	0.4638	0.7805	0.8101	0.7627
FINDEP	3.8607 ***	6.4112 ***	4.1686 ***	6.4514 ***
	0.3444	0.8655	0.3441	0.8731
FINSUP	0.6109 **	0.4442	0.9605 ***	0.8609 ***
	0.2937	0.3181	0.36	0.3193
HOMECARE	-0.7761 *	0.8083 **	0.9100 **	1.2544 ***
	0.4369	0.3961	0.4128	0.4506
DAILYHH	0.0534	1.4625 ***	0.2166	1.2499 ***
	0.2006	0.3254	0.2481	0.2717
IFDHCARE	**2.2412 *** **			
	0.6998			
IFDHWORK		**-1.6598 *** **		**-1.5269 *** **
		0.4345		**0.4203**
IFIHCARE			**-3.2014 ** **	**-3.8071 *** **
			1.4279	**1.1374**
Regional dummies	Yes	Yes	Yes	Yes
ln-L	-22936.19	-22933.1	-22937.85	-22929.07

Asymptotic standard errors are shown below the estimates; Significance: '*'=10%; '**'=5%; '***'=1%.

APPENDIX

Table A1. Uncorrected estimates of coresidence

	1	2	3	4
	cor=0	cor=0	cor=0, het	cor=0, het
CONS5	0.3289 ***	0.2462 ***	1.6587 ***	1.3318 ***
	-0.0504	-0.0488	-0.3117	-0.2943
AGE75	-0.2792 ***	-0.2543 ***	-0.7337 ***	-0.6870 ***
	-0.043	-0.0426	-0.1274	-0.1262
MALE	0.3098 ***	0.2083 ***	0.5851 ***	0.3314 ***
	-0.0386	-0.0397	-0.0843	-0.0899
WIDSEP	-0.3757 ***	-0.3616 ***	-1.0406 ***	-0.9385 ***
	-0.0299	-0.03	-0.0916	-0.0928
FINDEP	0.7358 ***	0.8779 ***	2.2622 ***	2.5446 ***
	-0.0254	-0.0282	-0.0989	-0.1074
PROPFA	0.1703 ***		0.4089 ***	
	-0.0296		-0.0826	
FINSUP		0.4087 ***		0.9726 ***
		-0.0318		-0.0817
HLTHPR	-0.0772 ***		-0.2312 ***	
	-0.016		-0.0397	
HOMEHELP		0.0176		0.0686
		-0.0611		-0.1613
DAILYHH	0.0806 ***	0.0929 ***	0.1726 ***	0.1640 ***
	-0.0203	-0.0202	-0.0558	-0.0556
EAST	-0.0025	-0.0074	0.1777 **	0.1489 *
	-0.0318	-0.0319	-0.0805	-0.0851
NORTH1	0.0127	0.0131	-0.1813 **	-0.1617 **
	-0.0299	-0.0301	-0.0746	-0.0787
NORTH2	0.2000 ***	0.1980 ***	0.8444 ***	1.0282 ***
	-0.045	-0.0448	-0.1237	-0.1355
SOUTH	-0.2061 ***	-0.2460 ***	-0.3761 ***	-0.4713 ***
	-0.0312	-0.0312	-0.0824	-0.0846

Table A1 continued

	1	2	3	4
	Cor=0	cor=0	cor=0, het	cor=0, het
SIGU1			3.0664 ***	3.0633 ***
			-0.3037	-0.303
SIGU2			2.1325 ***	1.3697 ***
			-0.1255	-0.0693
SIGU3			1.9217 ***	1.3625 ***
			-0.0708	-0.0732
SIGU4			1.5589 ***	1.5589 ***
			-0.0815	-0.0825
SIGU5			3.1733 ***	3.0424 ***
			-0.3921	-0.3696

Asymptotic standard errors are shown below the estimates; Significance: '*'=10%; '**'=5%; '***'=1%.

Table A2. Estimates of auxiliary equations

	Probit estimates			Multinomial logit		Probit estimates	
	FINDEP	PROPFA	FINSUP	HLTHPR1	HLTHPR2	HOMECARE	HWORK
Intercept	-0.2821 ***	0.7620 ***	-3.4108 ***	-0.6540 ***	-1.2496 ***	-3.4520 ***	3.3775 ***
	-0.0768	-0.0987	-0.1219	-0.2228	-0.2304	-0.3145	-0.2018
AGE75	1.0649 ***	-0.1972 **	-0.8629 ***	0.7251 ***	1.4798 ***	1.0255 ***	-0.8796 ***
	-0.1406	-0.0902	-0.0992	-0.1213	-0.1214	-0.1068	-0.1119
MALE	-0.5880 ***	1.5992 ***	1.6277 ***	0.3651 ***	0.5066 ***	0.3417 ***	-0.1548 **
	-0.0611	-0.0734	-0.0648	-0.0588	-0.0685	-0.0746	-0.0663
WIDSEP				0.3360 ***	0.5629 ***	-0.0676	-0.1231
				-0.0799	-0.0834	-0.0951	-0.1
PSCH	-0.1528 *	0.3285 ***	0.2841 ***	0.0733	-0.0009	-0.0365	0.0353
	-0.0909	-0.1016	-0.0895	-0.1083	-0.1169	-0.1279	-0.1245
HSCH	-0.5454 ***	0.4098 ***	0.7899 ***	-0.3099 **	-0.5718 ***	-0.1491	0.236
	-0.1039	-0.1258	-0.0948	-0.1238	-0.1357	-0.158	-0.1568
AGLAB	0.2954 ***	-0.8866 ***	-0.2230 ***				
	-0.0867	-0.0833	-0.0725				
OTHLAB	0.8963 ***	-0.1459	0.0438				
	-0.1734	-0.1261	-0.1255				
SOMEGIRL	0.0297						
	-0.0683						
SCST	-0.2354 ***	-0.0633	-0.0752				
	-0.0671	-0.0669	-0.0597				
ECONACT		-0.0010 ***	-0.0014 ***				
		-0.0001	-0.0001				
APCE				0.0012 **	0.0009 *	0.01	
				-0.0005	-0.0005	-0.0006	

Table A2 continued

	Probit estimates			Multinomial logit		Probit estimates	
	FINDEP	**PROPFA**	**FINSUP**	**HLTHPR1**	**HLTHPR2**	**HOMECARE**	**HWORK**
TOILET				0.3918 ***	0.1084	0.0914 **	
				-0.0914	-0.1325	-0.0443	
GCHILD							0.0955**
							-0.0479
EAST	0.1610 *	0.1834 **	0.0359	0.1612	0.4999 ***	-0.2398 *	0.0694
	-0.0925	-0.0906	-0.0764	-0.1119	-0.0943	-0.1375	-0.1193
NORTH1	-0.6567 ***	-0.0677	0.3336 ***	-0.051	0.3879 ***	-0.2632 **	0.6652 ***
	-0.0797	-0.0833	-0.0717	-0.098	-0.1153	-0.125	-0.1282
NORTH2	0.0453	0.0519	0.2925 **	-0.2404 *	0.0557	-0.4886 **	1.2303 ***
	-0.1357	-0.1283	-0.1185	-0.141	-0.1025	-0.2033	-0.2455
SOUTH	0.2711 ***	-0.6746 ***	0.2134 ***	0.0204	-0.4227 ***	0.1072	-0.1193
	-0.1038	-0.0896	-0.0822	-0.0989	-0.1498	-0.1145	-0.1141

Note: These estimates correspond to the complete correlated model.
Asymptotic standard errors are shown below the estimates; Significance: '*'=10%; '**'=5%; '***'=1%.