Do Children Act As Old Age Security in Rural India? Evidence from an Analysis of Elderly Living Arrangements

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Abstract

Little is known about the living conditions of a growing number of elderly persons in India partly reflecting the common belief that they are well-cared for by their children with whom they tend to coreside. Analysis of living arrangements using the recent National Sample Survey data from rural India suggests that although presence of economically active sons with schooling may enhance the likelihood of coresidence, there are limits to children as old age security. Current health and wealth of the elderly play a key role in our sample: vulnerable elderly persons who lack health, wealth or both are less likely to coreside. In the absence of any tradition of extra-familial welfare systems, the welfare state therefore needs to intervene to protect the interests of the disadvantaged elderly.

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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 there are problems of earning from assets in old age, where credit and insurance markets are poorly developed and where there is no tradition of extra familial welfare institutions.[1] Traditionally the burden of caring for the elderly is borne by the immediate family in India. However with a growing trend towards nuclear family set up and the associated decay of the extended family structure, the vulnerability of the ageing population is increasing. Unless policies and social protection schemes specifically address issues of the old age poverty,[2] targets for poverty reduction will not be achieved.

Little is however known about the living conditions of the elderly in India. The latter in part reflects the common belief that they are well provided for by their sons with whom they predominantly tend to coreside. Using 1995-96 National Sample Survey data, the present paper examines the pattern of living arrangements among male and female elderly members and derives implications for children as old age security in rural India.

Old age security hypothesis centres on the argument that children provide some form of insurance against risks when parents are old, which in turn, justifies parental investment in young children. Although investment in children may be risky (because they may die, be born with the wrong sex, be economic failures or disloyal), children still have the qualities that set

[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 are no official data on the income of the elderly in India.

them apart from other possible sources of old age insurance in developing countries, e.g., land or other assets. The existing empirical literature is, however, very limited and often focuses on fertility motive for old age security. For example, population and development theorists (e.g., Cain, 1983; Nugent 1985) rationalise fertility in terms of old age security hypothesis. These studies highlight the values of children as insurance against the risk of income insufficiency in parents' old age. Raut (1996) shows that parents have longer birth spacing when they have a sufficient stock of wealth to support themselves during the old age. He also shows that the probability that respondents will rely on their children when they are old is lower for couples with high income, with better access to private pensions[3] and other financial assets. Vlassoff and Vlassoff (1980) challenged the validity of the fertility motive for old age security and suggested that economic resources and not the number of sons are relevant factors determining old age security in rural Maharashtra. Vlassoff (1990) further argued that sons are valuable in rural Maharashtra (western India) more for the cultural reasons than for economic support and care.

There are also studies examining the nature of intergenerational transfer of resources from adult children to elderly parents in developing countries. Kochar (2000), for example, argued that intra-household transfers are likely to be dominated by income transfers between parents and co-resident children and there is a negative correlation between days work reported by fathers and the incomes earned by their co-resident adult sons in rural Pakistan. Lillard and Willis (1997) assess the alternative motives for intergenerational transfer for elderly parents in Malaysia and find evidence in favour of old age security and also that old age security is, in part, children's repayments to parental investment in their education. Elderly parents in low income countries however depend on financial as well as non-financial assistance (e.g., those related to cooking, cleaning or medical/personal care when sick and frail) provided by children.

[3] The idea that social security may act as a substitute for children is empirically supported (e.g., Nugent and Gillaspy, 1983). In a similar vein it is suggested that children and financial markets are competing assets for support in old age (Cigno, 1993). The demand for children for old age has also been linked to the uncertainty related to expected transfer from children (Rosati, 1996; Jellal and Wolff, 2002).

Indirect evidence of old age security may also be found from the studies on the pattern of living arrangements among the elderly persons in different developing countries.[4] For example, Devanzo and Chan (1994) find that higher parental income is associated with lower co-residency in Malaysia. Cameron (2000) however argues the opposite that co-residency is a desirable state for elderly Indonesians despite their income levels while higher income of children is likely to lower co-residency perhaps against the parental wish.

Clearly, these existing studies tend to emphasize the role of financial support from adult children to elderly parents. In doing so, these studies not only ignores the importance of other non-financial assistance provided by children, e.g., health[5] and other personal care (e.g., help with daily household chores cooking, cleaning, especially for the frail and sick ones), in old age, but also the reverse flow of services (financial and others) from elderly parents to their adult children well into their old age. An exception is Hoddinott (1992), who considered both financial and other types of assistance, provided by children and argued that elderly parents in western Kenya can induce greater assistance with household tasks and also monetary transfers if they have more inheritable assets. In analysing the pattern of living arrangements among the elderly in rural India, the present paper extends this line of argument and, among other things, focuses on the role of parental contribution (vis-à-vis those offered by adult children) on the likelihood of coresidence with children. In other words, we argue that coresidence with children is a mutually beneficial arrangements in rural India. On the one hand, children may provide financial and other personal assistance to their elderly parents. On the other hand, the elderly persons too continue to contribute to the family both financially and otherwise well into their old age. In particular, we compare the welfare implications of different living arrangements and then identify the factors

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[4] This excludes the sizeable literature investigating the determinants of living arrangements of the elderly in various western countries (e.g., Schwartz, Danziger and Smolensky, 1984; Borsch-Supan, 1989, Kotlikoff and Morris, 1987, 1990; Borsch-Supan , 1990; Borsch-Supan et al , 1992. This is because in most western countries there is social security for the elderly.

[5] Kochar (1999) argues that medical expenditures on the elderly in rural Pakistan declines with elderly's declining economic contributions which is closely related to a sharp decline in wages rates with age.

determining the likelihood of coresidence with a view to derive indirect implications for children as old age security.

The empirical analysis of the present paper is based on the 52nd round National Sample Survey (NSS) data 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 states of India. We choose to focus on the rural households because of the greater poverty and vulnerability of the elderly people residing in the rural sector. Unlike their urban counterparts, many rural elderly do not own financial assets and/or property. A majority of rural Indians tend to work in the informal sector and lacks the provision of regular income after retirement. In the absence of any extra-familial welfare institutions (private or state provided), dependence on children for financial assistance and/or personal care may be crucial for those who lack health, wealth or both. In this context, we examine (a) if the presence of economically active sons with schooling (*progeny effects*) could significantly encourage coresidence with children and more importantly could be regarded as a sufficient means for old age insurance. (b) Secondly we consider the role of reverse flow of services from the elderly parents to their adult children and examine the effects of elderly person's accumulated wealth (e.g., ownership of properties and/or financial assets) on coresidence (*wealth effects*). (c) Finally we consider the effects of elderly person's current health status on coresidence with children (*health effects*). The latter in turn would determine an elderly person's participation in daily household chores/social/religious mattes and/or their current economic participation, if any.

Since our analysis focuses on the *current* living arrangements of the elderly members of households using cross-section household-level data for 1995-96, without any loss of generality we assume that education, marital status and past employment of the elderly to be given and thus directly focus on the hypotheses of our interest. There still remain serious problems of simultaneity between presence of economically active sons with schooling, current wealth (current property and/or financial assets) and health, on the one hand and coresidency with

children on the other. In an attempt to address the problem of simultaneity, we use a unique correlated model to jointly determine presence of economically active sons with schooling, current health, wealth and co-residence with children (with/without the spouse). This allows us to redress the possible simultaneity bias in the estimates.

The paper is developed as follows. Section 2 describes the data and section 3 explains the methodology of our empirical analysis. 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, social/religious matters. For example, we observe if an elderly person is living alone or in an old home, co-residing with spouse only, spouse and own children or own children only (without the spouse). Second, we have information on the state of economic dependence of these elderly members, i.e., if they are economically independent or dependent (fully/partially) and if dependent, who is supporting the elderly member (e.g., spouse, children, grand children or others). In case the elderly person is financially independent, we also observe the number of dependants that s/he has to provide for. The survey also provides information on ownership/management of properties/financial assets of the elderly person. Among various health problems, we observe the state of physical immobility (if confined to bed or home), disability (visual, hearing, speech, locomotor etc.) and/or chronic (long-term,

e.g., high blood pressure, heart problems, cough, stomach related problems etc.) illness if any.[6] In addition, we observe whether these elderly members are able to participate in daily household chores or other social/religious matters. Finally, we have information pertaining to the usual individual, household and other community characteristics of all members of the sample households that most household survey data provides.

2.1. Aspects of living arrangements in rural India

As a result of the success of the Indian family planning programme and significant improvement in life expectancy, there has been a slow but steady increase in the proportion of older people in total population. While in 1961 5.6% (12.36 million) of the total population were old (aged sixty years or above), in 1996 about 7% (62.32 million) of the total population were aged. Though there are no official estimates of the poverty among the aged population, there are millions of elderly persons below the official poverty line (Gore, 1992).

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 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. This gives rise to a sample size of 13810 elderly members of whom 3555 (about a quarter of the sample) had no children.

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[6] Besides incidence of illness, health has many other dimensions as may be captured, e.g., by nutritional intake or anthropometric measures (heights, weights etc.) that we cannot incorporate in this study for dearth of information in our data-set. But the main contribution of the present study is to analyse some different aspects of adult health status that is not strictly based on nutrition and other anthropometric measure and has not been studied before. Also, this paper attempts to capture the aspects of health externality, i.e., how health of an old head is affected by characteristics/behaviour of his/her spouse, children and grand children in the family.

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.

First we consider the pattern of living arrangements among all elderly men and women (with and without children) in our sample. While 75% of widowed male (as against 57% of widowed female) live with their children, 28% of widowed female (as against only 8% of widowed male) live on their own. Thus a smaller proportion of widowed/separated women live with their children. Secondly, a majority of married male (81%) and female (77%) elderly members live with their spouse and children while only 15% of married male and 18% of married female live with their spouse only (without children). Selected characteristics of all elderly members with different types of living arrangements are summarised in Table 1A.

If, however, we distinguish between elderly persons with/without children, a clearer pattern is found. In general about 98% 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

[7] Though we cannot identify if the elderly person coresides with son, we note than more than 90% of these elderly members have at lease one son. So it is highly likely that most of them tend to coreside with sons.

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).

Most existing literature tends to highlight the importance of financial dependence on children among elderly parents. Financial dependence on children[8] however depends on gender and marital status of elderly members of households. For example, while 71% of widowed women with children are financially dependent on children, only 45% of married women are financially dependent on children. In contrast, incidence of financial dependence on children is significantly less among elderly men: Only 36% of currently married men and 48% of widowed/separated men are financially dependent on children.

In this context, it is also important to examine the distribution of educated and economically active sons among the sample elderly. In general, 55% of sample elderly with children has economically active married sons while only 22% has economically active unmarried sons with schooling. If however we cross-tabulate the incidence of financial dependence on children and presence of economically active educated sons, we find that as high as 72% of financially dependent elderly has at least one economically active educated son (married and/or unmarried). Thus, other things remaining the same, there seems to be a close correspondence between presence of economically active sons with schooling and elderly parents financial dependence on children.

Financial dependence on children is also correlated to the elderly person's current savings defined as the ownership of property and/or financial assets. Among the elderly with children 78% have some financial assets and/or property, which are essentially their lifetime savings. Among those with some form of savings, 63% are financially independent while the others are dependent on children. The close correlation between financial dependence on children and savings is also reflected in the observed gender difference in financial dependence on

children in old age. An obvious reason for higher financial dependence of married/widowed female members is their lack of ownership of property and/or financial assets. In particular, while 51% of married and 49% of widowed women owned financial assets, 75% married and 72% widowed men owned financial assets. Similarly, while only 55% married and 67% widowed women owned properties, 88% married and 82% widowed men did so.[9] Secondly, we consider if some elderly person has made provision for regular income in old age (usually provided by participation in some pension scheme during their working life). The latter is closely related to the occupational choice during the major part of the working life. Only about 3% of our sample elderly members had access to some regular income and as high as 80% of them were men. Finally, we also find that a significantly higher proportion of men continue to earn through participation in self-employment or various informal casual farm/non-farm jobs well into their old age. In particular, as high as 70% of married and 58% of widowed men (with children) are currently economically active. These figures are only 20% and 27% for married and widowed women respectively. Taken together, elderly women, especially widowed/separated ones are particularly vulnerable as they do not have many options but to depend on adult children, especially sons.

Another possible factor influencing the coresidence with children is the current health status and personal care, if any, offered to sick and frail elderly parents by co-resident children (in fact there could be a two way relationship between health status and living arrangements), which has not so far been highlighted in the literature on low-income countries. In the absence of any information on direct health care provided by co-resident children, we consider three different indicators of actual health problems among the elderly members to obtain

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[8] We cannot however identify if married/unmarried sons or daughters are providing this financial assistance. But we can assume without much loss of generality that most elderly persons financially dependent on children tend to receive the assistance from their adult economically active sons.

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indirect evidence of health care assistance provided by co-resident children. These health problems relate to (a) physical disability (visual, speech, hearing, locomotor), (b) chronic illness (cough, problem of joint, heart problem, high/low blood pressure, urinary problems, diabetes, cancer) and (c) physical immobility (i.e., confined to bed or confined to home) among the elderly. Compared to elderly women in our sample, incidence of these health problems are found to be slightly higher among elderly men. For example 33% married men (as against 29% married women) have some physical disability; 51% married men (as opposed to 46% married women) suffered from some chronic illness; 8% married men (as against 7% of married women) had some kind of physical immobility. Also compared to married elderly members, incidence of these health problems is higher among widowed/separated members of a given gender: 43% widowed men (41% widowed women) have physical disability, 56% widowed men (55% widowed women) suffer from chronic illness and 10% widowed men (7% widowed women) have some physical immobility. Taken together, we find that about 63% elderly men and 60% elderly women suffer from one or more of these health problems. Compared to widowed/separated elderly persons, incidence of these health problems is generally lower among married men (62%) and women (57%). However, compared to widowed/separated elderly men, incidence of health problems is higher among widowed/separated women (71% as against 69%).

Though the old age security hypothesis emphasizes the role of financial transfer from adult children to elderly parents, a significant proportion of elderly persons in our sample continue to contribute to their family, financially or otherwise.[10] For example, a significant proportion of elderly persons, especially elderly men, continue to supplement family earnings. About 43% of elderly men with children provide financial support to their family and about 90% of them are currently economically active. As expected, the corresponding proportion for elderly

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[10] One may argue that their contribution declines with age since in general wage rates decline wth age. But the total economic contribution of an elderly also includes ownership of their accumulated wealth (ownership of property and/or financial assets), if any.

women supporting their family is much less: only about 10% elderly women co-residing with children provide financial support to their families and 56% of them are currently economically active. Elderly persons are also found to contribute to the family by participating in daily household chores, social/religious matters. Nearly 80% of elderly members in our sample tend to participate in these activities irrespective of their gender and marital status. However, compared to men, a slightly higher proportion of women participate in daily household chores while a higher proportion of men tend to participate in social or religious matters.

2.2. Living Arrangements and Standard of Living

Before we examine the pattern of living arrangements among the elderly, it is pertinent to compare the welfare levels associated with different kinds of living arrangements in our sample. In doing so, we classify sample elderly members into three categories: (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. Table 1B summarises the characteristics of these elderly members pertaining to wealth, health as well as their participation in daily household chores and other social and religious matters. Our primary observations are summarised here. (i) A higher proportion of elderly persons living with children tend to own properties and financial assets while a lower proportion of them have made provision of regular income. (ii) A higher proportion of elderly members living with children participate in social and religious matters, but a slightly lower proportion of them participate in daily household chores. (iii) A lower proportion of these elderly members living with their children suffer from chronic illness, physical disability or immobility. (iv) Only about a third of the elderly living on their own have children or other relatives living in the same village/town.

Table 1C compares the average per capita monthly consumer expenditure (APCE) for elderly persons in different living arrangements. There are two important issues involved in the comparison of APCE. First of all, use of APCE to compare different groups of households is

problematic since it ignores differences in household age-sex composition (e.g., % of adult/child, male/female etc.). One way of addressing this difficulty is to make use of the equivalence scales that allows us to give different weights to household members with different age/sex composition. We examine the sensitivity of the scale adjusted APCE to different choice of weights given to adult (>15 years) male, adult female and children (0-15 years old) respectively : (1,1,0.6), (1,0.8,0.6), (1,0.7,0.5).

Secondly, one needs to take account of the possibility of size economies of consumption. The scale adjusted per capita expenditure y for a household of size n is defined as: $y = \frac{Y}{n^q}$

where Y is the total household expenditure, n family size and θ is a parameter lying between 0 and 1. If $\theta = 1$, there are no economies of scale (y is the per capita expenditure) and if $\theta=0$, y is the total household expenditure (e.g., the case of public goods where one person's consumption does not lower the consumption of others in the household). In contrast, a lower value of θ would signify a larger economies of scale in consumption. We have considered 4 possible intermediate values of θ, namely, 0.8, 0.6, 0.4, & 0.2 to compare adjusted APCE among different living arrangements .

Both unadjusted and adjusted APCE are shown in Table 1C. While the unadjusted APCE does not seem to vary much between alternative living arrangements, equivalence scale adjusted APCE figures are significantly higher for elderly persons living with children irrespective of the choice of weights. The same holds for different choices of θ, even when there are smaller economies of scale.[11] Thus living arrangements and APCE as a measure of living standards seem to be correlated in our sample such that both adjusted and unadjusted APCE are higher for elderly members coresiding with children than otherwise. Although some may argue that APCE to be a poor indicator of household welfare, in the absence of any better indicator, the evidence from this

simple exercise would indicate that in the absence of any extra-familial welfare institutions, coresidence with children is associated with higher standard of living in our sample.

In the next section we move on to an analysis of coresidence with children and examine if elderly persons' coresidence with adult children could solve the problem of old age insurance in rural India.

3. AN ANALYSIS OF CORESIDENCE WITH CHILDREN

Choice of a living arrangement, as an independent household, with adult children or other related or unrelated persons has important external effects for the well-being of an elderly person. Traditionally joint residence of adult children with their elderly parents is viewed as an arrangement where elderly parents receive financial and other assistance from coresident adult children. However, analysis of our data in section 2.1 provides indirect evidence that elderly persons, especially elderly men, continue to offer financial support to the family well into their old age through accumulated wealth and/or active economic participation. Depending on their current health status, a majority of elderly persons are also found to contribute to the family in other ways, e.g., by participating in daily household chores, social/religious matters. Thus without much loss of generality, we can argue that elderly persons' co-residence with children (and thus children's co-residence with elderly parents) is a mutually advantageous arrangement in rural India.

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 some relevant information. For example, NSS provides information only on whether an elderly member is financially dependent on their own children though we cannot identify whether elderly parents

[11] Table 2A and Table 2B further support this inference for the complete sample in that the adjusted APCE figures are always higher among households with older members and this holds good in all the states.

receive financial support from *co-resident* or *non-coresident* children. We cannot also identify if assistance is provided by a *son/daughter - married/unmarried.* The data-set also does not provide any further information regarding the types of non-financial assistance children may provide to their elderly parents. Thus, motives are not always directly observable and hence one needs to identify *indirectly* the a priori circumstances that may influence the intensity of the motive for co-residence.

Taken together it could be argued here, without much loss of generality, that coresidence with children is closely related to current wealth (wealth effects) and health (health effects) of the elderly as well as the presence of economically active sons with schooling (progeny effects).[12]

Wealth effects: Ownership of financial assets and properties are savings or accumulated wealth over the life cycle and can be expected to vary with living arrangements. This is because besides children savings represent an alternative form of old age insurance. For example, the availability of savings can be expected to reflect the individual's (unobserved) life cycle income profile which would also influence living arrangements. Savings or accumulated wealth may affect living arrangements in different ways. Wealthy elderly parents may influence the action of their children ex ante with their resources (Bernheim, Shleifer and Summers, 1985) or conversely parental resources may attract kids to coreside with them. Moreover, both own savings and living arrangements are likely to reflect the unobserved wealth of other members of the household.

In our analysis wealth is measured by a composite indicator called PROPFA. The variable takes a value 1 if the elderly person currently owns any property and/or financial assets and zero otherwise.

Health effects: Current health status of the elderly too may affect living arrangements.[13] For example, in the absence of any alternative welfare system, an elderly person with health problems may receive personal health care from coresident adult children especially when they

[12] Sons are expected to offer financial assistance as well as medical/personal care to elderly parents.

are sick and frail. There is also the possibility that elderly with health problems may be discouraged from coresidence and may be forced to live on their own (with/without the spouse). Here we examine the effect of elderly person's health status (good health or lack of it) on coresidence, thus yielding some indirect evidence of health effects.

Though we do not observe the personal care, if any, provided by the coresident children, we derive a composite health indicator (HLTHPROB) from three indicators of actual health problems: (i) chronic illness (e.g., heart problem, blood pressure, diabetes etc.); (ii) physical disability (e.g., hearing, vision, speech etc.) and (iii) physical immobility (confined to bed or home). The variable HLTHPROB is one if the elderly person suffers from any of these health problems and zero otherwise. Significance of this composite indicator HLTHPROB in determining coresidence with children could, in the absence of any better indicator, be taken as a measure of personal care offered by coresident children to elderly sick parents. It is also 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.

Progeny effects: Coresidence with daughters is not socially very desirable in India except in very special circumstances, e.g., if the daughter is a widow or if the elderly person does not have any son (see Vlassoff, 1990 for example). Traditionally sons are expected to provide financial assistance to elderly parents. Thus sons in India, are a main source of old age security, which it is argued, provides a rationale for greater investment in sons' schooling (relative to girls) when children are young. Coresident sons and their family could also offer medical and/or personal care to the elderly parents. So a primary variable of our interest is whether an elderly person has any economically active married and/or unmarried sons with schooling. If presence of adult economically active sons with schooling (SONSCHEA) encourages coresidence, this could

[13] It would also be correlated with the elderly person's ability to participate in daily household chores, social and/or religious matters – so we refrain from including the latter in our econometric analysis.

provide indirect evidence of the flow of services (financial and others) from these children to their elderly parents as repayment for the parental investment in child education when these children were young. Otherwise one would question the very basis of the old age security hypothesis.

3.1. Determination of coresidency

The primary variable of our interest is coresidence with children:

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

= 0 otherwise

It is assumed here that $CORESIDE = \beta X_C + \eta_C + u_C$ where X_C is a set of observable individual/household characteristics explaining coresidence.

Specification of X_C : Co-residence with children depends not only on gender (MALE), marital status (WIDSEP), schooling (SCH) of the elderly person, but also on the presence of economically active married/unmarried sons with schooling[14] (SONSCH), measures of wealth, e.g., ownership of property[15] and/or financial assets (PROPFA), if any,[16] as well as the current health status (HLTHPROB) of the elderly.[17]

In addition to the observable characteristics, it is likely that household-level unobserved heterogeneity may 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 these could affect the living arrangements significantly. This unobserved heterogeneity is accounted for by η_c where

[14] In our cross-section analysis of living arrangements of the elderly, we assume the family composition to be given and thus abstract from the dynamics of fertility and old age security, which is beyond the scope of this paper.

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

[16] In our sample there is a significant correlation between ownership of property and/or financial assets of the elderly and their financial dependence on own children. So we leave out elderly person's financial dependence on children from our econometric analysis.

[17] Though we also observe an elderly person's participation in daily household chores, social/religious matters, we could not include these variables in explaining coresidence as this could raise further questions about simultaneity.

$h_c \sim N\left(0, s_c^2\right)$ is assumed to be uncorrelated with the other covariates. All other residual variation is captured by u_C : $u_C \sim IIDN(0,1)$.

3.2. Addressing the problems of simultaneity

Addressing simultaneity is a difficult problem in our analysis where household structure affects elderly person's well-being measured in terms of their coresidence with their children, which are all choice variables. The problem could be somewhat simplified if we could consider a static one-period framework. Thus, without much loss of generality, we could assume gender, marital status, education and past employment of the elderly person to be given. Consequently, we need to address the simultaneity between elderly person's coresidence with children (CORESIDE) on the one hand, and their current wealth (PROPFA), health (HLTHPROB) and presence of economically active sons (SONSCHEA) on the other. Ignoring this simultaneity is likely to bias our estimates. To redress this problem, we determine CORESIDE with PROPFA, HLTHPROB and SONSCHEA as correlated processes.

In our specification, the first problem of simultaneity may arise with respect to the elderly person's ownership of financial assets and/or properties (PROPFA). As argued earlier, ownership of wealth could co-vary with living arrangements if the former represent an alternative form of old-age insurance. In an attempt to address this problem, we estimate the following equation:

$$PROPFA = b_W\ x_W + h_W + u_W$$

Where X_W refers to a vector of explanatory variables affecting wealth, η_W captures unobserved heterogeneity and u_F captures any other residual variation where $h_W \sim N(0, s_W^2)$ and is uncorrelated with all other covariates and $u_W = IIDN(0,1)$.

The second possible simultaneity in a static one-period framework arises with respect to the inclusion of current health problems into the coresidency function. On the one

hand, given the health problems elderly persons 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, we estimate the following equation: $HLTHPROB = \beta_H X_H + \eta_H + u_H$ where X_H refers to a vector of explanatory variables that affect health of the elderly, η_H captures unobserved heterogeneity 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 $u_H = IIDN(0,1)$.

Finally, one could also identify a possible simultaneity between coresidence with children and presence of economically active sons with schooling (SONSCHEA). So the equation that we estimate here is as follows: $SONSCHEA = \beta_S X_S + \eta_S + u_S$ where X_S refers to a vector of explanatory variables that affect financial dependence on children, η_N captures unobserved heterogeneity and u_S captures any other residual variation: $\eta_S \sim N(0, \sigma_S^2)$ and is uncorrelated with all other covariates and $u_S = IIDN(0,1)$.

Clearly all four variables, namely, CORESIDE, PROPFA, HLTHPROB and SONSCHEA are binary variables. We use univariate probit specifications to model them. The likelihood functions in these cases would be as follows:

Coresidence :
$$L^C = \Phi(\beta X_C + \eta_C + u_C) \quad if \quad the \quad elderly \quad coresides$$
$$= 1 - \Phi(\beta X_C + \eta_C + u_C) \quad otherwise$$

Wealth:
$$L^W = \Phi(\beta_W X_W + \eta_W + u_W) \quad if \quad the \quad elderly \quad owns \quad wealth$$
$$= 1 - \Phi(\beta X_W + \eta_W + u_W) \quad otherwise$$

Health:
$$L^H = \Phi(\beta_H X_H + \eta_H + u_H) \quad if \quad the \quad elderly \quad has \quad health \quad problems$$
$$= 1 - \Phi(\beta X_H + \eta_H + u_H) \quad otherwise$$

$$L^S = \Phi(b_S X_S + h_S + u_S) \quad if \quad has \quad active \quad sons \quad with \quad schooling$$

Progeny:

$$= 1 - \Phi(b X_S + h_S + u_S) \quad otherwise$$

In order to build up a coherent model (see Maddala, 1982 pp. 117-125), we develop a recursive system such that the summed probability over all possible outcome combinations is equal to one. In other words, we do not allow for any interdependence between wealth (PROPFA), health (HLTHPROB) and progeny (SONSCHEA) effects. But we assume that in the completely correlated model decision to coreside with children (CORESIDE) could be correlated with wealth, health and progeny effects (see specification 5 below). In order to facilitate identification of these four equations, we keep some identifying variables in each equation. This is summarised in Table 3A (the Table also lists the definitions of variables). For example, household size (HHSIZE) is the identifying variable in the wealth equation while predicted value of average per capital consumer expenditure (APCE)[18] is the identifying variable in the health equation. The binary variable SCST indicating whether a household belongs to lower caste (scheduled caste/scheduled tribe category) is meant as an identification variable in the progeny equation.

3.3. Correlated Estimates

The joint marginal likelihood function can be written as:

$$\int_{h_c}\int_{h_F}\int_{h_H}\int_{h_S}\left[\prod L^C(h_C)\prod L^W(h_W)\prod L^H(h_H)\prod L^S(h_S)\right] f(h_c, h_W, h_H, h_S)\, dh_c\, dh_W\, dh_H\, dh_S$$

[18] Since average per capita monthly consumer expenditure depends on household structure and earnings, it too would suffer from simultaneity bias. In an attempt to reduce this bias, we use the value of average per capital consumer expenditure predicted by various household composition variables as well as the charactersitics of the head of the Household. This is denoted by APCE.

where $f(h_C, h_W, h_H, h_S)$ is the joint distribution of the unobserved heterogeneity components. Here $f(h_C, h_W, h_H, h_S)$ is a four dimensional normal distribution characterised as follows:

$$\begin{pmatrix} h_C \\ h_W \\ h_H \\ h_S \end{pmatrix} \sim N\left[\begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} s_C^2 & & & \\ (r_{WC} s_C s_W) & s_W^2 & & \\ (r_{HC} s_H s_C) & (r_{HW} s_H s_F) & s_H^2 & \\ (r_{SC} s_S s_C) & (r_{SW} s_S s_W) & (r_{SH} s_S s_H) & s_S^2 \end{pmatrix} \right]$$

The model is estimated using Full Information Maximum Likelihood (FIML) Method. Conditional on all the heterogeneity terms, the equations are independent and the conditional joint likelihood can be obtained by simply multiplying the individual log likelihoods.

The main reason for joint estimation is the simultaneity and the implicit self-selection: elderly persons who have educated and economically active sons, elderly persons who have accumulated wealth and those who have some health problems and elderly person who choose to coreside with their children are not necessarily a random subset of all elderly persons in the sample. In addition elderly persons who coreside with children might well have some (additional) and private information about their own wealth and health and thereby may choose to educate their sons with a view to coreside with them. All these essentially means that the correlation between the heterogeneity terms in the wealth equation, health equation, presence of economically active sons equation and the coresidency equation could be non-zero: i.e., Cov(η_i, η_j)?0, i,j = C, W, H, S, i ? 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 log likelihoods.

4. DETERMINANTS OF CORESIDENCE

Means and standard deviations of the included variables are summarised in Table 3.

Estimation is carried out in stages. (a) First we estimate the uncorrelated probit estimates of coresidence with children, assuming current wealth, health of the elderly and presence of economically active sons with schooling to be exogenously given.[19] These estimates are summarised in column (1) and (2) of Table 4A. While column 1 shows the estimates without any unobserved heterogeneity (specification 1), column (2) shows those with household-level unobserved heterogeneity (specification 2). Estimates shown in columns (3)-(5) of Table 4A allows for the possibility that that coresidence with children may be correlated with (a) current wealth (specification 3: assumes health and progeny effects to be exogenous), (b) current wealth and health of the elderly person (specification 4: assumes progeny effects to be exogenous) and (c) current health, wealth and progeny (specification 5: allows for correlation with health, wealth and progeny). The latter is the most complete model in our analysis. Table 4B, 4C and 4D show the corresponding estimates (jointly determined with coresidence) of wealth, health and progeny equations respectively for these specifications. Finally Table 4E summarises the corresponding estimates of the unobserved heterogeneity terms involved in these specifications (1)-(5) as shown in Tables 4A-4D.

4.1. Coresidence with children

It clearly follows from Table 4D that there is a significant unobserved heterogeneity in living arrangements in our sample. So we start by considering the uncorrelated estimates with heterogeneity as shown in column (2) of the Table and compare these estimates with those shown

[19] 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 as shown in Table 4A-4C are obtained by excluding the insignificant terms and represents the most parsimonius specification.

in columns (3), (4) and (5) of the Table. This suggests some evidence of simultaneity bias in these estimates. For example, when we allow only wealth to be correlated with coresidence with children, the variable (HLTHPROB) indicating current heath status is not statistically significant though it turns out to be significant when we allow health, wealth and progeny to be correlated with coresidence. We also find that as we allow for the correlation between coresidence on the one hand and health, wealth and progeny equations on the other, significance of wealth goes up significantly. This is also reflected in the corresponding correlation coefficients between the unobserved heterogeneity terms in these equations. For example, allowing only for correlations between wealth and coresidence, the correlation coefficient (ρ_{WC}) is positive and statistically insignificant. However as we allow all the equations to be correlated, this correlation coefficient turns out to be negative and statistically significant too.

We therefore proceed to interpret the final results (specification 5) where the unobserved heterogeneity terms in the progeny, wealth and health equations are all treated to be correlated with that in the coresidency equation. The likelihood of coresidence is higher among elderly men in general. Although widowed elderly persons are less likely to coreside, widowed elderly men are more likely to coreside. In other words, widowed elderly women are less likely to coreside with children. Likelihood of coresidence is, however, higher among better off elderly persons, e.g., those with some accumulated wealth or those belonging to households with generally higher average per capita expenditure. In other words, there is some confirmation that in our sample that wealth attracts kids though given the data limitations we could not test the hypothesis of manipulative parents. Secondly, effects of health problems are adverse in that elderly members with some health problems are less likely to coreside with children. Given the nature of our data, we however cannot explore whether it is the result of some coercion or whether decided by the elderly persons themselves. Finally, elderly persons with economically active married/unmarried sons with schooling are more likely to coreside.

Given the significance of health and wealth estimates, mere presence of active

sons with schooling and/or coresidence with children could not suggest that children provide the expected old age insurance in rural India. In fact there are reasons to believe the contrary as our results suggest that elderly persons who lack wealth, health or both or disadvantaged in other ways (e.g., widowed elderly women) are less likely to coreside with children.

4.2. Wealth Effects

Estimates of the elderly people's wealth as measured in terms of ownership of property and/or financial assets are summarised in Table 4B for specifications (1) - (5).[20] Considering the final specification (5), it follows that elderly men are more likely to be wealthy though widowed/separated men are less likely to do so. There is also a return to schooling so that elderly persons with schooling are more likely to be wealthy. Similarly, previously economically active elderly are more likely to be wealthy.[21] Finally, elderly persons from larger households are more likely to be wealthy, even after accounting for unobserved household-level heterogeneity. The latter could reflect the fact that own savings/wealth of the elderly is likely to be correlated with the unobserved wealth of the other members of the household. Thus in a larger household, it is more likely that more members will have some savings than in a smaller household which in turn would justify this finding.

4.2. Health effects

Estimates for health problems (HLTHPROB), if any, are shown in columns (1)-(5) respectively for specifications (1) – (5) in Table 4C. Note that there are no estimates for the health function in specification (3) when we allow only wealth to be correlated with coresidency decision and treat health to be exogenously given. In this section we interpret the correlated estimates for

[20] Please note that we had also experimented with a broader definition of wealth that in addition includes the provision of regular income after retirement, if any, and obtained very similar results as presented here.
[21] Note that there seems to be a selection bias with respect to this variable in specification (3) and (4) where ONCEACT has a negative coefficient.

specification (5) (see column 5 of the Table). In general, incidence of health problems is likely to be higher among widowed/separated and previously economically active elderly persons, especially among elderly men. Also elderly from better off households as indicated by higher APCE is more likely to have some health problems. However, widowed/separated elderly men are less likely to report of having any health problem.

4.3. Progeny effects

Finally, we consider the uncorrelated and correlated estimates of having economically active sons with schooling in our sample. These estimates are shown in columns (1), (2) and (5) of Table 4D. Note that in this case we do not have any estimates corresponding to specification (3) and (4) where we do not allow for non-zero correlation with the progeny equation.

As before we proceed to interpret the estimates of the complete model that allow the unobserved heterogeneity terms in wealth, health and progeny equations to be correlated with that in the coresidency equation. Most of these results are self-explanatory. For example, parental education, especially mother's education, plays an important role on sons schooling. In particular, elderly persons, especially elderly women, with primary schooling or higher are more likely to have educated economically active sons. Parental past employment is important too in that previously economically active elderly are more likely[22] while elderly persons from poorer lower caste households (scheduled caste/scheduled tribe)[23] are less likely to have to have economically active sons with schooling. The latter seems to signify the role of parental wealth on children schooling which is well documented in the literature.

To summarise, these results raise concern particularly for two groups of disadvantaged elderly, namely, those lacking wealth, health or both and also those widowed/separated women (who are generally considered asset poor, e.g., see Drèze and

[22] Here too a simultaneity bias is observed if we compare estimate of ONCEACT in columns (2) and (5).

Srinivasan, 1997) in that both these groups of elderly are less likely to coreside. 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 help if needed. Thus, 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 both 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, especially sons. The lack of research in this area partly reflects the general belief that these elderly are well looked after by their children. Using the recent NSS data we examine the living arrangements of the elderly in rural India.

A comparison of average per capita consumer expenditure between elderly persons in different living arrangements suggests that both unadjusted and adjusted APCE are higher in households where elderly persons coreside with children than living otherwise. In the absence of any better indicator of the well-being of the elderly, elderly coresiding with children is better off than living otherwise in a society where there is no tradition of extra-familial welfare institutions.

Next we examine the factors determining the elderly person's coresidence with children. In our analysis household structure affects elderly person's well-being as measured in terms of coresidence with children where both household structure and living arrangements are both choice variables. This necessitates us to resolve the complex simultaneity problem in our

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[23] The correlation between caste and distribution of wealth in rural India is well documented. In general, lower caste households in rural India tend to have less land and non-land assets (Pal, 1994).

analysis. We adopt a unique approach to estimate the probability of coresidence, after allowing for its possible correlation with elderly person's current wealth, health and presence of economically active sons with schooling while we assume gender, marital status, education and past employment of the elderly person to be given in a static framework. These estimates tend to reveal a more complex picture than it emerges from a comparison of APCE across different living arrangements. Although presence of economically active sons with schooling may promote coresidence with children, presence of sons could not by itself be regarded as old age insurance in our sample. Current health and wealth of the elderly play an important role in the analysis of living arrangements where more vulnerable elderly, especially those without health, wealth or both are less likely to coreside with children.

While coresidency with children is a social convention in India till today and APCE is higher for elderly coresiding with children, analysis of coresidency with children tends to suggest that the latter cannot by itself is sufficient as old age insurance. In particular, our results raise concerns for those who lack wealth, health or both or disadvantaged in other ways, e.g., widowed/separated elderly women. Public policy on ageing in developing countries has tended to emphasise the welfare requirements of older populations, ignoring the wider dimensions of livelihoods in old age. The prevailing emphasis on pension schemes for formal sector workers and on individual contributions to pension funds, as outlined by the World Bank in 1994, excludes the majority of older people in poor countries who live and work outside the formal sector and lack the capacity to save. Basic non-contributory pension schemes, designed as an integral part of India government's poverty reduction programmes, are most likely to target the increasing numbers of poor older people though the pronounced inter-state disparity in this respect needs to be addressed.

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Table 1A. Selected Characteristics of Elderly Living Arrangements (All members with and without children)

	Married				Widowed/separated			
	Male		Female		Male		Female	
	Spouse only	Sp. + chld	Spouse only	Sp. + chld	Alone	Child only	Alone	Child only
Ownership of financial assets	69	75	51	49	64	73	48	51
Ownership of property	83	88	56	57	77	83	62	67
Financially dependent on children	18	35	44	24	19	48	39	71
Financially dependent	20	23	53	63	18	35	40	62
Physical disability	40	33.5	31.6	29	42	44	37	42
Long-term illness	54	51	45	47	59	57	52	56
Physical immobility	11.4	7.2	6.7	6.6	7.8	10	6.5	6.8
Participates in daily household chores	86	84	88	92	92	78	93	85
Participates in social matters	83	86	77	75	81	84	71	74
Participates in religious matters	84	89	85	84	83	86	77	83
No of obs.	1098	5929	642	2758	153	1094	431	740

Note: All figures are in percentages.

Table 1B. Welfare Characteristics of Various Living Arrangements

	Living alone or with other relations/non-relations	Living with spouse only	Living with children (with/without spouse)
Owns financial assets (%)	60	61	67
Owns financial properties (%)	72	73	78
Owns financial assets & properties (%)	56	66	63
Provision of regular income (%)	4.3	5.2	3
Physical immobility (%)	19	10	8
Physical disability (%)	41	37	34
Chronic illness (%)	54.4	51	51
Any of these health problems (%)	67	65	62
Able to participate in daily household work (%)	90	88	84
Able to participate in social matters (%)	75	80	82
Able to participate in religious matters (%)	80	84	87
No of observations	971	1766	10952

Note: [1] Standard deviations are given in the parentheses.

Table 2: Living Arrangements and Living Standards

Average per capita monthly consumption exp. (APCE) in Rs.	**Alone or with other relations/non-relations**	**With spouse only (without children)**	**With children (with/without spouse)**
Unadjusted APCE	370.2	372.6 (195.4)	371.9 (205.3)
Equivalence scale adjusted APCE			
1, 1, 0.6	564.2 (734.1)	516.3 (426.8)	620.1 (593.2)
1, 0.8, 0.6	610.0 (781.4)	565.5 (481.9)	672.2 (643.6)
1, 0.7, 0.5	662.9 (820.6)	620.1 (527.9)	737.9 (701.9)
Size economies of scale adjusted APCE			
0.8	497.4 (318.3)	498.8 (243.8)	521.6 (273.1)
0.6	681.8 (422.1)	679.5 (335.0)	741.8 (392.1)
0.4	951.7 (600.0)	941.1 (499.9)	1068.3 (599.4)
0.2	1350.2 (900.3)	1323.5((786.1)	1556.5 (956.6)

Table 2A. Equivalence scales adjusted APCE : All households

	Households with old persons			Households without old persons		
States	(1,1,0.6)	(1.0.8,0.6)	(1,0.7, 0.5)	(1,1,0.6)	(1.0.8,0.6)	1,0.7, 0.5)
AP	471.9	516.7	567.6	409.0	448.9	492.6
Assam	531.5	572.1	626.5	401.1	431.5	471.7
Bihar	496.8	535.8	590.2	388.4	421.9	465.1
Gujarat	601.2	654.4	718.4	520.4	565.6	618.8
Haryana	730.8	783.8	857.7	601.7	646.8	710.7
J&K	695.1	743.3	814.3	565.4	606.1	663.2
Karanataka	582.8	639.4	702.2	422.7	461.5	507.3
Kerala	684.2	749.6	819.1	590.2	650.3	714.7
MP	554.4	598.8	656.0	407.8	441.0	483.3
Maharashtra	544.6	598.9	660.1	450.3	492.5	540.8
Orissa	492.7	535.8	588.8	361.1	392.4	428.9
Punjab	921.6	997.3	1091.6	649.3	700.4	765.3
Rajasthan	645.9	695.7	765.1	529.7	571.3	627.1
Tamilnadu	478.0	527.9	578.3	440.2	486.3	532.4
UP	586.4	631.7	691.6	451.0	486.2	532.4
WB	566.5	613.2	675.3	390.4	423.6	465.0
All India	588.6	638.3	700.0	464.2	503.2	551.2

Source: Pal and Palacios (2004).

TABLE 2B. Size economies of scale adjusted APCE, All households

	Households with elderly members				Households without elderly members			
State	0.8	0.6	0.4	0.2	0.8	0.6	0.4	0.2
AP	429.3	578.1	789.8	1094	402.8	530.8	705.6	945.7
Assam	448.2	647.0	941.5	1381	420.8	571.1	780.5	1073
Bihar	403.1	584.1	858.0	1276	374.9	515.6	716.9	1007
Gujarat	564.6	785.6	1109	1587	526.9	718.5	988.8	1372
Haryana	658.4	948.3	1379	2023	658.9	911.9	1271	1783
J&K	581.3	848.1	1250	1858	603.2	835.6	1165	1636
Ktaka	464.7	661.6	955.2	1397	441.5	595.5	811.5	1117
Kerala	622.1	858.6	1197	1686	654.5	859.0	1137	1516
MP	442.3	632.5	918.4	1353	410.8	559.4	769.3	1068
Maharra	469.5	649.8	913.4	1302	455.3	610.9	826.9	1128
Orissa	387.5	546.5	781.5	1132	356.9	473.8	636.2	863.3
Punjab	782.7	1128	1642	2411	696.4	954.6	1319	1835
Rajasthan	532.8	761.4	1103	1616	527.1	720.4	994.5	1386
Tamilnadu	441.0	578.1	768.9	1036	433.6	564.1	740.0	978.4
UP	465.3	667.9	974.8	1445	443.5	611.2	851.5	1198
WB	467.4	661.6	947.9	1374	404.2	545.9	743.4	1020
All India								

Source: Pal and Palacios (2004).

Table 3A. Specification of a complete coherent model

	Coresidency	Wealth	Health	Progeny
	CORESIDE	PROPFA	HLTHPROB	SONSCHEA
Intercept	v	v	v	v
MALE	v	v	v	v
WIDSEP	v	v	v	v
MWID	v	v	v	v
SCH	×	v	v	v
MSCH	v	v	×	v
ONCEACT	v	v	v	v
SCST	×	×	×	v
HHSIZE	×	v	×	v
APCE	v	×	v	v
PROPFA	v	×	×	v
HLTHPROB	v	×	×	v
SONSCHEA	v	×	×	v
EAST	v	v	v	v
NORTH1	v	v	v	v
NORTH2	v	v	v	v
SOUTH	v	v	v	v

Note: Definitions of variables: MALE: 1 if an elderly male person. WIDSEP: 1 if the elderly perosn is widowed/separated. MWID: MALE*WIDSEP. SCH: 1 if the elderly person has primary or higher level of schooling. MSCH: MALE*SCH. ONCEACT: 1 if the elderly person has previously participated in some economic activity. SCST: 1 if the elderly person belongs to a scheduled caste or scheduled tribe household. HHSIZE: Natural logarithm of household size. APCE: predicted value of average per capita monthly consumer expenditure. PROPFA: 1 if the elderly person owns property and/or financial assets. HLTHPROB: 1 if the elderly person suffers from some health problem (see text). SONSCHEA: 1 if the elderly person has any economically active son with schooling (coresident/non-coresident). EAST, NORTH1, NORTH2, SOUTH: regional dummies for eastern, northern and southern states in India.

Table 3B. Means and Standard Deviations of Variables

Variable	OBS	Mean	Std Dev
MALE	13810	0.645402	0.478409
WIDSEP	13810	0.199204	0.399416
MWID	13810	0.104996	0.30656
SCH	13810	0.26336	0.440472
MSCH	13810	0.221579	0.415324
ONCEACT	13810	0.27357	0.445807
Log(HHSIZE)	13810	1.636465	0.694536
APCE/1000	13810	0.372062	0.093868
SCST	13810	0.280956	0.449482
PROPFA	13810	0.773642	0.418488
HLTHPROB	13810	0.626358	0.483788
SONSCHEA	13810	0.548421	0.467099
EAST	13810	0.211658	0.408499
NORTH1	13810	0.269515	0.443724
NORTH2	13810	0.073642	0.261197
SOUTH	13810	0.211079	0.408089

Table 4A. Determinants of coresidency

	(1) No het	(2) Hety. & zero correlation	(3) With Heterogeneity + non-zero correlation	(4)	(5)
			Wealth	health + wealth	health + wealth + progeny
CONS4	0.9708 ***	1.5420 ***	1.5827 ***	1.6635 ***	-3.7372 ***
	0.1088	0.3965	0.4097	0.4151	0.81
MALE	-0.1462 **	-0.3633 **	-0.3380 **	-0.3170 *	-0.9540 ***
	0.0634	0.1588	0.1722	0.1763	0.1733
WIDSEP	-0.1896 ***	-0.2282 ***	-0.2279 ***	-0.2181 ***	-0.1740 ***
	0.0611	0.2159	0.2172	0.2202	0.249
MWID	0.2144 **	1.0074 ***	0.9948 ***	0.9877 ***	1.2006 ***
	0.0909	0.2763	0.2768	0.2794	0.2847
MSCH	0.3257 ***	0.3856 *	0.3948 *	0.3777 *	0.6036 ***
	0.0465	0.2015	0.2029	0.2051	0.1954
ONCEACT	0.0443	0.2095	0.2065	0.2279	0.1952
	0.0369	0.1418	0.1423	0.1542	0.1624
APCE	-2.9266 ***	-5.1938 ***	-5.1775 ***	-5.1845 ***	-7.5952 ***
	0.2118	0.8428	0.8389	-=0.8437	1.0152
PROPFA	0.2429 ***	0.5568 ***	0.4756 *	0.4788 *	0.8615 ***
	0.0375	0.1314	0.2571	0.2592	0.2748
HLTHPROB	-0.0198	0.1485	0.1472	-0.0241	-0.8787 ***
	0.032	0.1306	0.1308	0.2582	0.2317
SONSCHEA	0.0850 ***	0.3299 ***	0.3260 ***	0.4422 ***	0.6168 ***
	0.00344	0.0428	0.04	0.0372	.0236
EAST	-0.3469 ***	-0.6277 ***	-0.6168 ***	-0.6303 ***	-1.0761 ***
	0.0476	0.2086	0.208	0.2077	0.2423
NORTH1	-0.2846 ***	-0.6110 ***	-0.5975 ***	-0.6090 ***	-0.5418 ***
	0.0413	0.1792	0.1797	0.1814	0.203
NORTH2	0.2755 ***	0.6557 **	0.6825 **	0.6459 **	1.2099 ***
	0.0607	0.3024	0.3035	0.3088	0.395
SOUTH	-0.0900 **	0.3659 *	0.3702 *	0.3711 *	-1.5731 ***
	0.043	0.1928	0.1929	0.1948	0.2238
ln-L	-26524.71	-23836.59 -	-9342.54	-17877.72	-19677.18

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

Table 4B . Determinants of wealth

	(1)	(2)	(3)	(4)	(5)
	No het	Het+ zero correlation	With Heterogeneity + non-zero correlation		
			Wealth	health + wealth	Health+wealth+ progeny
CONS1	0.2212 ***	0.9272 ***	0.9272 ***	0.9439 ***	0.9361 ***
	0.0438	0.2481	0.2468	0.2536	0.2557
MALE	1.0256 ***	2.3212 ***	2.3200 ***	2.3150 ***	2.2711 ***
	0.0383	0.0834	0.0831	0.0833	0.082
WIDSEP	0.4745 ***	1.2110 ***	1.2094 ***	1.1998 ***	1.1813 ***
	0.0449	0.1082	0.108	0.1081	0.107
MWID	-0.6406 ***	-1.4907 ***	-1.4894 ***	-1.4839 ***	-1.4722 ***
	0.0661	0.135	0.1345	0.1348	0.1343
SCH	0.1032 *	0.3389 **	0.3376 **	0.3386 **	0.3213 **
	0.0573	0.1388	0.1383	0.1379	0.1365
MSCH	0.1379 *	0.1841	0.1856	0.1832	0.2055
	0.0709	0.1508	0.1504	0.1502	0.1489
ONCEACT	-0.4044 ***	-0.9605 ***	-0.9615 ***	-0.9576 ***	0.9558 ***
	0.027	0.0617	0.0615	0.0616	0.0617
HHSIZE	0.0604 ***	0.1225 ***	0.1228 ***	0.1206 ***	0.1446 ***
	0.018	0.0443	0.0442	0.0442	0.0445
EAST	-0.0133	-0.0612	-0.0623	-0.0585	-0.0645
	0.0356	0.0933	0.0928	0.0931	0.0924
NORTH1	-0.0021	0.0148	0.0142	0.022	0.0218
	0.0328	0.087	0.0869	0.087	0.0864
NORTH2	-0.1299 ***	0.0431	0.0485	0.0369	0.0174
	0.05	0.1259	0.1256	0.1256	0.1252
SOUTH	-0.4214 ***	-0.7921 ***	-0.7920 ***	-0.7949 ***	-0.7858 ***
	0.034	0.0858	0.0856	0.0856	0.0851
ln-L	-26524.7	-23836.5	-9342.54	-17877.72	-19677.18

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

Table 4C. Determinants of health problems

	(1) No heterogeneity	(2) With Heterogeneity + zero correlation	(3) With Heterogeneity + non-zero correlation	(4)	(5)
			Wealth	health + wealth	Health+wealth+progeny
CONS3	-0.2851 ***	-0.4451 ***		-0.4561 ***	-0.4587 ***
	0.063	0.1131		0.1132	0.1118
MALE	0.0799 ***	0.1933 ***		0.1943 ***	0.1826 ***
	0.0308	0.0358		0.0358	0.0357
WIDSEP	0.2211 ***	0.4122 ***		0.4119 ***	0.3964 ***
	0.0434	0.0664		0.0665	0.0659
MWID	-0.1085 *	-0.2315 ***		-0.2334 ***	-0.2229 ***
	0.0601	0.087		0.087	0.0865
SCH	-0.0007	0.0111		0.0076	0.016
	0.0282	0.0438		0.0437	0.0433
ONCEACT	0.5775 ***	0.8227 ***		0.8239 ***	0.8140 ***
	0.0262	0.0418		0.0418	0.0415
APCE	0.9631 ***	1.3949 ***		1.4245 ***	1.4346 ***
	0.1372	0.2539		0.254	0.2509
EAST	0.1700 ***	0.2494 ***		0.2574 ***	0.2562 ***
	0.035	0.0631		0.0633	0.0625
NORTH1	0.0064	-0.0064		-0.0027	0.0011
	0.0301	0.0558		0.0558	0.055
NORTH2	-0.1776 ***	-0.2598 ***		-0.2697 ***	-0.2664 ***
	0.0432	0.0811		0.0811	0.0801
SOUTH	-0.0075	-0.0246		-0.0265	-0.0162
	0.0322	0.0569		0.0569	0.0562
ln-L	-26524.7	-23836.5	-9342.54	-17877.72	-19677.18

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

Table 4D. Progeny effects

	(1) No Heterogeneity + zero correlation	(2) With Heterogeneity + zero correlation	(5) With Heterogeneity + non-zero correlation Health, Wealth & Progeny
MALE	0.0809	0.1206	-1.8333
	0.0533	0.1783	4.4204
WIDSEP	-0.5874 ***	-3.7703 ***	-4.3504
	0.0497	0.2461	4.4455
MWID	0.6029 ***	4.0733 ***	3.3669
	0.073	0.2964	4.4509
SCH	0.8602 ***	2.2219 ***	2.1074 ***
	0.0647	0.2364	0.4776
MSCH	-0.3300 ***	-1.1903 ***	-1.1004 **
	0.0753	0.2527	0.4863
ONCEACT	0.0014	-0.0072	0.6157 ***
	0.0267	0.0965	0.2288
APCE	-8.7696 ***	-35.8275 *** -	10.4431 ***
	0.1772	1.5913	2.1568
SCST	-0.5748 ***	-0.5572 ***	-0.6237 ***
	0.0246	0.1267	0.1268
EAST	-0.9272 ***	-3.6700 ***	-0.9472 **
	0.0359	0.2039	0.3705
NORTH1	-0.5730 ***	-1.6839 ***	-0.2016
	0.0306	0.1356	0.3419
NORTH2	0.8789 ***	3.6075 ***	2.9725 ***
	0.0426	0.2232	0.9758
SOUTH	-0.5786 ***	-1.9378 ***	-1.1998 ***
	0.0312	0.1282	0.27
ln-L	-26524.7	-23836.5	-19677.18

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

Table 4E. Structure of unobserved heterogeneity terms

	(1) No heterogeneity + zero correlation	(2) With Heterogeneity + zero correlation	(3) With Heterogeneity + non-zero correlation	(4)	(5)
			Wealth	health & wealth	Health,wealth & progeny
η_W		2.7778 ***	2.7753 ***	2.7844 ***	2.7597 ***
		-0.317	-0.3152	-0.3249	-0.3275
η_S		4.5352 ***			6.6788 *
		-0.1867			3.4348
η_H		1.1549 ***		1.1575 ***	1.1367 ***
		-0.0404		-0.0406	-0.0409
η_C		3.5912 ***	3.5942 ***	3.6408 ***	10.5834 ***
		-0.1848	-0.187	-0.2162	-1.0112
ρ(W,S)					0.0783
					-1.0013
ρ(W,H)				-0.0701 ***	-0.0634 ***
				-0.0234	-0.0235
ρ(W,C)			0.0156	0.0163 ***	-0.0242*
			-0.045	-0.0045	-0.0053
ρ(S,H)					0.0566
					-0.0071
ρ(S,C)					-0.8143 ***
					-0.0402
ρ(H,C)				0.0453 *	-0.0666 ***
				-0.0243	-0.0182