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

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Abstract

In the absence of any extra familial welfare system, most elderly persons in India tend to live with their children. Little is however known about their living conditions. The present paper attempts to bridge this gap of the literature and examines the living arrangements of elderly men and women in rural India with a view to derive implications of old age security. An analysis of the recent National Sample Survey data suggests that a majority of elderly men and women with children tend to corside with children and enjoy a higher per capita household expenditure compared to non-coresident elderly persons. While ownership of property and financial assets among the elderly tend to enhance the likelihood of coresidence, physical immobility of the elderly tend to reduce it. There is little evidence that economically active sons with schooling are more likely to support their elderly parents. These results tend to highlight the problems of caring for the elderly, especially when they do not have wealth, health or both.

JEL Classification: J14, I31, H55,

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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] In the absence of any alternative, the brunt of the burden of caring for the elderly is borne by the immediate family, usually own children, who are themselves often at subsistence level of income.[2] Little is however known about the living conditions of the elderly in India. Using 1995-96 National Sample Survey data, the present paper examines the pattern of living arrangements among male and female elderly members with a view to derive implications for 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 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

[1] Majority of the older people in India work outside the formal sector and and lack the capacity to save. Only 1 in 10 Indian workers participates in some pension schemes (World Bank report).
[2] There are no official data n the income of the elderly in India.

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. Secondly, there are studies examining the nature of intergenerational transfer of resources from adult children to elderly parents in developing countries. Kochar (1998), for example, argued that intra-household transfers are likely to be dominated by income transfers between parents and coresident children and there is a negative correlation between days work reported by fathers and the incomes earned by their coresident 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. While existing studies, however limited, emphasizes the role of financial transfer from adult children to elderly parents, surprisingly very few studies examine the nature of the non-financial assistance provided by adult sons to parents in 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. Finally, indirect evidence of old age security may also be found from the studies on the pattern of living arrangements among

[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).

the elderly persons in different developing countries.[4] For example, Devanzo and Chan (1994) find that higher parental income is associated with lower coresidency in Malaysia. Cameron (2000) however argues the opposite that coresidency is a desirable state for elderly Indonesians despite their income levels while higher income of children is likely to lower coresidency perhaps against the parental wish.

In our attempt to understand the role of children in the provision of old age security in rural India, we attempt to tie these different strands of the literature. Our analysis is based on the pattern of living arrangements among the eligible elderly members with children. In the absence of extra-familial welfare institutions, coresidence with children, as opposed to living alone or with other relations is considered to be an indicator of the welfare of the elderly. Coresidence with children has many external effects, especially if the elderly persons lack wealth, health or both (see further discussion in section 2). At the same time, we recognise that there is a reverse flow of services, both financial and non-financial, from the coresident elderly parents to their adult children and their families. In this context, we examine the following hypotheses: (a) *wealth effects*: to what extent coresidence is associated with wealth of the elderly parents. (b) *Health effects*: to what extent coresidence is associated with the health status of the elderly members. (c) *Progeny effects*: to what extent coresidence is associated with adult economically active children (especially sons) with schooling. This would provide indirect evidence if this inter-generational monetary transfer from coresident children, if any, is influenced by children's motives to repay their parents for investment in their education when these children were young.

Traditionally the burden of the elderly is borne by the immediate family in India. It is however important to analyse the aspect of old age security in a changing society where the extended family structure is slowly giving way to western-style nuclear family set up, thus worsening the vulnerability of the ageing population. Unless policies and social protection

[4] This excludes the sizeable literature investigating the determinants of living arraangements fo 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 secuirty for the elderly.

schemes specifically address issues of the old age poverty, targets for poverty reduction will not be achieved.

The empirical analysis is based on the 52nd round National Sample Survey (NSS) data from the rural sectors of the Indian states. 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, a majority of these elderly people neither own financial assets and/or property nor have access to any regular income after retirement (e.g., pension etc.). In the absence of alternative source of market or state provided insurance mechanism to help these vulnerable elderly people, dependence on children becomes crucial for survival, as often reflected in their coresidence with children. However, as Vlassoff and Vlassoff (1980) pointed out those economic resources of the elderly are crucial for their survival in rural Maharashtra, even when coresiding with children. This observation will be examined for the current sample drawn from the major Indian states.

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

2. DATA & METHODOLOGY

We use the fifty second round NSS data from the rural sector of different states and union territories in India collected in 1995-96. NSS provides information about the pattern of living arrangement among the elderly members of the sample households, aged sixty years and above: if s/he is living alone or in a old home, coresiding with spouse only, spouse and own children or own children only (without the spouse). We also have information if some elderly member is living with other relations or even non-relations. There is also detailed information about the health status and the state of economic dependence of these elderly members. For example, 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.[5] We also have information on the elderly person's own perception of current health status (excellent, good, fair, poor). 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 dependents that s/he has to provide for. There is also information about whether these elderly members are able to participate in daily household chores or other social/religious matters. Besides, we have the set of information pertaining to the usual individual, household and other community characteristics of all members of the sample households.

2.1. Preliminary observations

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 taken from 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

[5] 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.

characteristics of their children, (which 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.

Information on coresidence 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 coreside with spouse and children, a majority of widowed/separated elderly members with children coreside with children only. However, a majority of currently married elderly members *without children* coreside 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 much less in these categories.

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 members with/without children, a clearer pattern is found. Between 97%-98% of married and widowed elderly members *with children* tend to coreside with children (with or without the spouse). 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 coresiding with children (with or without spouse). The rest of our analysis, however, focuses on elderly members with children only since they constitute the group of eligible elderly for our analysis of old age security.

Most existing literature tends to highlight the importance of financial dependence on children among elderly parents. In our sample, financial dependence on children is found to be closely related to the gender and marital status. 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 the 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.

There are various plausible causes for the observed gender difference in financial dependence on children in old age. An important 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.[6] 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 employment 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.

[6] This is broadly in line with the Indian inheritance law (see Vlassoff, 1990: pp. 8).

Taken together, elderly women, especially widowed/separated ones are particularly vulnerable as they do not have many options but to depend on children.

Another possible factor of coresidence is the expected health care assistance to sick and frail elderly parents provided by coresident children. Since we do not have any information about the direct health care provided by coresident children, we consider three different indicators of functional activity limitations among the elderly members and obtain indirect evidence of health care assistance provided by coresident children. These are: (a) if one has any physical disability (visual, speech, hearing, locomotor); (b) if one has any chronic illness (cough, problem of joint, heart problem, high/low blood pressure, urinary problems, diabetes, cancer) and (c) if one suffers from any immobility (i.e., confined to bed or confined to home). 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 member, 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.

Finally, we consider the coresident elderly members' contribution to the family. Though the old age security hypothesis centres around the financial transfer from adult children to elderly parents, not all elderly persons in our sample are financially dependent on their children. A significant proportion of elderly persons also 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 women supporting their family is much less: only about 10% elderly women coresiding 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/religious matters. In other words, there is little evidence that these elderly members obtain any significant assistance with domestic services from coresident children.

To conclude, we compare the living conditions of coresident and non-coresident elderly members in our sample as summarised in Table 1B. Our primary observations are summarised here. (1) Compared to the elderly persons living with spouse and/or children, a lower proportion of elderly living without children (alone or living with spouse only) own properties and financial assets while a higher proportion of them have some kind of physical immobility. (2) A significantly lower proportion of the elderly not living with their children participates in daily household chores or social/religious matters. (3) Only about a third of the elderly living on their own have children or other relatives living in the same village/town. (4) Although a slightly higher proportion of the elderly living on their own have provision of regular income after retirement (4.3% as opposed to about 3%), average per capita monthly expenditure is significantly less among the elderly not coresiding with children. Taken together, it can be argued that in the absence of any extra-familial welfare institutions, elderly persons in rural India is better off if coresiding with children. In other words, coresidence with children could be taken as an indicator of welfare of the elderly still today.

2.2. Methodology

Old age security is considered to be a multidimensional concept, which includes both financial and various non-financial assistance adult children may provide to elderly parents.

Most elderly persons with children in our sample tend to coreside with children (with or without the spouse, depending on their marital status) in rural India. 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. For example, in the absence of any extra-familial welfare institutions for the elderly in India, living with children may help during financially or otherwise (e.g., during illness) or living alone may make things difficult during any crisis. The present paper examines the pattern of living arrangements among the elderly to derive indirect evidence as to whether children provide old age security to elderly parents in rural India.

Prevalence of joint residence of adult children with their parents could be viewed as motivated by the need for financial and non-financial support during old age. While some elderly men and a significant proportion of women in our sample are financially dependent on children, elderly persons, especially elderly men, continue to participate in active employment and financially support the family well into their old age. Most 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, one can argue that elderly persons' coresidence with children (and thus children's coresidence with elderly parents) is a mutually advantageous arrangement in rural India.

Thus, motives are not always directly observable and hence one needs to identify indirectly the apriori circumstances that may influence the intensity of the motive for coresidence. We seek to probe this issue by considering possible indicators of (a) assistance provided by children to their elderly parents and (b) also those of the contribution made by the elderly parents towards the household. We are though 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 receive financial support from *coresident* or *non-coresident* children. We cannot also identify if any 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. Hence we adopt an indirect approach as described below.

Financial transfer from adult children to elderly parents is an important part of the old age security hypothesis[7] in developing countries. We directly observe if elderly members are financially dependent on their children and use this information to examine its effect on coresidence (with or without the spouse). However, financial dependence on children is likely to be endogenous to coresidency decision and hence we need to redress the bias introduced by the possible endogeneity. Our estimates are corrected for this possible endogeneity bias (see section 2.3 for further details).

Second, old and frail parents may need to depend on adult children for other assistance as well, for example, provision of domestic services (e.g., cooking, cleaning etc.) and health care. Clearly there are no market provided substitutes for these services. Some of these non-financial factors too are likely to influence the coresidency decision. Since we do not observe the personal care, if any, provided by the coresident children, we use three different health indicators: (i) if the elderly person has any chronic illness (e.g., heart problem, blood pressure, diabetes etc.); (ii) if s/he has any physical disability (e.g., hearing, vision, speech etc.) and (iii) if s/he has any physical immobility (confined to bed or home). Significance of any of these health factors on coresidence with children would indirectly indicate the personal care offered by coresident children to elderly sick parents. Presence of a spouse in the household may, however, blur the fact whether the personal care, if any, is provided by the spouse or the child (or his/her family). This is addressed by controlling for the marital status of the elderly person in our analysis.

Besides the flow of services from adult children to elderly parents, there is also a reverse flow of services from elderly parents to adult children and their families, which may also influence the pattern of living arrangements. For example, we consider whether an elderly person owns any property and/or financial assets or s/he is currently economically

[7] This is because financial institutions are primitive, property rights are insecure, currency is subject to inflaction and private pensions, health insurance or state provided social security schemes are almost nonexistent.

active. Ceteris paribus, economic resources of an elderly may encourage coresidence by making them more valuable or these may even induce someone to live a more independent life (with/without the spouse). Secondly, we consider whether an elderly person is able to participate in daily household chores or regular religious/social matters. On the one hand, these abilities may make an elderly person more needed in the child's family, thus encouraging coresidence. On the other hand, elderly persons with these abilities may choose to lead a more independent life rather than depending on coresident children. In fact, wealthy and able elderly parents may choose to be more *'manipulative'* than others. In other words, parents may wish to influence the action of their children ex ante with their resources (Bernheim, Shleifer and Summers, 1985[8]) or alternatively parental resources may attract kids to coreside. Hoddinott (1992) suggest that wealthy parents in western Kenya are 'manipulative' in that they can induce greater attention by credibly threatening to disinherit the child unless s/he supplies a given level of attention.

Finally, demographic composition of the household may also influence the decision to coreside. First, we include the number of sons who have schooling, are economically active or both. Number of economically active sons has obvious implications for coresidence as traditionally older parents in rural India will coreside with sons. Coresidence with daughters is not socially very desirable except in special circumstances, e.g., if the daughter is a widow or if the elderly person does not have any son (see Vlassoff, 1990). Traditionally sons are expected to provide financial assistance to elderly parents. Inclusion of number of sons with schooling and with economic activity would signify whether educated and economically active sons would repay for parental investment in children's schooling. We also include the presence of daughter-in-law, grand child or both. Presence of a daughter-in-law may encourage coresidence, for example, for a widowed elderly man; in the

[8] Within a non-cooperative bargaining framework, parental utility is derived from parental consumption, utility of their child and child's 'attention to parents' while child's utility is a function of his/her own consumption and from supplying 'attention to parents'. Initially the child chooses a certain level of attention and then the parents make a transfer such as a bequest to the child.

absence of his wife, the daughter-in-law may generally carry out the daily household chores.[9] Presence of a daughter-in-law may on the other hand discourage coresidence if she does not get along well with the in-laws; it may even result in a breakdown of the family, thus indicating a trend towards nuclear family structure. Thus the distinction between married and unmarried sons could be interesting in that it may indicate substitutability, if any, between elderly parents and his family (wife and children) in coresidence. Presence of grand children may also influence coresidence, since traditionally grand parents tend to assist in caring for the grand children, especially when they are young.

Thus the observed living arrangements (i.e., coresidency or not) will reflect the relative importance of the parental contribution (financially in terms of ownership of financial assets or property and also non-financially in daily household chores, social/religious matters) vis-à-vis the financial and other (e.g., health care) assistance provided by the coresident adult children to elderly parents. These factors are included in our econometric analysis that follows.

2.3. Joint determination of financial dependence and coresidence with children

As indicated earlier, an important methodological question relates to the possible problem of simultaneity that may bias our estimates of living arrangements. While most of our variables could be treated as exogenous for the single cross-section data at our disposal,[10] the problem of simultaneity may arise with respect to the inclusion of the indicator of financial dependence on children. 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 unmeasurable variable. Finally,

[9] We also experimented with the characteristics of the daughers (married and unmarried) and the presence of son-in-law in the family though these variables were never significant. So these variables were excluded from the final specification.

[10] For example, without much loss of generality for the single cross-section data relating to elderly parents we treat the number of married and unmarried sons, their levels of schooling or economic activities to be exogenously given.

we include a number of variables, namely, ownership of financial assets and properties, current economic participation, if any, to capture the wealth effects of the elderly. 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.

Financial dependence on children is denoted by the variable FINDEP. This is a binary variable, which takes a value 1 if the elderly person is financially dependent (fully or partly) on children and zero otherwise. Coresidence with children is captured by a second binary variable CORESIDE: this variable takes a value 1 if the elderly person coresides with children and 0 otherwise. Since both these variables are binary and also endogenous, we jointly determine these variables in terms of a simultaneous probit model. The basic formulation of the model is as follows:

$$Z_{i1} = b_1' X_{i1} + e_{i1}; \quad FINDEP_i = 1 \ \ if \ Z_{i1} >= 0; \quad FINDEP_i = 0 \ \ otherwise;$$

$$Z_{i2} = b_2' X_{i2} + g_2' Z_{i1} + e_{i2}; \quad CORESIDE_i = 1 \ \ if \ Z_{i2} >= 0; \quad CORESIDE_i = 0 \ \ otherwise;$$

Both FINDEP and CORESIDE are assumed to satisfy the assumptions of the probit model. Here ε_{i1} and ε_{i2} follow a bivariate normal distribution with zero means and unit variances $\sigma_1 = \sigma_2 = 1$. Thus the covariance between ε_{i1} and ε_{i2} is also the correlation between ε_{i1} and ε_{i2}. This is a conventional simultaneous equations probit model in latent variables (Z_1, Z_2) where the observed counterparts are FINDEP and CORESIDE. The two step procedure is to estimate the two reduced forms by the probit maximum likelihood estimation (MLE) method, estimate the two dependent variables using the linear functions, then use these linear functions in structural MLEs. The resultant estimates are limited information maximum likelihood estimates (LIML) and not the full-information maximum likelihood estimates (FIML).[11]

[11] The primary diffeerence between LIML and FIML is that the former is a simpler method and does not estimate the correlation coefficient.

3. RESULTS

Since there is a significant gender difference in the pooled regression, we obtain separate male-female likelihood estimates of financial dependence and coresidence with children for elderly persons with children.[12] These estimates are summarised in Table 3. In general similar explanatory variables are included in both equations. There are also some identifying variables which are present in the equation of FINDEP, but not in CORESIDE and vice versa. Specifications and results pertaining to financial dependence and coresidence are further explained in sections 3.1 and 3.2.

3.1. Determinants of Financial Dependence

Financial dependence among the elderly depends on their individual characteristics as well as characteristics of their sons. Among individual characteristics of the elderly person we include schooling (if illiterate or not, ILLIT), if currently economically active (NOWACT), if retired (ONCEACT), if has made any provision for regular income after retirement (REGINC), if owns any financial assets (OWNFA) or properties (OWNPROP) if has any health problems (LTD, DAB, IMOB). We also include two interaction terms between NOWACT and LTD (NACTLTD) and also between NOWACT and DAB (NACTDAB) – these interaction terms would show to what extent health problems, if any, affect current economic participation. Among the relevant characteristics of their children, we include numbers of economically active married (SONACTM) and unmarried (SONACTUM) sons, numbers of married and unmarried sons with schooling (SONSCHM, SONSCHU), numbers of economically active married and unmarried sons (see footnote 9) with schooling (ACTSCHM, ACTSCHU). The distinction between married and unmarried sons could be significant as married sons have also the responsibility of looking after their wives and children; economically active unmarried sons may however be more eligible to look after

[12] Please note that we also ran similar regression for all elderly men and women (with and without children) in our sample and found that some of these estimates are misleading, justifying our choice that we should not pool the sample of elderly with children with those without.

their elderly parents, thus indicating the substitutability between parents and own family. More interestingly, we include two interaction terms to capture the number of economically active married and unmarried sons with schooling (ACTSCHM, ACTSCHU). Significance of these interaction variables may indirectly suggest if adult working children with schooling are more likely to repay their elderly parents in exchange for parental investment in their schooling. Finally we include if the elderly person belongs to a labour household (LABOUR) to capture effects of poverty and also the regional dummies (NORTH1, NORTH2, EAST and SOUTH) to control for regional variation, if any. Probit maximum likelihood estimates for male and female sub samples are summarised in Table 3.

In general elderly men and women from poorer labour households and those widowed and separated are more likely to be financially dependent. Illiterate elderly men are more likely to be financially dependent while level of literacy does not matter for elderly women. There is also evidence that economic resources of the elderly are important too. For example, ownership of financial assets and properties lowers the likelihood of financial dependence on children though among elderly men only (these variables are insignificant among elderly women). Secondly, currently economically active elderly men and women are less likely while retired elderly men and women are more likely to be financially dependent on children. However, the provision of regular income remains insignificant in our sample, perhaps because there is rather limited number of cases in this respect. In other words, estimates and significance of the indicators of economic resources of the elderly tend to provide support to the hypothesis that there is substitutability between number of sons and financial assets for old age security. We also find some evidence of health effects in financial dependence on children. Elderly men and women with chronic illness, physical disability or immobility are more likely to be financially dependent. Even economically active elderly men with chronic illness are more likely to be financially dependent on children.

Characteristics of sons play an important role and in this respect there are some interesting variation as to how schooling and active economic participation of married and

unmarried sons may interact to influence financial dependence among elderly men and women. For example, number of economically active *married* sons significantly enhances the likelihood of financial dependence among both elderly men and women while that of economically active *unmarried* son enhances the probability of financial dependence only among elderly men (the variable is insignificant among elderly women). Secondly, while elderly men and women are more likely to be dependent on married sons with schooling, they are less likely to do so if they have more unmarried sons with schooling and also if have more *economically active* married and unmarried sons with schooling. In other words, there is little support for the hypothesis that economically active sons (married/unmarried) with schooling are more likely to provide financial support to elderly parents as a return to parental investment in schooling of young children.

3.2. Determinants of Coresidency

We obtain the predicted value of financial dependence (PREDEP) from the probit equation of FINDEP and use it as an explanatory variable in the coresidency equation. Other possible factors explaining the coresidency arrangements among the elderly members would include indices of various health problems, e.g., chronic illness (LTD), physical disability (DAB), immobility (IMOB), if any, economic resources of the elderly, e.g., ownership of financial assets (OWNFA), ownership of properties (OWNPROP), current economic participation (NOWACT) and elderly person's ability to participate in daily household chores (HWORK) or social (SOC) and religious (RELIG) matters. Since there may also be possible interaction between health problems and ability to participate in daily household chores, we also include some interaction terms between chronic illness and ability to do daily household work (LTDHWORK) and also between physical disability and ability to daily household work (DABHWORK).[13] It is also important to include some demographic characteristics of the children, e.g., number of economically active married and unmarried sons with schooling

[13] We however do not include any such interaction term for physical immobility as physically immobile persons are not able to participate in daily household chores.

(SONACTM, SONCACTUM, SONSCHM, SONSCHUM, SCHACTM, SCHACTUM), if the elderly person has any daughter-in-law (DIL) or grand child (GC) or both (DILGC) living in the household. We also include the regional dummies (NORTH1, NORTH2, EAST, SOUTH) to control for regional variation, if any.

As indicated earlier, there are some identifying variables in the two equations, FINDEP and CORESIDE, estimated. For example, whether an elderly person is illiterate or not (ILLIT) is an important determinant of his/her earning ability and hence of financial dependence, but not important in coresidency decision. In contrast, an elderly person's ability to participate in daily household chores (HWORK), religious (RELIG) or social (SOC) matters is of direct relevance to coresidency decision, but not to decision relating to financial dependence on children. For similar reasoning, we include the presence of daughter-in-law (DIL), grand child (GC) or both (DILGC) in the coresidency equation only.

Results as summarised in Table 3 indicate significant evidence of gender difference in coresidency pattern, especially with respect to wealth variables though marital status does not seem to be important here. In general, economic resources of the elderly persons, especially elderly men, turn out to be important in our sample. For example, ownership of property and current economic participation among elderly men significantly enhances the likelihood of coresidence though both these variables remain insignificant among elderly women in our sample. The fact that more wealthy elderly men are more likely to coreside may support the hypothesis of 'manipulative parents' or alternatively 'wealth attracts kids'. Though we do not have the historical information of family formation as to who decided to coreside, ownership of family house by the elderly parents may play a critical role here. Considering ownership of property to be an indicator of ownership of family house, these results may be taken to indirectly support the hypothesis of 'manipulative parents'.

Financial dependence on children too enhances the likelihood of coresidence though among elderly men only (the variable is insignificant for elderly women). In order to further understand this result, we re-ran the simultaneous probit regressions including two more interaction terms, that between PREDEP and OWNPROP and also that between

PREDEP and NOWACT. These estimates are summarised in Table 4. A comparison of the estimates of coresidency presented in Table 3 and Table 4 suggests that most estimates remain similar, except those related to ownership of properties. These new results seem to clarify our understanding: while generally elderly men with properties and also those financially dependent on children are more likely to coreside, financially dependent elderly men with properties as well those currently active, but partly financially dependent are less likely to do so. In other words, financial dependence on children does not necessarily enhance the likelihood of coresidence with children.

Health effects of coresidence are mixed too. Though it is more likely for elderly men and women with chronic illness and physical disability to coreside, it is less likely for physically immobile elderly persons to do so. Ability to participate in daily household chores significantly enhances the possibility of coresidency among both men and women. If, however, elderly persons with chronic illness or physical disability are able to participate in daily household chores, they are less likely to coreside with children. The latter raises concerns about the provision of care provided by coresident children to elderly persons with health problems, especially those with physical immobility.

Finally, we do not find strong progeny effects in the coresidency decision and if at all, it exists only for the elderly men in our sample. For example, coresidence with children is less likely if an elderly have more economically active married sons though it is more likely if have more unmarried sons with schooling. In other words, there seems to be substitutability between a married child's family and presence of elderly parents for an unmarried child.

3.3. Effects of Health, Wealth and Progeny: Joint Tests of Significance

We conclude our analysis with tests of health, wealth and progeny effects on coresidency and financial dependence among elderly men and women in our sample. We construct likelihood

ratio statistics to test the joint significance of different health, wealth and progeny variables on decisions to coreside.

Wealth effects

Ownership of financial assets or properties and current economic participation of the elderly are considered to be indicators of economic resources. While elderly men with more properties and currently economically active elderly men are more likely to coreside with children. However, ownership of financial assets does not seem to have any perceptible impact on elderly men or women. The null hypothesis to test the total wealth effect is:

H_0: OWNFA=OWNPROP=NOWACT=0

LR statistics: Male: 20.4000 **; Female: 2.6646

Health effects

While elderly men and women with chronic illness and physical disability are more likely to coreside, those with physical immobility are less likely to do so. More interestingly, elderly men and women with chronic illness or physical disability, but with ability to participate in daily household chores are less likely to coreside. A test of joint significance of these health variables is based on the following null hypothesis:

H_0: LTD=DAB=IMOB=LTDHWORK=DABHWORK=0

LR statistics: Male: 70.36**; Female: 25.4652**

Effects of progeny

We include a number of variables to capture the effects of children on coresidency. The test of joint significance of these variables capturing the progeny effects is based on the following null hypothesis:

H_0: SONACTM=SONACTU= SONSCHM=SONSCHU=SCHACTM=SCHACTU

The test yields the following likelihood ratio statistics:

LR statistic: Male= 10.5450*; Female=2.1236

Taken together, there are significant health effects among both elderly men and women while wealth and progeny effects are significant only among elderly men.

Similarly, we could test for health, wealth and progeny for financial dependence. These test results[14] suggest that there are significant health, wealth and progeny effects among elderly men while the wealth effects of financial dependence on children are insignificant among elderly women.[15]

Taken together, our analysis reveals that wealth of the elderly enhances the likelihood of coresdence while some kinds of health problems (e.g., physical immobility) may discourage it. There is also little evidence that economically active sons with schooling are more likely to repay their parents in old age. Thus in the absence of extra-familial welfare institutions, there is an urgent need for the state to come forward with alternative social security programme for the elderly, especially when they lack wealth, health or both in their fight against poverty among the elderly.

4. CONCLUDING COMMENTS

In the absence of any extra familial welfare system, it is common among the elderly in India to live with their children. Little is however known about the living conditions of these elderly members in India. The present paper attempts to bridge this gap of the literature and examines the living arrangements of male and female elderly members in rural India. Our estimates based on the recent NSS data from the rural sector of major Indian states indicate the limits to children as old age security. First, elderly persons, especially men, who own property and financial assets and are also currently economically active are less likely to be financially dependent on children; thus, there is some substitutability between children and economic resources among the elderly person in our sample. Also financial dependence on children does not necessarily result in coresidence with children. Second, elderly men and

[14] Corresponding likelihood ratio statistics are given here: Health effects: male= 122.8860; female=64.3460; Wealth effects: male=198.4720 ; female=871620. Progeny effects: male= 161.8120; female=75..8080.

[15] If, however, we select the elderly widowed women in our sample, ownership of property is statistically significant in reducing financial dependence on children though the variable is still not a significant determinant of coresidency decision. This seems to be consistent with the inheritance law in India.

women with more economically active married and unmarried sons with schooling are less (rather than more) likely to be financially dependent. The latter indirectly negates the hypothesis that economically active adult children with more schooling are more likely to offer more financial and other assistance to elderly parents to repay for the parental investment in child schooling when children were young. Finally, these results also indicate that frail and sick elderly parents with long term illness, physical disability and physical immobility are unlikely to obtain the adequate health care from coresident children and are therefore less likely to coreside with children. Effects of wealth, health and progeny are also confirmed in terms of our likelihood ratio statistics.

While coresidency with children is a social convention and can be taken as an indicator of welfare among the elderly even today (in the absence of any better alternative), our results raise concerns for those who lack wealth, health or both. 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 there remains a problem of implementation across the Indian states.

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Table 1A. CHARACTERISTICS OF ELDERLY MEMBERS WITH DIFFERENT LIVING ARRANGEMETNS (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 ELDERLY MEMBERS WITH CHILDREN

	Living alone or with spouse only	**Living with spouse and children**	**Living with children only**
Mean per capita consumption exp (Rs.) (s.d. in parenthesis)	326 (151.43)	350.00 (173.11)	362 (200.81)
Owns financial assets (%)	58	67	64
Owns financial properties (%)	63	78	77
Owns financial assets & properties (%)	56	66	63
Provision of regular income (%)	4.3	2.7	3.8
Physical immobility (%)	19	7	9
Physical disability (%)	26	32	42
Chronic illness (%)	42	50	56
Able to participate in daily household work (%)	67	85	80
Able to participate in social matters (%)	62	83	80
Able to participate in religious matters (%)	66	87	85
No of observations	234	8064	1942

TABLE 2. MEANS AND STANDARD DEVIATIONS (S.D.) OF SELECTED VARIABLES (Elderly members with children)

	Male		Female	
Variable	Mean	Std.Dev.	Mean	Std.Dev.
CORESIDE	0.975118654	0.155774692	0.976983646	0.149978043
DEPCHLD	0.375377535	0.484255065	0.499394306	0.500075362
ILLIT	0.606644614	0.488529683	0.855542096	0.351606681
WIDSEP	0.16223213	0.368690136	0.202301635	0.401776767
SONACTM	0.95239465	0.824087408	1.04391278	0.882464508
SONACTUM	0.396950956	0.702659685	0.308903695	0.631621119
SONSCHM	0.713217316	0.784831321	0.802543913	0.836761155
SONSCHU	0.528405005	0.854710095	0.367353119	0.70858343
SCHACTM	1.15360276	2.13927976	1.38219261	2.53360767
SCHACTU	0.585646484	1.63354717	0.410357359	1.45173441
OWNFA	0.74155041	0.43781385	0.503331314	0.500064629
OWNPROP	0.866532432	0.340103826	0.57571169	0.494309355
NOWACT	0.664173738	0.472312468	0.208358571	0.406196067
ONCEACT	0.297713217	0.457285614	0.226529376	0.418648895
REGINC	.0.035668057	0.185474511	0.015142338	0.122137485
LABOUR	0.221487128	0.415277477	0.232586311	0.422544661
DIL	0.725729901	0.446177816	0.752574197	0.431581607
GC	0.680569538	0.466289516	0.143549364	0.350685312
DILGC	0.625053934	0.484143806	0.105087826	0.306713
LTD	0.517762117	0.499720344	0.486069049	0.49988159
DAB	0.349201783	0.476752124	0.314354936	0.464328768
IMOB	0.080253128	0.271704216	0.072380376	0.259155931
HWORK	0.822378829	0.382221012	0.863718958	0.343138715
LTDHWORK	0.403998274	0.490732416	0.405511811	0.491065181
DABHWORK	0.254422551	0.435567449	0.253785584	0.435242268
RELIG	0.875449446	0.330232339	0.837068443	0.369359149
SOC	0.849848986	0.357245073	0.754694125	0.430333575
NORTH1	0.255573134	0.436214253	0.286493035	0.452191
NORTH2	0.072342874	0.259073417	0.093579649	0.291287133
EAST	0.238026751	0.425906217	0.176256814	0.381096226
SOUTH	0.19444844	0.395803961	0.219261054	0.413808534
NOBS	6953		3302	

Note: ILLIT: 1 if the elderly person is illiterate; WIDSE: 1 if the elderly person in either widowed or separated; SONACTM: number of economically active married sons; SONACTUM: number of economically active unmarried sons; SONSCHM: number of married sons with schooling; SONSCHU: number of unmarried sons with schooling; ACTSCHM: number of economically active married sons with schooling; ACTCHUM: number of economically unmarried sons with schooling; DIL: 1 if has any daughter-in-law; GC:1 if has any grand child; DILGC: interaction term between DIL and GC; OWNFA: 1 if owns financial assets; OWNPROP : 1 if owns property; NOWACT: 1 if currently economically active; ONCEACT: 1 if were economically active during major part of workign life, but now retired; REGINC: 1 if has made provision for regular income; LTD: 1 if has any chronic illness; DAB: 1 if has any physical disability; IMOB: 1 if has any physical immobilty; HWORK: 1 if able to participate in daily housheold chores; LTDHWORK: interaction between LTD and HWORK; DABHWORK: interaction beween DAB and HWORK; RELIG: 1 if able to participate in religious matters; SOC: 1 if able to participate in social matters: LABOUR: 1 if belongs to poorer labouring households.

TABLE 3. SIMULTANEOUS PROBIT ESTIMATES OF FINANCIAL DEPENDENCE AND CORESIDENCE

	Financial dependence on children				Coresidence with children			
	Men		Women		Men		Women	
Variable	Coeff	T-Stat	Coeff	T-Stat	Coeff	T-Stat	Coeff	T-Stat
PREDEP					0.651072	3.225	8.11E-01	0.313
Constant	-0.29151	-2.719	-0.45649	-5.359	0.791425	5.056	1.194119	5.377
WIDSEP	0.171778	3.698	0.641536	9.68	-0.16459	-1.69	-0.25301	-0.922
DIL					9.33E-01	-0.58	5.48E-01	-0.025
GC					0.28474	1.382	-0.32226	-1.06
DILGC					-0.15023	-0.67	0.602992	1.719
SONACTM	0.300226	8.911	0.235478	5.438	-0.20625	-2.195	7.69E-01	-0.714
SONACTUM	8.91E-01	2.194	7.70E-01	1.305	6.07E-01	-0.696	6.29E-01	-0.478
SONSCHM	0.181279	4.102	0.184333	3.236	-0.11128	-0.964	1.38E-01	0.092
SONSCHU	9.14E-01	-2.779	-0.11512	-2.213	0.123502	1.728	5.61E-01	-0.492
SCHACTM	-0.10481	-6.316	7.28E-01	-3.879	8.46E-01	1.602	1.98E-01	0.353
SCHACTU	3.07E-01	1.463	4.61E-01	1.514	4.83E-01	0.093999 9999999 99	8.94E-01	0.96
OWNFA	-0.10195	-2.06	5.08E-01	-0.611	-0.11607	-0.971	9.89E-01	0.508
OWNPROP	-0.34639	-5.546	5.31E-01	-0.638	0.672359	4.455	2.14E-01	-0.109
NOWACT	-0.63727	-6.779	-0.55689	-6.606	0.572073	2.457	-0.15008	-0.76
ONCEACT	0.654466	7.63	0.460692	7.661				
LTD	0.184185	3.06	0.118949	2.24	0.629854	3.722	0.750752	3.009
DAB	0.209687	3.555	0.233976	4.072	0.201564	1.097	0.731802	2.554
IMOB	0.179454	2.714	0.295486	3.119	-0.82322	-7.234	-0.47476	-2.563
NACTLTD	9.71E-01	1.303	0.231049	1.914				
NACTDAB	8.55E-01	0.113	2.06E-01	0.149				
HWORK					0.565071	4.245	0.941242	4.325
LTDHWORK					-0.86522	-4.716	-0.801	-2.873
DABHWORK					-0.19658	-1.029	-0.76238	-2.478
RELIG					0.305405	2.059	6.78E-01	0.355
SOC					3.10E-01	0.202	0.25216	1.449
NORTH1	-0.16042	-3.227	-0.28594	-4.259	0.176682	1.777	-0.33406	-2.008
NORTH2	-0.17033	-2.324	-0.14986	-1.647	0.134417	0.921	-0.10054	-0.447
EAST	0.12734	2.593	2.53E-01	-0.336	1.27E-01	0.128	-0.26393	-1.622
SOUTH	2.31E-01	0.434	0.163601	2.227	0.466209	3.753	0.463394	2.075
LOGL	-3550.54		-2006.14		-715.775		-321.684	
CHISQ	2101.302		565.2572		188.1087		80.1454	
NOBS	6953		3302		6953		3302	

Note: PREDEP is the instrument of FINDEP obtained from the probit estimates of FINDEP.

TABLE 4. FURTHER ESTIMATES OF CORESIDENCE

	Coresidence with children			
	Male		Female	
Variable	Coeff	T-Stat	Coeff	T-Stat
PREDEP	0.974555	4.396	0.113809	0.404
DEPPROP	-0.3358	-2.576	0.103407	0.496
DEPACT	-0.60668	-3.258	-0.68436	-2.448
Constant	0.667656	3.971	1.152227	5.165
WIDSEP	-0.12131	-1.234	-0.15334	-0.543
DIL	-5.68E-03	-0.035	1.45E-02	0.065
GC	0.364234	1.721	-0.37482	-1.209
DILGC	-0.1651	-0.722	0.658901	1.839
SONACTM	-0.15579	-1.625	-7.71E-02	-0.713
SONACTUM	-1.36E-02	-0.153	-5.18E-02	-0.393
SONSCHM	-0.1006	-0.863	3.15E-02	0.209
SONSCHU	9.62E-02	1.308	-7.01E-02	-0.602
SCHACTM	6.95E-02	1.302	1.58E-02	0.283
SCHACTU	1.16E-02	0.212	9.80E-02	1.031
OWNFA	-0.14978	-1.251	0.103802	0.523
OWNPROP	0.56644	3.71	-2.49E-02	-0.125
NOWACT	0.203488	0.8	-0.4605	-2.016
LTD	0.673749	3.901	0.74138	2.963
DAB	0.206894	1.107	0.706036	2.457
IMOB	-0.81962	-7.208	-0.50008	-2.679
HWORK	0.483997	3.486	0.908502	4.165
LTDHWORK	-0.7795	-4.197	-0.73921	-2.637
DABHWORK	-0.12756	-0.659	-0.71441	-2.311
RELIG	0.32789	2.171	9.62E-02	0.499
SOC	-3.20E-02	-0.206	0.241595	1.375
NORTH1	0.11919	1.179	-0.35436	-2.107
NORTH2	9.66E-02	0.652	-8.42E-02	-0.371
EAST	7.25E-02	0.71	-0.27804	-1.695
SOUTH	0.45925	3.665	0.474691	2.105
LOGL	-702.863		-318.621	
NOBS	6953		3302	

Note: DEPPROP = interaction term PREDEP *OWNPROP; DEPACT = interaction term PREDEP*NOWACT. We do not show the estimates of FINDEP as they are similar to those shown in Table 3.