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ANDREW D. FOSTER†

I. INTRODUCTION

It has long been thought that the household is an important unit of analysis in rural areas of developing countries. From an economic perspective, the household is generally assumed to be the principal locus of decision-making about consumption and production. From a demographic perspective, it is thought that household factors play a key role in determining patterns of fertility, mortality, migration, and marriage. Although household-level information is a fixture of most survey data, there is a variety of conditions under which we might expect an analysis of household-level effects to yield misleading conclusions.

First, inter-household ties may have important effects on household behaviour. For example, couples who live in close proximity to their parents may be affected in similar ways to those who share a household with their parents. If many couples live close to their parents, then behaviour of those in joint and nuclear households may not differ substantially, even if the influence of parents on behaviour is quite substantial. The problem is that the need to provide a consistent and easily implemented definition of the household for purposes of survey research may conflict with the notion of the household as a locus for decision-making and resource allocation.

Secondly, decisions about joint residence may be endogenous with respect to a number of economic and demographic outcomes of interest. Although it is increasingly recognized that certain demographic variables should be treated as endogenous in analyses of economic and demographic data from developing countries, very little is known about the implications of the fact that joint residence is itself a choice variable. In a setting in which household formation is generally tied to marriage this distinction would be relatively unimportant: knowledge about the determinants of marriage could be used to inform an analysis of the effects of household structure on variables of interest. In a different setting, where married couples are found to be living with parents or siblings, however, the situation is more complex. If, for example, more fecund couples are likely to set up separate households at earlier ages because of increased household crowding, then a comparison of fertility rates among joint and nuclear households in a natural-fertility population might incorrectly lead to the conclusion that co-residence with a couple's parents leads to lower fertility.

In this paper I use longitudinal data collected in rural Bangladesh to provide new insight into both these issues. First, I carry out a descriptive analysis of household structure patterns and changes in these patterns over time, using individual-level data. Secondly, a procedure is developed for the analysis of household partition, which makes use of data on relationship to head of household in two different periods. Thirdly, data on the educational attainment of children are used to provide an indirect measure of the extent to which recently partitioned households continued to operate as a single economic and social unit.

* I wish to thank the Demographic Surveillance System of the International Centre for Diarrhoeal Research in Bangladesh for collecting and linking these data. I also wish to thank Jane Menken for the suggestion that an analysis of household structure using the ICDDRDB data might prove fruitful.

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II. HOUSEHOLD PARTITION

Although the term 'household partition' is not often used in the economic and demographic literatures, it is generally recognized to be an event with important behavioural implications in rural South Asia. Caldwell *et al.* argued in the Indian context that partition

...is one of the central facts of social life, observed and discussed by all. There is little in the way of an intermediate or blurred situation: when partition occurs, division, somewhat ceremoniously and usually without rancour, is effected in eating arrangements, the family budget, land (if any), and residential arrangements.¹

It seems surprising, therefore, that empirical evidence regarding the determinants of household partition in South Asia in general, and in Bangladesh in particular, is extremely scarce. One important reason is the relative absence of longitudinal data on household formation and dissolution. Even in cases where household partition is an important determinant of household structure it is likely to be a relatively rare event.² Thus, even when longitudinal data are available, a large sample is needed in order to obtain precise estimates of household-partition rates. Cross-sectional surveys provide a snapshot of the household structure at any given time, and can suggest whether household partition is likely to play an important role in determining household size and structure, but say little about the underlying relationships.

An example is provided by research focused on the effects of wealth on household structure. Although a number of authors have reported that the structure of better-off households in Bangladesh is likely to be more complex than that of their poorer counterparts,³ interpretation of these patterns is difficult because the partition of a household will also result in the division of assets, such as land. Thus, even if there were no relation between landholdings and partition one would observe a positive correlation between joint residues and landholdings: partition can be both a cause and a result of low levels of wealth. Similarly, Cain's results which indicated that landowners were less likely to have sons who lived separately, and that those who had left did so at later ages, might be attributed to the fact that the early departure of a son can result in lower landholdings, either through land transfers associated with partition, or greater land sales on the part of households with no son present.⁴

One way to address this problem is to focus on ownership of goods that may be consumed jointly by partitioned households (such as tubewell water), or goods measured on a per-person level (such as number of meals eaten per day). While these results generally confirm the impression that emerges from an analysis of landholdings,⁵ they provide only indirect evidence that wealthier households are less likely to be partitioned or are partitioned at later stages.

Retrospective data on the reasons for and conditions underlying household partition provide an interesting, if somewhat subjective, complement to cross-sectional data on

¹ J. C. Caldwell, P. H. Reddy and P. Caldwell, 'The determinants of family structure in rural South India', *Journal of Marriage and the Family*, 46 (1) (1984), p. 128.

² In a population in which only males can be household heads, the number of partitions experienced during the headship of any particular male should roughly equal the net reproduction rate (the average number of sons) minus one (the son who inherits the household).

³ J. C. Caldwell, G. Immerwahr and L. T. Ruzicka, 'Illustrative analysis: Family structure and fertility', *WFS Scientific Reports*, No. 39 (Voorburg, 1982), pp. 39-40 and Barkat-e-Khuda, 'The nuclearization of the joint family households in a rural area of Bangladesh', *Journal of Comparative Family Studies*, 16 (3) (1985), p. 393.

⁴ M. T. Cain, 'The household life cycle and economic mobility in rural Bangladesh', *Population and Development Review*, 4 (3) (1978), p. 436.

⁵ Barkat-e-Khuda, *loc. cit.* in fn. 3, p. 396.

household structure. For example, in one study of household partition in Bangladesh, Barkat-e-Khuda reported that 36 per cent of households cited economic pressures as the immediate cause of household partition. Although no evidence is presented, it is suggested that a key source of economic pressure may be the extent of inequality in terms of the relative contributions from and benefits to sub-households, and that this problem is likely to be more acute in poorer households.⁶

A second reported cause of household partition in the Barkat-e-Khuda study was discord among females (26 per cent) and males (10 per cent). While one would like to know the extent to which this discord reflected differences over the allocation of resources, it is interesting to note that in other studies of household partition in South Asia the importance of discord among women as a proximate cause of household partition has been mentioned.⁷

A third factor that is said to be of some importance in determining the timing of household partition is the survival of the patriarch, or father of the household. While there are good reasons to believe that the patriarch might play an important role in mediating disputes and so forth, the evidence is again extremely weak. The fact that a substantial proportion of partitions take place after the father's death, as reported by Barkat-e-Khuda in Bangladesh and Caldwell in south India,⁸ proves only that household partition occurs relatively late in life, not that it occurs as a result of the death of the patriarch. A related problem is that most cross-sectional surveys do not distinguish between individuals who choose to live in a simple household, and those who are constrained to live in a simple household as a result of an absence of close kin. Thus, if a man is living with his wife and children only, it is not known whether he has chosen to live separately from his parents, or whether his parents are no longer alive.

III. DATA

The data used in this paper consist of a ten per cent sample of the population covered by the Demographic Surveillance System (DSS) of the International Centre for Diarrhoeal Disease Research-Bangladesh (ICDDRDB).⁹ The DSS provides detailed demographic data on a population of over 25,000 households in 149 geographically contiguous villages in rural Bangladesh. In addition to carrying out vital registration since 1966, this system has involved periodic censuses, which provide information on socio-economic status and household structure. Census data taken in 1974 and 1982 have been linked to vital events during the intervening years. While the ICDDRDB data have been used extensively to study problems of health and reproductive behaviour in a developing country,¹⁰ they have not to my knowledge been used to study household structure. Households are defined as those individuals who eat and sleep together on a regular basis, and household headship is self-reported.

⁶ *Ibid.* p. 397.

⁷ Caldwell, *et al.*, *loc. cit.* in fn. 1, pp. 223–224 and T. S. Epstein, *Economic Development and Social Change in South India* (Manchester, 1962), pp. 176–177.

⁸ Barkat-e-Khuda, *loc. cit.* in fn. 3, p. 394 and Caldwell *et al.*, *loc. cit.* in fn. 1, p. 222.

⁹ The data set used in this analysis was constructed by taking a ten per cent population-weighted sample of villages, and includes all available information for any individual resident in one of the sample villages in either 1974 or 1982 (i.e. it includes information in 1982 for an individual who was in a sample village in 1974, but in a non-sample village in 1982). The reason for using a sample of villages rather than households was to ensure that recently partitioned households living in close proximity would all appear in the sample. The sample consists of 22,040 individuals from 3,815 households in 1974, and 25,086 individuals from 4,244 households in 1982.

¹⁰ For a useful summary of some of the demographic insights that have been gained from the analysis of data from this population see J. Menken and J. F. Phillips, 'Population change in a rural area of Bangladesh, 1967–1987', *The Annals*, 50 (1990), pp. 87–101.

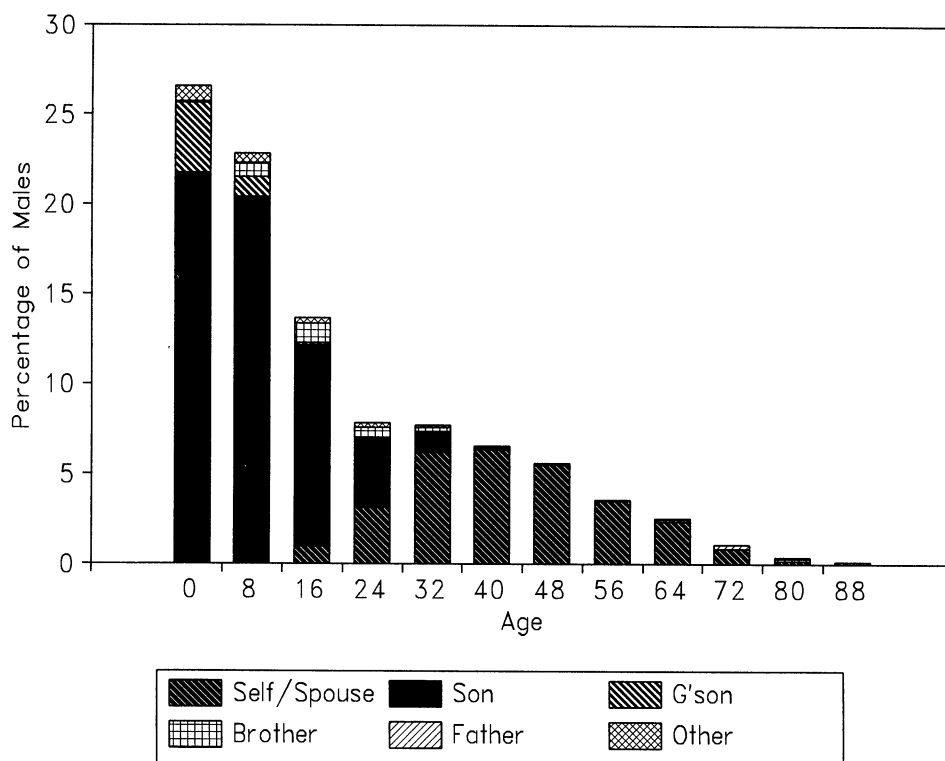


Figure 1. Relationship to household head for males by age in 1974.

Information on household structure is available in a number of different forms. First, in the Census of 1974 family-type was recorded, using the standard typology (i.e. nuclear, stem-joint, etc.). Secondly, in both the 1974 and 1982 censuses, information on relationship to head of household is available. Thirdly, in the Census of 1982, children and spouses within the same household can be linked. The analysis in this paper is focused on the relationship data for four reasons. First, because comparable information is provided in the two censuses, it is possible to compare changes in the composition of households over time. Secondly, in the presence of significant life-cycle effects on living arrangements, data on relationship to household head may be standardized for age, in order to distinguish the effects of changes in the age distribution in a population from changes in the living arrangements of people of a given age. Thirdly, individual-level data permit an analysis of the effects of individual-level characteristics on the probability of household partition. Fourthly, aggregate data on relationship to head of household are frequently available in census reports, thus making it possible to undertake comparisons between regions or countries, and over time.¹¹

A disadvantage of focusing on relationship data is that the characterization of any given person or household may in part depend on the assignment of headship. For example, in a household that consists of two married brothers and a father, the status of, say, the younger brother will depend on whether the elder brother or the father is

¹¹ See, e.g. T. K. Burch, S. S. Halli, A. K. Madan, K. Thomas and L. Wei, 'Measures of household composition and headship based on aggregate routine census data', in J. Bongaarts, T. K. Burch, and K. W. Wachter, *Family Demography: Methods and Applications* (Oxford, 1987), pp. 19-39.

identified as the household head. If household headship is not a meaningful concept in the society, then, since household headship is self-identified in this study, households that are identical in composition may appear to be different. Fortunately, as will become evident shortly, rules for the assignment of household headship seem to be quite consistent across households in this population.

An overall perspective on the patterns of household residence can be obtained by examining Figures 1 and 2 which present the age distribution by relationship to

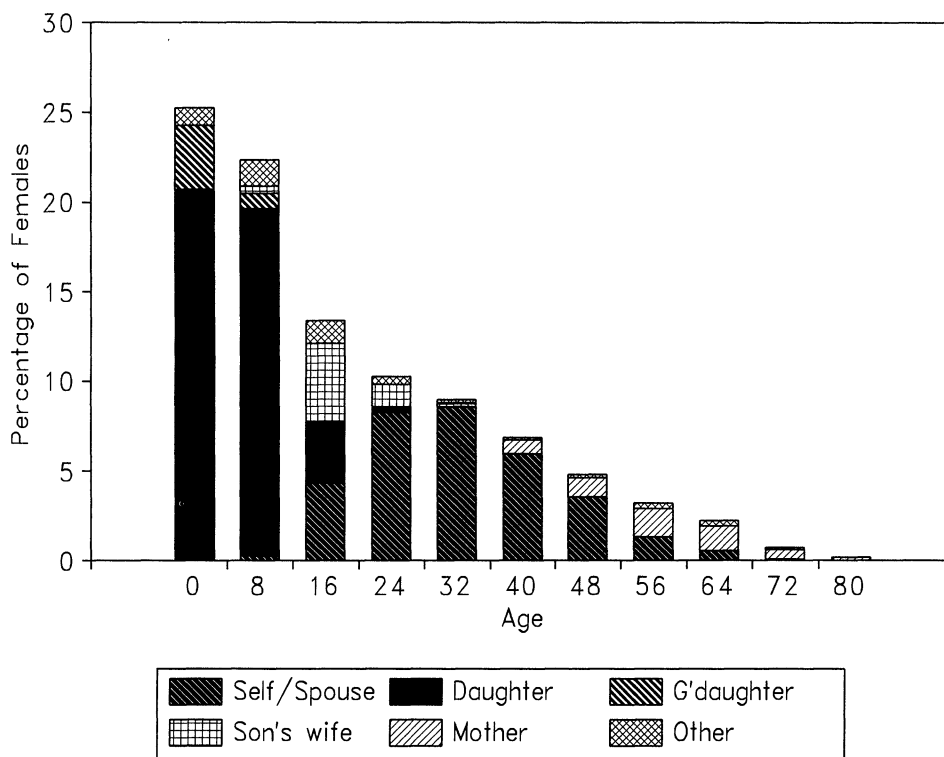


Figure 2. Relationship to household head for females by age in 1974.

household head for males and females, respectively, in 1974.¹² Not surprisingly, strong life-cycle effects are evident. At ages below 16 most children were the sons and daughters of the household head. By the age of 24, most women were married; one-third of these women had set up residence in a household that was headed by their fathers-in-law. By the age of 32, however, most women were married to the household head: either the father had died, the son had set up separate residence, or the father had relinquished control of the household to his son. The latter possibility can be ruled out in general,

¹² Age data are grouped into eight-year segments in order to facilitate comparison between the 1974 and 1982 data. The division of children and young adults into eight-year groups 0-7, 8-16, and 16-24 is also reasonable in terms of the economic contributions of children and the timing of marriage in this population. Finally, because the population is being followed longitudinally, ages in 1974 are based on the age at which individuals first entered the study population, and as different villages entered the sample at different points in time, age heaping is irregular and absent entirely in the younger population.

because the vast majority of older men were reported to be household heads, except at advanced ages.¹³

An alternative way of examining the relationship data presented in Figures 1 and 2 is to use the observed proportions at each age to construct measures of the expected time in each state for members of a synthetic cohort experiencing these proportions (Table 1).

Table 1. *Average years spent in various states for synthetic cohorts*

Age	Year	Self/ Spouse	Males				
			Son	Grand- son	Brother	Father	Other
8	1974	0.00	6.56	1.12	0.05	0.00	0.26
	1982	0.00	6.28	1.40	0.02	0.00	0.30
24	1974	0.68	20.00	1.59	1.05	0.00	0.69
	1982	0.61	19.73	1.94	1.01	0.00	0.71
40	1974	10.01	25.25	1.63	2.03	0.00	1.08
	1982	9.90	24.98	1.96	1.96	0.01	1.20
56	1974	25.46	25.53	1.63	2.15	0.02	1.21
	1982	25.07	25.39	1.96	2.12	0.04	1.43
72	1974	40.52	25.56	1.63	2.17	0.76	1.36
	1982	39.81	25.39	1.96	2.12	0.72	2.00

Age	Year	Self/ Spouse	Females				
			Daughter	Grand- daughter	S. Wife	Mother	Other
8	1974	0.00	6.56	1.12	0.00	0.00	0.33
	1982	0.00	6.23	1.45	0.00	0.00	0.32
24	1974	2.91	15.22	1.46	2.81	0.00	1.59
	1982	2.37	15.92	1.91	2.17	0.00	1.62
40	1974	16.72	15.59	1.46	4.03	0.12	2.08
	1982	15.23	16.70	1.91	3.70	0.10	2.35
56	1974	29.38	15.60	1.46	4.09	2.86	2.62
	1982	28.12	16.75	1.91	3.73	2.72	2.76
72	1974	34.84	15.60	1.46	4.17	11.46	4.48
	1982	33.76	16.75	1.91	3.73	10.89	4.96

As is evident from this table, based on the 1974 proportions, a male who survived to age 72 would have spent, on average, 66.1 years or 91.8 per cent of his life as a head, spouse of head, or son of head. A woman of that age would have spent 70.1 per cent of her life as a head, spouse of head, or daughter of head; the principal difference is the average of 11.5 years that the woman would have spent as the mother of a head, and the 4.2 years she would have spent as a daughter-in-law.

The fact that individuals spent little time as anything other than a household head, or the spouse or child of a head is somewhat surprising, as it has been reported that fewer than half the households in rural Bangladesh consist of a standard nuclear family.¹⁴ An examination of the relationship data from the sample considered here indicates that 59.9 per cent of households did not contain members other than heads, spouses and their children, and only 45.3 per cent were complete nuclear households.

¹³ The patterns of headship for females are more complex. In fact 13.58 per cent of households in the 1974 census were reported to be headed by women. Heads in these cases were almost all married women with absent husbands and widows not residing with married sons. Of those who are married 94.4 per cent received remittances, presumably from a husband who was living and working elsewhere. Only 11 out of 3,815 households were anomalous, in the sense that the head was an unmarried woman who lived in the same household with a married son.

¹⁴ Caldwell *et al.*, *op. cit.* in fn. 3, p. 35 and Barkat-e-Khuda *loc. cit.* in fn. 3, p. 391.

Table 2. Average years spent in various types of households for synthetic cohorts

Age	Year	Simple ¹	Vertical ¹	Other ¹
Males				
8	1974	4.59	2.02	1.40
	1982	4.22	2.35	1.43
24	1974	12.80	6.61	4.59
	1982	12.72	6.87	4.41
40	1974	18.77	12.76	8.47
	1982	18.69	12.72	8.59
56	1974	29.50	16.09	10.41
	1982	28.83	16.26	10.91
72	1974	36.09	23.83	12.09
	1982	34.90	23.88	13.22
Females				
8	1974	4.62	2.09	1.29
	1982	4.28	2.31	1.41
24	1974	11.98	7.46	4.56
	1982	11.68	7.62	4.69
40	1974	22.26	10.91	6.83
	1982	21.01	11.32	7.67
56	1974	28.76	16.89	10.35
	1982	27.66	17.22	11.11
72	1974	31.12	25.97	14.90
	1982	29.84	26.17	15.99

¹ Simple households include only heads and spouses and children of heads; vertical households also include grandchildren, daughters-in-law, and parents; households containing individuals with other relations to the household head are classified as Other.

This point is further illustrated in Table 2 which is similar to Table 1 but presents the average number of years spent by individuals in different types of households based on the distributions of the population in 1974 and 1982. In this table *simple* refers to households with only heads, spouses and children of heads, *vertical* refers to households that also include grandchildren, mothers, fathers and/or daughters-in-law, and *other* refers to households with other types of individuals.

An examination of Table 2 indicates that individuals subject to the observed proportions in 1974 would have spent roughly half their lives in a simple household. For example, based on the estimates from 1974, a 24-year-old male would have spent 53.3 per cent of his life in a simple household while a 72-year-old would have spent 50.1 per cent of his life in a simple household. In addition, approximately two-thirds of the time spent in non-simple households would have been spent in vertical households.

It is evident, then, that most individuals spent half their lives in non-simple households but only a small share of their lives as anything other than a head, the spouse of a head, or the child of a head. The resolution to this seeming paradox is, of course, that most households consisted primarily of household heads, spouses, and their children, along with one or two other members from outside the nuclear family. Households headed by young heads generally included the head's siblings and/or mother, while households headed by older heads included daughters-in-law, and grandchildren. This point is illustrated in Table 3 which presents the proportion of households with at least one member of the corresponding type of individual by the age of the household head. For example of the 438 households headed by someone aged 16–24 in 1974, 19.4 per cent contained a brother of the head, 39.7 per cent contained the mother of the head, and 19.4 per cent contained women in the residual category which includes sisters. By contrast, of the 308 households headed by someone aged 56–64, 50.6 per cent contained a

Table 3. *Percentage of households with at least one individual of corresponding type and total households in 1974 by age of head*

Age	Males						Total households
	Self/Spouse	Son	Grand-son	Brother	Father	Other	
8-16	78.29	17.83	0.00	41.86	1.55	3.88	129.00
16-24	79.00	56.62	0.46	19.41	3.42	5.48	438.00
24-32	84.40	78.50	0.25	7.37	3.44	4.91	814.00
32-40	88.36	88.99	1.00	3.63	2.88	3.63	799.00
40-48	89.57	87.10	7.97	1.59	1.16	4.49	690.00
48-56	89.19	81.98	23.20	0.23	0.45	4.05	444.00
56-64	90.58	76.30	36.69	0.32	0.32	4.22	308.00
64-72	87.20	62.40	36.00	0.00	0.00	8.00	125.00

Age	Females						Total households
	Self/Spouse	Daughter	Grand-daughter	S. Wife	Mother	Other	
8-16	48.84	17.83	0.00	0.00	65.89	43.41	129.00
16-24	91.10	49.77	0.68	0.23	39.73	19.41	438.00
24-32	98.65	78.99	0.25	0.25	24.57	10.69	814.00
32-40	98.00	84.86	1.00	3.38	12.77	7.88	799.00
40-48	97.25	77.25	8.99	19.57	7.39	7.54	690.00
48-56	95.05	61.94	19.59	38.06	2.48	4.50	444.00
56-64	95.45	41.88	35.06	50.65	0.97	4.87	308.00
64-72	93.60	24.80	33.60	47.20	2.40	4.80	125.00

daughter-in-law, 35.1 per cent contained a granddaughter, and 36.7 per cent a grandson. It should be noted that although the average amount of time any given daughter-in-law spent in her father-in-law's house was relatively short (4.2 years, see Table 1), high fertility made it likely that at least one married son would be present for a substantial proportion of the father's tenure as household head.

Data on the average duration spent in various states by members of a synthetic cohort may also be used to assess changes in the structure of households over time. As is evident from Table 1, the changes were extremely small for males. Conditional on survival to age 72, there was a slight decrease in the time spent as household head (40.52 to 39.81 years), and a corresponding increase in the time spent in the 'Other' category. The difference at age 56 was even smaller (0.39 years). For females, changes were somewhat larger. Based on the period rates, women aged 72 would have experienced 1.60 more years as a daughter or granddaughter, and correspondingly less time as a head/spouse or daughter-in-law.

The absence of a strong change over time in the composition of households is interesting in the light of the debate about the possibility that economic change can have strong adverse effects on the ability of households to live jointly.¹⁵ Although eight years is a relatively short period in which to look for possible changes in residence patterns, this result is consistent with other empirical studies examining intertemporal variation in household structure in South Asia as well as those examining regional variation.¹⁶

¹⁵ See the discussion in Caldwell, *loc. cit.* in fn. 1, pp. 216-217.

¹⁶ See, e.g. H. M. Orenstein, 'The recent history of the extended family in India', *Social Problems*, 18 (1961), pp. 341-350; P. D. Frenzen and B. D. Miller, 'Regional variations in household formation in rural India', manuscript presented at the Population Association of America meeting in Chicago (1987); and P. M. Kolenda, 'Region, caste and family structure: A comparative study of the Indian joint family', in M. Singer and B. S. Cohn, eds., *Structure and Change in Indian Society* (Chicago, 1968), pp. 339-396.

With regard to the common perception that families are changing, Caldwell *et al.* conclude 'most people believe that families are changing even when their structure is not'.¹⁷

In any case, the overall perspective that emerges from this analysis is consistent with other discussions of household structure in rural Bangladesh:¹⁸ young men continue to live with their parents for some time after marriage, and even after having had children. Although it might be argued that the average duration spent as a grandchild was too short to be meaningful, it should be noted that these average levels may obscure considerable heterogeneity in the amount of time spent after marriage in the husband's parents' household. Indeed, if we assume that children were only found in their grandparents' household when they were born into that household, we may use the fact that 22.0 per cent of children aged 0 were grandchildren of the household head to determine that the average time spent as a grandson, among those spending part of their life as a grandson of the head, was 8.7 years. A better understanding of this underlying heterogeneity may be gained by examining the causes of household partition: the circumstances under which a given household was split into two or more sub-households.

IV. THE CAUSES OF HOUSEHOLD PARTITION

In order to carry out a study of household partition with these data, a number of methodological issues must first be resolved. The main problem is that although the study population was followed continuously over the relevant period, information on household partition was not recorded directly. Instead, this information must be inferred from changes in relationship to head of household. Specifically, in the subsequent analysis I assume that a household partition took place if two individuals enumerated in a given household in 1974 were observed to be household heads in 1982. While there are circumstances which could make such an interpretation inappropriate, given the patterns of household residence and the rules of headship in rural Bangladesh, it provides a useful operational rule.

While this simple rule is useful in many cases, it presents a problem at the individual level for households in which the household head in 1974 was no longer a household head in 1982. Consider a household in which there were a father and two sons in 1974, the father died before the Census of 1982, and the two sons were found in separate households at that time. In these circumstances it may be argued that only one partition took place: one son simply inherited a household from his father. It is, therefore, necessary to determine which of these sons headed a new household, and which headed the inherited household. This was done according to the following rules: (1) if the original head was still in the study area and lived in the household of one of the new heads, then that new head was assumed to have inherited the household; (2) if the original head was no longer in the study area, then the oldest new head was assumed to have inherited the household.

This procedure can be clarified by examining transition probabilities for male non-heads between 1974 and 1982. Individuals of this type could have experienced six types of transition over this period. If such an individual did not remain a non-head in some household in the study area, he could have inherited headship from a head who was still in the study area, inherited headship from a head who was no longer in the study area, experienced partition from a household in which the head was still in the study area,

¹⁷ Caldwell *et al.*, *loc. cit.* in fn. 1, p. 218.

¹⁸ See, e.g. M. Cain, *loc. cit.* in fn. 4, pp. 421-425.

experienced partition from a household in which the head was no longer in the study area, left the study area, or died. The proportion of males of a given age who experienced each of these transitions is presented in Table 4. Note that these measures represent the

Table 4. *Status in 1982 of male non-heads in 1974 (row percentages sum to 100)*

Age	Migrated	Died	Partition Head's status:		Inheritance Head's status:		Still non-head	N
			Gone	Present	Gone	Present		
0-8	4.50	4.65	0.00	0.00	0.11	0.00	90.73	2,731
8-16	15.31	1.38	0.75	1.51	2.73	0.96	77.32	2,377
16-24	28.02	1.23	2.60	10.13	7.74	4.20	46.05	1,381
24-32	17.85	1.88	8.08	18.04	14.47	4.51	35.15	532
32-40	15.21	3.80	11.95	20.65	14.13	6.52	27.71	184
40-48	13.88	2.77	8.33	16.66	30.55	5.55	22.22	36
48-56	20.00	30.00	0.00	10.00	20.00	10.00	10.00	10

distribution of individuals by their status in 1982, rather than the average number of transitions they experienced during the intervening years.

Table 4 suggests that there was considerable variation in the timing of household partition. Based on these estimates, the probability of partitioning a household between 1974 and 1982, conditional on not migrating out, dying, or inheriting a household was 0.0305 for individuals aged 8 to 16, 0.217 for individuals aged 16 to 24, 0.426 for individuals aged 24 to 32, and 0.541 for individuals aged 32 to 40. The high rates of partition between ages 24 and 40, coupled with the substantial proportion of male non-heads who inherited a household or migrated, ensured that there were relatively few male non-heads by the age of 40, as is also evident in Figure 1. It should also be noted that most partitions took place while the original head was still present: there is little evidence that partition was delayed until the death or departure of the original household head.

A third interesting feature of Table 4 is the fact that a large fraction of male non-heads migrated out of the study area during the relevant period. For example, among those aged 8 to 16 in 1974, 15.3 per cent had migrated and 12.7 per cent had experienced a partition by 1982. The fact that a large proportion of non-heads chose to migrate sheds new light on the finding that there were relatively few changes in the distribution of relation-to-household-head measures between 1974 and 1982. If these individuals had not migrated, there is every reason to believe that a larger change would have been observed; these individuals would have either had to set up separate households or chosen to live with parents or siblings. In the former case the synthetic-cohort measures would show an increase in the average amount of time spent as a household head, and in the latter an increase in the amount of time spent as a son or daughter-in-law.

In addition, the importance of migration complicates the analysis of household partition because it is not clear whether migration should, in fact, be distinguished from other changes in household residence. There are two problems with not making this distinction. First, although migrants live in a different household from that of their previous household head, we cannot establish whether they have, therefore, become household heads, a key criterion used to define household partition. Secondly, there are important factors that affect the desire to migrate that are not relevant in the context of other forms of household partition: for migrants, the decision to leave the household will be influenced by the availability of better employment, the desire to further his or

her education, or other factors which might make it desirable to live in another region. For household partitions as defined above, however, there was very little in the way of spatial relocation.

This latter point is illustrated in Table 5 which shows the proportion of male non-heads who did not die, migrate, or inherit a household according to whether the partitioned household and the household of origin were in the same *bari*, in the same village but not the same *bari*, or outside of the village (but by definition within the study area). The *bari*, which is a common feature of rural Bangladeshi life is '... a cluster of houses usually around the common yard accommodating families whose heads are related by blood or affinal connections. The *bari* members usually co-operate with each other, in particular in crisis.'¹⁹ As is evident in Table 5, except for those who left the

Table 5. *Location in 1982 of male non-heads in 1974 as a percentage of those who did not die, migrate, or inherit a household (row percentages sum to 100)*

Age in 1974	Partition: destination			Still non-head	N
	<i>Bari</i>	Village	DSS Area		
0-8	0.000	0.000	0.000	100.000	2,478
8-16	2.748	0.106	0.000	97.146	1,892
16-24	20.567	0.493	0.616	78.325	812
24-32	41.104	0.920	0.614	57.362	326
32-40	52.252	0.901	0.901	45.946	111
40-48	47.059	0.000	5.882	47.059	17
48-56	50.000	0.000	0.000	50.000	2

study area, the vast majority of individuals who left their 1974 household to set up a separate household did so in close proximity to other household heads who shared the same household in 1974.

It therefore seems necessary to distinguish migration from other forms of household partition. Although perhaps the most appropriate mechanism for dealing with this problem is to estimate a general model which allows for partition, migration, inheritance, and death, in this paper I examine the probability of household partition conditional on not migrating, inheriting a household, or dying. This approach allows me to focus on a relatively narrow set of issues. Specifically, it provides a cleaner picture of the relative benefits of joint and separate residence in the absence of spatial relocation.

Analysis of the determinants of household partition was carried out at two levels. The first involved an analysis at the household level: logistic regression was used to examine the effects of different characteristics on the probability of household partition. Explanatory variables include the survival status of the original head in 1982, the number of individuals in each of 12 relationship-to-head groups (the same groups as were used in Figures 1 and 2) in the household, and three variables thought to be correlated with household wealth: the number of types of items owned (including radios, watches, quilts, and lamps), the number of cows owned, and whether the household receives remittances. Estimates appear in Table 6, Model 1.

Three basic features are worthy of note. First, the absence of the original head had a weak negative effect on the probability of household partition. At least from this perspective, there is little evidence that the death of a household head was likely to lead to household partition. Note, however, that from the perspective of the household, the

¹⁹ Caldwell *et al.*, *op. cit.* in fn. 3, p. 36.

Table 6. *Effects of demographic characteristics and household composition on the risk of household partition between 1974 and 1982*

	Model 1 Household logit		Model 2 Individual logit		Model 3 Individual logit with household variables		Model 4 Individual logit with household fixed effects	
	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Relation to head (son is reference)								
Grandson			-0.115	0.232	-1.09	1.89		
Brother			1.93	11.3	4.19	9.33		
Other			-0.166	0.426	0.141	0.287		
Age (8-16 is reference)								
16-24			1.98	11.9	1.99	11.5	2.97	3.85
24-32			2.13	9.40	2.12	8.72	4.16	4.19
32-40			1.90	5.96	1.83	5.42	2.23	1.65
Married			1.15	6.00	1.04	4.60	1.12	1.50
Sons			0.082	0.644	0.008	0.049	0.191	0.798
Daughters			0.306	2.05	0.135	0.797	1.30	1.87
Head gone		0.939	1.45	9.45	1.36	8.34		
Household composition								
Males								
Head/spouse	474	1.61						
Sons	0.299	6.69			0.011	0.31		
Grandsons	0.180	1.85			0.021	0.423		
Brothers	1.23	9.06			0.149	1.61		
Father	0.352	0.981			-0.755	3.95		
Others	0.597	4.19			0.105	0.251		
Female								
Head/spouse	0.841	3.21			0.150	1.07		
Daughters	0.083	1.48			1.13	4.05		
Granddaughters	0.400	3.79			-0.023	0.366		
Sons' wives	1.35	10.1			0.363	3.60		
Mother	0.573	3.18			0.333	2.46		
Others	0.337	3.26			-0.009	0.035		
Owned items	-0.146	1.69			-0.068	0.581		
Cows	-0.088	2.14			-0.365	4.01		
Remittances	-0.377	2.07			-0.184	4.51		
Log-likelihood	-969.21			-871.76				-29.06
Observations	3806			3154				119

death of a household head may have two effects: although the household head is no longer around to hold the household together, thus leading to an increase in household partition, the departure of the head leads to the inheritance of headship, thus reducing the probability of household partition, given the definitions used above. This ambiguity can be removed through an individual-level analysis as I will show below.

Secondly, increases in each relationship-to-household-headship group increase the probability of household partition, with the effect being especially large in the case of brothers and daughters-in-law. Neither of these results is surprising: larger households should be more likely to experience partition, particularly if these households contain individuals who are likely to become household heads (or spouses of heads) themselves. More surprising is the fact that the effects on household partition for grandsons and granddaughters seem to differ somewhat. While an additional granddaughter leads to an increase of 0.400 ($t = 3.79$) in the predicted log-odds of household partition an additional grandson leads to an increase of only 0.180 ($t = 1.85$). While the large standard errors make it impossible to reject the hypothesis that the coefficients are equal at conventional significance levels, the P -value of 0.164 is suggestive. I will return to this point shortly.

Finally, the three wealth measures are negatively related to household partition. As has been argued before, but not convincingly demonstrated, household partition was less likely in wealthier households, when the size and composition of the household is controlled for. These controls are likely to be of some importance because, as a result of the lower rates of household partition, wealthier households were likely to be larger, and thus might appear to be more likely to split if controls for household size and composition were not introduced.

Some of the problems associated with the interpretation of the household-level data can be avoided by considering an individual-level analysis of household partition which is focused on the probability that an individual who was not a household head in 1974 and did not inherit a household, migrate out, or die by 1982 became a household head in 1982. Because few women, old men, or children were observed to set up separate households, and since the conditions under which such individuals did, in fact, become new household heads are likely to be different from those faced by young men, the analysis was restricted to men aged 8–40 in 1974.

Estimates from three different individual-level models are presented in Table 6. Model 2 explores the effects of individual-level characteristics on partition including relationship to household head in 1974, age, marital status, and the number of co-resident sons and daughters in 1974.²⁰ Model 3 also includes the household composition and wealth measures that were used in the household-level analysis. Finally, Model 4 controls for household-level fixed effects, and is based only on those households in which there were at least two eligible males in 1974 and in which the original household head was still present in 1982.²¹ This approach has the advantage of removing possible biases arising from the fact that unmeasured household variables such as landholdings may affect both individual characteristics (such as marital status) and the probability of setting up a separate household.

²⁰ Because contraceptive prevalence was very low at this time, it seems reasonable to take the number of children in the household as exogenous, particularly during the early stages of family formation.

²¹ The fixed-effects logit procedure is discussed in G. Chamberlain, 'Analysis of covariance with qualitative data', *Review of Economic Studies*, 47 (1980), pp. 225–238. I restrict the analysis to households in which the original head was still present in 1982 in order to avoid problems of interpretation arising from the assignment of inheritance for cases in which the original head was absent. Relationship variables were excluded from Model 3, because, in the vast majority of cases that met the other criteria, all males in the same household in 1974 had the same relationship to head in that period.

A number of patterns emerge. First, there are two items of evidence that suggest that household partition was tied to the death of the father or patriarch: (a) individuals who were brothers of the household head were more likely to set up separate households than were sons of the head (the reference category) and (b) partitions were much more likely in households in which the original household head had died or migrated out by 1982. As suggested above, the negative coefficient in the household-level analysis may be attributed to the fact that the death of a household head was likely to lead to an inheritance, and thus reduce the probability that a partition would take place when viewed from the perspective of the household.

Secondly, the effects of the family-status variables (marital status, the number of sons, and the number of daughters) are consistent with the results of the household-level analysis. In order to interpret these coefficients it is helpful to convert the estimated coefficients into relative risks. Recall that the conditional probability of partitioning a household for an individual aged 24–32 was 0.426. Using this figure as a base and the coefficients from Model 4, one may conclude that marriage increased the probability of partitioning a household by 26.1 per cent. The corresponding figures associated with having one son and one daughter are 5 per cent and 29.2 per cent, respectively.

Although, as was the case with the grandson–granddaughter coefficients in Model 1, one cannot reject the hypothesis that the coefficients on sons and daughters are the same, the notion that boys and girls might have had different effects on the probability of household partition is of some interest. In Bangladesh, the economic contributions of male and female children to the household differ significantly, and there are differences in the educational attainment, medical treatment received, and mortality of girls and boys.²² The dowry costs associated with marrying a daughter might also be significant, particularly given the substantial growth in the number of young women of marriageable ages during the study period (see Figure 2). In this light one might speculate that boys were more likely to contribute to the well-being of other household members than girls, and were thus less likely to lead to feelings of ill-will that threaten the stability of the joint threshold.

V. EFFECTS OF HOUSEHOLD PARTITION

While the above analysis provides evidence that there were systematic differences in the timing of the household partition, it does not tell us anything about how important these differences are. Because the vast majority of household partitions took place into the same *bari*, it is questionable whether household partition is of any behavioural significance at all. Perhaps the *bari*, and not the household, is the appropriate unit of analysis for decision-making in rural Bangladeshi villages.

In order to test this proposition, I again made use of the longitudinal character of the data to reconstruct partitioned households. In particular, I traced all households whose heads in 1982 lived in the same household in 1974. These ‘linked’ households were then used to test a simple proposition that can be derived from a neo-classical household model: if household partition is of no behavioural significance, then decisions about resource allocation should not depend on the resources available to a particular household, only to the households considered as a whole.²³ On the other hand, if

²² M. Cain, ‘The economic activities of children in a village in Bangladesh’, *Population and Development Review*, 19 (3) (1977), pp. 201–227 and L. Chen, E. Huq, and S. D’Souza, ‘Sex bias in the family allocation of food and health care in rural Bangladesh’, *Population and Development Review*, 7 (1) (1981), pp. 55–70.

²³ G. S. Becker, *A Treatise on the Family* (Cambridge, 1981), pp. 175–176.

Table 7. *Within bari analysis of educational attainment*

	Model 1 ML with linked-household characteristics and combined-household random effects $N = 226$		Model 2 ML with combined-household fixed effects $N = 226$	
	Coefficient	t -ratio	Coefficient	t -ratio
Age	0.165	3.82	0.175	3.02
Male	0.257	1.38	0.291	1.25
Grandchild	-0.714	3.81	-1.12	5.67
Own household				
Land	0.024	2.98	0.036	2.93
Education of head	0.078	4.01	0.028	0.974
Males 8-16	-0.121	1.37	-0.074	0.590
Females 8-16	-0.109	1.18	-0.165	1.57
Linked household				
Land	0.011	1.95		
Education of head	0.048	2.39		
Males 8-16	-0.042	0.557		
Females 8-16	0.072	0.868		
Resid. Covariance	0.131	1.37	0.245	2.46
Tests	Stat.	P -value	Stat.	P -value
GOF (χ^2_{18}, χ^2_{15})	15.02	0.660	12.11	0.671
No links (χ^2_4)	9.89	0.042		
No own eff. (χ^2_4)	28.32	0.000	11.66	0.020

partitioned households are completely separate economic units then resource allocation within a given household should depend only on the resources available to that household, not on the resources available to the other households.

To construct such a test it is necessary to identify some consumption good which has three features. First, it cannot be a pure public good from the perspective of the linked households. Access to tubewell water, for example, would not help in distinguishing the relative independence of different households, unless households within the same *bari* could be excluded from the use of that water. Second, there must be significant differences in terms of choices made by different households. If, for example, everyone chose to live in houses of the same size regardless of wealth, this measure could not be used to construct the desired test. Thirdly, there should be relatively little heterogeneity in the consumption of the good within households by individuals of similar types. This feature provides a mechanism for distinguishing between intra- and inter-household allocation decisions.

The educational attainment of children seems to meet all these criteria. There was substantial variation in the extent of schooling for children in this population: the average number of completed years of schooling for children aged 8 to 16 in 1982 was 1.069 with a standard deviation of 1.662. Furthermore, it seems at least plausible to argue that individuals will care more about the education of children in their own household than for that of children in neighbouring households, and that children within a given household will receive similar levels of education when age and sex are controlled. For example, a grandfather with two sons might see the education provided to each of his grandsons as complementary; thus if the grandfather is the household's decision-maker, equal education will be provided for the children, if they live in the same household. If each son sets up a separate household, however, differences may emerge in the educational attainment of the grandchildren depending on the relative

wealth/ability of their fathers, as well as on the number of other grandchildren in the same nuclear family. Finally, it is worth pointing out that educational attainment is a subject of substantive interest in its own right.

Table 7 presents estimates of reduced form decision rules which express educational attainment for children aged eight to sixteen years as a function of the characteristics of the child, the characteristics of the child's household, and the characteristics of a linked household.²⁴ The specific characteristics considered are the land ownership of the household, the education of the head, and the number of males and females aged 8–16 in the household.

Model 1 examines the proposition that, controlling for own-household characteristics, linked-household characteristics did not affect the educational attainment of a child. Under the null-hypothesis that decisions about resource allocations in one household were not affected by the land endowment and other attributes of the linked household, the coefficients on the characteristics of the linked household should equal zero.

The hypothesis of no linked-household effects is rejected at the five per cent level ($P = 0.042$). An increase in land ownership and in the education of the head in the linked household both increased the level of education of a given child, although these effects were weaker than the corresponding own-household effects. While this result is consistent with the hypothesis that recently partitioned households retained significant economic ties, it is not completely convincing: these results could be attributed to the fact that some education may have been provided during the period when the linked households were still co-resident, or to the fact that linked-household characteristics may have been correlated with unmeasured own-household characteristics.

Model 2 provides a test of the hypothesis that the linked households behaved like a single decision-making unit. In particular, I examine whether own-household characteristics affected the educational attainment of a child, net of a combined-household fixed effect. The resulting coefficients on the own-household variables may be thought of as the difference between the effect of a unit increase in an own-household characteristic and the effect of a unit increase in the corresponding linked-household characteristic. If, for example, the educational attainment of a child depended on the combined landholdings of the two households, but not on the distribution of landholdings, then a unit increase in land would have had the same effect on education regardless of which household were allocated that land; the corresponding coefficient in Model 2 would thus be zero.

Table 7 shows that the hypothesis of no own net effects is rejected ($P = 0.020$). Specifically, the coefficient on own land ownership is significant and positive, when the combined-household fixed effects are controlled. Interestingly, the number of children in the household is negatively related to educational attainment with the effect of girls being somewhat larger than that of boys, controlling for the sex of the child of interest.

The fact that the distribution of resources between linked households is related to the educational attainment of children in those households does not prove that household

²⁴ Results presented in Tables 7 and 8 are estimated by fitting the data covariance matrix to the theoretical variance-covariance given the structural model. Under the assumption that errors are normally distributed the estimates are maximum likelihood; however, the estimates remain consistent under other distributions. The reported *t*-ratios are robust to mis-specification of the distribution of errors, a correction which is important because a substantial proportion of the children have zero years of education, and thus it is difficult to justify the assumption that the errors are normally distributed. Both Model 1 and Model 2 assume the presence of an error component that is common to each pair of linked households. Model 1 assumes that this effect is uncorrelated with the regressors and thus may be thought of as a random-effects regression. Model 2 drops this assumption, and thus may be thought of as a fixed-effects regression; because regressors are allowed to be correlated with the fixed effect it is only possible to identify the difference between the effects of own-household and linked-household regressors.

partition, as defined in this paper, is of behavioural significance. It is further necessary to establish that unpartitioned households behaved in a different fashion from partitioned households. Table 8 presents results for an analysis similar to that presented

Table 8. *Within household analysis of educational attainment*

	Model 1 ML with linked-family characteristics and household random effects $N = 152$		Model 2 ML with household fixed effects $N = 152$	
	Coefficient	t -ratio	Coefficient	t -ratio
Age	0.424	7.62	0.448	7.82
Male	0.065	0.192	0.227	0.634
Grandchild	0.307	1.54	-0.616	2.34
Own family				
Sons	-0.064	0.350	-0.320	1.29
Daughters	0.193	0.705	-0.130	0.388
Education of father	0.090	3.09	-0.003	0.064
Father absent	-0.396	1.69	-0.296	1.07
Linked family				
Sons	0.261	1.42		
Daughters	0.416	1.95		
Education of father	0.069	2.43		
Father absent	-0.140	0.557		
Resid. Covariance	0.395	1.95	0.885	3.37
Tests	Stat.	P -value	Stat.	P -value
GOF (χ^2_{18}, χ^2_{15})	25.97	0.100	22.41	0.098
No links (χ^2_4)	20.00	0.000		
No own eff. (χ^2_4)	19.40	0.001	3.30	0.508

in Table 7 which is focused on jointly resident families, where families are defined as groups of children in a larger household with the same mother. In this analysis, four distinguishing features of each family are included: the number of male and female children, the education of their father, and a dummy variable which identifies children who were not co-resident with their fathers in 1982. Because most of these children lived with currently-married mothers, the absence of fathers can usually be attributed to migration for reasons of employment.

In Model 1 the hypothesis of no linked-family effects is strongly rejected ($P = 0.000$). This result seems to be driven by the effect of father's education: the presence of educated fathers in a household is associated with higher education of his own children, but also with higher education of children with other mothers in that same household. It should be noted that some of the same caveats discussed in the context of Model 1 of Table 7 apply here as well.

The fixed-effects estimates (Model 2, Table 8) provide a marked contrast with the estimates from Table 7. Specifically, the hypothesis that the own-family net effects are zero is not rejected. Thus there appears to be a difference between the behaviour of joint households on the one hand, and recently-partitioned households on the other. While this result is interesting, it should be noted that relatively few households contained at least two children aged 8-16 with different fathers, and also that household-level characteristics (such as landholdings) cannot be used to distinguish sub-households.

One further caveat arises from the evidence that grandchildren were disadvantaged relative to children with other relationships to the head (primarily sons) when it comes to educational attainment, even when these children were co-resident. Specifically,

controlling for age and sex a grandchild had, on average, 0.6 fewer years of education than a son of the head (Table 8, Model 2). An even larger effect (1.07 fewer years) arises in a comparison of children in partitioned households with different relations to their respective heads (Table 7, Model 2). In addition to suggesting that household heads may care more about the education of their own sons than about that of grandsons, this result is at least consistent with the notion that disagreement over the schooling of a grandchild is one factor that contributes to household partition.

VI. CONCLUSION

Although the above analysis has provided new insights into some old issues (the effect of wealth and a father's death on household partition), and introduced some new ones (the timing of household partition was affected by the sex-composition and number of children in the household), the main purpose of this paper has been to provide a more complete understanding of how household structure interacts with economic and demographic behaviour in a rural developing economy.

A number of conclusions emerge. First, variation in household structure is largely determined by differences in the timing at which sons set up separate households. While this departure often happens some time after a son has started a family, there is little evidence of extended joint residence of brothers or other similar arrangements after the death of their father. Secondly, sons leave their parent's home in one of two ways: they migrate, or set up a separate household in the same area. Thirdly, household partitions are more likely in households with more daughters, and, to a lesser extent, more sons. As a result, as suggested earlier, estimates of the effects of joint residence on fertility may be biased if heterogeneity in fecundity is not controlled for. Fourthly, sons who set up households near their households of origin enjoy at least some autonomy. The distribution of resources within the linked households matters. Fifthly, the distinction between a joint household and a group of linked households seemed to lie in the ability to accommodate inequality among family sub-units. The results presented here suggest that in joint households, members are treated equally (characteristics of the family did not affect education net of a household fixed effect), but that recently partitioned households admitted some inequality (characteristics of the household affect education net of a linked-household fixed effect). It seems that household partition provides a mechanism for retaining some of the benefits of living in close proximity while avoiding conflicts associated with the allocation of resources in joint households.