Lineage Networks and Intrahousehold Resource Allocation

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Abstract

A large number of studies of intra-household behavior in developing countries demonstrate that more resources are allocated to children when mothers have more bargaining power relative to fathers. The most widely held interpretation of this finding is that women care more about the well-being of children than men. In this paper, we demonstrate that these findings are consistent with household behavior in lineage systems where men care about an expanded set of children than women. In most of low income societies, men usually play an expanded role in the lineage and their properties often descend to children outside of own household. This raises the possibility that care for the well-being of other children in the lineage dilutes the impact of men's resources in the household. Using a cooperative bargaining framework we derive testable implications and proceed to the test by taking advantage of differences in lineage systems in order to deal with unobserved heterogeneity. We could not reject an hypothesis of equal parental income effects when fathers do not have siblings and find evidence for lower effect of men's income in the household when there are possibilities of fathers input into lineage children . Taken together, the results suggest that the scope of policies targeting a specific gender as recipient of a given benefit may be very narrow when inter-household resource sharing in lineage networks is taken into account.

1   Introduction

Using data from a variety of sources, various empirical tests of income pooling have rejected the unitary household model emphasizing common preference and established existence of differential tastes among household members (Phipps & Burton (1992), Hoddinott & Haddad (1995), Haddad & Hoddinott (1994), Pitt, Shahidur & Khandker (1998), (Thomas 1990)). This development has brought about the growth of a number of household models in which household demand emerges from a bargaining framework; the higher the relative bargaining power of a member, the more household demand reflects the preferences of that member. In particular, a section of this literature examining investment in children summarized in Strauss & Beegle (1996) finds that more resources are allocated to children when mothers have more bargaining power. Although this finding lends itself to various interpretations, the simplest and perhaps most widely held interpretation is that women care more about child well-being than men. This interpretation suggests, in effect, that policies which reallocate resources toward women are beneficial to child well-being.

In providing a basis for this behavior, Eswaran & Kotwal (2004) suggests that sex differences in altruism toward children could arise from the crucial asymmetry that exists between men and women in terms of childbearing capacity: while men have an almost unlimited capacity to sire (father) children, females are relatively limited in their capacity to bear them. They argued that female altruism toward children will be stronger than that of male, and the extent of disparity between their altruism levels will be influenced by the relative importance of their inputs into children, the degree of substitutability of their inputs and the scarcity of resources.

An alternative interpretation of the results attributed to household's "separate spheres" by Lundberg & Pollak (1993) is that women specialize in the provision of child goods while men specialize in the provision of other goods in the household in a model where traditional gender roles and expectations define equilibrium allocation of resources in marriage, rather than the threat point of divorce as emphasized in other cooperative household models such as those presented in Manser & Brown (1980).

The general approach to decision-making in this literature views investment in children as decision of *independent* two-person households that fully bear the costs and solely reap the benefits of children, taking income and a set of prices as given. However, several

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features of household formation, residence and resource sharing within family groups in many social contexts in developing countries render the two-person bargaining approach rather unsustainable characterization of households.

First, extended households are the rule rather than the exception in most developing societies. Joint residence of a large number of adults implies integration of decision-making by the constituent conjugal units to some extent within the household. Households tend to rely on one another for livelihood through exchange of physical and human resources within lineage and descent groups. Second, and in most societies, children are *public* goods in the lineage as they are viewed as perfect substitutes in the provision of labor, financial security in old age and in enhancing lineage economic and social network (Fapohunda & Todaro 1988). One particularly important feature of lineage groups is that whereas women's properties descend usually to their children, men's properties descend to children in the lineage. This may arise in part from common property rights in productive assets in those societies. If parents display altruism toward children to whom they will bequeath their property, then men's altruistic behavior will extend to children in the lineage.

In this paper, we argue that the reduced effects of men's altruism in the household obtained in this literature is consistent with common preferences over child well-being but understatement of men's altruism by focussing on the bounded household. In other words, rather than caring less about children, our approach implies that lower effects of father's resources compared to mother's effects reflects dilution of men's resources by other children in the lineage.

Our approach in this paper is consistent with Wilson (1978)'s genetic viewpoint. He argues that whereas women possess recognizable parameters of genetic interests and will tend to display altruism more readily within the household, men have a wider range of possible and unverifiable progeny, and therefore will have greater interest in contributing to the well-being of the social unit as a whole.

Lacking detailed data on other households and children in the lineage, our empirical tests are rather indirect. We test the effects of local co-residence and resources of siblings of parents using data from a multi-purpose household survey conducted in rural Bangladesh and Indonesia. The empirical approach involves estimating the effects of gender-specific lineage resources, conditional on household resources, on the quality of

children in the sampled households. To overcome the econometric challenge posed by family-level heterogeneity, we compare the results obtained from patrilineal systems in Bangladesh with similar estimates from family systems in Indonesia where contrasts with the Bangladesh system suggest different sets of implications.

Our tests show that the presence of father's brother's household in the same village raises the quality of children in the household but reduces the effect of men's resources in the household in the patrilineal settings in Bangladesh. We do not find such effects for his sisters and neither do we find effects for either male or female siblings of the wife. We shed light on this result by examining the effects of siblings resources on child quality, and find that father's brothers' resources raise the quality of children. On the other hand, it is the mother's sister's resources that raise the quality of children in family systems with matrilineal or matrifocal orientation in Indonesia. Our results suggest that differences in intrahousehold resource effects may be generated by differences in altruism sets rather than altruistic differences between parents.

2   Conceptual Framework

We introduce and analyze a simple model of cooperative bargaining in altruistic networks where children are public goods in the lineage. This characterization of children seems plausibly suited to describing the cultural patterns of child-rearing in extended families in most areas of low income countries. A vast amount of literature suggests that this pattern of child-rearing is aimed at sustaining dynastic links between households, perpetration of the lineage group, provision of old-age consumption for the elderly, and provision of cooperative farm labor for agricultural production on lineage farms. Despite their public good nature however, children draw a contrast with lineage-based property such as farmland[1] in the sense that they are offsprings of particular parents in the lineage who naturally hold private parental rights over them. Overall, this characterization implies that children are imperfect public goods in the lineage.

Adults expecting support from non-biological children may invest in the quality of those children. In addition, parents may choose to invest in other children in their lineage

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[1]Due mainly to lack of private property rights, most landed properties are often owned by lineage groups and are allocated to members for productive use. Such rights of usage are usually not transferrable.

for reciprocity purposes. Since parents care about the welfare of their own offsprings, they may expect reciprocal behavior toward them when faced with shocks in the future depending on their own current behavior toward other children. In other words, current investment in other children is reciprocated by investment in own children in future.

2.1   Model

In order to capture the basic elements of the system, consider two households indexed by i and j in a dynastically linked lineage network where marriage is exogamous. For the moment, we consider lineage systems where inheritance and kinship pass along male genetic lines where brothers' wives are typically genetically unrelated[2]. Later, we will discuss the theoretical implications of other lineage systems where inheritance passes along the female line. Each household comprises a husband, wife and one child. Household income y_i which is subject to productivity shocks is separable into husband's income y_i^h and wife's income y_i^w. We abstract from gender of children in this model by assuming that in adulthood, men and women are equally likely to care for old-age parents through resource transfers.

Utility derived from children is transferrable between brothers but not between their wives. Parents' utility defined over a composite consumption good (c) and quality of children (q) are

$$(2.1) \qquad U_i^h = U_i^h(c_i, q_i, q_j) \quad and \quad U_i^w = U_i^w(c_i, q_i)$$

where q_i is quality of own (biological) child and q_j is quality of the kin child, and $\gamma_i > 0$ is an altruism parameter measuring how the husband in household i cares about his brother's child. Parents' utilities are separable in consumption and child quality, and utility over each commodity is identical for both parents. Using smooth utility functions, the respective utilities are

$$(2.2) \qquad U_i^h = u(c_i) + v(q_i) + \gamma_i v(q_j) \quad and \quad U_i^w = u(c_i) + v(q_i)$$

where u and v are well-behaved utility functions. Child quality is produced according to

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[2]Although there are cases of brothers marrying wives from the same lineage in patrilineal settings, this is less common. If links established through marriage help to diversify risk (Rosenzweig & Stark 1989), then it is optimal that sons marry wives from different lineages.

an increasing and concave production function $q_i = q(x_i)$ that has as inputs the level of market goods x_i allocated to that child.

Our discussion draws from both the cooperative bargaining framework provided by McElroy & Horney (1981) and the intrahousehold framework of Manser & Brown (1980). Following our assumption of common preference among parents, we maintain the assumption of income pooling within the household. In our model, while brothers bargain cooperatively over resource allocation across households, each of them offers an allocation that is sufficient to induce his wife to accept.

2.2 Autarchic Households

When households are in autarchy and there is no bargaining between brothers, each husband maximizes his utility subject to the household budget constraint and to his wife's reservation utility constraint. For given values of exogenous income and prices, the wife's reservation utility is determined, and there exists a unique set $\Phi_i = \{c_i, q_i, \mu_i\}$ that maximizes his utility, where μ_i is the lagrange multiplier relating to the wife's utility constraint. Household demand equations have the usual neoclassical property that only the pooled household income matters. Let the indirect utility attained in autarchy be $V_i^0(y_i)$, where y_i is the pooled household income under the control of the husband.

2.3 Bargaining Households

In the case where brothers cooperatively engage in child rearing, utility of brother in household i is $U_i(c_i, q_i, q_j, \gamma_i, \theta_i)$ where θ_i summarizes a set of household characteristics including the wife's reservation constraint. We assume that brothers choose the level of input into both children (x_i, x_j) to maximize the "utility gain *product* function"

(2.3)
$$N = [U_i(c_i, q_i, q_j, \gamma_i, \theta_i) - V_i^0(y_i)][U_j(c_j, q_j, q_i, \gamma_j, \theta_j) - V_j^0(y_j)]$$

subject to the lineage budget constraint

(2.4)
$$y_i + y_j \geq p(x_i + x_j) + c_i + c_j$$

where the prize of child inputs p is equal for both children. Using the specifications of the utility functions in (2.2), taking the first partial derivatives of the Lagrangian and setting

these to zero provides conditions necessary for a maximum. In particular, the conditions imply

(2.5) $\quad [U_j - V_j^0]v'(q_i)q_i' + [U_i - V_i^0]\gamma_j v'(q_i)q_i' = [U_j - V_j^0]\gamma_i v'(q_j)q_j' + [U_i - V_i^0]v'(q_j)q_j'$

Solving equation (2.5) and making the substitution that $MU(x_i) = v'(q_i)q_i'$, the first order conditions provide a set of restrictions on the ratio of marginal utilities of inputs allocated to children,

(2.6) $\qquad R(x) = \dfrac{MU(x_i)}{MU(x_j)} = \dfrac{G\gamma_i + 1}{\gamma_j + G} \quad where \quad G = \dfrac{U_j - V_j^0(y_j)}{U_i - V_i^0(y_i)}$

is the "utility gain $ratio$ function".

Observe that if brothers only pool resources in the lineage but children are purely private goods in each household ($\gamma_i = \gamma_j = 0$), equation (2.6) reduces to

(2.7) $\qquad R(x) = \dfrac{MU(x_i)}{MU(x_j)} = \dfrac{U_i - V_i^0(y_i)}{U_j - V_j^0(y_j)}$

which is the general restriction applicable to the two-person allocation problem where an increase in one agent's income results in increase in his relative consumption. In this case, increase in a brother's (household) income leads to increase in investment in his own child.

On the other hand, if children are perfect public goods in the lineage ($\gamma_i = \gamma_j = 1$), equation (2.6) reduces to

(2.8) $\qquad R(x) = \dfrac{MU(x_i)}{MU(x_j)} = 1$

in which case allocations to children in the lineage are invariant to changes in household income. Although the utility gain ratio G increases if y_i^h increases, this increase does not translate into a decrease in the marginal utility of quality of child i relative to child j. Each child receives equal allocations in the case of positive income shocks in either household and equal reduction in inputs in the case of negative income shock in the lineage. An equivalent and equally important implication is that shocks to men's income would have less effect on their own household as they are partly absorbed by other household in the lineage.

When children are imperfect public goods, the extent to which an increase in y_i^h affects child investments depends on the degree of altruistic behavior in the lineage. Taking the

partial derivative,

$$(2.9) \qquad \frac{\partial R(x)}{\partial G} = \frac{\gamma_i \gamma_j - 1}{(\gamma_j + G)^2} \begin{cases} < 0 & \text{if} \quad \gamma_i \gamma_j < 1 \\ = 0 & \text{if} \quad \gamma_i \gamma_j = 1 \\ > 0 & \text{if} \quad \gamma_i \gamma_j > 1 \end{cases}$$

In the first case ($\gamma_i \gamma_j < 1$), either children are imperfect public goods, or preferences are asymmetrical between brothers. Generally, the higher the level of altruism toward other children in the lineage the less of men's income effect is felt within the household, and the more important is lineage income in household demand. The third case ($\gamma_i \gamma_j > 1$) is applicable in family systems where inheritance rules may induce a parent to care relatively more about children outside of the household. This is particularly the case with men in matrilineal lineage systems where inheritance rules stipulate that a man's property be inherited by his sister's children[3].

In general, a woman's property is inherited by her children from whom she expects support in old age. Exogenous increase in a wife's income raises her reservation utility and therefore raises the desired level of child investment in the household. Under the assumption that her reservation utility constraint is not binding ($\mu_i = 0$), the husband in reaction increases his utility by investing in the kin child until the pre-existing relative marginal utility is attained. Thus, exogenous increase in wife's income raises the extent to which the husband invests in the lineage child, and equivalently decreases the fraction of the man's income that is spent in the household. Under the assumption that the wife's reservation constraint is binding ($\mu_i > 0$), an exogenous increase in the wife's income does the opposite, by decreasing the extent to which the husband invests in the lineage child[4].

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[3]In matrilineal societies where inheritance flows through the female line, brothers will display a higher altruism toward their sisters' children relative to their own biological children. While women's property pass to their children, and may also pass to their sisters' children, men's property mainly descend onto children of their sisters, from whom they expect support rather than their brother's children.

[4]The wife's utility function has both consumption and child quality and so an exogenous increase in her income raises her reservation level of both commodities. If her reservation constraint is not binding, implying that existing levels of consumption and child input are above her reservation, further increases in either commodities that she purchases have no effect on the husband's utility. On the other hand, if her reservation utility is binding, conditional on the assumption that consumption and child quality are not interchangeable in her utility, the altruistic husband will raise his level of contribution to the public good until the wife achieves an indirect utility that is at least equal to the new reservation level.

There are a number of implications that follow from this model. First, the more cohesive a family lineage, the more social income matters in child investment in the lineage and individual male income becomes less important in the household. Second, higher income of wives would, on the average, reduce husband's income effects in the household. Third, differences in the bargaining power of wives will affect transfer possibilities within the lineage, and may influence the pattern of joint residence among brothers' households. If brothers who are most likely to honor lineage resource sharing norms are the ones that co-reside, asymmetric changes in bargaining power across households may generate tensions between the co-residing units and induce household split. Fourth, resource sharing across households reduces investment in wealthier households and allows poor households to achieve higher levels of investment than is otherwise attainable in autarchy. This effect becomes pronounced as the level of altruism rises, suggesting that altruistic behavior may diminish intergenerational transfer of inequality in human capital within families.

As an extension, suppose that reservation utilities of the wives in both households are fixed at given levels and remain invariant to changes in income and prices. In autarchy, household demand will have neoclassical property that only total household income matters. In the bargaining framework, it also implies that only the pooled lineage income matters; men will simply allocate resources across households to achieve Pareto-Optimal outcomes in the lineage.

3   Econometric Implementation

The essential empirical finding to be detected in this paper is whether father's effect on own children is lower than for mothers when there are other households in the lineage to which father's altruism may extend. That is, if men expect support from their brothers children but women solely depend on their own children for support in old age, then some fraction of a man's resources should be distributed toward his brothers children, if he has brothers, and thus have lower impact on his own children compared to the impact of his wife's resources.

Detecting lineage effects on resource allocation requires detailed data on measures of income or endowment of parents and children in the lineage, a requirement that is hardly

satisfied by existing data sets. Previous tests of bargaining in households (although not all those tests are conclusive) have used labor income (Phipps & Burton (1992), Hoddinott & Haddad (1995)), non-labor income (Thomas 1990), credit (Pitt et al. 1998) and other measures of individual control over assets. All those data-sets except those used in Pitt et al. (1998) do not collect data on kinship networks.

In terms of measuring bargaining power in households, the intrahousehold literature makes a distinction between income, which is potentially endogenous due to labor supply decisions and the possibility of gender wage differentials; and endowment, which is pre-determined and hence considered a more reasonable measure of bargaining. In order to avoid endogeneity of income and wealth, a number of studies have used education to measure parental resources (see Thomas (1994), Lillard & Willis (1994), Glewwe & Jacoby (1994) and Deolalikar (1993)).

In this paper, we use education and landowning as alternative measures of resources. In most rural areas of the societies where our data come from, men and women are most likely to have finished attending school at the time of marriage. It is also common for people to drop out of school due to marriage, qualifying education as a pre-marital endowment. In societies where land markets are non-existent, the amount of land owned by an individual can qualify as endowment, as most land undergo division when an adult son enters marriage and is about to establish a household. We are not aware of any data set that collects information on parents and children in a lineage, neither do existing household data provide genetic links between individuals across households.

3.1 Data

We use two data sets. The first is a multi-purpose household survey in 87 villages of 29 thanas (subdistricts) randomly drawn from 391 thanas in rural Bangladesh, conducted during the year 1991/92[5]. The data provides education of parents, but instead of education of siblings of parents, the survey only collected information on their landholding. An econometric concern is that landowning may incorrectly measure the resources of siblings as education. Measurement error in a regressor will bias its effects downward rather than upward, and we think that the coefficients will be lower bounds. The second source of data

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[5]See Pitt et al. (1998) for detailed description of the data.

is the third wave of the Indonesia Family Life Surveys (IFLS) conducted in 2000. This data provides education of parents and those of their siblings rather than their landowning. We restrict the sample to the Minangkabau, Javanese and Sundanese ethnic groups of Indonesia, which exhibit matrilineal/matrifocal orientation. Our objective in using data from a patrilineal/patrilocal lineage system in Bangladesh and matrilineal/matrifocally oriented family systems in Indonesia is to examine the empirical implications of differences in lineage systems on household behavior rather than in testing the implications of broadly defined patrilineal and matrilineal lineage systems.

Our data does not provide education or landowning of the spouses of siblings. We argue that this omission does not constitute serious problems in interpreting our results for the following reasons. If resources of the wife of the father's brother affects quality of children in the household but is omitted in the regression, the coefficient of the father's brother's resources will pick that effect in the presence of assortative mating. Although such omission implies that we are unable to differentiate inter-household effects along gender lines, it does not contradict our claim of lineage effect on children. On the other hand, if brothers' wives' education are correlated, which is more plausible in societies where parents exert substantial influence in the spouse selection process[6], then omission of education of the husband's brother's wife merely overstates the effect of education of the mother in the household and does not affect the coefficient of the husband's brother's resources.

Our measure of child quality also differs in the two datasets. In the Bangladesh data, we use years of schooling of children ages $6 - 16$ whereas in Indonesia, we use anthropometric measures of child well-being for children under age 10. Although the Indonesia data provides education of children of the same age as in Bangladesh, education is *compulsory* for children up to age 15 in Indonesia. Conditional on age, we suppose there is potentially little variation in child education to be explained in the regressions. On the other hand, the sample of children for which we have child-health measures in Bangladesh is rather too small. While a comparison of different measures of child quality may seem

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[6]This is more likely the case in patrilocal societies where arranged marriages are prevalent. A strong correlation between between education of wives than between education of conjugal spouses might arise particularly where the input of the husbands' mother into wife selection takes into account her ability to get along with them as well as the desired level of home care.

like comparing demand for "apples" and "oranges", the objective of the paper is not to compare the quantities demanded of these commodities themselves, but to compare the pattern of lineage effects on quantities demanded of those commodities since they are both considered to be normal goods.

3.2 Settings

Lineage systems are both patrilineal and patrilocal in Bangladesh. A household comprising the husband, wife and children is an integral part of the husband's lineage. Husbands remain in their villages of birth or natal compound and wives move to join the husbands upon payment of the bride price in a move that is considered as changing affiliation from her natal kin to that of the husband. Women exercise little or no control over farmland and their access to land is usually through their husband. The basic lineage group consists of a group of brothers under the headship of their father or the eldest son in the family.

The Javanese and Sundanese ethnic groups which make up about 90 percent of the Indonesia sample reckon kinship bilaterally. Both male and female blood lines are equally important, and married couples are mostly free to choose the location of their household. However, evidence suggests that family relationship exhibit matrifocal orientation[7]. From the cultural information provided on the villages during the second wave of the IFLS, about 70% of households identified with the two ethnic groups live in villages where newly married couples live with the parents of the wife rather than those of the husband. In this setting, while sisters are more likely to locate their households near their natal household, interact more frequently and share resources, brothers would be more dispersed. The Minangkabau ethnic group are a well known matrilineal descent group where property and family names descend through the female blood line. A man's properties are not inherited by his children, but by children of his sisters, in particular the eldest sister. At marriage, a husband pays no bride price, and often moves from his parents' household or village to live with his wife and relations in her village, and exercises little control over his children and productive resources.

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[7]Frankenberg & Kuhn (2004) suggests that although there are no strict rules about residence in the Indonesian societies, newly formed households are more likely to reside with the parents of the bride than those of the husband among the ethnic groups.

3.3 Econometric Model

We attempt to detect lineage effects by following the line of reasoning that if men's altruism extends to the lineage, then father's brother's resources will have non-trivial effect on children in the household in the patrilineal setting. In the Indonesian sample, rather than father's brother's effect, we would expect mother's sister's effects on children to be non-trivial. The model that we estimate is:

$$(3.1) \qquad q_i^* = \beta_0 + \beta_1 X^i + \beta_2 edu^{fi} + \beta_3 edu^{mi} + \Sigma \beta_{pr} R_{pr}^i + \epsilon_i$$

where q_i^* is a measure of child quality, X^i are observed child characteristics, edu^{fi} is father's education and edu^{mi} is mother's education, and R_{pr}^i is a measure of resources of sibling type $r = b(rother), s(ister)$ of parent $p = f(ather), m(other)$. This generalized specification of parental siblings' resources reflects the different measures of resources that are available in the data that we use in estimation.

4 Descriptive Statistics: Lineage and Residence

To demonstrate how lineage systems determine the social environment of the household, we summarize data on residence of siblings of the household head and his spouse in male headed households in Table 1. In the Bangladesh panel we exclude households where brothers jointly reside in the same household, leaving a sample of 1498 male-headed households. In the first panel, the number of siblings of the husband are significantly fewer than those of the wife; a demographic regularity that derives from age difference between spouses in most patriarchal societies. The average age difference between husband and wife in the data is about 8 years. In the second panel, 1.69 of the 2.09 brothers of the male household head that are alive live in the same village as the sampled household whereas only about 0.45 brothers of the wife live in the same village with her. The data does not support the converse, the possibility that sisters marry into the same village. Instead, sisters of the husband are more likely to live in the same village than sisters of the wife (0.53 vs 0.31), and these are perhaps unmarried sisters of the head. The third panel allows us to see how far individuals move away from their village of origin. It shows that women are likely to marry across villages in the district, and perhaps outside of the district while men are less likely to move away from their villages. This reflects the general

practice of patrilocal exogamy where daughters are married into other villages and sons marry wives from outside of the village.

On the other hand, the social environment is composed differently for households in matri-focally oriented lineage systems. The Indonesia panel summarizes the social environment of 3224 male headed households. The first panel of the table shows that there are no differences in the number of married brothers of the husband and married brothers of his wife that reside in the same village, although siblings tend to be more dispersed in Indonesia data than in Bangladesh. However, more sisters of the wife are married into households in the same village than sisters of the husband. While the social environment of the household is composed by those of brothers of the head in the Bangladesh data, the social environment of the household although more mixed among the Indonesian ethnic groups, has more sisters of the wife than those of the husband.

5   Results

As a measure of child quality, we examine regressions of child schooling in the rural Bangladesh data and exclude households with co-resident brothers. An obvious econometric implication of this choice is that if brothers who are more likely to honor lineage norms for resource sharing are the ones who co-reside, then our sample is biased toward finding lower effects for the presence of brothers in the village. In the results presented in Table 2, we estimate the effects of education of the husband and wife on the education of children aged 6 to 16 assuming a framework in which education has bargaining effect on resource allocation: higher education confers command over more resources in the household.

First, we examine the intuition that differences in father's and mother's effects in the household should depend on whether fathers have nephews or nieces. In columns 1 and 2, we estimate a baseline regression on samples where father has no brother and where father has brothers respectively, and test whether the coefficients of parents education differ conditional on age and sex of children. The coefficients and the test suggest equality of parental effects when father has no brother but a significantly lower effect for father when he has brothers. A plausible interpretation of this difference is that relative to the

wife, the husband spends less of the resources accorded by increased education in the household when there are brothers' households in existence. One might wonder whether the differences only arise because of sample size differences as the sample in the no-brother group is about a quarter of the with-brother group. The test in columns 3 and 4 are similar but allows a redistribution of the sample into the two categories. We find that parents education effects are not different in the absence of brothers in the village but are different when there are father's brothers in the village. In addition to presence and absence of statistically significant difference in parents effects by father's brother's presence, the change in the coefficients may also be suggestive. Mother's effects tend to increase when father's effects decreases due to brother's presence in village. As the number of children that fathers expect to provide old-age support for him increases, the less impact of his resources is felt in the household as a result of investment in children outside of the household. In turn, mothers may invest more resources in own children to compensate for the loss of investment from the fathers. If transfers affect father's effects in the household, then we should expect equal effects when the father is not likely to be transferring resources outside of the household. In columns 5 and 6, we check whether the level of wealth of brothers matter, and find that parents effects are not different when father is poorer than his brothers but lower effects for fathers when not poorer than his brothers.

Next, we pool the data and examine the effects of presence of both siblings of parents, and present the results in Table 3. Again, father's effect is lower than mother's in the baseline regression. In the next three columns (2 to 4), we test whether residence of each type of parents' siblings changes intra-household effects. If the presence of husband's brother's household in the village leads only to the husband spending less resources in his household, then brother's residence in the village should reduce father's education effect, and might raise mother's effect. The results in column (II) shows exactly that: having a brother in the village raises child education by 0.26 of a year, but reduces father's education effect by 0.08 of a year while raising mother's effect although insignificantly. Addition of father's sister's residence and interaction with education does not change the result (comparing columns II and III), and his sisters' residence in the village has no effect on child schooling. We also examine the effects of residence in the same village

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with siblings of the wife in columns (V) to (VII). Turning to mother's siblings, the results in column V show that residence of the household in the same village as the wife's brother reduces child education, but does not change either the husband or wife's effects. Residence of the household in the same village as sisters of the wife does not affect child schooling with or without controls for residence of her brothers (columns VI and VII).

The channel through which residence of siblings in the village can affect quality of children in the household is through sharing of resources among households. We will like to examine the effect of their resources on children in the household. Unfortunately, the Bangladesh data does not provide education of siblings of parents, but collects information on their landowning. Using this measure, we classify kin who have more than half acre of land as non-poor and others as poor. We investigate the effect of this classification on the schooling of children in Table 4. Conditional on education of parents, column (I) shows that the number of non-poor brothers, most of whom reside in the same village as the household, raises child schooling significantly. We do not observe any effects from sisters of the husband, and neither from brothers and sisters of the wife[8]. In the second column, We used dummies rather than the count of people. The results are qualitatively similar except that the dummy for wife's brothers become significant and positive. The difference between the schooling of children of a husband that has at least one non-poor brother and that of a husband whose brothers are all poor is about 0.39 of a year.

The presence of siblings in the village may incorrectly measure lineage children if parent's siblings without children have different residential location choices than siblings with children. This is however less of a problem if brothers with children are those more likely to live in the village, in a setting where joint-rearing of children in extended families seems to be a norm. It also seems reasonable to assume that those who migrate from the village are most likely to be unmarried brothers who do so for work purposes.

It is also possible that brother's effects on children reflects unmeasured heterogeneity. Non-poor father's brothers may raise child schooling if unmeasured ability determines both child schooling and father's brother's landholding. We deal with this possibility by examining regressions using data from social groups where family systems imply a

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[8]I obtained similar result for uncles, although a substantial number of them seem to live outside the village.

different set of implications for lineage effects. For this purpose, we turn to the data from Indonesia. We use a measure of child health that reflects cumulative investment. We present in Table 5 estimates of child height-for-age from the Indonesia Family Life Surveys (IFLS) 2000 using the restricted sample. The estimates of parental education effects on child height-for-age shows that women's effects are bigger than men's effects even in the baseline regression. In column (I), a unit increase in the wife's education raises child height by about 0.94 percentiles whereas the same increase in the husband's education does so by only 0.60 percentiles. In the household, husband's resource effects are necessarily lower than the wife's even when husband and wife do not have siblings. Since some of the groups are matrilineal-leaning, it is possible that children of sisters inherit property from the same source. The data provides education of all siblings of each parent, and from this information, I computed the maximum years of schooling of siblings by their gender. Columns (II) to (IV) show that education of women's female siblings importantly raise the health of children (by 0.40 percentiles) while their brother's education does not have any effect. In addition, education of the husband's brothers and sisters have no effect on child outcomes.

In interpreting the empirical results, the essential comparison is that of husband and wife's own and sibling effects within each data sets. Using similar measures of siblings' resources for husband and wife in the Bangladesh, the results show that having a brother's household in the village raises child quality in the household but decreases the effects of the husband's education on the human capital of children. Other regressions show that having a rich paternal uncle raises child quality, but does not happen for maternal uncles. To further buttress this idea, we showed that instead of paternal uncle's effect on children, what is important in the matrilineal-leaning society is resource of maternal aunts who are more likely to live close to the household than other siblings of the parents. Interpreted with respect to the pattern of residence, these results suggest that the effects are not driven by correlated heterogeneity, but by resource sharing among households arising from the system of lineage and kinship.

6   Conclusion

Most of the theoretical conceptions of household behavior in the developing countries and the empirical studies they stimulate consider the household as an independent, nuclear entity. Meanwhile, households in developing countries to a large extent depend on relatives for their livelihood, and sometimes survival, and private transfers within extended families affect the distribution of economic well-being. The analytic channels through which resource sharing in extended families affect behavior within households have not been sufficiently incorporated into the economic literature.

Our approach suggests that husband's resource effects in the household will be smaller than the wife's resource effects, and that quality of children depends not only on household resources, but largely lineage resources. Contrary to the widely held interpretation of greater effect of women's resources on children as possession of higher level of parental altruism toward children than men, we demonstrate in this paper that the results are consistent with common parental preferences over children but parents altruistic behavior over different sets of children: whereas women's resources are generally spent within the household, men's resources are more likely to be spend both within and outside of the household so that the observed differences arise from "dilution" of men's resources rather than lack of altruism toward children.

Taken together, the results suggest that the scope of policies targeting a specific gender as recipient of a given benefit may be very narrow when inter-household sharing is taken into account.

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Table 1: Residential Location of Relatives
Head of Household is Male

Type of Kin:	Brothers	Sisters
A. Bangladesh Credit Program Survey		
Number Alive		
Head of Household	2.09	1.92
Spouse of the Head	2.27	2.18
Difference (Head$_{stat}$ - Spouse$_{stat}$)	-0.18	-0.26
t-stat:Difference = 0	**3.28**	**4.81**
Number who live in the village		
Head of Household	1.69	0.53
Spouse of the Head	0.45	0.31
Difference (Head$_{stat}$ - Spouse$_{stat}$)	1.24	0.23
t-stat:Difference = 0	**24.06**	**7.58**
Number who live in the upazilla		
Head of Household	1.85	1.43
Spouse of the Head	1.64	1.43
Difference (Head$_{stat}$ - Spouse$_{stat}$)	0.21	0.00
t-stat:Difference = 0	**3.80**	0.01
B. Indonesia Family Life Survey		
Number who live in the village		
Head of Household	0.52	0.54
Spouse of the Head	0.50	0.61
Difference (Head$_{stat}$ - Spouse$_{stat}$)	0.02	(0.07)
t-stat:Difference = 0	0.95	**2.89**
Number who live in the subdistrict		
Head of Household	0.20	0.20
Spouse of the Head	0.20	0.19
Difference (Head$_{stat}$ - Spouse$_{stat}$)	0.00	0.01
t-stat:Difference = 0	0.09	0.89
Number who live in the district		
Head of Household	0.29	0.28
Spouse of the Head	0.26	0.25
Difference (Head$_{stat}$ - Spouse$_{stat}$)	0.03	0.03
t-stat:Difference = 0	**2.09**	1.59

Table 2: OLS Regression: Years of Schooling of Children Ages 6-16
Sample of Households where brothers are not coresident
Bangladesh Credit Program for the Poor 1991/92 Survey Data

| | Father Has Brothers | | Father's Brother in Village | | Father Poorer than His Brothers | |
	No	Yes	No	Yes	No	Yes
	(1)	(2)	(3)	(4)	(5)	(6)
Mother's Education	0.21229***	0.24962***	0.22129***	0.25624***	0.26796***	0.16078***
	[0.06869]	[0.03044]	[0.05271]	[0.03280]	[0.03525]	[0.06018]
Father's Education	0.20660***	0.15245***	0.20565***	0.13996***	0.15079***	0.15805***
	[0.04650]	[0.02190]	[0.03610]	[0.02363]	[0.02609]	[0.03972]
Number of Children	484	1869	794	1559	1441	428
R-squared	0.32	0.36	0.33	0.37	0.38	0.33
F-Statistic : $\beta_{MEDU} = \beta_{FEDU}$	0.0000	4.2800	0.0400	5.2500	4.3400	0.0000
p-value	0.9551	0.0389	0.8402	0.0223	0.0375	0.9726

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Other Regressors: Child Age and sex

Table 3: OLS Regression: Years of Schooling of Children Ages 6-16
Sample of Households where brothers are not coresident
Bangladesh Credit Program for the Poor 1991/92 Survey Data

	Baseline	Husband's Sibling Type			Wife's Sibling Type		
		Brother[1]	Brother[2]	Sister	Brother	Sister[1]	Sister[2]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mother's Education	0.23609***	0.20863***	0.21219***	0.24028***	0.22531***	0.23137***	0.22681***
	[0.02967]	[0.05622]	[0.05670]	[0.03557]	[0.03350]	[0.03331]	[0.03523]
Father's Education	0.18396***	0.23438***	0.23259***	0.18590***	0.18552***	0.19074***	0.18824***
	[0.02120]	[0.03806]	[0.03895]	[0.02506]	[0.02439]	[0.02303]	[0.02473]
Sibling's Residence in Village		*0.26211***	*0.27135***	0.03839	*-0.25173**	-0.19913	-0.10238
		[0.13009]	[0.13792]	[0.14041]	[0.13571]	[0.15654]	[0.18886]
Sibling's Residence in Village x Father's Education		*-0.07778**	*-0.08153**	-0.00748	-0.00764	-0.06664	-0.07929
		[0.04583]	[0.04644]	[0.04748]	[0.04839]	[0.06098]	[0.07275]
Sibling's Residence in Village x Mother's Education		0.04433	0.05277	-0.0167	0.05662	0.04521	0.02782
		[0.06635]	[0.06833]	[0.06468]	[0.07271]	[0.07063]	[0.07272]
Number of Children	2469	2469	2469	2469	2469	2469	2469
R-squared	0.35	0.35	0.35	0.35	0.35	0.35	0.36

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Other Regressors: Child Age and sex
([1]) Does not include dummy for residence and interaction of parents' education with residence of the other type of sibling
([2]) Includes dummy for residence and interaction of parents' education with residence of the other type of sibling

Table 4: OLS Regression: Years of Schooling of Children Ages 6-16
Bangladesh Credit Program for the Poor 1991/92 Survey Data

	Regression using Reported number of Sibling	Regression using Dummy for at least one Sibling
	(I)	(II)
Mother's Education	0.22807***	0.23276***
	[0.02996]	[0.02941]
Father's Education	0.17535***	0.17018***
	[0.02137]	[0.02141]
Non-Poor Mother's Brothers	0.06641	0.23427*
	[0.04193]	[0.13085]
Non-Poor Mother's Sisters	0.01593	-0.07605
	[0.05209]	[0.12849]
Non-Poor Father's Brothers	0.10892**	0.39331***
	[0.05090]	[0.12710]
Non-Poor Father's Sisters	-0.0482	0.01361
	[0.05379]	[0.11739]
Number of Children	2469	2469
R-squared	0.36	0.36

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Other Regressors: Child Age and sex

Non-poor siblings are those reported to possess more than half acres of land.

Table 5: OLS Regression: Anthropometric Measures of Children ages 0-10 years
Indonesia Family Life Survey (2000)

	Height-for-Age Percentile			
	(I)	(II)	(III)	(IV)
Mother's Education in Years	0.93571***	0.96630***	0.83122***	0.87723***
	[0.18643]	[0.21600]	[0.20560]	[0.23411]
Father's Education in Years	0.59607***	0.45777**	0.45568**	0.36049*
	[0.16521]	[0.17849]	[0.17915]	[0.19273]
Father's Brothers Education			0.20024	0.06928
			[0.12197]	[0.12881]
Father's Sisters Education			0.20548	0.23739
			[0.14044]	[0.14866]
Mother's Brothers Education		-0.10095		-0.04557
		[0.13291]		[0.13723]
Mother's Sisters Education		0.40068***		0.39503***
		[0.14025]		[0.14613]
Number of Children	3759	3298	3469	3030
R-squared	0.13	0.14	0.13	0.13

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Other Regressors: Child Age and sex