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Intra-household Efficiency in Extended Family Households: Evidence from Rural India

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ABSTRACT *The extended family household, in which multiple generations or married siblings of a family live together, is common in developing countries. We conducted a series of public goods experiments in such households in five villages in rural North India to shed light on decision-making efficiency within this household structure. In this experiment, we offered household members the choice to receive either a lower amount over which they have private control or a higher payout that becomes a common resource. We measure efficiency as the degree to which individuals are willing to forego personal rewards for larger, collective rewards. We find that relationships within extended households are not equally efficient, with the relationship between the daughter-in-law and mother-in-law particularly problematic. Supplementary survey and qualitative evidence points to the role of decision-making power, with young, married women lacking the power to assert their preferences in extended households and resorting to actions that reduce the overall efficiency of the household.*

1. Introduction

Family is the primary institution in society within which social and economic activities are carried out. As Mani (2020) puts it, family is a universal and enduring institution that forms the basis of economic interactions, from allocating time to work, to human capital investment, to issues of marriage, consumption, and child rearing. The extended family household structure, or extended household in short, is an arrangement in which multiple adults other than spouses and unmarried children live and eat together on a daily basis.[1] This structure is common in developing countries (Bongaarts, 2001). In India, around 50 per cent of households are extended households (2011 Indian Human Development Study), although the exact number depends on how one defines this institution (D'cruz & Bharat, 2001; Rajadhyaksha & Smita, 2004). The institution of the extended family household in this context is not restricted to any social group and closely connected to the social norm of patrilocality, which prescribes cohabitation of young married couples with the husband's parents (Medora, 2007; Niranjan, Nair, & Roy, 2005; Ram & Wong, 1994).

The economic benefits and costs of the extended family household structure are in many ways akin to the benefits of marriage. Gains include cost-sharing of household public goods such as residence, meals, and children; economies of scale and specialisation in the production process; and risk-sharing (Becker, 1981; Bergstorm, 1997; Bergstrom, Blume, & Varian, 1986; LaFave & Thomas, 2017; Rosenzweig & Wolpin, 1985). However, larger households might also suffer from significantly more

free-riding, as more adults are in charge of production and public good provision (see Baland, Bonjean, Guirkinger, & Ziparo, 2016; Jakiela & Ozier, 2016, on the effect of a sharing tax and Cox & Fafchamps, 2007, for an overview on extended families and kinship networks). In addition, the presence of many adults might introduce additional conflicting preferences, which in situations where actions cannot be observed or enforced, might further encourage cheating and free-riding.[2] As Uberoi (1994) writes:

> A joint family ... is always an exciting group to live in. All the time something of interest is happening there. Now it is the marriage of a girl or a boy, now it is an initiation ceremony, the birth of a new baby, the puberty rites of a new bride, a particular family ritual, a fast, a feast and sometimes a death. There is always bustle and expectations, laughter and quarrels, discussions and plans. Life may be complicated, sometimes full of bitterness, always full of quarrels and petty jealousies, but rarely dull at least from the point of view of the children. (p.32)

Given its importance, the Indian extended family household has been a subject of inquiry since the 1940s. D'cruz and Bharat (2001) and Rajadhyaksha and Smita (2004) provide useful overviews. Studies concern family patterns (Bharat, 1994; Medora, 2007), but also family dynamics (Jeffery & Jeffery, 2018; Uberoi, 1994), changes in family structures (Caldwell, Reddy, & Caldwell, 1984; Niranjan et al., 2005; Ram & Wong, 1994) and the relationship between family structures, women's work, and health and educational outcomes for children (Harris-Fry, Shrestha, Costello, & Saville, 2017; Scott & Karberg, 2016). However, despite its importance, few studies exist in economics on extended households, and most of those focus on the efficiency implications for agricultural productivity of African extended households (Guirkinger, Platteau, & Goetghebuer, 2015; Kazianga & Wahhaj, 2013; Ouedraogo, Dillon, & Porter, 2016).[3] However, Rangel and Thomas (2019), also in the African context, note the limitations of production-side tests of efficiency as they observe inconsistencies between these and consumption-side tests, a discrepancy they attribute to measurement error in plot-level inputs and outputs.[4]

This paper contributes to the literature in economics, but we also hope to add to a wider literature in the social sciences. Our goal is primarily descriptive. We introduce a novel dataset collected in 2014 among 193 extended households in Utter Pradesh, North India, an area where extended family households are common (Speizer, Lance, Verma, & Benson, 2015). The strength of this dataset lies not in its scale, covering just five villages, but in its depth, combining experimental, survey with qualitative sources of information. Using these data, we study within household relations in extended households, and can confirm the unique role of the mother-in-law – daughter-in-law relationship as in, for instance, Jeffery and Jeffery (2018). In addition, we collected data among nuclear households in these same villages, and note a difference in functioning between the two sets of households.

Our analysis centres on efficiency. We define efficiency in the sense of Pareto Efficiency: a resource allocation in which it is not possible to make one individual better off without making another one worse off. Our interpretation of efficiency is constrained by our main data collection tool: a public goods experiment. In this experiment, we measure the individual household members' willingness to forego personal monetary rewards for larger, collective monetary rewards. This is a test of a key implication of Pareto Efficiency, because an efficient household can coordinate to use the greater collective reward to compensate the individual for forgoing personal monetary rewards. While other measures of efficiency are possible (Rangel & Thomas, 2019), this experiment is a common tool among economists and its interpretation, in our context, akin to the inefficiencies observed in migrant households as in Joseph, Nyarko, and Wang (2018) and De Weerdt, Genicot, and Mesnard (2019).[5]

The experiment proceeded as follows. In each household, we recruited up to four adults: the respondent (we define this individual in Section 2), the respondent's spouse, a randomly selected male and a randomly selected female member. We then paired the individuals with one another to play a public goods experiment. In each of the experiments, we asked the two individuals playing to each divide 10 tokens between a private account and a common account. Tokens placed in the private

account were paid out at a rate of three Rupees (Rs); the proceeds were revealed only to the individual and intended for private consumption. Tokens placed in the common account were paid out at a rate of four Rs, but the proceeds were revealed to both individuals and hence were intended for joint consumption. Note that two individuals could together earn up to 80 Rs, equivalent to 2 USD or twice the daily wage at the time, if they contributed everything to the common account, whereas they would only receive 30 Rs each or 60 Rs in total if they contributed all to the private account. While this experimental set-up has been frequently used to study within household efficiency, we are the first to use it within the context of extended households, and hence, the focus of our analysis is on investigating (possibly) differential contributions among different pairs in the household, for instance, the husband/wife pair versus the mother-in-law/daughter-in-law pair. We also conducted this experiment within a set of 67 nuclear households in the same villages; we present those results as a reference point.

We find that, consistent with past studies using a public goods experiments in rural India (Castilla, 2015; Mani, 2020; Munro, Kebede, Tarazona-Gomez, & Verschoor, 2014), both participants contribute their full endowment to the common account in only 2 per cent of the experiments. Contributing 50 per cent appears to be a focal point, with 32 per cent of the individuals opting for half. This result implies that decision-making within these households is not Pareto Efficient, at least as so far as measured by this experimental approach (which has limitations to which we return in the conclusion). This lack of Pareto Efficiency implies a rejection of the traditional unitary model in economics (Becker, 1981) or the more flexible collective model (Chiappori, 1992).[6] However, it is consistent with a sizeable literature in development economics using survey data to shed light on within household decision-making. For instance, Udry (1996), finds that in Burkina Faso overall yields of the household could be increased by reallocating inputs from male-controlled plots to female-controlled plot, indicating productive inefficiencies (see also Dercon & Krishnan, 2000; Dubois & Ligon, 2009 for evidence, Bobonis, 2009; LaFave & Thomas, 2017 for counter-examples).

In addition, we find large differences in contribution rates depending on the relationship of the participants. A key finding is that participants linked through in-law relationships contribute less to the common account than members related by blood. For instance, father/son pairs contribute 5 percentage points more to the common account compared to mother-in-law/daughter-in-law pairings. We also find a significant difference in the contribution made to the common account by couples residing in nuclear versus extended households. Couples residing in extended households contribute 51 per cent of their endowment to the common account, as opposed to 59 per cent when they constitute a nuclear household. This difference is statistically significant and robust to controlling for key household characteristics. This implies that couples in nuclear households leave 9.6 Rs on the table, while couples in extended households leave 8.2 Rs on the table, a difference of 1.4 Rs. In absolute terms, perhaps a small difference.

We emphasise that this comparison between spousal contributions in nuclear and extended households should not be interpreted as (causal) evidence of a lower overall efficiency in extended households as compared to nuclear households, for two main reasons. First and foremost, the type of efficiency measured in this experiment does not (and cannot) account for many of the production efficiency gains in the extended family, such as those created in the production of household public goods and through specialisation. Second, the fact that households and individuals choose whether to live in extended or nuclear households implies that extended and nuclear households may differ along unobservable dimensions, so that observed correlations between family structure and efficiency may not represent causal effects.[7]

We complement these findings with survey and qualitative data. Using survey data, we note that decision-making power is often concentrated in the elder generation or among males in extended households, leaving a young daughter-in-law with little say. In effect, consistent with Rangel and Thomas (2019), we note an increase in the number of decision makers in extended households. This concentration of decision-making power among the family-in-law (from the young daughter-in-law's perspective) is correlated with an overall lower contribution to the common account, suggesting that

her lack of say in what the household spends money on might be driving this increased non-efficiency.

Qualitative accounts among a smaller sample corroborate this mechanism: Unable to assert one's preferences or achieve one's goals, junior women in extended households report to behaviours that improve their personal well-being but might reduce the household's. These behaviours include slacking off on assigned tasks, avoiding tasks altogether, or hiding income or resources. For instance, a young daughter-in-law with a migrant husband, noted that she hides around 20 per cent of his remittances from her in-laws. Our public goods experiment effectively mimics this situation of funds that arrive in the household, and asks the participants to make a decision as to what to do with these 'remittances.' However, the qualitative work also highlights other forms of inefficiencies, such as free-riding among brothers who farm together. Hence, the value of the qualitative work is to highlight these different forms of inefficiencies, as it might be difficult to find supporting quantitative evidence for a myriad of possible inefficient behaviours in small sample sizes; thereby suggesting pathways for future research.

These results are consistent with recent evidence from South Asia. Using the large sample of the India Human Development Survey, Dhanaraj and Mahambare (2019), building on Debnath (2015), show that norms around decision-making of daughters-in-law in extended households prevent them from taking up employment. They suggest that limited autonomy of young married women within extended households, characterised by, the practice of purdah, and generally low mobility, to be the primary explanation. Similarly, Saikia and Singh (2009) find that women in extended households are less likely to utilise maternal health services. Lentz (2018) interviewed Bangladeshi women using ethnographic techniques; she highlights the lack of agency among young women in extended households, which she refers to as 'burdened agency.' The social norms surrounding patrilocality include assigning lower status to wives of younger brothers (Coffey, Khera, & Spears, 2016; Harris-Fry et al., 2017).[8]

2. Data collected and descriptive statistics

We collected data from five villages in the Sant Ravidas Nagar district (also known as Bhadohi district) in the state of Uttar Pradesh in 2014–16. These five villages were selected by the Delhi-based NGO Development Alternatives with the purpose of including them in an adult literacy programme for women. Note that as this paper will be using baseline, pre-programme data, the impact of this programme is not the focus of this paper.[9] These five villages were selected by the NGO on the basis of their proximity to major roads,[10] and the presence of illiterates, in one of their programme districts. Illiteracy is common Uttar Pradesh. Using data from the 2011 Census of India, we compute a male illiteracy rate of 30 per cent for men, and 60 per cent for women.[11]

In each of the five villages, we made a list of all self-declared illiterate, married adult women (as these women were eligible for the literacy programme). This sample comprises a total of 393 households containing at least one illiterate married adult woman. We define members as belonging to a household if they eat meals together on a regular basis for at least six months (Glewwe & Grosh, 2000), and selected the respondent of our survey as the illiterate, married woman eligible for the literacy programme, i.e. the 'wife' (in the case of multiple possible respondents, all were interviewed). We were able to conduct the public goods experiment in 260 (out of 393) households – this is our main analysis sample and represents 271 women. The attrition was due to non-availability of household members (for the experiments, we needed at least two adults).[12] Seventy-five percent of this analysis sample, or 193 households representing 204 women, were extended households.

We collected experimental and survey data in April–May 2014, prior to the implementation of the literacy programme. The survey data collection included, among others, information on household assets, household composition, educational investments and outcomes, and health outcomes. We also inquired about the position of the selected woman in the household. We asked respondents about their role in various decision-making processes, who in the household had a say, and who in the household

had the most say. The decision-making processes included what to cook, what and how much to purchase at the market, what to do when a child becomes ill, whether a child goes to school on a particular day, whether a child is enrolled in school, and so on. At the same time as the survey data collection, we conducted a series of public goods experiments.

In December 2016, we conducted a series of qualitative semi-structured interviews in two nearby villages, selected from the larger literacy project area. All respondents selected for this qualitative exercise had participated in the literacy programme. Prior to our visit, we had made a census list of all nuclear and extended households that had at least one literacy programme participant. We randomly selected three households from the nuclear family list and five households from the extended family list. The interviews followed a semi-structured format; a set of open questions around pre-identified themes, but allowing the respondent to talk freely and at length about each topic. We covered perceptions, benefits, and disadvantages of extended versus nuclear households, division of labour and output, relationships, and decision-making within the household.

2.1. Public goods experiment

In the basic version of the experiment with the couple (the spousal experiment), we invited the respondent, i.e. the woman, and her husband to a central location in the village where we could ensure their privacy while playing the experiment. Once present, we placed the participants in different rooms and explained the experiment to them simultaneously.

We first showed them each 10 tokens and two boxes. One box was coloured blue and the other was yellow (colours chosen as they lack any religious or other meaning). We explained that they would each receive 10 tokens and would be asked to divide the 10 tokens between the two boxes. We illustrated the choice by putting a few tokens in one box and the rest in the other box. We then noted that the tokens in the blue box were worth more than the tokens in the yellow box: The tokens in the blue box are converted at a rate of four Rs (10 US cents) whereas the tokens in the yellow box are converted at a rate of three Rs (seven-and-a-half US cents). In addition, the use of these funds differs. The participant could decide personally on the use of the funds from the tokens in the yellow box. We gave a few examples of such use: clothing, food, or savings, and emphasised that it was the participant – 'you' – who could decide on the use of the funds. Use of the funds from the tokens in the blue box, on the other hand, would be decided upon by both participants, in this case the spouses. We then handed 10 tokens to each of the participants and invited them to make the decision as to how many tokens should be placed into each box. We emphasised that the decision the participant made would not be observed or shared with the other participant.[13] We then paused for questions and asked the participant to make her or his decision. Once the decision was made, one of the enumerators left the location with the four boxes and counted the total amount of tokens in the (common) blue boxes. The enumerator returned to the location, paid out the participants for the funds from the (individual) yellow boxes in private, then brought the two participants together and paid out the funds from the (common) blue box, plus our unknown amount.

Note that in this experiment, there are higher returns to contributing to the common account (multiplying the number of tokens by four as opposed to three) compared to contributing to the private account.[14] This ensures that full contribution (that is, 100 percent of tokens) to the common account by all participants is the Pareto Efficient solution within this experiment. However, not contributing to the common account (free-riding) is likely the optimal action from the individual participant's point of view. To understand what is optimal from the individual's point of view, we need to think through the best response of each individual, taking the other individual's action as something one cannot alter. For instance, assuming that the funds in the common account were to be split equally among the participants, it is easy to see that 1 token in one's own account would yield 3 Rs while one token into the common account would yield 50 per cent * 4 Rs = 2 Rs. Only if an individual is able to retrieve at least 75 per cent of the common account funds, whether directly, or

Table 1. Overview of public goods experiments

	Extended	Nuclear
Spousal experiment (selected woman and her husband)	111	62
Woman and another male	86	
Woman and another female	124	
Husband and another male	38	
Husband and another female	52	
The other male and female	63	
Total number of experiment played	474	62

Notes: This table presents the number of experiments played by experiment type (row variable) and household structure (column variable). A total of 536 experiments were conducted.

indirectly by pushing through their purchase choice, this individual would become indifferent between the two accounts.

In the extended households, we, in addition, selected one additional married adult male and one additional married adult female at random among present members. We then played all possible bilateral experiments between the two spouses and these two additional household members, using the same protocol. We randomly selected up to two experiments among the full set to be paid out (in a way such that all participants received one pay-out). Table 1 lists all experiments played in the extended and nuclear households in order of which they were played,[15] as well as the associated sample sizes.

2.2. Descriptive statistics

Table 2 presents the mean and standard deviation of selected variables by household structure; the second column reports the overall statistic, followed by the extended and nuclear household.

Table 2. Descriptive statistics

	Total	Extended	Nuclear	*p*-value
Wife's current age	38.72	38.71	38.76	0.969
	(10.175)	(10.616)	(8.768)	
Husband's current age	41.75	41.68	41.95	0.850
	(9.982)	(10.360)	(8.874)	
Number of years married	23.44	23.47	23.33	0.920
	(11.24)	(11.94)	(8.902)	
Husband's education in years	6.254	6.83	4.60	0.001
	(4.732)	(4.689)	(4.492)	
Backward Caste	0.365	0.38	0.31	0.302
	(0.482)	(0.487)	(0.467)	
Scheduled Caste	0.491	0.44	0.64	0.004
	(0.501)	(0.498)	(0.483)	
PPI score	25.12	24.98	25.55	0.699
	(10.81)	(10.95)	(10.43)	
Number of household members	8.649	9.838	5.030	0.000
	(4.391)	(4.352)	(1.714)	
Wife's number of children born to date (fertility)	4.87	4.77	5.19	0.239
	(2.612)	(2.676)	(2.389)	
Any child died to date (1 = yes; 0 = no)	0.461	0.44	0.53	0.204
	(0.499)	(0.498)	(0.503)	
Observations	271	204	67	

Notes: The sample includes all women (and their household) who played at least one public goods experiment. The table reports the mean and standard deviation. Base category for Backward Caste and Scheduled Caste is General Category. PPI Score is Progress out of Poverty Index (renamed Poverty Probability Index in 2017) ranging from 0 to 100.

The final column reports the p-value of the test of difference in the means between nuclear and extended households.

The average age of the woman at marriage is 15 years, whereas that of the husband is 18 years. The average length of marriage is 23 years. There is no significant difference in the length of marriage by household structure. Although all women in our sample were uneducated (as we selected only illiterate women), the average level of education attained by husbands is substantial, six years, on average. Husbands in an extended household have two years of extra education, on average, compared with those in a nuclear household. Almost all households below to the lower castes, although nuclear households are more likely to belong to Scheduled Castes.

In order to establish a comparable metric for the living standard of each household, we computed a Progress out of Poverty Index (PPI) ranging from 1 to 100. In 2009, a PPI score of 20 corresponded to a 90 per cent chance of being under the poverty line. The average PPI score is 25 for our sample. The extended household has, on average, 10 members, whereas the nuclear household has, on average, 5 members. Respondents in nuclear households tend to have more children (on average 1.4 more) and a higher proportion of nuclear household respondents reports (own) child deaths.

3. Analysis and results

We start with the spousal experiment. This experiment acts as a reference point, as it is the one that has been played in many different studies. Appendix Figure A1 presents the histogram of the total contribution to the common account for the spousal experiment in both extended and nuclear households. Consistent with past studies using a public goods experiment in rural India (Castilla, 2015; Mani, 2020; Munro et al., 2014), we find that both spouses contribute their full endowment to the common account in only 2 per cent of the experiments. The mode of this distribution is 50 per cent, also consistent with past studies who interpret this as either a focal point (Castilla, 2015) or indicative of numerical challenges. In very few experiments (less than 2 percent) both spouses contributing nothing at all to the common account. The average contribution is 54 per cent, which implies that pairs, on average, forego 9.2 Rs (or 23 percent of the daily wage) in efficiency gains.

Considering the corresponding distribution of individual contributions to the common account (not reported in Figure A1), we note that 30 per cent of participants opt for half-half, 8 per cent contribute nothing, while 10 per cent contribute everything to the common account. The discrepancy with the total or average experimental-level contributions highlight the importance of looking at individual participants.

Table 3 presents the average contribution to the common account by household structure, participant type, and relationship. The top panel presents information on contributions in the spousal experiment, separately by nuclear and extended households, and presents information on both the total and individual contributions of husbands and wives. The second panel presents average contributions across all non-spousal relationships in the extended household. The bottom panel summarises. The average contribution to the common account, across experiments, is 52 per cent. The mode is 50 per cent, with 32 per cent of individuals opting for half-half. In only 2 per cent of the experiments, both participants contribute everything.

Note that the average contribution to the common account is eight percentage points lower in the extended household spousal experiment compared to the nuclear household spousal experiment. Appendix Figure A2 depicts the respective distributions, which indicate this shift to the right among nuclear households. This is driven by lower contributions by both wife (seven percentage points lower) and husband (eight percentage points lower) in the extended household.

The average contribution to the common account in all other experiments is 51 per cent, compared to 59 per cent in the nuclear households. This implies an additional efficiency loss of about 1.5 Rs. In the next sub-sections, we further unpack these averages, considering the relationships and identities of the respondents.

Table 3. Contributions to the common account by household structure

		Extended	Nuclear	t-test
Spousal experiment	Wife	47%	53%	−6.6*
	Husband	56%	64%	−8.4**
	Total	51%	59%	−7.5***
	N	111	62	
Other experiments	Total	51%		
	N	363		
All experiments	*Total*	52%		
	N	536		

Notes: This table presents the average contribution by participants to the common account. It also reports the total contribution to the common account from both participants in an experiment, in the row labelled 'Total.' The contribution is shown in percentage terms, with 100 per cent denoting that all 10 tokens were contributed to the common account. The averages are shown by experiment type (row) and household structure (column). The last column reports the results of a t-test between nuclear and extended households (with unequal variance).

3.1. Household structure and spousal contributions

We first look at the correlations between the type of household structure and the level of contributions. The difference between nuclear and extended households could be related to a number of factors, both observable and unobservable. We find that nuclear households in our sample are more likely to belong to a lower caste and to be lower educated than extended households (Table 2). We account for observable differences in characteristics by including appropriate controls in the regression analysis of contributions in the spousal experiment presented in Table 4.

In Table 4, we present the results from OLS regressions where the dependent variables are the average contribution of both spouses to the common account (Column (1)), the contribution of the wife to the common account (Column (2)), and the contribution of the husband to the common account (Column (3)). This regression controls for the socio-economic factors listed in Table 3. Contributions are measured in proportion of total feasible contribution, that is, a value of 1

Table 4. Household structure and contributions to the common account

	Average contribution	Wife's contribution	Husband's contribution
	(1)	(2)	(3)
Nuclear household	0.073**	0.063	0.083*
0 = extended household; 1 = nuclear household	(0.036)	(0.046)	(0.049)
Constant	0.229	0.062	0.395
	(0.261)	(0.426)	(0.367)
Control variables included	Yes	Yes	Yes
Observations	159	159	159
R-squared	0.063	0.048	0.057

Notes: This table reports the results of the regression mapping the contribution to the common account in spousal experiment. Contributions are measured in proportions. Standard errors are clustered at the household level. Control variables included but not reported: age of wife and husband, number of years married, husband education, caste, PPI score, number of household members. Note that the sample is less than the expected 173 due to missing co-variate variables. See Appendix Table A5 for the full results.*** p < 0.01, ** p < 0.05, * p < 0.1.

corresponds to 100 per cent and a 0.1 effect size corresponds to an increase in 10 percentage points. The main independent variable of interest is 'nuclear household.' This variable takes the value of 1 if the experiment was conducted in a nuclear household and 0 for an extended household.

We find that being in a nuclear household is positively and significantly correlated with the husband's contribution as well as with the total contribution in the spousal experiment. The total contribution to the common account is approximately 7 percentage points larger when the spousal experiment is played in a nuclear household versus extended households (an effect size of 14 percent), whereas the husband's contribution is 8 percentage points larger (also an effect size of 14 percent). The difference in the wife's contribution in extended versus nuclear households is not statistically significant from zero.

Note that the results in Table 4 should be interpreted as correlations. As shown in Table 2, there are many differences between the two household structures, some of them likely to be unobservable. Because we are unable to control for these unobserved characteristics and the small sample size does not allow for a (quantitative) study of household formation that might lead to an instrumental variables strategy along the lines of Foster and Rosenzweig (2002) or Dhanaraj and Mahambare (2019), the coefficients estimated in Table 4 capture only correlations between household structure and contributions.

3.2. Contributions within the extended household

We now turn our attention to the inside workings of the extended household, which are less prone to this critique. In Table 5, we analyse how patterns of contributions in the extended household experiments change with the relationship between participants. We present the results using outcomes of all experiments played within the extended household. The dependent variable is the average contribution of both players to the common account (again in proportion). Due to the complexity and variety of household structures and potential players, and the limits in terms of sample size, we

Table 5. Contribution to the common account by household relation in the extended household

	Average contribution	Average contribution
	(1)	(2)
Both players male	−0.010	−0.048
(0 = players are not both male; 1 = both players are male)	(0.046)	(0.041)
Both players different sex	0.049**	0.034
(0 = both players not different sex; 1 = both players are different sex)	(0.020)	(0.022)
Blood relatives	0.089***	0.098***
(0 = players are not related by blood; 1 = players are related by blood)	(0.025)	(0.029)
Same generation	−0.021	−0.030
(0 = players belong to different generations; 1 = players are from same generation)	(0.025)	(0.033)
Spouses	0.031	0.055
(0 = players are not married to each other; 1 = players are married to each other)	(0.027)	(0.034)
Constant	0.462***	0.469***
	(0.017)	(0.017)
HH fixed effects	No	Yes
Number of experiments	474	474
R-squared	0.053	0.626

Notes: This table reports the results of the regression mapping the contribution to the common account in all games (including the spousal game) played in the extended family. Contributions are measured in proportion. In Column (1), standard errors are clustered at the household level. Column (2) employs household fixed effects. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

estimate determinants of the bilateral relationship as a function of blood relation, sex, generation, and marital links. Note that the mother-in-law/daughter-law relationship is captured by the constant – both players female, not related by blood, of different generations and not spouses. Column (1) does not control for household fixed effects; Column (2) includes household fixed effects. Since each household could have played up to six public good experiments, the fixed effects control for observable and unobservable household characteristics that are fixed across experiments played within the household (such as, size of household, income, caste, religion).

The results in Table 5 indicate that when players are of different sex, the contribution to the common account increases by possibly 3 to 5 percentage points as compared to an experiment where both players are female (the omitted dummy category). Blood relatives contribute significantly more to the common account (9 to 10 percentage points) as compared to in-laws.

To gain a better understanding of the relative efficiency of each relationship within the extended household, we report the results of a series of joint hypothesis tests in Table 6. The tests are performed using the OLS results (with household fixed effects) from Column (2), Table 5. Consider the following OLS regression that corresponds to the results presented in Table 5, where $C_{i,j}$ is the contribution to the common account by pair i in household j and θ is the household fixed effect:

$$C_{i,j} = b_0 + b_1 MALE_{i,j} + b_2 DIFFGEND_{i,j} + b_3 BLOOD_{i,j} + b_4 GENERATION_{i,j} + b_5 SPOUSE_{i,j} + \theta j + \epsilon_{i,j}$$

The constant term in Table 5 (b_0), that is, when all dummy variables are zero (both players are female, in-laws, of different generation, and not spouses) captures the base category, the relationship between the mother-in-law and daughter-in-law. This pair contributes, on average, 47 per cent of the total endowment to the common account.

Table 6. Contribution to the common account by household relation in the extended household: results of hypothesis tests

Relationship			Coefficient			
Player 1	Player 2	Number of experiments		Direction	Percentage point difference	p-value
Column (1)	Column (2)	Column (3)	Column (4)	Column (5)	Column (6)	Column (7)
In-law relations						
Mother-in-law	Daughter-in-law	96	b0	*base category*		
Father-in-law	Daughter-in-law	85	b0+ b2	more	+3	0.115
Brother-in-law	Sister-in-law	32	b0+ b2+ b4	more	+0.5	0.905
Sister-in-law	Sister-in-law	23	b0+ b4	less	−3	0.366
Blood relations						
Mother	Daughter	5	b0+ b3	More	+10	0.001
Father	Son	35	b0+ b1+ b3	More	+5	0.108
Father	Daughter	47	b0+ b2+ b3	More	+13	0.000
Mother	Son					
Sister	Sister	0	b0+ b3+ b4	More	+7	0.149
Brother	Brother	3	b0+ b1+ b3+ b4	More	+2	0.669
Brother	Sister	1	b0+ b2+ b3+ b4	More	+10	0.033
Spousal relationship						
Husband	Wife	147	b0+ b2+ b4+ b5	More	+6	0.010

Notes: This table reports the hypothesis tests of coefficients from the regression run in Table 5. Note that as the father-daughter pair and the mother-son pair share the same specification in Table 5, no separate hypotheses testing can be conducted in Table 6. A t-test comparing these contributions across these two pairs however reveals no statistically significant differences. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Different combinations of these dummy variables capture the other relationships within a household – see Column (4). We conduct tests whether contributions in these relationships differ from those in the mother-in-law/daughter-in-law relationship. Column (6) reports the mean differences between the base category and the other relationships in percentage points. Column (7) reports the *p*-value of the corresponding hypothesis test. Column (3) notes the number of experiments within each category. Observe that some categories have a very small sample size, especially among the blood relations, and results need to be interpreted with this caveat in mind.

Compared to the mother-in-law/daughter-in-law pair, parents and children contribute significantly more. Mothers and daughters contribute 10 percentage points more to the common account, on average, whereas fathers and sons contribute about 5 percentage points more, on average. Fathers paired with daughters and mothers paired with sons contribute the highest on average to the common account (60 percent on average, which is about 13 percentage points more than the mother-in-law /daughter-in-law pair). Spouses also contribute significantly more, by 6 percentage points, on average. The only relationship that contributes less than the mother-in-law/daughter-in-law pairing is two sisters-in-law. However, this result is not statistically significant.

Note that these results are contingent on other members present in the household. Meaning, when looking at the experimental data of a father–son combination in a given household, for instance, their behaviour will be contingent on the fact that they are part of a large household. In addition, recall that Table 5 – Column (2) – on which Table 6 is based – exploits the within household variation in efficiency among pairs of participants, and reports the average of these household-level comparisons. Hence, when looking at the father–son combination in Table 6, the effects reported are conditional on the household structures in the sample.

Table 6 considers the overall contributions to the common account. However, as noted in Table 3, contributions of participants might be drastically different from each other. In effect, free-riding has been widely documented in both laboratory and field settings. In Appendix Table A1, we regress the first participant's contribution on the second participant's contribution for a variety of experiments and specifications. We note that, overall, the participants' contributions are positively correlated. However, the strength of this correlation declines, and becomes statistically insignificant when one considers within-household relationships in the extended family with household fixed effects. Considering only the mother-in-law – daughter-in-law relationship, we can no longer find evidence of such a positive correlation. Keeping in mind the limitations of this exercise – indeed, we do not know what would have happened if the mother-in-law would have increased her contribution as we only conducted the experiment once per pair per household, these results suggest overall cooperative behaviour across pairs, likely household-dependent, with perhaps an increase in strategic behaviour for certain pairs, such as mother-in-law – daughter-in-law.

What factors contribute to the lack of efficiency in the key relationships surrounding the daughter-in-law in an extended household? One hypothesis that emerges from the qualitative work is that the ability to affect decision-making (or lack thereof) in extended households is a key driver of inefficiency and this ability is heavily affected by the presence of the senior in-law members.

3.3. Decision-making in the extended household

Our survey sheds light on the distribution of decision-making power within the household. We asked the respondent to list the primary decision maker as well as all the persons who have a say in a series of daily household activities and decisions regarding children. Table 7 tabulates the responses for extended households and, as a comparison point, nuclear households. We distinguish between three types of extended households. First, where neither the father-in-law nor the mother-in-law is present. Second, where either of the parents-in-law is present. Third, where both parents-in-law are present. Note that in this table the respondent is the wife and the relationships are with respect to her.

In about half of nuclear households, we find the husband identified as the primary decision maker; in the other half, it is the wife who is considered the main decision maker. In extended households

Table 7. Primary decision maker within extended and nuclear households

	Nuclear		Extended			
			No parents-in-law	Only mother-in-law	Only father-in-law	Both parents-in-law
Decisions	Primary decision maker	%	Primary decision maker %	%	%	%
HH chores: cooking, shopping	Husband	45	Father-in-law		40	47
	Wife	51	Mother-in-law	6		13
			Husband 31	26	17	13
			Wife 65	64	40	22
	Others	4	Others 4	4	4	6
Children: child illness, school enrolment and attendance	Husband	49	Father-in-law		22	38
	Wife	50	Mother-in-law	3		4
			Husband 35	34	21	16
			Wife 58	54	48	31
	Others	1	Others 7	9	9	12
Number of respondents		67	84	38	19	63

Notes: This table reports results from an analysis of survey data recording who is the primary decision maker for specific situations in nuclear and extended households. For the list of situations, see Table A2. The percentage reported is the average over three decision-making subcategories (for household chores – cooking, local purchases, and shopping outside the village; for decisions related to respondent's children – health, enrolment, and attendance).

where both parents-in-law are present, 22 per cent of wives in the younger generation are the primary decision maker regarding daily tasks and a bit under one-third are the primary decision makers over realms concerning (their) children. In households with only one parent-in-law, the situation critically depends on who that person is. If it is just the mother-in-law, then the proportion of wives with decision-making power regarding daily tasks is higher, 64 per cent. If it is just the father-in-law, on the other hand, this percentage is just 40. In households with no parents-in-law, the proportion of households where the wife is the decision maker is even larger than those in nuclear households. Note that in these households, the wife could be the mother-in-law herself, or either she or her sister-in-law could be the most senior woman in the household.

The complexity of who has decision-making power in extended household is consistent with the literature. Rangel and Thomas (2019) also noted an increase in decision makers in extended households in their study set in Burkina Faso, and Mookerjee (2019), looking at the impacts of an inheritance reform in India, indicates shifts in power from the senior generation to the junior generation. Of particular interest is the discrepancy between the mother-in-law and father-in-law presence, pointing at changes in power when the eldest male member dies.

We now link up this information on decision-making with the contributions in the public goods experiment. We distinguish between three cases: (1) both individuals have a say, (2) only one individual has a say, and (3) neither of the two individuals has a say. The regression sample for Appendix Table A2 is all experiments excluding the spousal experiment and hence, by definition, only includes extended households. The base category for each decision-making realm is neither of the two individuals has a say in decision-making. Across all decision-making domains, only the situations of one of two players or both players having a say in decision-making are negatively

correlated with contributions to the common account relative to neither player having a say, although these differences are not always statistically significant. In terms of decisions relating to what to cook, what/how much to buy in the local market, and (the respondent's) child's illness, the (negative) coefficient on both players having a say is almost double that of only one player having a say, and is statistically significant. On the contrary, when the decision-making concerns (the respondent's) children's education, a more concentrated decision-making power among one of the individuals is negatively correlated with contributions to the common account. This second set of results regarding children's education is consistent with the qualitative interviews: it is the lack of decision-making power among one of the players that is driving down the contribution to the common account. The first set of results is harder to interpret, as both parties having a say might indicate either a battle for power or a cooperative – in the colloquial sense of the word – decision-making process with limited conflict.

3.4. Results from qualitative interviews

We summarise the results of the qualitative interviews in the Appendix. Respondents included wives in nuclear families and daughters-in-law and mothers-in-law in the extended families. Half of the households interviewed have migrant members. Appendix Table A3 introduces the sample.[16]

We review the main conclusions here. Documenting the general perceptions on the costs/benefits of extended households, we note that only one respondent considered nuclear families to be superior to extended households, citing conflict. We proceed with a description of the inefficiencies mentioned by the respondents (note that respondents did not use the term 'inefficiency,' rather, we flagged something to be inefficient when the respondent described cases of free-riding, moral hazard, cheating, and so on). We then proceed with examples, linking up inefficiency with elements of the household decision-making process.

We note that junior women in extended households perceive themselves to have little decision-making power, in contrast with women in nuclear families. It is this lack of decision-making power of junior women, together with discrepancies in preferences and goals and the opportunity to hide one's efforts, which then appears to lead to the various inefficiencies the respondents mention. Unable to assert one's preferences or achieve one's goals, junior women in extended households appear to resort to behaviours that improve their personal well-being but reduce the household's.

4. Conclusion

Using a series of public goods experiments conducted with adults in extended and nuclear households in India, we investigate efficiency in within-household decision-making. We focus on Pareto Efficiency of an allocation in which it is not possible to make one individual better off without making another individual worse off. We find three interrelated sets of results. First, we find that households are inefficient across household structures, whether it be a nuclear or an extended family household. Indeed, all but 2 per cent of pairs failed to maximise surplus in the public goods experiment. On average, each pair leave about 10 Rs on the table. Second, relationships within the extended households are not all equally inefficient, with the mother-in-law and daughter-in-law relationship being particularly inefficient. Third, we provide descriptive evidence that spouses are less efficient in extended households than in nuclear households. Comparing extended households with nuclear households, it should be noted that the difference in magnitude between the two types of structures, while statistically significant, and substantial in relative terms, is not that large in absolute terms. The difference of 8 per cent between nuclear and extended pairs is equivalent to 1.5 Rs.

Survey and qualitative evidence further point at an unequal distribution of power between generations and sexes as an underlying factor in these results. As such, this paper contributes to a broader literature which uses experiments to shed light on social relations (Hoff, Kshetramade, & Fehr, 2011; Pecenka & Kundhlande, 2013) and differences between communities (Andersen et al., 2008; Braaten,

2014).[17] These findings fill important gaps in the literature, as the economics literature, albeit with some notable exceptions (e.g. Rangel & Thomas, 2019), has struggled to understand complex households, even though they are a central part of many non-Western societies. Just as the study of within-household decision-making in nuclear households has led to a better understanding of the allocation of resources within households and more appropriately designed policies, it is equally important to understand decision-making in extended households to improve a variety of outcomes, such as fertility, health and education.

While we recognise that external validity is limited from this in-depth, but small-scale study, we note that the most direct policy implication of our findings on patterns of inefficiency within extended households is for policies that target specific recipients within a household, such as cash-transfer programmes in the context of societies with extended family households. Duflo (2012) notes the importance of targeting transfers to the 'woman' in the household, with the aim of promoting gender equality as well as improving other desirable outcomes such as health and education (Gitter & Barham, 2008; Millán, Barham, Macours, Maluccio, & Stampini, 2019).[18] In the context of an extended family household, the identity of this 'woman' is ambiguous, so simply targeting transfers on the basis of sex might fail to achieve desired outcomes. Our combined survey, qualitative and experimental results point at the overall lack of decision-making power among certain members of the household, implying that, if government programmes maintain the household head as the beneficiary, these members are unlikely to have much say in whether and how the benefits of these programmes may be used. This point is also argued by Porter and Adams (2016), who note the need to study sharing rules within households for redistributive programmes. Thus, what might work in nuclear households might not be work in extended households, and vice versa (this is also evident from the results reported by Heath, Hidrobo, & Roy, 2020 who note a decrease in partner violence as a response to a cash transfer to men, but only among polygamous households).

Previous studies indicate that some degree of sharing should be expected. Bertrand, Mullainathan, and Miller (2003) find that a South African pension programme reduced the labour supply of prime age individuals in extended households, especially when the pensioner was a woman. Similarly, Angelucci, De Giorgi, Rangel, and Rasul (2010) find that secondary school enrolment only responds to cash transfers in the Mexican PROGRESSA programme when the family is embedded in an extended family network in the village. In the Indian context, given the conflictual nature of the mother-in-law/daughter-in-law relationship, as recognised in this study, but also others, it is not clear to what extent transfers targeted to the female head of household or spouse of the head would lead to improvements in the situation of the daughter(s)-in-law. Thus, particular attention needs to be paid to designing cash transfer programmes in extended households. A back-of-the-envelope computation using our estimates reveals that if funds were to be transferred directly to a junior daughter-in-law, one would expect an efficiency loss of 10 to 12 per cent. Comparing this to the situation where a cash transfer would be made to the woman in a nuclear household, one would expect an efficiency loss of 9 per cent (and if made to the man in a nuclear household, the efficiency loss is estimated at 7 percent).

A common criticism levelled against lab-in-the-field experiments is whether they mimic real life decisions sufficiently such that patterns of behaviour in the experiment allow us to learn something about real-life behaviour. The public goods experiment we implement is designed to uncover a particular dimension of inefficiency within households: concealing personal resources instead of contributing them to the household as a whole, with potentially larger shared benefits. We draw on the qualitative interviews to argue that household members in extended households do hide resources in processes that our experiment mimics. For example, as in the experiment, the wife of a migrant husband decides to hide a share of the remittances from her family-in-law. However, the qualitative work also uncovered additional patterns and dimensions of inefficient behaviour that other experiments could better mimic, such as production inefficiencies (slacking off and other forms of free-riding). Neither does our experiment speak directly to issues studied in Dhanaraj and Mahambare (2019), Debnath (2015), or Saikia and Singh (2009): the role of norms in extended households around women's employment and access to health care. Developing experiments or other empirical methods,

building on Udry (1996), and more recently Rangel and Thomas (2019), to unpack these other dimensions of inefficiency within the extended family household and to relate them to observed behaviour, is one fruitful avenue for future research.

We conclude with a note on household formation and household structure. Although we find both higher inefficiency between spouses and their in-laws within extended households, and higher inefficiency between spouses in extended households relative to nuclear households, this does not mean that household members would be better off if they split into nuclear households. This would be true even if the correlations we present were causal relationships, given that there are economies of scale and specialisation gains in production that favour larger households. Appendix Table A4 compares several health and education outcomes in extended and nuclear households. Although it is based on a small sample, mothers are more likely to inquire into a child's homework in the nuclear family, whereas children are healthier in the extended household. These patterns are suggestive of tradeoffs between private and public goods with (average) choices that may be different between nuclear and extended households.

However, in order to fully study the causal implication of household structure for household consumption, production, and investment decisions, one would require access to long-term panel data and a strategy to deal with the endogeneity of choice of household structure. As Jeffery and Jeffery (2018) note, and as we confirmed in our qualitative interviews, households change. A young couple may start off their married life in an extended household but split off later and form a nuclear household as their family continues to grow. Foster and Rosenzweig (2002), using a national level data set from India (ARIS/REDS), note that one-third of the households documented in the early 1970s with more than one heir had split during re-interview in the early 1980s; in many cases this split was linked to the death of a parent. Hence, they use death of the most senior male member, number of heirs, and claimant wives as drivers of household splits (and thus, creators of nuclear households). Similarly, Dhanaraj and Mahambare (2019) rely on an indicator for whether the husband's father is alive. Mookerjee (2019) documents effects of a change in inheritance law on within-extended household bargaining power, and possibly family splits. Such a study would start with the careful documentation of the prevalence and characteristics of extended households, and then proceed with the causal implication. Further inspiration for plausible identification methods can be drawn from the numerous studies in the other social sciences, both demographic accounts as well as detailed ethnographic studies, some of which highlight the role of conflict (Caldwell et al., 1984; Jeffery & Jeffery, 2018; Lentz, 2018; Ram & Wong, 1994).[19] Relatedly, we see a careful analysis of the intersection of bargaining power and temporary migration as an important avenue for future research (Antman, 2015, 2018; Joseph et al., 2018; Rao, 2012).

Notes

1. We define a household as members who eat together on a daily basis. For other definitions, see Beaman and Dillon (2012). The extended family household is positioned opposed to nuclear household, which comprises partners and their unmarried children. Other disciplines have further categorised family structures and consider the concept of family in a more nuanced and fluid manner (Caldwell et al., 1984; D'cruz & Bharat, 2001; Khatri, 1975; Niranjan et al., 2005).
2. The long-term nature of the extended family household and altruism between family members might counter some of these pressures. In addition, enforcement through violence and lack of privacy could turn any household into a 'unitary' household, that is, a family decisions are made according to the preferences of the head or 'dictator' in the family, de facto achieving efficiency. For a recent nuanced account on the use of violence see Lentz (2018).
3. There is a growing literature on polygynous households in West Africa. See Akresh, Chen, and Moore (2012), Barr, Dekker, Janssens, Kebede, and Kramer (2019), Damon and McCarthy (2019), Hidrobo, Hoel, and Wilson (2020), Munro, Kebede, Tarazona, and Verschoor (2019), and Rossi (2019).
4. Guirkinger et al. (2015), building on Udry (1996), document that land yields are larger on plots where an individual has control over inputs and the use of resources, compared to extended family plots in Mali. But Kazianga and Wahhaj (2013) find the opposite results in Burkina Faso, a difference that Guirkinger et al. (2015) attribute to the relatively large and complex households in their sample. Ouedraogo et al. (2016), also in Burkina Faso, document that nuclear households are more likely to adopt labour-intensive agricultural technologies than extended households. There is a growing literature on polygynous households in West Africa. See Akresh, Chen, and Moore (2012), Barr, Dekker, Janssens, Kebede, and Kramer (2019), Damon and McCarthy (2019), Hidrobo, Hoel, and Wilson (2020), Munro, Kebede, Tarazona, and Verschoor (2019), and Rossi (2019).

5. See Munro (2018) for a survey of the literature using experiments to investigate household behaviour; and Ashraf (2009), Castilla and Walker (2013), Cochard, Couprie, and Hopfensitz (2016), Iversen, Jackson, Kebede, Munro, and Verschoor (2011), and Kebede, Tarazona, Munro, and Verschoor (2014), Mani (2020) for experiments among nuclear households in developing countries; and Barr et al. (2019) and Munro et al. (2019) for polygynous households.

6. For a discussion of within-household models, see Browning, Chiappori, and Weiss (2014), Doss and Quisumbing (2020) and Strauss and Thomas (1995).

7. The fact that many individuals enter into and remain in the extended family household voluntarily suggests that the benefits of the extended family structure exceed the costs for these individuals. However, when social norms such as patrilocality and around spousal cohabitation constrain choices over living arrangements, this deduction might be incorrect. Browning et al. (2014) note that efficiency in intra-household decision-making can be undermined 'when existing social norms impose patterns of behavior that may conflict with efficiency.'

8. Harris-Fry et al. (2017) review the literature on food allocation in South Asian families and link social hierarchies and patrilocality with unequal status and access to food. Coffey et al. (2016) document effects of these hierarchies on the next generation in India and find that children of wives married to younger brothers in extended households are, on average, shorter than children of wives married to older brothers; the same pattern does not exist among brothers living separately in nuclear households.

9. The project's data and instruments are available via:https://figshare.com/articles/Tara_Akshar_Research_Project/7205696.

10. The villages are well connected by bus service and tarred roads to the nearest town and railway station (within 5 km and 12 km, respectively). All villages have access to electricity, cellular phone coverage, and water (though not all of these services might be available throughout the day and to everyone).

11. Computed from Table DDW-0000 C-O8, and SC-09-00-008-2011-DDW.XLS, Census of India, 2011. Restricted to all persons above the age of 18 years. Literacy is defined as being able to read and write.

12. While we tried to limit the impact of a temporary absence, by returning to the household the following day if experiment participants were not present, some household members might engage in seasonal or temporary migration. Relative proximity of the study area to major cities such as Varanasi, Allahabad, and Delhi, combined with low living standards, indeed resulted in a high migration rate, especially among the men. Among our respondents, 30 per cent noted that her husband was not working in the village at the time of the survey. We recognise the limitation this implies in terms of sample selection.

13. To further provide confidentiality, we contributed an amount of 42 Rs to the (common) blue box; as this amount was not known to the participants, the counterpart could not figure out how much the other had contributed to the blue box.

14. While the experiment does not impose any assumptions on the structure of preferences (apart from the standard assumptions, including strict monotonicity), the experiment can only detect inefficient behaviour if participants have different preferences. This is likely to be the case. See Duflo (2012), Ashraf, Field, and Lee (2014) and Castilla (2015).

15. Note that the order in which the experiments were played was fixed. This fixed order could be a concern for the analysis, as previous results in the laboratory show that a participant's contribution to the common account declines (in repeated experiments) over time (Chaudhuri, 2011). Using natural variation in the number of experiments played due to varying household size, absent or missing players, we note that there is no evidence of order effects in our sample. This may be because experiments were only paid out after all three experiments were completed for each participant; while the results on declining rates occur when participants learn about the other participants' behaviour over the rounds (Chaudhuri, 2011).

16. The household structure appears to be both transient and complex and respondents in nuclear households reported having lived in an extended family household in the past. In three cases, the productive unit surpasses the consumption unit (interviews 4, 7, and 8), meaning that the group of people who worked together on the land owned or co-owned is larger than what we defined to be the household. This is not an uncommon (Beaman & Dillon, 2012; Udry, 1996).

17. There is a significant literature in the Indian context describing differences in outcomes by caste, religion and sex. See Borooah (2012), Deshpande (2017), and Kambhampati and Rajan (2008).

18. Even when the woman in the household is targeted, it is still possible that the funds end up with the husband (Bernhardt, Field, Pande, & Rigol, 2019).

19. Our current understanding of nuclear households has been driven by studies using surveys, experimental experiments and randomised controlled trials (this is also noted by Doss & Quisumbing, 2020). We would encourage future research to combine these with ethnographic methods and other more qualitative approaches to fully uncover the role, dynamics and policy implications of extended households in developing countries.

20. The men in the extended households are engaged in agriculture, casual labour, sales jobs, or migration. Here too, social norms appear to be at play; in all farming households (with the exception of interview 5, where only one male was involved in farming), decisions regarding the household land (that is, which crops to cultivate and other input decisions) are usually made by the eldest able man, sometimes in discussion with the other adult men. All available men work on the land to a certain extent. In all families, the harvest is shared equally between the households who work on the land. In the cases where the production unit exceeded the consumption unit, this gave rise to free-riding. For instance, respondent 8 noted that although everyone receives an equal share from the harvest, her youngest brother-in-law contributes little to the activities and is mostly preoccupied with his carpet weaving activity, the returns of which are only used by himself and his nuclear unit.

21. These inconsistencies in an individual's narrative were not uncommon, and we attribute them to the complexity of the family relations where an individual tries to reconcile many contradictory aspects of her reality, but also to the limitations of our method. A carefully executed ethnographic approach, as in Caldwell et al. (1984), Jeffery and Jeffery (2018) and Lentz (2018), would have likely yielded many additional insights.

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References

Akresh, R., Chen, J. J., & Moore, C. T. (2012). Productive efficiency and the scope for cooperation in polygynous households. *American Journal of Agricultural Economics*, *94*, 395–401.

Andersen, S., Bulte, E., Gneezy, U., & List, J. A. (2008). Do women supply more public goods than men? Preliminary experimental evidence from matrilineal and patriarchal societies. *American Economic Review*, *98*, 376–381.

Angelucci, M., De Giorgi, G., Rangel, M. A., & Rasul, I. (2010). Family networks and school enrolment: Evidence from a randomized social experiment. *Journal of Public Economics*, *94*, 197–221.

Antman, F. M. (2015). Gender discrimination in the allocation of migrant household resources. *Journal of Population Economics*, *28*, 565–592.

Antman, F. M. (2018). Women and migration. In S. L. Averett, L. M. Argys, & S. D. Hoffman (Eds.), *Oxford handbook of women and the economy* (pp. 731–747). New York: Oxford University Press.

Ashraf, N. (2009). Spousal control and intra-household decision-making: An experimental study in the Philippines. *American Economic Review*, *99*, 1245–1277.

Ashraf, N., Field, E., & Lee, J. (2014). Household bargaining and excess fertility: An experimental study in Zambia. *American Economic Review*, *104*, 2210–2237.

Baland, J. M., Bonjean, I., Guirkinger, C., & Ziparo, R. (2016). The economic consequences of mutual help in extended families. *Journal of Development Economics*, *123*, 38–56.

Barr, A., Dekker, M., Janssens, W., Kebede, B., & Kramer, B. (2019). Cooperation in polygynous households. *American Economic Journal. Applied Economics*, *11*, 266–283.

Beaman, L., & Dillon, A. (2012). Do household definitions matter in survey design? Results from a randomized survey experiment in Mali. *Journal of Development Economics*, *98*, 124–135.

Becker, G. S. (1981). *A treatise on the family*. Cambridge: Harvard University Press.

Bergstorm, T. C. (1997). A survey of theories of the family. In M. R. Rosenzweig & O. Stark (Eds.), *Handbook of population and family economics* (Vol. 1A, pp. 21–79). Amsterdam: North-Holland Publishing Company.

Bergstrom, T., Blume, L., & Varian, H. (1986). On the private provision of public goods. *Journal of Public Economics*, *29*, 25–49.

Bernhardt, A., Field, E., Pande, R., & Rigol, N. (2019). Household matters: Revisiting the returns to capital among female microentrepreneurs.". *American Economic Review: Insights*, *1*, 141–160.

Bertrand, M., Mullainathan, S., & Miller, D. (2003). Public policy and extended families: Evidence from pensions in South Africa. *World Bank Economic Review*, *17*, 27–50.

Bharat, S. (1994). Alternate family patterns and policies. In M. Desai (Ed.), *Enhancing the role of the family as an agency for social and economic development* (pp. 72–76). Mumbai: TISS.

Bobonis, G. J. (2009). Is the allocation of resources within the household efficient? New evidence from a randomized experiment. *Journal of Political Economy*, *117*(3), 453–503.

Bongaarts, J. (2001). Household size and composition in the developing world in the 1990s. *Population Studies*, *55*(3), 263–279.

Borooah, V. K. (2012). Social identity and educational attainment: The role of caste and religion in explaining differences between children in India. *Journal of Development Studies*, *48*, 887–903.

Braaten, R. H. (2014). Land rights and community cooperation: Public goods experiments from Peru. *World Development*, *61*, 127–141.

Browning, M., Chiappori, P. A., & Weiss, Y. (2014). *Economics of the family*. Cambridge: Cambridge University Press.

Caldwell, J. C., Reddy, P. H., & Caldwell, P. (1984). The determinants of family structure in rural South India. *Journal of Marriage and Family*, *46*, 215–229.

Castilla, C. (2015). Trust and reciprocity between spouses in India. *American Economic Review*, *105*, 621–624.

Castilla, C., & Walker, T. (2013). Is ignorance bliss? The effect of asymmetric information between spouses on intra-household allocations. *American Economic Review*, *103*, 263–268.

Chaudhuri, A. (2011). Sustaining cooperation in laboratory public goods experiments: A selective survey of the literature. *Experimental Economics*, *14*, 47–83.

Chiappori, P. A. (1992). Collective labor supply and welfare. *Journal of Political Economy*, *100*, 437–467.

Cochard, F., Couprie, H., & Hopfensitz, A. (2016). Do spouses cooperate? An experimental investigation. *Review of Economics of the Household*, *14*, 1–26.

Coffey, D., Khera, R., & Spears, D. (2016, April). *Intergenerational effects of women's status: Evidence from joint Indian households*. PAA 2016 Annual Meeting, Washington DC. Retrieved from https://paa.confex.com/paa/2016/meetingapp.cgi/Paper/6434

Cox, D., & Fafchamps, M. (2007). Extended family and kinship networks: Economic insights and evolutionary directions. In T. P. Schultz & J. A. Strauss (Eds.), *Handbook of development economics* (Vol. 4, pp. 3711–3784). Amsterdam: Elsevier.

D'cruz, P., & Bharat, S. (2001). Beyond joint and nuclear: The Indian family revisited. *Journal of Comparative Family Studies*, *32*, 167–194.

Damon, A. L., & McCarthy, A. S. (2019). Partnerships and production: Agriculture and polygyny in Tanzanian households. *Agricultural Economics*, *50*, 527–542.

De Weerdt, J., Genicot, G., & Mesnard, A. (2019). Asymmetry of information within family networks. *Journal of Human Resources*, *54*, 225–254.

Debnath, S. (2015). The impact of household structure on female autonomy in developing countries. *Journal of Development Studies*, *51*, 485–502.

Dercon, S., & Krishnan, P. (2000). In sickness and in health: Risk sharing within households in rural Ethiopia. *Journal of Political Economy*, *108*, 688–727.

Deshpande, A. (2017). Affirmative action in India. In E. Kennedy-Dubourdieu (Ed.), *Race and inequality: World perspectives on affirmative action* (pp. 63–76). London: Taylor and Francis.

Dhanaraj, S., & Mahambare, V. (2019). Family structure, education and women's employment in rural India. *World Development*, *115*, 17–29.

Doss, C. R., & Quisumbing, A. R. (2020). Understanding rural household behaviour: Beyond Boserup and Becker. *Agricultural Economics*, *51*(1), 47–58.

Dubois, P., & Ligon, E. (2009). *Nutrition and risk sharing within the household* (TSE Working Papers 09-108). Toulouse School of Economics (TSE). Retrieved from https://ideas.repec.org/p/tse/wpaper/21967.html

Duflo, E. (2012). Women empowerment and economic development. *Journal of Economic Literature*, *50*, 1051–1079.

Foster, A. D., & Rosenzweig, M. R. (2002). Household division and rural economic growth. *Review of Economic Studies*, *69*, 839–869.

Gitter, S. R., & Barham, B. L. (2008). Women's power, conditional cash transfers, and schooling in Nicaragua. *World Bank Economic Review*, *22*, 271–290.

Glewwe, P., & Grosh, M. E. (Eds.). (2000). *Designing household survey questionnaires for developing countries: Lessons from 15 years of the living standards measurement study*. Washington, DC: World Bank.

Guirkinger, C., Platteau, J. P., & Goetghebuer, T. (2015). Productive inefficiency in extended agricultural households: Evidence from Mali. *Journal of Development Economics*, *116*, 17–27.

Harris-Fry, H., Shrestha, N., Costello, A., & Saville, N. M. (2017). Determinants of intra-household food allocation between adults in South Asia: A systematic review. *International Journal for Equity in Health*, *16*, 107.

Heath, R., Hidrobo, M., & Roy, S. (2020). Cash transfers, polygamy, and intimate partner violence: Experimental evidence from Mali. *Journal of Development Economics*, *143*, 102410.

Hidrobo, M., Hoel, J., & Wilson, K. (2020). Efficiency and status in polygynous pastoralist households. *Journal of Development Studies*, 1–17. doi:10.1080/00220388.2020.1762863

Hoff, K., Kshetramade, M., & Fehr, E. (2011). Caste and punishment: The legacy of caste culture in norm enforcement. *Economic Journal*, *121*, F449–F475.

Iversen, V., Jackson, C., Kebede, B., Munro, A., & Verschoor, A. (2011). Do spouses realise cooperative gains? Experimental evidence from rural Uganda. *World Development*, *39*, 569–578.

Jakiela, P., & Ozier, O. (2016). Does Africa need a rotten kin theorem? Experimental evidence from village economies. *Review of Economic Studies*, *83*, 231–268.

Jeffery, P., & Jeffery, R. (2018). *Don't marry me to a plowman!: Women's everyday lives in rural north India*. New York: Westview Press.

Joseph, T., Nyarko, Y., & Wang, S. Y. (2018). Asymmetric information and remittances: Evidence from matched administrative data. *American Economic Journal. Applied Economics*, *10*(2), 58–100.

Kambhampati, U. S., & Rajan, R. (2008). The 'nowhere' children: Patriarchy and the role of girls in India's rural economy. *Journal of Development Studies*, *44*, 1309–1341.

Kazianga, H., & Wahhaj, Z. (2013). Gender, social norms, and household production in Burkina Faso. *Economic Development and Cultural Change*, *61*, 539–576.

Kebede, B., Tarazona, M., Munro, A., & Verschoor, A. (2014). Intra-household efficiency: An experimental study from Ethiopia. *Journal of African Economies*, *23*, 105–150.

Khatri, A. (1975). The adaptive extended family in India today. *Journal of Marriage and the Family*, *37*, 633–642.

LaFave, D., & Thomas, D. (2017). Extended families and child well-being. *Journal of Development Economics*, *126*, 52–65.

Lentz, E. C. (2018). Complicating narratives of women's food and nutrition insecurity: Domestic violence in rural Bangladesh. *World Development*, *104*, 271–280.

Mani, A. (2020). Mine, yours or ours? The efficiency of household investment decisions: An experimental approach. *World Bank Economic Review*, *34*, 575–596.

Medora, N. P. (2007). Strengths and challenges in the Indian family. *Marriage & Family Review*, *41*, 165–193.

Millán, T. M., Barham, T., Macours, K., Maluccio, J. A., & Stampini, M. (2019). Long-term impacts of conditional cash transfers: Review of the evidence. *World Bank Research Observer*, *34*, 119–159.

Mookerjee, S. (2019). Gender-neutral inheritance laws, family structure, and women's status in India. *World Bank Economic Review*, *33*, 498–515.

Munro, A. (2018). Intra-household experiments: A survey. *Journal of Economic Surveys*, *32*(1), 134–175.

Munro, A., Kebede, B., Tarazona, M., & Verschoor, A. (2019). The lion's share: An experimental analysis of polygamy in Northern Nigeria. *Economic Development and Cultural Change*, *67*, 833–861.

Munro, A., Kebede, B., Tarazona-Gomez, M., & Verschoor, A. (2014). Autonomy and efficiency. An experiment on household decisions in two regions of India. *Journal of the Japanese and International Economies*, *33*, 114–133.

Niranjan, S., Nair, S., & Roy, T. (2005). A socio-demographic analysis of the size and structure of the family in India. *Journal of Comparative Family Studies*, *36*, 623–652.

Ouedraogo, A., Dillon, A., & Porter, M. (2016, July 3–August 2). *How do nuclear and extended-family households differ in labor allocation decisions due to agricultural technology adoption? Evidence from Burkina Faso*. AAEA 2016 Annual Meeting, Boston, MA. Retrieved from https://ageconsearch.umn.edu/record/236123/

Pecenka, C. J., & Kundhlande, G. (2013). Theft in South Africa: An experiment to examine the influence of racial identity and inequality. *Journal of Development Studies*, *49*, 737–753.

Porter, M., & Adams, A. (2016). For love or reward? Characterising preferences for giving to parents in an experimental setting. *Economic Journal*, *126*, 2424–2445.

Rajadhyaksha, U., & Smita, S. (2004). Tracing a timeline for work and family research in India. *Economic and Political Weekly*, *39*(17), 1674–1680.

Ram, M., & Wong, R. (1994). Covariates of household extension in rural India: Change over time. *Journal of Marriage and the Family*, *56*(4), 853–864.

Rangel, M., & Thomas, D. (2019). *Decision-making in complex households* (NBER Working Paper No w26511). National Bureau of Economic Research (NBER). https://www.nber.org/papers/w26511

R ao, N. (2012). Breadwinners and homemakers: Migration and changing conjugal expectations in rural Bangladesh. *Journal of Development Studies*, *48*(1), 26–40.

Rosenzweig, M. R., & Wolpin, K. I. (1985). Specific experience, household structure, and intergenerational transfers: Farm family land and labor arrangements in developing countries. *Quarterly Journal of Economics*, *100S*, 961–987.

Rossi, P. (2019). Strategic choices in polygamous households: Theory and evidence from Senegal. *Review of Economic Studies*, *86*, 1332–1370.

Saikia, N., & Singh, A. (2009). Does type of household affect maternal health? Evidence from India. *Journal of Biosocial Science*, *41*, 329–353.

Scott, M. E., & Karberg, E. (2016). Measuring children's care arrangements and their educational and health outcomes internationally. *Global Social Welfare*, *3*, 75–89.

Sharma, U. (1980). *Women, work and property in North West India*. London: Tavistock Publications.

Speizer, I. S., Lance, P., Verma, R., & Benson, A. (2015). Descriptive study of the role of household type and household composition on women's reproductive health outcomes in urban Uttar Pradesh, India. *Reproductive Health*, *12*(1), 4.

Strauss, J., & Thomas, D. (1995). Human resources: Empirical modelling of household and family decisions. In J. Behrman & T. N. Srinivasan (Eds.), *Handbook of development economics* (Vol. 3, pp. 1883–2023). Amsterdam: Elsevier.

Uberoi, P. (1994). *Family, kinship and marriage in India*. New Delhi: Oxford University Press.

Udry, C. (1996). Gender, agricultural production, and the theory of the household. *Journal of Political Economy, 104*, 1010–1046.

Appendix.

Results from qualitative interviews.

The perceived benefits of the extended household include risk sharing, emotional support, specialisation and household public goods and joint assets. Respondent 7 noted that if her husband, a migrant, did not send money one month, it would not matter, as her mother-in-law ensures that she is taken care of. However, four out of five respondents in extended households noted inefficiencies, whereas none of the nuclear household respondents mentioned any event, activity, or behaviour that could be construed as inefficient. Most of these inefficiencies relate to labour and effort. All respondents noted a fixed set of daily duties that can include cooking, fetching water, gathering firewood, making dung cakes (used as fuel), feeding cattle, and taking care of young children and the elderly. Few women noted agricultural duties (interviews 4 and 5), including collecting fodder and threshing. In extended households, all women reported to be assigned to a subset of these tasks. Respondent 7 is in charge of cooking and looking after her own son. Her elder sister-in-law visits the field, collects fodder for the animals, and feeds them. Her mother-in-law, according to her account, does little and mainly takes care of her father-in-law, who had been unwell recently. Consistent with the literature, these tasks are governed by social norms (Jeffery & Jeffery, 2018). None of the mothers-in-law interviewed were involved in cooking, e.g. which was left to the youngest daughter-in-law.

Although these social norms may protect the household from excessive free-riding, meaning the norm ensures that meal preparation – a public good within the household – gets done, the lack of observability of effort might introduce inefficiencies. Respondent 7 admitted (to us) to cooking the food slowly so as to avoid receiving other tasks. In addition, some household members might (be perceived to?) contribute little due to the hierarchical assignment of tasks: All daughters-in-law we spoke to referred to their mothers-in-law as being 'idle' or 'somewhat useless.'[20]

Following the decision-making process sheds light on household relations. Agricultural decisions were made by the eldest capable male member. For other decisions related to clothing, education and health, there could be no obvious decision maker. Instead, we noted alliances with negotiation at the centre. Respondent 8, when she wishes to purchase something personal, will approach her husband, who is usually amenable to the request and will either purchase the item himself or approach his elder brother for funding. Or, when respondent 7 wanted to attend the literacy programme she approached her sister-in-law, who in turn approached her mother-in-law, who then, together with the sister-in-law made the decision and informed the father-in-law.

This last example illustrates the complex position of junior women in extended households. In effect, all junior women interviewed noted having 'little' to 'no' decision making power, but when pressed for examples, except for the daughter-in-law of respondent 6, all described forging alliances when need be, and perhaps they are not as powerless as they proclaim themselves to be.[21] In contrast, women in nuclear households note having considerable say. This is especially the case when the husband is a migrant worker and the day-to-day decisions are left to his spouse. In this case, the respondents all noted making the decisions themselves as to what to cook, how much to cook, and what to spend on clothing, medicine, and pens and books. The migrant husband would be asked to give his approval, though, when it comes to less frequent decisions, such as visits to the natal family, attending adult educational classes, and school enrolment. Even though such permission would be necessary, all women in nuclear households we interviewed noted that their initial request would usually be approved after a discussion with their husband.

This lack of power of junior women, together with discrepancies in preferences and goals and the opportunity to hide one's efforts, can lead to the inefficiencies the women mentioned. Unable to assert one's preferences or achieve one's goals, junior women in extended households resort to behaviours that improve their personal well-being but might reduce the household's. These behaviours can include slacking off on assigned tasks, avoiding tasks altogether, or hiding income or resources. Respondent 7, who has a migrant husband, noted that she hides around 20 percent of the remittance her husband sends her from her mother-in-law.

Finally, respondents recognised that decision-making was subject to change. This is consistent with the literature (Jeffery & Jeffery, 2018; Uberoi, 1994). The relationship between the various extended family household members is complex and changes over time when life events take place. For instance, a younger daughter-in-law might have very little say when she joins the household, relative to the unmarried daughters living in the household; however, her position might change after the birth of a son or daughter. The mother-in-law's power can change after her husband dies. It is in these periods of change that households see bargaining around household chores, expenses, and the allocation of resources (Sharma, 1980).
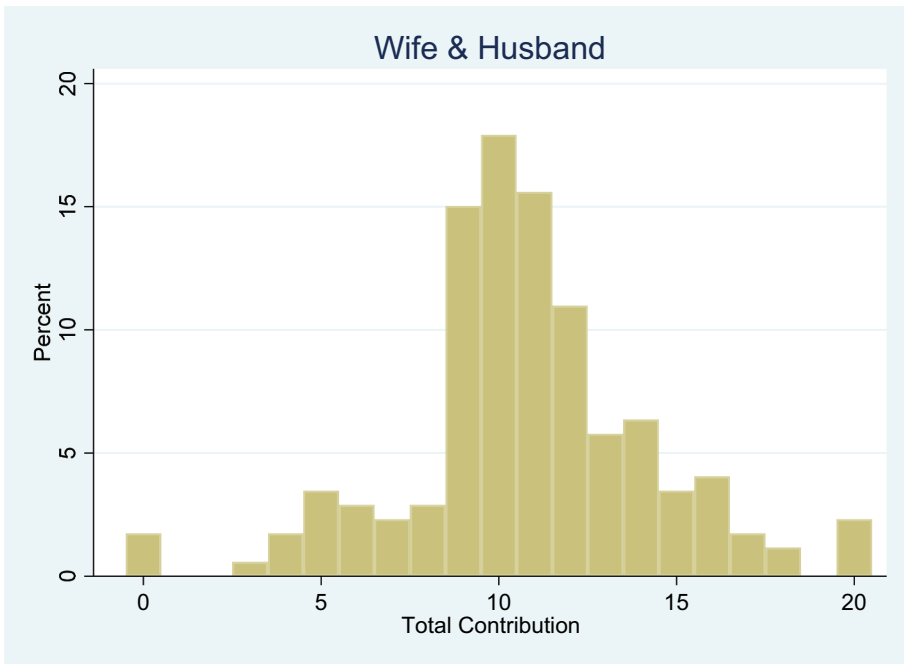
Figure A1. Histogram of the total contribution to the common account in the spousal experiment [20 tokens = 100 percent].
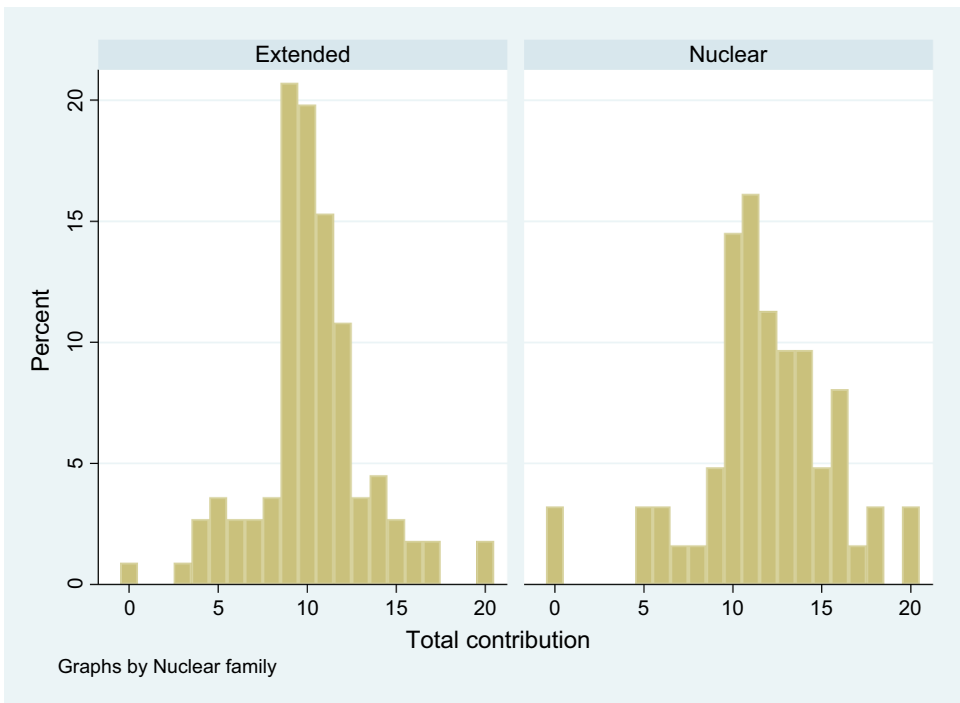

Figure A2. Histogram of the total contribution to the common account in the spousal experiment, by extended and nuclear household [20 tokens = 100 percent].

Table A1. Correlations between participants' contributions to the common account

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Dependent variable: Participant 1's contribution to the common account			
Participant 2's contribution to the common account	0.118**	0.056	0.118**	0.010	0.144**	0.058	0.054
	(0.060)	(0.121)	(0.060)	(0.058)	(0.063)	(0.067)	(0.099)
Nuclear household (1 = nuclear; 0 = extended)	0.421	0.522					
	(1.144)	(1.308)					
Nuclear household *Participant 2 contribution	−0.054	0.015					
	(0.167)	(0.201)					
Constant	4.500***	4.361***	4.500***	5.054***	4.516***	4.944***	4.677***
	(0.305)	(0.649)	(0.305)	(0.311)	(0.336)	(0.349)	(0.523)
Standard errors/Fixed Effects	Clustered at HH level	Clustered at HH level	Clustered at HH level	HH fixed effects	Clustered at HH level	HH fixed effects	Clustered at HH level
Experiments included	All games	Only Spousal games	All games within extended family	All games within extended family	Games in extended family excluding spousal game	Games in extended family excluding spousal game	Mother-in-law and daughter-in-law games
Observations	540	173	474	474	363	363	96
R-squared	0.016	0.022	0.017	0.515	0.027	0.497	0.004

Notes: This table reports the results of the regression mapping the contribution to the common account by the first participant onto the contribution of the second participant in selected samples and experiments. Contributions are measured in proportions. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A2. Contribution to the common account within extended households, by decision making power distribution

Distribution of decision making power	Average contribution (1)	Average contribution (2)	Average contribution (3)	Average contribution (4)	Average contribution (5)	Average contribution (6)
What to cook on a daily basis – one participant	−0.036 (0.024)					
What to cook on a daily basis – both participants	−0.065* (0.036)					
What and how much to purchase at the local shop/market – one participant		−0.032 (0.024)				
What and how much to purchase at the local shop/market – both participants		−0.068** (0.032)				
What and how much to purchase at the market outside the village – one participant			−0.038 (0.024)			
What and how much to purchase at the market outside the village – both participants			−0.052 (0.039)			
What to do when your child is sick – one participant				−0.033 (0.022)		
What to do when your child is sick – both participants				−0.061* (0.034)		
Whether your child is enrolled in school a particular year – one participant					−0.034* (0.021)	
Whether your child is enrolled in school a particular year – both participants					−0.010 (0.029)	
Whether your child attends school a particular day – one participant						−0.036* (0.020)
Whether your child attends school a particular day – both participants						−0.026 (0.028)
Number of experiments	363	363	363	363	363	363
R-squared	0.075	0.074	0.073	0.074	0.071	0.072

Notes: This table reports the results of the effect of decision making power distribution on the average contribution to the common account in all experiments (excluding the spousal experiment). Contributions are measured in proportion. Controls added are both players are male, both players are female (base category), both players are different sex, both players are related by blood, both players are from the same generation (such as two brothers). Standard errors are clustered at the household level.
*** p < 0.01, ** p < 0.05, * p < 0.1.

Table A3. Qualitative interview summary results

Panel A: Nuclear households

	Interview 1	Interview 2	Interview 3
Village	Poorer	Wealthier	Wealthier
Number of children	2	4	7
Role in the household	Wife	Wife	Wife
Migrant household members	Yes, husband	Yes, husband	No
Livelihood of household	Small store, remittances	Remittances, sell milk from cow	Making and selling of spice mixtures
Views on extended family households	Emotional support, public goods and joint assets	Prefers nuclear family as extended family is characterised by conflict	Emotional support, risk-sharing
Mention of inefficiency?	No	No	No
Sources of inefficiency	Not relevant	Not relevant	Not relevant

Panel B: Extended households

	Interview 4	Interview 5	Interview 6	Interview 7	Interview 8
Village	Poorer	Poorer	Wealthier	Poorer	Poorer
Number of children	1	6	2	1	5
Role in the household	Daughter-in-law	Mother-in-law	Mother-in-law	Daughter-in-law	Daughter-in-law
Migrant household members (in relation to respondent)	No, but migrant brother-in-law	No	Yes, eldest son	Yes, husband	No
Livelihood of household	Farming, sell milk from cow	Farming, casual labour, driver, shoemaking	Remittances, petrol stand	Farming, remittances	Farming, carpet weaving, sell milk from cow
Views on extended families Public goods, specialisation	Emotional support, public goods, specialisation	Risk-sharing, public goods	No	reflections offered	Risk-sharing
Mention of inefficiency?	Yes: free-riding brothers-in-law and mother-in-law	No	Yes: free-riding mother-in-law	Yes: hiding remittances, free-riding brothers-in-law and mother-in-law, low effort from daughter-in-law	Yes: free-riding brothers-in-law and mother-in-law
Sources of inefficiency	Uncontractable effort with social norms of equal share Invisible effort, unequal power		Invisible effort, unequal power	Invisible effort, unequal power	Uncontractable effort with social norms of equal share Invisible effort, unequal power

Table A4. Child investments by household structure

Characteristics	N (of children)	Total	Extended	Nuclear	*p*-value
Child age (years)	681	8.628	8.407	9.462	0.019
		(4.944)	(4.991)	(4.684)	
Sex (1 = female; 0 = male)	677	0.474	0.481	0.448	0.474
		(0.500)	(0.500)	(0.499)	
Educational investments					
Currently enrolled in school (1 = yes; 0 = no)	536	0.849	0.848	0.852	0.900
		(0.358)	(0.360)	(0.356)	
Education (in years)	676	3.303	3.217	3.627	0.216
		(3.469)	(3.458)	(3.506)	
No absence from school in last 7 days (1 = yes; 0 = no)	458	0.541	0.582	0.404	0.001
		(0.499)	(0.494)	(0.493)	
Mother asks child about homework (1 = yes; 0 = no)	455	0.688	0.652	0.808	0.001
		(0.464)	(0.477)	(0.396)	
Child spends at least 1 hour on homework daily (1 = yes; 0 = no)	451	0.625	0.662	0.500	0.004
		(0.485)	(0.474)	(0.502)	
Health outcomes and investments					
Child has been sick in the last 30 days (1 = yes; 0 = no)	645	0.222	0.293	0.265	0.034
		(0.416)	(0.402)	(0.457)	
Received treatment when sick (1 = yes; 0 = no)	136	0.934	0.946	0.943	0.717
		(0.250)	(0.258)	(0.229)	
Mother attended treatment (1 = yes; 0 = no)	130	0.569	0.618	0.643	0.510
		(0.497)	(0.500)	(0.493)	

Notes: The sample includes children of all women (and their household) who played at least one public goods experiment. The table reports the mean and standard deviation in parenthesis. All educational investment variables have been reported for children age 6 years and above, that is, for children eligible for enrolment in school.

Table A5. Household structure and contributions to the common account

	Average contribution	Wife's contribution	Husband's contribution
	(1)	(2)	(3)
Nuclear household	0.073**	0.063	0.083*
0 = extended household; 1 = nuclear household	(0.036)	(0.046)	(0.049)
Wife's age	−0.061	−0.097*	−0.025
	(0.045)	(0.054)	(0.070)
Husband's age	0.065	0.107*	0.024
	(0.045)	(0.056)	(0.067)
Wife's age squared	0.001	0.001*	0.000
	(0.000)	(0.001)	(0.001)
Husband's age squared	−0.001	−0.001**	−0.000
	(0.000)	(0.001)	(0.001)
Number of years married	−0.002	−0.001	−0.002
	(0.005)	(0.007)	(0.006)
Husband's education	0.001	−0.004	0.006
	(0.003)	(0.005)	(0.005)
Backward Caste	0.044	0.040	0.049
	(0.049)	(0.071)	(0.072)
Scheduled Caste	0.045	0.007	0.084
	(0.051)	(0.069)	(0.075)
PPI score	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)
Number of household members	0.000	0.002	−0.001
	(0.004)	(0.004)	(0.006)
Constant	0.229	0.062	0.395
	(0.261)	(0.426)	(0.367)
Observations	159	159	159
R-squared	0.063	0.048	0.057

Notes: This table reports the full results Table 4 in the main this. These results correspondent to the regression mapping the contribution to the common account in spousal experiment. Contributions are measured in proportions. Standard errors are clustered at the household level. PPI score is Progress out of Poverty Index ranging from 0 to 100. Base category for Backward Caste and Scheduled Caste is General category. Note that the sample is less than the expected 173 due to missing co-variate variables. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.