Do Mothers-In-Law Ruin Efficiency? Evidence from Rural India

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Abstract

The extended family household is common in developing countries. In this study, we combine a randomized controlled trial with a series of public good games to shed light on the efficiency implications of this family structure. We find that extended family households are more inefficient than nuclear families and that inlaws behave less cooperatively with eachother than do married partners. We hypothesize that concentrated (decision-making) power within the extended family contributes to this lack of efficiency and exploit the random assignment of women to receive an adult education program (aiming to improve the women's power) to test this proposition. We find that the program increases efficiency between spouses, but has no statistically significant effect on efficiency within the extended family household, suggesting that the power relations between the woman and her husband are not only more balanced, but also easier to alter compared to the power relation between the woman and her in-laws.

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1 Introduction

Extended families and kinship networks can play an important role in countering market failures in developing countries (Cox and Fafchamps 2008). For instance, marriage networks across localities in India mitigate income risk and facilitate consumption smoothing (Stark and Rosenzweig 1989), adult children in Peru provide an old age pension for their parents (Cox and Jiminez 1992) and extended family members work on eachother's farm during peak agricultural season (Krishnan and Sciubba 2005). While these positive effects are significant, information and enforcement constraint can be expected to limit the extend to which households insure one another (Ligon, 1998). In addition, the implicit 'sharing tax' applied to any 'gifts' such as pensions might decrease effort and investment of talented individuals in the network (Baland et al. 2014, Jakiela and Ozier 2016).

The studies cited above consider the relationships between family members who reside in different households. Extended family members might play a different role if they live together in the same household and share public goods (defined as a common consumption unit, see Beaman and Dillon 2012 for a discussion on household definitions). This extended family household, in which several generations or adult siblings live and eat together, is common in developing countries, and especially in South Asia and Sub Sahara Africa. An estimated 50% of children in India live in families which include other adults than their parents. In Congo, the corresponding estimate is 58% and in Tanzania it is 60% (Child Trends, 2014). Compared to nuclear households, extended family households might be characterized by more divergent preferences, less altruism and a more unequal distribution of decision-making power, all of which could increase inefficiencies in resource allocation within the household (the literature on within household decision-making is vast, for a discussion on within-household efficiency, see among others, Udry 1996, Dercon and Krishnan 2000, Duflo and Udry 2004, Bobonis 2009, Dubois and Ligon 2009, Robinson 2012, Chen 2013, LaFave and Thomas 2013 and Guirkinger et al. 2015).[1]

Despite their prevalence, we know relatively little about the allocation of resources within extended family structures. Notable exceptions are Guirkinger

[1] There is evidence on polygenous households in Western Africa that polygenous wives are more likely to coordinate with their wives than with their husbands (Akresh et al. 2011) but at the same time likely to go into a fertility competition with eachother (Rosi 2015).

et al. (2015) - building on Udry (1996) - who find that land yields are significantly larger on individual plots than on extended family plots in Mali (but Kazianga and Wahhaj (2013) find exactly the opposite results in Burkina Faso, a difference that Guirkinger et al. attribute to the relatively large and complex households in their sample) and Kazianga and Wahhaj (2015) who show that nuclear agricultural households in Burkina Faso allocate resources more efficiently than their extended household counterparts and that the extent of inefficiency is related to the relationship between family members.

We implemented a lab-in-the-field game in India to provide complimentary evidence to these patterns observed in West Africa and allow us to investigate why this might be the case. In 2014, we collected data among over 900 households in rural Utter Pradesh in North India, an area where extended family households are common (Speizer et al. 2015). In our data, about half of the households are extended family households. The households selected all had at least one adult, married, illiterate woman and it's these women who constitute the focus of our study. The data collection included a series of public goods games. In the basic version of this game, we invited the woman and her husband to participate and asked them to each divide 10 tokens between a 'private account' and a 'common account'. Token placed in the private account were paid out at a rate of 3 Rs while tokens placed in the common account were paid out at a rate of 4 Rs (i.e., spouses could together earn up to 80 Rs, equivalent to 2 USD or twice the daily wage). Hence, contributing all tokens to the common account Pareto dominates any other allocation. However, the aggregate number of tokens placed in the common account (plus a random number) is revealed to the participants together and participants together are asked to determine its use. Tokens in the private account, by contrast, are only known to the individual participant, and it's up to the participant to decide what to do with it's payout. Consistent with past studies using a public goods game in rural India (see, for instance, Castilla 2015, Munro et al. 2011 and Mani 2011), we find that in only 2% of the games, both participants contribute their full endowment to the common account, forgoing, on average, 20 Rs (or half a daily wage) in efficiency gains.

To shed light on inefficiencies within the extended family, we repeated this game with participants who do not have a marital relationship with one another: we matched the woman with a randomly selected adult male and a randomly selected adult female, and did the same for her husband. In addition, we invited all four members to participate in a family-version of

the game together. Exploiting within-houshold variation we find that the average contribution to the common account decreases by 10% when the woman is matched to an in-law versus when matched to her husband. Utilizing the average contribution as a continuos measure of household efficiency, we compare household efficiency across types of families and find that extended family households are 7 to 9% less efficient than nuclear households. As extended households are typically larger than nuclear household, this discrepancy could merely reflect the number of players in the game. However, given the differences noted in the bilateral games, we propose that this discrepancy reflects preference heterogeneity and concentrated decision-making power within the extended family household.

To further understand the relative role of preferences and decision-making power we present a non-cooperative model of within-household decision-making. In this model, the funds in the common account are subject to a sharing rule. With heterogenous preferences, the sharing rule is determined by the members' decision-making power and members with larger decision-making power can be expected to contribute more to the common account (which is what Mani 2011 speculates drives the differences in contributions between women and their husbands). Considering the overall contribution to the common account, we shows that (under certain functional form assumptions), contributions are maximized when the decision-maker power is equally distributed between the household members.

This implies that a change in decision-making power is likely to affect the contribution to the common account. To explore this hypothesis empirically, we exploit the random assignments of the women (who all were illiterate in 2014) into a two-month adult education program, aiming at imparting functional literacy/numeracy skills and improving the position of the woman in the household. After the adult education program has taken place, we repeat the basic version of the game between the woman and her husband and a family version of the game. We find that participation into the program increases the contribution the woman makes to the 'common account' by 24% but does not affect the contribution of her husband or the overall contribution to the common account. Assuming that the adult education program has not altered preferences, this result suggests that the program increased the woman's bargaining power vis-a-vis her husband, which in turn increased her contribution to the common account. The fact that the husband does not appear to responds suggest that he might be viewing his wife's decision-making power differently than she does (as in Ambler et al. 2016). In the

family version of the game, where the woman plays the game with all adult family members, we find that the woman does not increase her contribution to the common account and nor does anyone else. Thus, while the adult education program altered the woman's relationship with her husband, it did not significantly affect the relationship she has with her in-laws. These results suggest that not only the baseline power relations between the woman and her husband are different from the relationship between the woman and her in-laws but that the latter relationship appears more difficult to alter.

The rest of this paper is structured as follows. In the next section, we introduce the sample and detail the public goods game. Section (3) presents the analytical framework and results. Section 4 concludes.

2 Setting and Data

We collected data from 12 villages in the Sant Ravidas Nagar district in Uttar Pradesh. These 12 villages were reasonably well connected to the local economy: while only 5 of them has a bus service, each of the villages had tarred roads and was within a 5 km radius of the nearest town and within 12 km of the nearest railway station. All villages have access to electricity, cellular phone coverage and water, even though not all of these services might be available throughout the day and to everyone. Relative proximity to major cities such as Varanasi, Allahabad and Delhi, combined with low living standards, result in a high migration rate, especially among the men.

In each village, we surveyed all self-declared illiterate, married women who reported to be interested in participating in an adult education program run by the Delhi-based NGO Development Alternatives: The Tara Akshar Literacy/Numeracy Program. In the rest of this paper, we will refer to this subset of women in the villages as the "(eligible) women", i.e. eligible for the Tara Akshar Literacy/Numeracy Program.

The Tara Akshar Literacy/Numeracy program is one of three instruction methods recognized and sponsored by the Indian Government under its National Literacy Mission. The program is implemented by computer-aided instructors in an interactive, group-based manner (10 women per group). The program builds on insights from cognitive psychology and uses memory tricks, flashcards, videos and applications from daily life. It runs daily for 1.5 hours for 56 days and aims not just at imparting functional literacy

and numeracy skills, but also at building practical household skills (such as how to cook nutritious meals), increasing confidence levels and improving the woman's position in the household. In Deshpande et al. (2015) we show that the program drastically improves literacy and numeracy skills among the participants. In Deshpande et al. (2016) we show that the program enhances (among others) nutritional and health knowledge and self-reported confidence levels.

Within the 12 villages, we recorded a total of eligible 1,061 women belonging to 919 households (we define members to belong to the same household if they eat meals together on a regular basis for at least 6 months). We collected baseline survey data among these women and their households in April-May 2014. In June 2014, we randomly assigned 723 eligible women (who reported continued interest in the program) either treatment group (493 women) or control group (230 women). The women in the treatment group were invited to participate in the program in July-August 2014, while the control group was invited at a later date, after we completed the endline survey in March-April 2015. Note that the randomization did not follow a 50/50 division: the fixed student/teacher ratio adhered to by Development Alternatives entailed that a certain number of women had to be allocated to the treatment group in each village. Note that only 57% in the treatment group effectively attended the program. We deal with this non-compliance using an instrumental variable strategy.

The baseline data collection included (among others) information on household assets and household composition. We also conducted two tests of cognitive ability among the eligible women. The first test us the Rapid Automatic Naming with Colors test. In this test, the eligible woman was shown six rows of four colored squares (Blue, Green, Red, Yellow) and then asked to name the colors as quickly as she could. The test is typically administered twice and scored in terms of the number of mistakes made (with the total number of mistakes 48) as well as the time taken to complete the assignment (in seconds). This test captures engagement-disengangement dynamics of attention. The second test is the Forward Digit Span test. In this test, we orally provided the eligible woman with a random sequence of digits and asked the woman to recall them in the same order. The administration of this test stops when the eligible woman does the exercise incorrectly twice in a row. The test captures working memory and the score equals the number of digits in the longest digit sequence recalled (the maximum score being 16).

Both base and endline data collection include a series of within-household

public goods games. We detail these games below and conclude this section with selected descriptive statistics.

2.1 Public Goods Game

At baseline, we played six bilateral games and one family game. Both are based on the basic version of the game detailed below.

In the basic version of this game, we invited the eligible woman and her husband to a central location in the village (where we could ensure their privacy while playing the game). If the husband was not available, we returned the following day and re-issued the invitation. If the husband was still not available on the next day, e.g., as he is a temporary migrant, we did not play this game with them. Once the eligible woman and her husband were present, we split them up into two different rooms and explained the game to them simultaneously. We first showed them ten tokens and two boxes. One box was colored blue and the other was colored yellow, the colors chosen as they lack any religious or other meaning in this context. We explained that each one of them would received ten tokens and would be asked to divide the ten tokens over 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 4 Rs (10 cents) while the tokens in the yellow box are converted at a rate of 3 Rs (7.5 cents). In addition, the use of these funds differ. The participant her(him) self could decide on the use of the funds from the tokens in the yellow box. We gave a few examples of such use: clothing, food, savings and emphasized that it was the participant "you" who could decide on the use of the funds. The funds from the tokens in the blue box, on the other hand, would be decided upon by both game participants, in this case the eligible woman and her husband. We then handed the ten tokens to the eligible woman (and her spouse in other room) and invited her(him) to make the decision as to how many tokens should be placed into each box. We emphasized the decision the participant made would not be observed or shared with the other participant. And as we also contributed a random amount to the (common) blue box, the other participant could not figure out how much she(he) contributed to the blue box. We then paused for questions and asked the participant to make her(his) decision. Once the decision were 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, brought the two participants together and then paid out the funds from the (common) blue box, plus our added 42 Rs.

At baseline, we expanded this basic version of the game to include with participants who do not have a marital relationship with one another. We invited, in addition to the eligible woman and her husband, up to two other members from the household, one male member and one female member. The male and female members were selected - randomly - from all adult (18 plus) members on the household roster. So for each households, we could have up to four participants. Each participant was asked to play three bilateral games, one which every other adult member of their household, resulting in a total of six bilateral games. To simplify the coordination, we invited each participant to make their choices for the three bilateral games back-to-back in the same room, while imagining different game partners. We pretested this format, as opposed to the format where participants would be making their choices sequentially, moving locations when they played with a different partner, and found no difference in the resulting contribution.

In addition to these six bilateral games, we invited all (three or) four members to join in a 'family game'. The set-up of this game was identical to the basic version of the game with the exception that now the payout of the blue box would go to all (three or) four members of the household playing the game and that we would add 52 Rs in the case of three-member games and 62 Rs in the case of four-member games.

At endline, we played the basic version of the game with the eligible woman and her husband. This time, we noted down the reason why the husband was not present to play the game (if applicable) and also, after the game was played but before the payouts were made, what each participant thought the other participant would have contributed to the (common) blue box. In addition, we played another family game, this time inviting all adult (18 plus) household members to join.

2.2 Descriptive Statistics

Table 1 presents selected descriptive statistics at baseline. In Table 1, we restrict the sample to the eligible woman (and her household) who completed at least one of the 3 bilateral public goods game (game with the eligible woman and her husband or with a male/female in-law member). Recall due

to political considerations we played this game only among a subset of 5 villages at baseline (ongoing elections in 7 out of 12 villages prevented us from using monetary rewards which could have been perceived as bribes by the local political parties). In addition, the game was only played if both the eligible woman and her husband were physically present.

The average age of the woman in our sample is 39 years, while that of the husband is 42 years. The average lenght of marriage is 24 years, suggesting that a significant proportion of the married under the age of 18 years. While all women in our sample were uneducated, the average level of education attained by husbands is substantial at 6 years (this corresponds to 80% of elementary school completion). In this sample, 31% of women have a husband who engages in temporary migration, defined as not currently part of the household but intending to return to the household).

Two cognitive ability tests were conducted at the baseline – Forward Digit Span (FDS) and Rapid Automatic Naming with Colors test (RAN). The average FDS score is 6 out of a maximum of 16, and RAN time which measures the time taken to complete the task is 80 seconds.

Caste classification shows that 37% of the women belong to the Other Backward Castes, 48% to the Scheduled Castes, and only 15% belong to the upper castes (General Category). 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 . A PPI score of 20, in 2009, corresponds to a 90% chance of being under the poverty line.[2] The average PPI score is 25 for our sample, which is fairly low but consistent with the North Indian rural setting. A household has, an average, 6 members and substantial minority of our sample (43%) can be described as a nuclear family - defined as the eligible woman living without any in-law members.

In Table 2 we present the same set of descriptive statistics, but this time for the sample of eligible women who completed the basic version of the public goods game at endline (with the eligible woman and her husband as participants) who also were assigned to either treatment or control group. Column (1) presents the mean (and standard deviation) for this sample. Column (2) presents the mean (and standard deviation) for the sub-sample of treatment women and Column (3) presents the mean (and standard deviation) for the

[2]The PPI score used for this study was created in May 2012 by Progress out of Poverty in collaboration with the Grahmeen Foundation. For more information, see www.progressoutofpoverty.org.

sub-sample of control women. In Column (4) we report the results of a t-test with unequal variances, testing the differences between the control and treatment group. We focus our discussion on the differences between treatment and control women at baseline (panel 3) and report no statistically significant differences between the treatment and control women in terms of baseline individual and household level characteristics, i.e., we succesfully randomized the sample into a treatment and control group.

3 Analysis and Results

To set the stage for the analysis, we present in Figure 1 a kernel density graph of percent contributed to the common account by the eligible woman in the game with her husband at baseline (the solid line). The distribution approximates normality, with an average contribution of 50%. To provide a comparison, we present the distribution for the game of the eligible woman and her in-law partner at baseline in the dotted line. We note that the distribution is almost identical.

In Figure 2, we show the other side of the coin: the distribution of the partner's contribution in both games. Again, the solid black line refers to the game of the eligible woman with her husband at baseline, and the dotted black line refers to the game of the eligible woman with her in-law partner at baseline. This time, we note that the distribution of in-law partner is to the left of the distribution of the husband. The average contribution to the common account of the former is 48% while in the latter it is 54%. This suggests that the relationship the eligible woman has with her husband is different compared to the relationship she has with her in-laws. In the remainder of this section, we first present the econometric specifications to further investigate this issue, exploiting the randomized variation of the adult education program, and then present the results of these regressions.

3.1 Regression Specifications

We start with the bilateral game data at baseline data using the following regression specification:

$$y_{i,k} = \alpha + \beta_k * INLAW_{i,k} + \gamma \mathbf{X}_i + \epsilon_{i,k} \quad (1)$$

where $y_{i,k}$ denotes the dependent variable (in this case, the eligible woman's contribution to the common account (in percentage terms) in game k (where $k = 1$ refers to the game with the spouse and $k = 2$ refers to the game with the in-laws) as well as the average contribution of both), $INLAW_{i,k} = 1$ for the game with the in-laws (=0 in case of game with the husband) and $\mathbf{X}_i$ presents a vector of woman-level controls: the age of the woman, FDS score, RAN test time, the caste, PPI asset score and the number of household members. $\epsilon_{i,k}$ refers to robust standard errors.

As about half of the women live in extended families (with their in-laws), we use a eligible-woman fixed effect to present the coefficient estimate of β_k using within-household variation only:

$$y_{i,k} = \alpha + \beta_{k,within} * INLAW_{i,k} + \mu_i + \epsilon_{i,k} \tag{2}$$

To further shed light on the dynamics with the in-laws, we compare the woman's and overal average contribution to the common account in nuclear families with extended families using:

$$y_i = \alpha + \beta_{EXTENDED} * NUCLEAR_i + \gamma \mathbf{X}_i + \epsilon_{i,k} \tag{3}$$

where $NUCLEAR_i$ =1 if the family structure is a nuclear family household and = 1 if the family structure is an extended family household.

We then proceed to use the random variation created by the random assignement of the adult education program. In Table 3 - Panels B - we present the average (and standard deviation) of the treatment and control eligible women of the dependent variables in the basic game at endline: the eligible woman's contribution to the common account, her husband's contribution to the common account and the average contribution of both. We note a significant difference in woman's contribution to the common account between treatment and control group; but no such difference to the husband's contribution toward the same. On average, the eligible woman in the treatment group contributes 3 percentage points more to the common account compared to the eligible woman in the control group. This increase of the woman's contribution also increases the total contribution to the common account with 3 percentage points. We further analyse these differences using the following regression specification:

$$y_i = \theta + \beta_{ITT} * T_i + \vartheta \mathbf{Y}_{i,} + \epsilon_i \tag{4}$$

where T_i denotes the treatment (=1 for treatment women, and =0 for control women) and β_{ITT} denotes the intent-to-treat effect. The vector of control variables $\mathbf{Y}_i$ now includes also in addition to the variables in $\mathbf{X}_i$ the characteristics of the husband (age and education level) as well as the relationship (number of years married). Using an instrumental variable specification, instrumenting the participation status with the random assignment, we further establish the treatment effect on the treated.

In Table 3 - Panel B - we present the average (and standard deviation) of the treatment and control eligible women of the family game at endline: the eligible woman's contribution to the common account and the average family contribution to the common account. This time, we cannot detect any statistically significant differences between the treatment and control group. We run the following regression:

$$y_i = \theta + \beta_{ITT} * T_i + \vartheta \mathbf{X}_i + \epsilon_i \tag{5}$$

where y_i now denotes the woman's contribution to the common account or the average family's contribution. The set of control variables is identical to the family-based analysis at endline in regression specification in (3). Again, we present the treatment-effect-on-the-treated estimate using an instrumental variable specification instrumenting the participation status with the randomized treatment.

3.2 Results

In Table 3 we present the regression results of specifications (1) (Columns 1 and 2) and (2) (Columns 3 and 4). The dependent variables are the eligible woman's contribution to the common account and the average contribution to the common account. The main independent variable of interest is "game with in-laws'. This variable takes the value of 1 if the game was played between the woman and her in-law; and a value of 0 if the game was played between the woman and her husband. In both Column (1) and (4) we cannot detect a statistically significant effect of the game being an in-laws game on the woman's contribution. However, we detect a significant and negative effect of the game being an in-laws on the partner's and the total contribution in Columns (2) and (3). The total contribution to the common account decreases by approximately 5 percentage point when playing with the in-laws vis-à-vis husband, which is an effect size of 9.8%.

In addition, the coefficient estimate on the woman's age is statistically significant. As the age of the woman increase by 1 year, the woman's contribution to the common account as well as the total contribution to the common account increases by 0.3 percentage points.

In Table 4, we present the regression results specification (3) with the variable of interest being – 'nuclear family'. This variable takes the value of 1 if the game was played between the woman and her husband in the case of a nuclear family; and a value of 0 if the game was played between the woman and 2-3 of her in-laws within an extended family setting. Columns (1) and (2) reports the effect of nuclear family on the woman's contribution. Columns (3) and (4) report the effect of nuclear family on the total contribution. The regression has been done without controls (Columns (1) and (3)); and with controls (Columns (2) and (4)) There is no significant effect of the nuclear family on the woman's contribution. However, there is a significant and positive effect of living in a nuclear family on the total contribution. This effect is significant in the regression without controls (P-value 0.06) and is almost significant in the regression with controls (P-value 0.15). The total contribution to the common account increases by approximately 4-5 percentage point when in a nuclear family vis-à-vis an extended family, which is an effect size of 7-9%. Among the controls, only the FDS score is statistically significant. The Forward Digit Span test, a measure of cognitive ability of the woman, increases the woman's contribution and the total contribution by approximately 1.5 to 2 percentage points.

In Table 5, we report the results of regression specification (4), i.e, the effect of the education program on the woman's contribution to the common account, the husband's contribution to the common account, and the average contribution of both woman and husband to the common account. Columns (1) through (6) report the intent-to-treat effect estimates, while Columns (6) through (12) report the treatment-effects-on-the treated. Columns (4)-(6) and (10)-(12) report the effects including control variables. We report the first stage results in Appendix Table 1.

We detect a positive and significant effect of the adult education program on the woman's contribution to the common account both with and without controls (significant at 5%). Assignment to the treatment group increases the woman's contribution to the common account by 6 percentage point (ITT), while participation in the program increases the woman's contribution by 13 percentage point (TET) which translates into an effect size of 24% (monetary gain of 9.6 Rs.). However, detect no statistically significant effects

of the treatment on the husband's contribution to the common account. The average contribution to the common account increases as well, arguably driven by the increase in woman's contribution.

In Table 6, we report the results of regression specification (5), i.e., the effect of the education program on efficiency in the extended family public goods game. Recall at the endline, all adult household members were invited to play the game. The number of participants in this game range from 3 to 6. We have excluded nuclear families in this part of the analysis, as the results would be similar to those of the spousal game reported in Table 6. Columns (1) through (4) report the intent-to-treat effect estimates, while columns (5) through (8) report the treatment-effects-on-the-treated. Columns (3)-(4) and (7)-(8) report the effects with control variables. We report the first stage results in Appendix Table 2.

Overall, we report no statistically significant effect of the education program on either the contribution of the eligible woman or the average contribution of all members. This results, combined with the results in Table 5, suggest that while the adult education program changed the relationship between the spouses, it did little to alter the relationship with the in-laws in extended families.

4 Conclusion

The extended family household, in which several generations or adult siblings live and eat together, is common in developing countries, and especially in South Asia and Sub Sahara Africa. Despite their prevalence, we know little about the efficiency of these non-nuclear families (with the exception of the literature on polygamous households, see, among others, Akresh et al. 2011 and Rosi 2015). Recent work by Guirkinger et al. (2015) and Kazianga and Wahhaj (2015) in West Africa indicates that the allocation of resources in these extended family households might be less efficient compared to nuclear households. We build on their work and use a combination of lab-in-the-field experiments (public goods game) and a randomized controlled trial to further shed light on why this might be the case.

Our main tool is a series of public goods games. In the basic version of this game, we invited the woman and her husband to participate and asked them to each divide 10 tokens between a 'private account' and a 'common account'. Token placed in the private account were paid out at a rate of 3

Rs while tokens placed in the common account were paid out at a rate of 4 Rs (i.e., spouses could together earn up to 80 Rs, equivalent to 2 USD or twice the daily wage). Hence, contributing all tokens to the common account Pareto dominates any other allocation. However, the aggregate number of tokens placed in the common account (plus a random number) is revealed to the participants together and participants together are asked to determine its use. Tokens in the private account, by contrast, are only known to the individual participant, and it's up to the participant to decide what to do with it's payout.

Using this game, we find that extended family households are more inefficient than nuclear families and that women with their spouses behave more cooperatively compared to women with th their in-laws. We hypothesize that concentrated (decision-making) power within the extended family contributes to this lack of efficiency and exploit the random assignment of women to receive an adult education program (aiming to improve the women's power) to test this proposition. We find that the program increases efficiency between spouses, but has no statistically significant effect on efficiency within the extended family household, suggesting that the power relations between the woman and her husband are not only more balanced, but also easier to alter compared to the power relation between the woman and her in-laws.

This implies that the current trend in India, from extended family household, to nuclear households is likely to have positive effects of within-household efficiency. However, as we expect insurance between these nuclear families to be less than perfect, the overall effect on a community is ambiguous.

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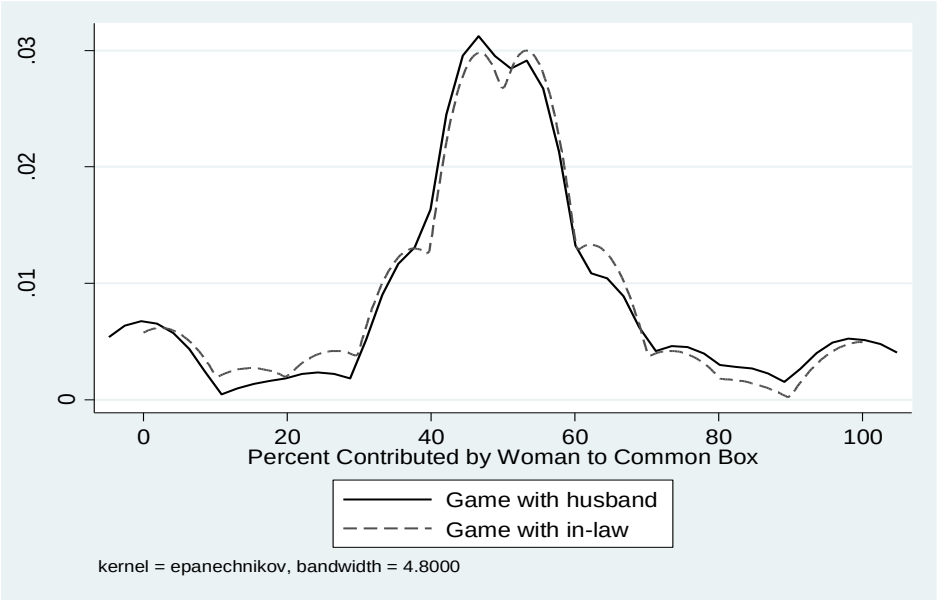
Figure 1


.03
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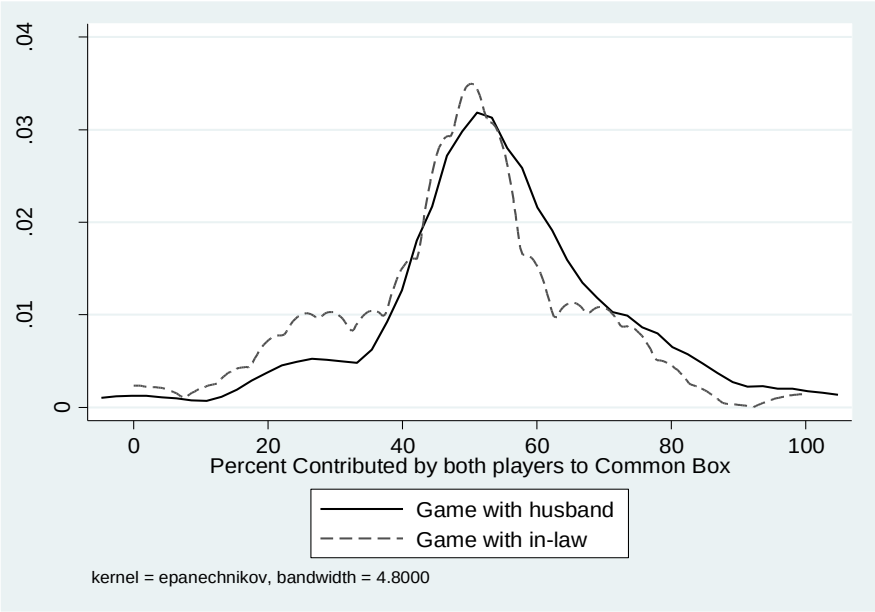
Percent Contributed by Woman to Common Box
Game with husband
Game with in-law
kernel = epanechnikov, bandwidth = 4.8000

Figure 2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Percent Contributed by both players to Common Box
Game with husband
Game with in-law
kernel = epanechnikov, bandwidth = 4.8000

Table 1

Characteristics	Mean	Standard Deviation
Woman's age in years	38.85	9.68
FDS Score	5.79	1.63
RAN Score	80.26	29.09
Husband's age in years	41.73	9.90
Husband's Education in years	6.27	4.74
Husband is not a migrant^	0.69	0.47
No. of yrs married	23.55	11.12
Backward Caste^^	0.37	0.48
Scheduled Caste^^	0.49	0.50
PPI Score	25.33	10.88
Number of HH members	5.64	3.68
Nuclear Family^^^	0.43	0.5
Number of women	239	

^ 0=Migrant; 1= Not a migrant. ^^ Base category for Backward caste and Scheduled caste is General category. ^^^ 0=Extended family; 1 = Nuclear family

Table 2

	Total	Treatment	Control	p-value of difference
Dependent Variable: Spouse Game				
Woman's contribution to common box	0.548	0.567	0.502	0.026
(expressed as a proportion)	(0.250)	(0.255)	(0.233)	
Husband's contribution to common box	0.598	0.600	0.593	0.807
(expressed as a proportion)	(0.264)	(0.275)	(0.234)	
Total Contribution to Common box	0.573	0.583	0.547	0.091
(expressed as a proportion)	(0.193)	(0.203)	(0.163)	
Dependent Variable: Family Game				
Woman's contribution to common box	0.543	0.536	0.557	0.538
(expressed as a proportion)	(0.269)	(0.273)	(0.262)	
Total Contribution to Common box	0.549	0.551	0.546	0.808
(expressed as a proportion)	(0.180)	(0.187)	(0.167)	
Independent Variables				
Woman's age in years	36.15	36.05	36.42	0.689
	(7.906)	(8.121)	(7.375)	
FDS Score	5.543	5.593	5.417	0.328
	(1.492)	(1.492)	(1.491)	
RAN Time	86.60	84.59	91.66	0.333
	(45.19)	(31.51)	(68.41)	
Husband's age in years	38.98	38.83	39.35	0.596
	(8.333)	(8.491)	(7.952)	
Husband's Education in years	5.558	5.664	5.292	0.528
	(4.771)	(4.708)	(4.939)	
No. of years married	21.09	20.95	21.45	0.648
	(8.997)	(8.960)	(9.128)	
Husband is not a migrant	0.944	0.950	0.927	0.444
0=Migrant; 1= Not a migrant	(0.231)	(0.218)	(0.261)	
Backward Caste^	0.401	0.402	0.396	0.911
	(0.491)	(0.491)	(0.492)	
Scheduled Caste^	0.555	0.548	0.573	0.675
	(0.498)	(0.499)	(0.497)	
PPI Score	22.66	22.53	23	0.693
	(10.18)	(10.37)	(9.724)	
Number of household members	6.653	6.651	6.656	0.991
	(3.463)	(3.523)	(3.327)	
Number of women: Spouse Game	337	96	241	

Standard Deviation in parenthesis. ^Base category for Backward caste and Scheduled caste is General category.

Table 3

VARIABLES	(1) Woman's contribution to common box	(2) Total contribution to common box	(3) Woman's contribution to common box	(4) Total contribution to common box
Game with in-laws	-0.00671	-0.0460**	-0.00303	-0.0370
0=Game with spouse; 1 = Game with in-la	(0.0245)	(0.0190)	(0.0423)	(0.0288)
Woman's age in years	0.00340**	0.00291***		
	(0.00139)	(0.000973)		
FDS Score	0.00429	0.00546		
	(0.00778)	(0.00581)		
RAN Time	-0.000400	4.67e-05		
	(0.000477)	(0.000334)		
Backward Caste	0.0157	0.0318		
	(0.0428)	(0.0322)		
Scheduled Caste	-0.0196	0.0322		
	(0.0405)	(0.0320)		
PPI Score	-0.000119	0.00186*		
	(0.00137)	(0.00109)		
Number of household members	-0.00432	0.00155		
	(0.00352)	(0.00258)		
Constant	0.402***	0.303***	0.484***	0.527***
	(0.0959)	(0.0785)	(0.0264)	(0.0173)
Woman Fixed Effects	No	No	Yes	Yes
Observations (number of games)	372	372	409	409
R-squared	0.036	0.069	0.776	0.774

Robust standard errors in parentheses. FDS is Forward Digit Span Test with a maximum score of 16. RAN time is the number of seconds taken to complete the Rapid Automatic Naming of colors test. PPI Score is Progress out of Poverty Index ranging from 0 to 100. [+]Base category for Backward caste and Scheduled caste is General category.

*** p<0.01, ** p<0.05, * p<0.1

Table 4

VARIABLES	(1) Woman's contribution to common box	(2) Woman's contribution to common box	(3) Total contribution to common box	(4) Total contribution to common box
Nuclear Family	0.0437	0.0408	0.0520*	0.0412
0=Extended family; 1=Nuclear family	(0.0372)	(0.0388)	(0.0274)	(0.0290)
Woman's age in years		-0.000467		0.00101
		(0.00202)		(0.00141)
FDS Score		0.0225*		0.0149*
		(0.0132)		(0.00799)
RAN Time		0.000850		0.000165
		(0.000714)		(0.000392)
Backward Caste		0.0142		0.0292
		(0.0711)		(0.0489)
Scheduled Caste		-0.00897		0.0458
		(0.0662)		(0.0482)
PPI Score		0.00241		0.00214
		(0.00192)		(0.00141)
Constant	0.482***	0.238*	0.521***	0.296***
	(0.0239)	(0.140)	(0.0153)	(0.0874)
Observations (number of women)	188	187	188	187
R-squared	0.007	0.044	0.020	0.055

Robust standard errors in parentheses. FDS is Forward Digit Span Test with a maximum score of 16. RAN time is the number of seconds taken to complete the Rapid Automatic Naming of colors test. PPI Score is Progress out of Poverty Index ranging from 0 to 100. [+]Base category for Backward caste and Scheduled caste is General category.

*** p<0.01, ** p<0.05, * p<0.1

Table 5

VARIABLES	(1) OLS Woman's contribution to common box	(2) OLS Woman's contribution to common box	(3) OLS Husband's contribution to common box	(4) OLS Husband's contribution to common box	(5) OLS Total contribution to common box	(6) OLS Total contribution to common box	(7) IV Woman's contribution to common box	(8) IV Woman's contribution to common box	(9) IV Husband's contribution to common box	(10) IV Husband's contribution to common box	(11) IV Total contribution to common box	(12) IV Total contribution to common box
Intent To Treat	0.0620**	0.0623**	0.0200	-0.000288	0.0410**	0.0310	0.141**	0.131**	0.0229	-0.0273	0.0818*	0.0520
	(0.0284)	(0.0289)	(0.0286)	(0.0302)	(0.0208)	(0.0213)	(0.0644)	(0.0642)	(0.0651)	(0.0685)	(0.0472)	(0.0498)
Constant	0.501***	0.450***	0.581***	0.721***	0.541***	0.586***	0.492***	0.453***	0.583***	0.744***	0.538***	0.598***
	(0.0236)	(0.158)	(0.0231)	(0.186)	(0.0165)	(0.132)	(0.0262)	(0.175)	(0.0262)	(0.186)	(0.0186)	(0.136)
Controls added	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
F-stat of first stage							148.29	82.56	148.29	82.56	148.29	82.56
Observations	366	337	366	337	366	337	346	319	346	319	346	319
R-squared	0.012	0.065	0.001	0.030	0.009	0.036		0.048		0.031		0.035

Robust standard errors in parentheses. Controls added are woman's age in years, FDS score, RAN time, husband's age in years, husband's education in years, length of marriage in years, husband is not a migrant, backward caste, scheduled caste and PPI score.

*** p<0.01, ** p<0.05, * p<0.1

Table 6

VARIABLES	(1) OLS Woman's contribution to common box	(2) OLS Woman's contribution to common box	(1) OLS Total contribution to common box	(2) OLS Total contribution to common box	(3) IV Woman's contribution to common box	(4) IV Woman's contribution to common box	(3) IV Total contribution to common box	(4) IV Total contribution to common box
Intent To Treat	-0.0221	-0.0181	-0.000769	0.00640	-0.0457	-0.0414	0.00184	0.0118
	(0.0330)	(0.0331)	(0.0219)	(0.0215)	(0.0664)	(0.0685)	(0.0449)	(0.0458)
Constant	0.559***	0.641***	0.551***	0.420***	0.568***	0.685***	0.555***	0.445***
	(0.0262)	(0.167)	(0.0170)	(0.0973)	(0.0291)	(0.156)	(0.0196)	(0.104)
Controls added	No	Yes	No	Yes	No	Yes	No	Yes
F-stat of first stage					148.21	90.28	148.21	90.28
Observations	286	282	286	282	263	259	263	259
R-squared	0.002	0.014	0.000	0.029		0.005		0.034

Robust standard errors in parentheses. Controls added are number of participants in the family game (3-6 participants), woman's age in years, FDS score, RAN time, backward caste, scheduled caste and PPI score.

*** p<0.01, ** p<0.05, * p<0.1

Appendix

Table 1

VARIABLES	(1) Partcipated in programme	(2) Partcipated in programme
Intent To Treat	0.490***	0.509***
	(0.0281)	(0.0301)
Woman's age in years		-0.00673
		(0.00976)
FDS Score		-0.00717
		(0.0121)
RAN Time		-0.000474
		(0.000376)
Husband's age in years		0.00969
		(0.00640)
Husband's Education in years		0.0124***
		(0.00442)
No. of years married		0.000166
		(0.00661)
Husband is not a migrant		-0.0436
0=Migrant; 1= Not a migrant		(0.0529)
Backward Caste		0.310***
		(0.0938)
Scheduled Caste		0.369***
		(0.0978)
PPI Score		-0.00141
		(0.00226)
Number of household members		0.00372
		(0.00654)
Constant	0.0408***	-0.401*
	(0.0142)	(0.229)
Observations	346	319
R-squared	0.221	0.262

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2

VARIABLES	(1) Partcipated in programme	(2) Partcipated in programme
Intent To Treat	0.517***	0.512***
	(0.0425)	(0.0443)
Number of game participants		0.0351
		(0.0258)
Woman's age in years		0.000323
		(0.00324)
FDS Score		-0.0138
		(0.0172)
RAN Time		-0.000565
		(0.000421)
Backward Caste		0.435***
		(0.0863)
Scheduled Caste		0.520***
		(0.0897)
PPI Score		0.00275
		(0.00287)
Constant	0.0326*	-0.506**
	(0.0186)	(0.223)
Observations	263	259
R-squared	0.261	0.305

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1