Autonomy and Efficiency. An Experiment on Household Decisions in Two Regions of India [*]

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Short running title: Household Decisions Experiment in India

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[*] This study forms part of "The Intra-Household Allocation of Resources: Cross-Cultural Tests, Methodological Innovations and Policy Implications", a project jointly funded by the UK's ESRC and DFID (RES-167-25-0251). As such the work has benefited greatly at all stages from the expertise and close cooperation of the other members of the team, Cecile Jackson and Nitya Rao. We are especially thankful to the hard-working efforts of our fieldwork manager, Matthew Osborne, and our local teams, led by Dr Biswarupa Gosh, Dr Pradip K. Sen, and Dr Anup K. Mishra in Uttar Pradesh, and Dr R. Naagarajan in Tamil Nadu, both under the guidance of Prof. Amaresh Dubey, from the Jawaharlal Nehru University, New Delhi. We are also grateful for helpful comments received from seminar participants at FASID, Tokyo, Tokyo Institute of Technology and the Economic Science Association meetings in Melbourne and Kuala Lumper.

Abstract

Dyson and Moore (1983) posit that women in South India enjoy relatively more agency than in the North. Their conclusions have become part of the standard picture of Indian rural society. In this paper, we examine using experimental data the implications of the regional contrast in female autonomy for efficiency of family decision-making. With a sample of 1200 couples (one rural and one urban area in the North (Uttar Pradesh) and one rural area in the South (Tamil Nadu)), we find large-scale and robust evidence of inefficiency and hiding of assets when possible. Men invest more and are more generous to their partners. Women are more willing to invest in a common pool when their income is earned through working and when assets are publicly observable. We find continuing significant differences between North and South and relatively little evidence that urban living is associated with changes in the nature of marital behaviour. There are some differences between responses to treatment but the key and striking difference between the North and the South is that in both rural and urban sites in the North household efficiency is considerably greater than in the South, which suggests a trade-off between autonomy and efficiency.

Introduction

Although in a context of overall low female autonomy (compared to much of the rest of the world), a North-South divide has often been remarked on for India. Distinct kinship systems and demographic regimes, including adverse-to-females sex ratios, that are consistent with less female say in household decisions, mobility and entitlement to resources in the north and north-western parts of the country (Sopher 1980; Miller 1981; Dyson and Moore 1983; Jejeebhoy 2001; Jejeebhoy and Sathar 2001; Agnihotri et al. 2002). The most influential characterisation of the northern and southern kinship systems in terms of their implications for female autonomy and demographic outcomes is that of Dyson and Moore (1983). Though the details of their research have been widely queried (e.g. Rahman and Rao, 2004 or Jejeebhoy and Sathar 2001), their broad conclusions have become part of the standard picture of Indian rural society.

In theory, autonomy need not be linked to household inefficiency. For instance, a greater degree of female autonomy could lead to more weight being given to her preferences in a bargained, but still Pareto-efficient outcome. However, when spouses independently control resources, there is opportunity for miscoordination, for the undersupply of household public goods as well as the chance to pursue the fulfilment of individual preference by hiding some income or consumption. Independence may also enhance asymmetries of information. All this creates the potential for sub-(Pareto) optimal household resource allocation decisions.

In this paper, using experimental data from modified voluntary contribution games we examine the implications of the regional contrast in female autonomy for the efficiency of family decision-making. We take a sample of 1200 couples from two areas in Uttar Pradesh (UP) in the north of India and one area in Tamil Nadu (TN) in the south that exemplify differences in the autonomy of women and the nature of marital relationships. Since the continued validity of the Dyson and Moore thesis has recently been questioned (Rahman and Rao, 2004), we use extensive interviews with almost all husbands and wives in our sample (interviewed separately) in order to verify that our sites typify the North-South contrast as it is normally held to be in the literature. In addition to choosing locations where autonomy measures vary naturally, we manipulate experimentally important features of the game that are usually linked to autonomy. Our key treatments allow us to examine the impact on efficiency of *earning endowments* (to mimic the situation of greater entitlement to one's own resources), *public endowments* (to create a contrast with the baseline in which resources can be hidden), and *control* of the allocation (to measure whether inducing autonomy experimentally through transferring agency matters for male and female contributions).

Generally, we find large-scale and robust evidence of inefficiency and the hiding of assets when this is possible. Men invest more and are more generous to their partners. Women are more willing to invest in a common pool when their income is earned through working and when assets are publicly observable. Regarding the other focus of our paper, we find continuing significant differences between North and South and we find relatively little evidence that urban living is associated with changes in the nature of marital behaviour. There are some differences between response to treatment (e.g. female contributions respond to endowments being public only in the South, and male investment to male control of the allocation only in the North) but the key and striking difference between the North and the South is that in both rural and urban sites in the former region household efficiency is considerably greater than in the latter, which does on the face of it suggest a trade-off between autonomy and efficiency. The result does not of course imply that female autonomy is not worth having, nor to ignore its numerous rewards (e.g. Anderson 2009). It is simply to point out that there may be a price to pay for these good things in that household decision-making is less efficient.

1. Background: India's North-South divide in female autonomy

In the northern kinship upon marriage, women leave their natal kinship network to join that of their husbands, after which their movements, economic activity and sexuality are strictly controlled. By contrast, the southern kinship system is said to rely on the reciprocal exchange of women between groups and favours cross-cousin, village-endogamous marriage, so married women do not tend to stray far from their blood relatives. In this depiction of it, the northern compared to the southern kinship system is obviously responsible for lower female mobility and exposure to the outside world, and plausibly for lower female labour force participation, higher fertility, higher female-to-male infant and child mortality (and therefore worse overall sex ratios), and less female say in household and personal decisions and entitlement to household resources (Sopher 1980; Miller 1981; Dyson and Moore 1983; Jejeebhoy and Sathar 2001).

Though they explicitly acknowledge the potential ultimate primacy of economic factors, Dyson and Moore have come to be associated with a school of thought that favours a cultural over an economic explanation for India's North-South divide in female autonomy. Others have emphasised the agro-ecological determinants of female economic worth, specifically the higher demand for female labour in wet-rice than in wheat growing areas, which would lead to a lower valuation of women in the North (Bardhan 1974; Miller 1981; Miller 1984).

Dyson and Moore's mostly historical data has been challenged and updated by more recent evidence. Using a survey administered in 1995 among 800 married women (in total) in the southern state of Karnataka and the northern state of Uttar Pradesh, both labelled without reservation by Dyson and Moore as typifying respectively the southern and northern kinship systems, Rahman and Rao find that female autonomy is worse in some respects in the North (influence over decisions about fertility and children's health and education) but better in others (expenditure decisions). Rahman and Rao's (2004) study uses purposively selected districts, five in Karnataka and five in Uttar Pradesh, and is not designed to be representative for those states, let alone for 'the' South and 'the' North of India. Indeed, another study, using a very similar questionnaire, and a larger sample, based on fieldwork carried out a year before that of the Rahman-Rao study, found female autonomy to be considerably better in all key respects in the latter state:[i] "A clear regional divide, net of individual and household characteristics is evident in almost every index of autonomy: decision-making authority, mobility, access to and control over economic resources, and, to a lesser extent, freedom from threat by husbands. Women in Tamil Nadu experience far greater autonomy than women in […] Uttar Pradesh." (Jejeebhoy and Sathar 2001: 708).

Our sites are purposively selected, in these same two states, in order to capture the North-South divide sketched above, but in the light of the contradicting findings from recent studies, site selection clearly needs to be validated, which we do using survey data, very similar in kind to those Rahman and Rao (2004) use, on the extent of female autonomy in a number of key respects. Our reasoning here is simply that we can only hope to shed light on the regional contrast we are interested in using experimental methods when we can be confident that we have captured the North-South divide using the more traditional questionnaire-based methods. In our view, while the survey data are used to validate our site selection, they are neither epistemologically superior nor inferior to the experimental data.[ii]

2. Autonomy versus Efficiency

It is useful to outline a theoretical model in which autonomy and efficiency are potentially in conflict. Given the complexity and dynamism of real household environments, we do not claim to be testing this theory, but it provides some further motivation for our experimental investigation. Suppose there are n+1 goods in the household, x_i $i = 1,\ldots,n$. We write u(x) as the continuous and quasi-concave utility function for the wife and v(x) as the corresponding function for the husband, where x is the vector of goods, with associated price vector, p. It is useful to think of x_0 as a purely private good consumed by the wife and x_1 as a purely private good for the husband. All other goods are in

theory household goods, providing benefits to both partners. Though in practice some goods may be of direct value only to one person, they may be indirectly valued by the other partner for the benefits brought to their spouse. In other words, this formulation allows for household goods which are clearly jointly consumed (e.g. heating) and for other-regarding preferences. We assume that there is at least one household good that is always positively valued by both spouses. Total household expenditure is y, which is the sum of three non-negative components: y^h, y^f and y^m where h, f and m refer to household, female and male budgets respectively. The allocation of goods is decided in a two-stage game. In the first stage, husband and wife separately allocate their own budgets to maximize individual utility. Note that both parties can purchase any of the goods and total consumption is the sum of individual purchases, x^f and x^m. In the second stage the household chooses x^h to maximize the weighted sum of individual utilities, $W(x)\ \lambda u(x)+(1-\lambda)v(x)$ $(0 < \lambda < 1)$ subject to the constraints that $px^h \leq y^h$, $x = x^h + x^f + x^m$ and $0 \leq x^h$. Another way of representing this is that the household chooses x subject to the constraints that $px \leq y$ and $x \geq x^f + x^m$. Either way, it is as if the spending chosen by the individual partners can be topped up by the household but not reduced. Thus the first stage of the game provides constraints on the possible values of x in the second stage and when allocating their individual budgets, both spouses anticipate this. The model is therefore a close relative of the separate spheres model proposed by Lundberg and Pollak, 1994. In their model, the solution to the household's resource allocation problem comes from the Nash bargaining solution, rather than maximizing W(x). The fallback positions in their model are provided by the solution to a non-cooperative game in which each spouse controls the allocation of resources to one (or more) household public goods. This game therefore corresponds to the first stage of this model albeit that in our model spouses can contribute to any and all household public goods.[iii] Because the individual budgets in our model give the spouses some power over the way the house allocates its resources, they can be interpreted as measures of autonomy. Specifically, when $y^f = 0$, the wife has zero autonomy over spending and more generally, a higher value of y^f (y^m) for given y indicates a higher level of autonomy for the wife (husband) in the household.

With regards to x*, the equilibrium pattern of expenditure, there are two cases to consider: first the individual budgets may be sufficiently low that they place no restrictions on the value of x in the second stage. In this case the equilibrium value of $x^* = x^{**}$, where x** is defined as the value of x that maximizes W(x) subject to $px \leq y$. Since x** is, by construction, Pareto efficient then x* is also Pareto efficient. In the second case, individual budgets and preferences are such that $x^* \neq x^{**}$ - i.e. the constraint, $x \geq x^f + x^m$ is strictly binding. Now when $y^m = y^f = 0$, then clearly $x^* = x^{**}$, the equilibrium is Pareto efficient. Conversely, Dubey (1986) shows that when $y^m + y^f = y$, then x* is generically strictly Pareto inefficient.[iv] Thus autonomy and efficiency are inversely related.[v]

A key question is what factors determine y^f and y^m. Income received and how it is acquired, may be important variables, along with social norms, the claims of others in the household and measures of bargaining power such as proximity of relatives, legal rules on individual property and divorce (Anderson and Eswaran, 2009). The potential for income or assets to be hidden may also be influential, inasmuch as a spouse who can hide income may need to be given some control over its allocation in order to induce him or her to reveal it to the household. In our experimental treatments we manipulate some of these factors (see below), though it is not clear that deeply established practices in a marriage, such as the level of autonomy, can be easily manipulated in an experimental setting.

3. Design

Across the three sites we have five treatments in common which we introduce as follows:

1. Investment baseline. Both partners have endowments and can make investments. The total amount is increased by 50% and then split equally after we add 50%. Subjects do not know their partner's endowments.

2 Female control – both subjects have endowments and can make investments, but the women control the allocation of the pool.

3. Male control – as above, but with male control of the allocation.

4. Public endowments. As for the investment baseline, but with endowments revealed publicly.

5. Production with investment – in this treatment subjects earn their endowments, but can then invest in the pool in the same format as treatment 1.

In addition we use a female 'trust'[vi] treatment, which has data for both northern (rural) India and the south, but not for the urban north. In this treatment, only men have endowments and the allocation of the pool is the responsibility of the wife. The endowment is twice the amount given to individuals in the other investment treatments.

In treatment 1, the *investment baseline* treatment, each subject, i, separately and privately receives an endowment of E_i = 160 Rupees. Each person then chooses an investment, x_i from the set {0, 40, 80, 120, 160}. The investments of the 2 players are summed and multiplied by 1.5 and then each player receives half of the total.

In the female control treatment each subject separately and privately receives the same sum as in treatment 1 and makes an investment decision from the same choice set. The investments are summed and multiplied in the same manner, but then the wife chooses how much to allocate to

each person in the household. This decision is made using the strategy method. That is, after choosing her own investment, for each possible investment by her husband, she must make a conditional allocation of the pool. Once the husband's actual investment is revealed, the allocation proceeds according to the conditional plan. Treatment 3 is the same, except it is the husband who controls the allocation and must produce a strategy for dividing the pool between the spouses.

In treatment 4, the private endowment is common knowledge. Otherwise this treatment is the same as treatment 1. In all but treatment 4, the private endowment E_i is known only to individual i., whereas the common account and the final allocation from that account is always common knowledge. We told participants that,

> *The exact amount will vary between people, but you will receive something between 0 and 160 Rupees. [Show the envelope.] Your wives will each receive a similar envelope and they will each receive an amount of money between 0 and 160 Rupees. They don't know how much you have in your envelope and you won't be told how much they have in their envelopes. None of you will know what the others have*
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Asymmetric information about individual resources and spending is a familiar and well-documented facet of household behaviour in many cultures (Pahl, 1990). Our own follow-up survey (see below) confirms its relevance for the samples in this experiment. Whether manipulating the information set alters behaviour is not clear from past experiments. Munro et al, 2008, find that providing information about a partner's choices makes no difference to behaviour in an experiment conducted on UK couples. However in her experiment on Philippine households and their savings decisions, Ashraf, 2009 concludes that transparency affects male (but not female) behaviour. Similarly, Hoel, 2012 finds that asymmetric information affects giving behaviour in a modified dictator game played out in villages in Kenya. In what is probably the closest parallel to our research, Mani, 2008 uses 300 couples in rural Andhra Pradesh, recruited through an NGO that organises women's self-help groups. Players typically face 4 tasks including one baseline task where they must split 50 rupees between a high return and a low return account (with the share going to each spouse fixed) and another task in which subjects split 50 rupees between a high return investment that goes to the spouse's private account or a low return account that stays with the investor. She finds that the separated spouses typically invest 70% to 80% of their investment in the high paying account that goes to the partner. Crucially, she has a full information and private information variations which make little difference to the results.

It is worthwhile stressing that in our experiment the total surplus maximizer has no incentive to withhold contributions, even with asymmetric information, but of course players with different motives may wish to hide some or all of their endowment from their partner. This could be achieved by not placing some of the endowment in the common pool. However, because there are other motives for not investing which apply even if endowments are common knowledge, we cannot interpret all failures to invest as evidence of deceit. The clearest evidence of attempts to conceal resources is provided where the potential investor also controls the allocation (i.e. the wife in treatment 3). In this context we measure *opportunism* as the difference $E_i - x_i$ where x_i is the investment made by player i who has a strictly positive endowment, E_i, and is the allocator.

In treatment 5 subjects earn their endowments by assembling up to 8 matchboxes in a fixed time period. For each pair of matchboxes completed the experimenter's satisfaction subjects were paid 40 rupees. Thus subjects could earn 160 Rupees – the same endowment as in treatments 1-4. The sexes were segregated for the production tasks, meaning that as in treatments 1-3, the endowment was private knowledge. After completing the task, subjects faced the same investment problem as in treatment 1. We include a production task, because if individuals have more control rights over money that is earned then a spouse may be more willing to invest it in the publicly observable pool.

The experiments took place on 5 consecutive days in 2009. In each site, five locations were selected. In the case of rural sites, these five locations were distinct villages. The villages had been pre-selected in the month leading up to the main fieldwork using local informants, data from the 2001 census, and prior visits by members of the research team. The major selection criteria were size (we needed to recruit 80 couples from each place), rural location and separation from the other sites (to limit the possibility of cross-contamination). The villages selected in Uttar Pradesh are between 10 and 40 kilometres away from central Varanasi. Typically, people are cultivators (they grow vegetables, cereals (mainly wheat), pulses, some rice) and daily wagers (commute to Varanasi or to nearby town or perform some services inside the village). In Tamil Nadu the villages selected were approximately 40-60 kilometres north from Coimbatore. Coconut plantations and poultry farms dominate local agriculture, and a large number of villagers, including women, work in towns in the garment, powerloom and hosiery industries. There is a high rate of female workforce participation.

For the urban location five wards out of 50 were randomly selected. Then within a ward, a named locality was selected that typically consisted of some 300 households on the criterion that we wanted lower income households. With the help of local corporators (the urban equivalents of the village pradhan (chief); as with pradhans these are elected local representatives), lower-income parts of the

wards were identified. The five urban localities selected were in three different U.P. assembly constituencies: Cantonment (Saketnagar, Lahartara), North (Sonarpura) and South (Khojwan, Nagawa). In each location, prior visits gave us a list of possibly willing households. From that list we randomly selected 90 households per village, 10 of which were assigned to the reserve list (again randomly) to be used in the case of no-shows.

The experimenters were 12 (6 female and 6 male) local researchers recruited through the advice of local partners from a local University. All of them were able to communicate effectively with the experimental participants in their local language, and to adequately understand the instructions they received in English. The experimenters received five days of training from three UK-based researchers from the project. The first day of training was used for explaining the principles of how to run experiments (what to do and what not to do with examples) and presenting all the treatments to be played in the region. On days 2 and 3 experimenters practised in the local language (and sometimes in English so that the team leaders could understand). On day 4 we ran a pilot using a small sample of subjects. The fifth day of training was used to give individual and collective feedback on the pilot, to explain the logistics for the game days and to distribute the material needed for the first 5 game days.[vii]

The experiments used scripts translated into the local language and then back-translated into English. Each experimenter was also used to compare the English and the translated versions of 2 or 3 treatments. Discrepancies were then corrected by all experimenters during the training in the local language version. Across the 15 locations, venues were mixed and included middle and secondary schools as well as farm building with concrete floors and specially erected tents.

The schedule for the 5 game days was as follows: 5 treatments in the morning and 5 treatments in the afternoon. After welcoming the participants, husbands and wives were split in different rooms. Secrecy was ensured by calling one person at a time, with each husband going to one location with a (male) researcher and each wife going separately to another location with the (female) researcher. Each spouse removed from their envelope what they wanted to keep for themselves, with the remainder left for the common account. The researcher collected their envelopes and recorded the decisions. At the end of the session, each couple was individually called and paid in private. For the production task, the sexes were segregated and subjects practised production before engaging in it for real.

4. Results

Before considering the experimental results, we begin by setting out some basic facts about our sample in Table 1. We then consider the survey data and compare the attitudes, lifestyles and measures of autonomy within our sample to those reported in Rahman and Rao, 2004, and Jejeebhoy and Sathar, 2001, which reach contradictory conclusions about the continued relevance of the Dyson and Moore thesis.

The tables which follow summarise our evidence on conjugal practices, drawn in our case from separate interviews with both husbands and wives.[viii] To a large degree we find very similar patterns in our rural and urban Uttar Pradesh locations, which in turn are typically very different to the average household in Tamil Nadu. Table 1, for instance, illustrates the differences in endogamy between north and south, which Dyson and Moore hold to be at the root of the regional divide in female autonomy. Marrying relatives is almost unheard of in our Uttar Pradesh samples, but common in Tamil Nadu. Wives are highly unlikely to be living in the maternal home in the north, whereas in both regions around 2/3 of men report that they are living in a household with their parents. Dowries were lower in the south compared to the north.[ix] Two rows of data report answers to questions about 'typical community practices.' Although spouses rarely split up in any of these sites, if they do it is relatively common for the wife to be allocated property (e.g. a house) upon divorce in Tamil Nadu, but almost unheard of in both urban and rural Uttar Pradesh. It is also notable that according to respondents in Tamil Nadu, prior ownership of property assets have little relevance for their allocation at divorce. For more mobile assets, such as cash and jewellery, allocation at divorce follows more closely the pattern of original ownership. For instance, with gold and jewellery, the percentage of respondents who state that wives would normally get jewellery on divorce is 18% if jewellery was owned by the husband at time of marriage and 90.2% if it was the wife's property. For gold jewellery bought after marriage the gap is only slightly less stark – the corresponding figures are 28% and 85%.

Table 2 provides some measures of perceived autonomy as reported by the women in our sample. Consider first the allocation of time. In both northern locations, unpaid work is the norm. In the south, unpaid work, including childcare is still the largest category (34.5%), but working on her own business (22.8%) and doing paid agricultural work (18.8%) are relatively common. In fact the proportion of women doing either agricultural or non-agricultural paid work is similar across all three locations. Tamil Nadu differs from the northern rural areas in the percentage of women who work in their own business in the south and in the higher percentage of southern women who work on the family farm. Similarly, women report less say in decisions that concern their ability to operate

independently outside the home, earn private income and purchase private goods in the north. One bit of evidence on autonomy is conflicting, in that women are more likely to own their own assets in Uttar Pradesh. (Separate ownership of land was rare in both north and south, with about 4% of women in each location reporting they had land under their own name.) However, it could well be that this reflects the larger dowry paid in the north, which even if it is counted as part of a woman's own assets, is highly unlikely to correspond with assets that she can dispose of as she sees fit.

When asked what major change women would like to make to their lives, 78% of women in the south reported no change, compared to 36% in rural Uttar Pradesh and 31% in the urban sample. Of the dissatisfied, by far the largest desire was for more time for paid work or own business, which could partly be explained by the fact that wives of migrant or wage workers in Varanasi are often managing the daily running of the household farm but not involved in the marketing of its produce, so that they have neither time left nor income of their own.

We asked both spouses who was the person primarily responsible for making decisions in a variety of areas.[x] Summary answers are given in Table 2**Error! Reference source not found.** where, as in Rahman and Rao, 2004, we aggregate across several questions. There is some difference between urban and rural north, but the biggest gap is between north and south: women generally answered that they were the primary decision-maker more often in Tamil Nadu than in Uttar Pradesh. For instance, 30.6% of women in the south declared themselves the primary decision-maker about whether they could work outside the home, whereas less than 1 of women in the north gave the same answer. Meanwhile 70.6% of women in the south stated that they buy a sari without their husband's permission whereas the figures for the rural and urban north were 46% and 48% respectively. Men generally gave similar answers to the women, but were more likely to nominate themselves as the main decision-maker in the south. Whether we take the men or the women's view our results are in contrast to those in Rahman and Rao 2004 (e.g. their Table 3) and more in line with the earlier conclusions of Dyson and Moore echoed in Jejeebhoy and Sathar 2001. The differences across states in the results of individual questions are always in line with the pattern of the overall indices. In particular, we find women have significantly more say on major household purchases or general expenditure of income in the south compared to the north.

In general in answer to our questions about various decisions under 10% of women in any community reported that they were neither the first nor the second decision-maker. Notable exceptions to this occur in the questions of whether a wife should work outside the home and to whom to marry children. In the first case, 11 and 17% of husbands in urban and rural Uttar Pradesh

respectively state that their wives are not the primary or secondary decision-maker. In Tamil Nadu the corresponding percentage is 4. In the second case, the percentages of women with no say are 14, 19 and 25 in urban Uttar Pradesh, rural Uttar Pradesh and Tamil Nadu. (The figures for the two rural sites yield p=0.04 for a Fisher's exact test of their equality.) Usually it is a child who acts as the co-decision maker though we have no information about whether this is the child facing marriage.

Table 3 produces some general figures on trust and satisfaction. Overwhelmingly the men and women of Tamil Nadu are more satisfied with their current allocation of time. Amongst all regions, dissatisfied women and men sought more time for paid activities. For women the major obstacles to their goals were unsurprisingly finance and childcare responsibilities. For men, lack of finance dominated the explanations. We asked men and women what portion of a windfall they would hide from their partner and what portion they would expect their partner to hide? The figures shown amalgamate the responses of subjects who declared that at least half the sum would be hidden. This was relatively infrequent amongst both men and women in the north, but significantly higher in the south. In general, spouses' expectations about their partners were close to what their partners declared in the north. The figures in the table suggest some (insignificant) tendency for men to plan to hide more than their wives were expecting and for wives to hide less than anticipated by their partners. However, when we look at the full range of figures this difference disappears. For instance 2/3 of men in Uttar Pradesh expect their partners to hide nothing, whereas in fact 50.8% of urban wives and 42.2% of rural wives state that they would hide nothing. The gap between expectations and plans is starker in the south, where 50% of men would hide at least half their windfall, but only 22.8% of women predicted such behaviour. Women were less likely to hide at least half, compared to the expectations of their husbands. Thus in short, men and women in the north were more trusting and trustworthy towards their partners, compared to subjects from the south, and their expectations were more accurate.

Table 4 summarises normative beliefs about appropriate behaviour. The table shows responses to questions where subjects were asked directly to agree or disagree with statements about appropriate household behaviour. As with the other responses, there are clear differences between north and south, but it would be wrong to categorise these along a one dimensional scale of conservatism (where for the sake of the table we define this ambiguous concept as agreement with the statements). Women and men in the northern state were significantly more likely to agree that a husband's permission was required for a woman to work outside the home and that a woman should follow the instructions of her elders. However, women and men in Tamil Nadu were more likely to believe that the man should have the last word and that priority should be given to boys in education.

Between question variation in percentages is similar for men and women, but husbands were significantly more likely to believe in obedience to elders. Significantly, men in the north were much more likely to agree that a woman's wages should be handed over to him, both compared to their wives and to men in the south.

Table 7 in this section examines the extent to which wives and husbands gave similar answers. Take the 'congruence on primary decision-maker' entries as an example. If the figure in a column was 1 this would mean that across 9 questions about who was the primary decision-maker, all couples in the sample agreed in every single instance. A figure of 0 would mean that all couples disagreed in their responses on all 9 questions. In practice, congruence on primary decision-maker was high in Uttar Pradesh and significantly lower in Tamil Nadu. In fact in all cases, the figure for Tamil Nadu is significantly lower than that for rural Uttar Pradesh.[xi] We also asked both spouses questions about their partner's income. Approximately 86% of men in rural Uttar Pradesh gave a figure for the wife's income that was within 5,000 Rupees of the figure she gave. For Tamil Nadu the corresponding statistic was only 29.8%. Agreement on husband's income was lower in the northern state, but still significantly higher than the figure for Tamil Nadu.

To sum up, we find significant differences between north and south and these distinctions are present whether we look at statements by female respondents or at the responses made by men. In general, urban and rural northern samples are very similar. Men in the north have more decision-making say and women have less autonomy compared to the south. Of specific relevance for our study, we find that the key respects in which greater autonomy of individual spouses could translate into inefficiency all differ across sites in the way we would expect. First, women are in a position to secure their own resources more frequently in the south: they earn their own income more often, and earn a higher income on average than in the north. Second, spouses hide their resources much more frequently from each other in the south. Third, almost invariably and in a large number of spheres, women are more frequently the primary decision-maker in the south than in the north. Rahman and Rao find some evidence that women in the north have relatively more say in particular decisions. We do not find supporting evidence for this. The impression that spouses act much more like a unity, if an enforced unity, in the north is reinforced by the strikingly larger congruence of views on the identity of the primary decision-maker and on normative beliefs, as well as by the much more accurate knowledge of the size of one's spouse's income and prediction of what one's spouse would do with a windfall.

Experimental Results

As we noted above, in all 10 treatments were conducted in each sites with 40 couples in each cell. Below we concentrate on the 5 treatments common to all three sites, though from time to time we bring in additional material from comparisons that are incomplete across locations, such as the female trust treatment, which has data for both northern (rural) India and the south. Table 5 provides a useful starting point, showing mean rates of investment by women across treatments and sites. The geographical pattern for men in the same table is broadly similar to that for women:

Figure 1 provides a snapshot of the women's data across the sites for the 5 universal treatments.

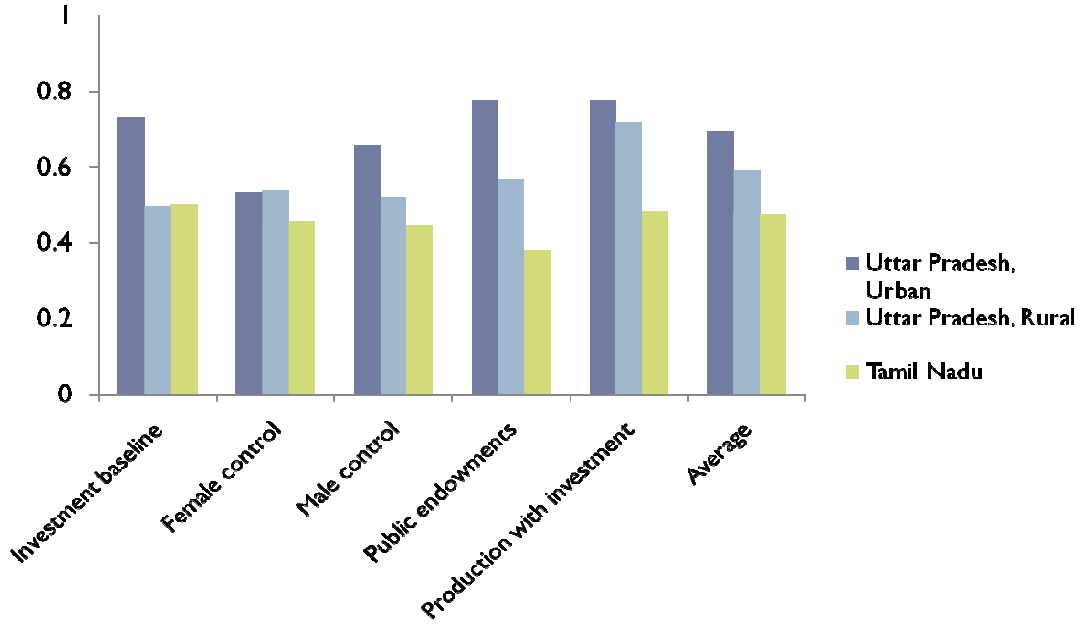


Figure 1. Average Investment Rates by Women for Site and Treatment.

Figure 2 provides a similar picture of the mens' data across the sites for the five common treatments.

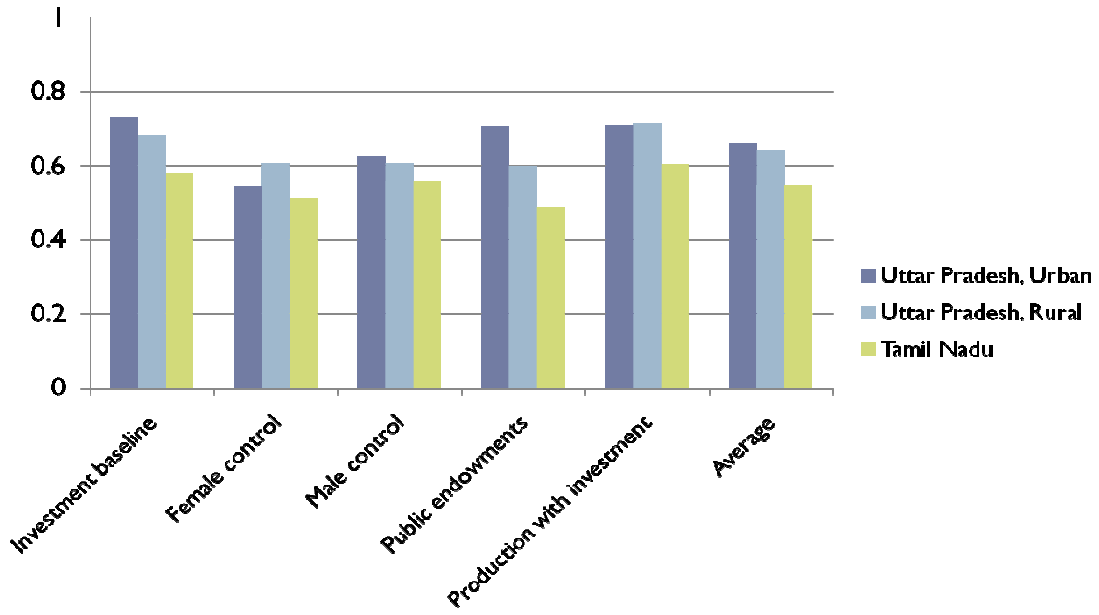


Figure 2. Average Investment Rates by Men for Site and Treatment.

There are seven basic messages in the data presented in the figures and tables, which are robust to the introduction of controls from the household survey data.

Result 1. Surplus is not maximized outside of a small number of households.

In the south only one household invests all its endowment. In the rural north, around 7% of households invest all and in the urban north approximately 15% of couples invest everything. Higher rates of investment are found in some treatments, but in no case does the mean rate of investment exceed 80%.

Result 2. With few exceptions, the investment figures for Tamil Nadu are significantly below those for the northern sites.

This applies to both men and women and across treatments. Men and women rarely invest all their endowment in the south and are more likely to keep the majority of their endowment themselves. For example, from these 5 treatments 116 women invest everything: 82 in urban Uttar Pradesh, 26 in rural Uttar Pradesh and only 3 in Tamil Nadu. For men the corresponding figures are 87, 55 and 2. The south also differs in the responses to treatments as we discuss further in points 5 and 6.

Result 3. In the rural areas, women generally invest less than men.

Although the overall gap is highly significant, differences within treatments are not always significant. In urban Uttar Pradesh, there are no significant differences between male and female investment rates, which are similar across treatments. In addition as we discuss below the response to treatment varies between rural sites.

Result 4. The two northern sites are clearly distinct from the south and there are many similarities between them.

In general investment rates are higher in the urban location, particularly for women. For instance, the average investment rate for women across the 5 comparable treatments in Table 8 is significantly higher at the 1% level (Mann-Whitney test) in the urban area, compared to the rural Uttar Pradesh sites.

Result 5. Comparing behaviour across treatments, the effects of control (perhaps better labelled *responsibility*), are ambiguous.

Generally assigning control to one person (i.e. comparing the baseline investment treatment to either of the control treatments), lowers investment rates for both sexes. The effect is particularly stark in urban Uttar Pradesh. Compared to female control, male control produces higher investment rates for men and women in the same site, but elsewhere, there are marginal, but not significant falls in female investment and rises in male investment as control is moved from wife to husband.[xii]

Result 6. Men invest less when all decisions are revealed to spouses. For women the treatment effect differs sharply between regions.

In the north, investment by women appears to be higher in the public treatment, although this difference is not significant even if we pool the two northern sites. In the south, investment by women falls in the public treatment to under 40% of endowments. The difference between baseline and public treatments is significant at the 1% level (Mann-Whitney test, two-tailed). So we can conclude that in the south both men and women invest less in the public treatment.

Result 7. Except amongst women in rural Uttar Pradesh there is no significant effect on investment from asking subjects to earn their endowments.

Investment amongst women in rural Uttar Pradesh rises significantly when endowments are produced, but elsewhere and for men we find no statistically significant pattern.

Next we report regression results for the investment decision to see if our conclusions are robust to the introduction of controls. Given that the fraction of endowment invested is censored at 1 and 0 and since we have a reasonable number of subjects who invest all their endowments, we use a Tobit model. In Table 6, for the first regression without controls we see the same basic features of the data that are already reported: investment by women is highest in the Northern urban setting. In the next two columns we consider interaction effects. In the same setting investment is lower when females control the allocation. In the rural Uttar Pradesh location, treatments have no significant impact on investment, except earning the endowment, which has a positive impact. In the south there are no significant treatment effects save for the public endowment treatment at the 5% level (two sided t-test).

In the final two columns of Table 6, we see results when controls are included. The equation shown reflects a number of features in which the controls are grouped into three broad groups (which potentially overlap). First we have the standard demographic characteristics. Then we have some potential measures of bargaining power, such as distance to parent's house and number of relatives living nearby. Finally we have the questionnaire responses about the state and organisation of the marriage. In interpreting the results, it is worth first noting that a large variety of controls were tried. Though they are largely significant we have left in standard demographic characteristics, in part because we anticipate that readers will be curious about their correlation with game play. With the other groups of variables we have been selective, dropping variables with low p-values and selecting one from a group of variables when there were high levels of collinearity.[xiii] We also include the fraction believed to be invested by the spouses' partner, omission of which might cause bias in the estimated coefficients. Inclusion though is problematic since the partner's contribution and therefore beliefs about it are potentially endogenous. In theory instruments can be used for the belief variable. In practice though, it is almost impossible to find variables that influence one partner's decisions but not beliefs about those made by the other partner. In the case of female investment, we use distance to mother's house and number of relatives living with 15 minutes as instruments. A Wald test does not reject the null of non-endogeneity (p=0.95) and so we present results in which belief about partner's investment is not instrumented.

When we look at the results for women, we see that first the conclusions of the previous section largely stand: women invest less in the south and most in the urban north. The apparent source of

this effect though is intriguing since the simple regional dummies are positive for the south and insignificant for the rural north. However, while the coefficient on beliefs about partner's investment is 0.810 for the urban north and highly significant, it is only 0.087 (=0.810-0.723) and insignificant for the south. The rural north is somewhere in between these two values, but also significantly different from zero. So, if we treat beliefs as exogenous, then it is as if women reciprocate or match male investment in the north, but choose their investments independently of men in the south. Moreover, compared to women in the south, wives in the urban north also believe their husbands will invest more (0.67 on average versus 0.46 in the south and 0.57 in the rural north) and this coupled with the higher beliefs coefficient drives the regional differences in investment levels.

When we consider the controls, standard demographic variables are largely insignificant. The exception is years of marriage and the dummy for non-membership of scheduled caste or scheduled tribe. For women there is evidence about whether proximity to family raises investment levels. Living closer to mother is associated with higher investment. Meanwhile living with a mother-in-law (which is common in all three regions) is linked to higher investment in the northern urban sites, but has no significant effect elsewhere, even in the rural north. There is some evidence that other measures of decision-making power are associated with investment levels: working on her own (non-farm) business is associated with higher investment for women. There is also some evidence that women invest less when they feel that they have less leisure than their husbands. Quantitatively the largest effects for women are her beliefs about her partner's investment, region, non-membership of a scheduled caste, tribe or other backward group, having her own business and living within half a day of travel to her mother.

Below the table for women we have the corresponding table for men. As with the women, we considered a number of other potential explanatory variables to the ones shown, none of which were stable or robust to changes in the specification. We also examined the endogeneity of male beliefs and accepted the null of exogeneity in a Wald test. As for women, however, we do not have good instruments for beliefs. In the investment behaviour, we see the lack of difference between the urban and rural sites in the north. When we add further controls a common feature is their lack of significance. There is a positive association between a husband's investment and his belief about what his wife has invested. Unlike that for women this correlation is not regionally sensitive, so that although men are not reciprocating as much as women in the north, they reciprocate more than women in the south.[xiv] As with women there is some evidence of a quantitatively significant association between investment behaviour and not being a member of a scheduled tribe, or caste or other backward caste.

5. Allocation behaviour: during and after the experiment

The main focus of the paper is on the investment decision, but we now briefly analyse the allocation to wives in the female and male control treatments. As Iversen et al, 2011 note, allocation involves intra-household transfers which are potentially reversible after the experiment. In that sense such decisions are different to investment choices, which affect the total returns to the household. Nevertheless, allocation decisions can be informative about patterns of money-sharing within the household whenever there is some deviation from income-pooling. For both male and female control treatments we used a strategy method to elicit allocations conditional on the partner's investment. This provides 5 data points per household (i.e. allocations based on 0, 40, 80, 120 and 160 Rupees by the partner). Table 8 summarises the results. As a benchmark, note that a coefficient of 1.5 on the decision-maker's investment means that all of the returns from a marginal increase in investment are returned to the investor. For each spouse we show three specifications: one without controls (random effects) and a fixed and random-effects specification using the same control variables. For both sexes a Hausman tests accepts the null of no difference in the comparable coefficients at high probabilities ($p = 0.998$, $p = 0.885$ for women and men respectively), suggesting that the random effects estimator is preferable.

There are some stark differences between male and female allocation behaviour. Female allocation to herself is highly correlated with her own investment and with that of her partner's. She gives her spouse half of the marginal returns from her own investment, but slightly less from his investment. There are no significant site effects on the treatment of own investment, but there are for her husband's investment. Notably, women in the two rural areas take significantly more of their husband's investment. Women also take more from their spouses' investment when more of their husband's relatives live close by, when the wife has relatively more leisure (as she sees it) and when she has her own business. These effects are large, in the sense that for a woman with none of her husband's relatives close by, where husband has more leisure and where she works on her own business, her marginal take from her husband's investment is close to 0.15 for an urban, Northern woman. Conversely, if she lives in the south, has more leisure, an average number of husband's relatives living close by and she does not have her own business, the take from her spouse's investment is close to 1.35. For women, the other, demographic variables have little explanatory power, whether they are entered (as in the specification shown) on their own or via interaction terms with spousal investment.

If we consider Table 9, the male intercept is positive, but not significant. The marginal return to the wife from the husband's investment is not significantly different from 1.5. In other words the typical husband gives his wife all the marginal returns from his own investment. He also claims only a fraction 0.211 of her investment, meaning that she gets 1.279 from each 1 rupee invested. There are no significant site effects for the coefficient on his investment, but men in the rural north give less back to their wives compared to urban men and men in the south.

For men, there is very little correlation between other variables and allocation to the wife. An exception is the 'best description of the household' variable, where we see that husbands tend to allocate more to themselves when they perceive that both spouses earn money and keep it. Against this, men give a higher return to wives when the women live further from their mother's home. Men also give more to wives with low or no education, at the margin and in lump-sum form. Other standard demographic variables explain very little of the variation. Age, household size, income and number of children have no significant effect. We also tried specifications that included occupation for instance, but again there was no evidence of correlation.

It is interesting to consider briefly the implications of taking the allocation data at face value and comparing it to the baseline treatment in which each partner faced a marginal return of 0.75 from investing in the pool. With male control the female return to her investment exceeds 1.2 and is significantly higher than 0.75 at the 1% significance level. This would suggest a greater incentive for women to invest. Nevertheless female investment is generally lower than in the baseline. This is a puzzle; it may be the result of a biased prediction of the husband's behaviour but it is also consistent with female risk aversion in the face of uncertainty over the rule the husband would follow.[1]

[1] About 25% of men in urban Uttar Pradesh report that they gave all their money away. Other groups report much lower figures. It is notable that 75% of men but only 30% of women in the south refused to say what they did with money they kept. In the north the relevant percentages were around 40% with no significant gap between the sexes. Out of those willing to reveal their expenditure plans, saving for the future was the most popular category amongst southern women (115 out of 400 nominated it first), whereas spending on the household as a whole topped the list in the north for women (117 out of 400). Spending on children ranked second in the north and third in the south, behind spending on the household. Saving for the future was nominated by only a handful of women in the north. Recall that very few southern men would reveal what they did with their winnings, but amongst northern men, spending on themselves and spending on the household were the equally

6. Discussion

We have conducted a large scale experiment with 2400 people and an accompanying survey in three distinct locations in India. The survey data confirms the continuing existence of prominent differences in the conjugal circumstances of households between north and south. Differences between urban and neighbouring rural communities in the north are less sharp. The social distinctions between north and south are mirrored in the way participants played the games: investment was generally closer to its maximum possible limit in the north for both men and women. Nevertheless in all our locations putting all into the common pool by both spouses was an uncommon strategy.

The intriguing results of the full information treatment suggest that an unwillingness to invest all the endowment is not driven by the opportunity to hide money from spouses. In fact men invested less in the full information treatment in all our sites, while investment rose for women in the north, but fell in the south. Such results contrast with Iversen et al, 2011 for Uganda but are in keeping with those found in some other non-Indian sites, in Ethiopia (Kebede et al, 2011) and Nigeria (Munro et al, 2010), and also with the results of Munro et al, 2007 for the UK. There is no evidence in our post-experiment surveys and interviews that individual spouses doubted their ability to hide payoffs from their partners.

Comparing regions, the broad outlines of our results are compatible with a theory where there is a trade-off between autonomy and efficiency, such as Lundberg and Pollak's separate sphere's model. In Tamil Nadu, where women have more autonomy their investment in the common pool is lower. This suggests that more opportunities for spouses' mutual gains are left unrealised in the region with greater female autonomy. As we stressed in the introduction, this is not of course to suggest that the female autonomy is not worth having, nor to close our eyes to the numerous benefits we know it brings: lower fertility, better child health and education, as well as a lower gender disparity in them, and so forth. It is simply to indicate that there may be a penalty to pay for these benefits in terms of the efficiency of household decision-making.

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likely categories, with children someway behind. As with the wives, savings were nominated by less than 5% of the participants who retained some money.

Meanwhile, the regression yields evidence of almost no reciprocity amongst women in the south. Within regions the results are suggestive of a link between autonomy and efficiency but not definitively so: variables such as having her own business play a part in explaining variation in investment rates in the regression analysis, but measures of household say are largely insignificant and there remain some quantitatively significant north south differences in the way the games are played that are not captured by differences in answers to standard questionnaires about conjugality. Of notable interest is the fact that women invest less if their mothers live further away. Living with a mother-in-law is associated with a significant positive effect on investment in the urban north, but not elsewhere.

Sen (1990) conjectured that women identify more closely than men with the household as a whole, which would lead them to contribute more to the common pool than men. Yet, even in the treatments where females are in control of allocation wives typically contribute less than their husbands.[xv] The larger investments by husbands are consistent with a conjugal world in which husbands are expected to provision the household and wives' contribution is discretionary. In fact, control may be a misnomer here; rather it is responsibility that may be assigned by the treatment and it seems that men and women respond in different ways to the burden. In every location, men invest less than in the baseline when one or other partner is assigned responsibility for dividing the common pool. Meanwhile, when allocating the payoffs our regression results indicate that men favour spouses over themselves while women favour themselves. If men take the allocation rules embodied in these regressions as a given, their treatment response to changes in control is consistent with a degree of self-interest on men's part - i.e. they invest less because they know they will receive less back. Women's response to changes in responsibility varies across regions: investment falls compared to the baseline in the south and the urban north, but it rises in the rural north, albeit only slightly. What men do and women do in rural Uttar Pradesh is mutually consistent[xvi], but in the other two locations, the responses of men and women are mutually inconsistent, unless we allow for some other intervening factor such as errors in expectations about the behaviour of their partners. In fact Table 12 gave support for such an explanation in Tamil Nadu: there we saw a significant mismatch between the reports of wives and husbands in the south. That still leaves unresolved the results in urban Uttar Pradesh and here we can only speculate. We noted earlier that risk aversion may play a role in investment decisions when individuals do not know how the proceeds will be finally allocated. In such a situation a move from a fixed allocation rule to one where an individual partner divides the pool can lead to an outcome in which both partners lower investment.

Endnotes

[i] This study, reported on in Jejeebhoy (2001) and in Jejeebhoy and Sathar (2001), uses for its India component a sample of 1,842 women; the fieldwork took place in 1993/94.

[ii] As an aside, we note that questions about female autonomy are often asked only to female respondents. In our case we ask both male and female spouses questions about female autonomy, which in some cases provides interesting contrasts in responses.

[iii] Generally in such models each spouse contributes to a distinct set of household public goods. Thus Lundberg and Pollak's assumption that the spouses control separate spheres can be relaxed without materially changing the outcome of their model.

[iv] Generically, in the sense that if for instance there are no household public goods then $y^h = 0$ can yield efficiency.

[v] The factors which raise autonomy may also influence the weight, λ in the second stage of the model. Such changes can alter the observed relationship between autonomy and efficiency. For instance, consider a rise in female power that increases λ and y^f simultaneously. If the change in λ is sufficiently large, then the outcome of the first stage of the game may no longer constrain the solution to the second stage. In other words, the rise in female power increases efficiency. However, as long as consider changes in autonomy keeping λ constant the inverse relationship between autonomy and efficiency holds.

[vi] The label 'trust game' derives from this format's typical use in a laboratory game played between non-couples.

[vii] We also had 2-3 days of training for the survey enumerators.

[viii] Major differences between samples: we include a sample of nearly 400 from urban Uttar Pradesh; we interview both men and women. Our sites are geographically more clustered and are subjects are overwhelmingly Hindu (by design). Rahman and Rao also by design include a variety of different levels of prosperity in their sample.

[ix] Our figures for dowries are substantially lower than those given in Rahman and Rao. We selected low income villages and urban districts, whereas in each region they chose 2 prosperous districts out of 5 in total. They also report a very high variance, which suggests that a relatively small number of large dowries may drive their figures.

[x] For instance, what food to prepare for family meals, whether to purchase major goods for the household such as a (TV)? whether or not you should work outside the home? How many children to have? Whether to purchase or sell gold/silver jewellery? Inviting guests to your home? What to do if a child falls sick? How much schooling to give your children? To whom to marry your children? How overall household income is spent? These questions are very similar to those asked in Rahman and Rao, but we simplify the answering format, with subjects asked to nominate the primary decision-maker and then a secondary decision-maker if appropriate.

[xi] In the underlying questions responses were typically – though not exclusively – more extreme in Uttar Pradesh. This raises the probability that a partner picked randomly from the sample would give a similar answer. In other words, the picture of marital congruence in the north might be overstated from these figures.

[xii] Iversen et al, 2011 report that assigning responsibility to women raises investment by both men and women. The different results here underline the 'one size does not fill all' conclusion of that paper.

[xiii] For such variables, such as the variables for control and say in marriage we have also tried factor analysis and indices. This did not produce results significantly different or superior to the ones shown.

[xiv] In bivariate correlations, men's beliefs about women's investment are more accurate than women's beliefs about male investment.

xv This is obviously an average. In fact, in about 40% cases men investment more than wives, in 32% cases men and women invest the same and in 28% of households it is women who invest the most. Even in Tamil Nadu, 21% of wives invest more than their husbands, a sharp reminder of the diversity of responses in our experiment.

[xvi] Rural Uttar Pradesh is also consistent with this interpretation for two other treatments that we ran there: one in which all the common pool goes to the wife and the trust game in which the wife invests and the husband allocates. In both cases wives invest significantly more than in the baseline. Meanwhile men's investment is lower in the trust treatment where men invest and the wife allocates.

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Appendix (not for publication). An Example of the Instructions: Women in the Male Control Treatment.

Instructions for Participants [Both partners present]

Welcome. Thank you for taking the time to come today. [Introduce EXPERIMENTERS and the assistants.] You can ask any of us questions during today's programme. We have invited you here because we want to learn about how married couples in this area take decisions. We will ask you to make decisions about money. Whatever money you win today will be yours to keep.

You will be asked very simple questions. Questions that do not have a correct answer, they are just about the way you think. For example, what is your favourite colour [ask someone in the room]? We cannot say that this answer is right or wrong. It is just your opinion and it can be different from the opinion of others in this room. However it is important to think seriously about your answers because they will affect how much money you will take home. What you need to do will be explained fully in a few minutes. But first we want to make a couple of things clear. First of all, this is not our money. We belong to a research organization, and this money has been given to us for research.

Second, this is a study about how *you* make decisions. Therefore you should not talk with others. This is very important. Please be sure to obey this rule because it is possible for one person to spoil the activity for everyone. I'm afraid that if we find you talking with others, we will have to send you home, and you will not be able to earn any money here today. Of course, if you have questions, you can ask one of us. Third, the study has two parts: today's exercise is one, but we will also visit you in your homes in the coming weeks to ask both the husband and the wife a number of questions. Finally, make sure that you listen carefully to us. You will be able to make a good amount of money here today, and it is important that the instructions are clear for you so that you can follow them. Would wives now please go with [Thea] and husbands with [Theo]? The task will then be explained to you.

[Instructions for wife]

In a moment I will give you an envelope containing money. The exact amount will vary between people, but you will receive something between 0 and 160 rupees. [Show the envelope.] Your husband will receive a similar envelope and he will also receive an amount of money between 0 and 160 rupees. He doesn't know how much you have in your envelope and you won't be told how much he has in his envelope. You have to decide how much money to take out of the envelope and how much to leave in. Any money you take out of the envelope is yours to keep. Your husband will be making the same decision with his envelope. After you have made your decision and your husband

has made his decision we will bring you together again. We will put all the money that you and your husband have left in your envelopes into one envelope. We call it, the common envelope. To whatever is in the common envelope we will add another half again. So, if there are 80 rupees in the common envelope we will add another 40 rupees to make the total 120. If there are 320 rupees in the common envelope we will add another 160 rupees to make a total of 480 rupees and so on. Both of you will know the total amount of money in the common envelope.

After that your husband will decide how to split the money in the common envelope. He has to decide how much to give to you and how much to keep for herself. In a moment we will give you some time to think about how much money you want to leave in your envelope.

Let me ask some questions to check whether you understood the instructions.
1. If you have 160 rupees in your envelope and you take out 80 rupees how much will be left in the envelope? [record the answer, correct participant if necessary]
2. If you put 80 rupees into the common envelope and your husband puts in 80 rupees how much will there be in total?
3. How much we will add if there is 160 rupees in the common envelope?
[Record each answer, correct participant if necessary]

[Responses to common questions: to be used only when subjects ask]
1. If you are asked whether the husband and wife will have the same amounts in their envelopes, answer: possibly, possibly not.
2. If you are asked what 'what should I do', you should say that it is 'your decision and I am not allowed to offer advice'
3. If you are asked precise arithmetical questions then answer them precisely. E.g if I put in 160 rupees and my husband puts in nothing how much will you add to the total?' Answer: 80 rupees.

[Once the experimenter is sure that the participant has understood the activity, give him/her some time to make his/her decision in private. DON'T FORGET TO KEEP RECORD OF THIS DECISION.]
Thank you. We will now rejoin your husband and put the money from your two envelopes into the common envelope.
[Bring husband and wife together & resolve the game.] [Experimenter looks up the allocation decision and executes it. Subjects are given their money and thanked]

Tables

Table 1. Background facts about the samples

	Uttar Pradesh (Rural)	Uttar Pradesh (Urban)	Tamil Nadu (Rural)	Rural north versus rural south (p-values)
Experiment sample size	400	400	400	-
Household survey sample size	393	376	400	-
Mean age (wife)*	41.8	39.7	39.9	0.040
Mean age (husband) *	46.1	44.1	47.3	0.260
Mean years married*	27.9	23.9	21.6	0.000
Mean household size*	7.31	6.10	3.70	0.000
Mean no. of children*	2.66	2.07	0.81	0.000
% working in agriculture (husbands)	26.3	3.7	50.5	0.000
Wife spends most of the day on unpaid work (%)*	50.90	62.50	34.50	0.000
Mean wife's annual income (Rupees) *	2787	4507	12618	0.000
Mean husband's annual income (Rupees) *	44976	33848	40384	0.040
Median Gross household wealth (Rupees) *	103308	92729	141450	0.000
Marry relatives (%)	0.5	0.3	42.8	0.000
Scheduled caste (%)	34.8	51.6	35.3	0.882
Living with parents (women, %)	0.0	2.9	21.0	0.000
Living with parents (men, %)	70.3	77.0	64.0	0.059
Average dowry paid (Rupees)*	3192	4174	2336	0.000
What happens upon divorce to house acquired jointly during marriage (% saying it goes to wife)	0.77	0.80	44.0	0.000
What happens upon divorce to house husband brought to marriage (% indicating it goes to wife)	0.00	0.27	40.5	0.000

Notes:

1. the statistical tests are Fisher's exact test, with the exception of the variables marked *, where a Mann-Whitney test is used. The p-values are for the 2-sided test. .
2. For income we use the figure reported by each person separately. For wealth, only husbands faced the relevant set of questions. Median income for women is zero in both northern samples. In the south median female income is 2000 Rupees per annum.

Table 2. Indicators of Economic Autonomy and Household Decision-making

	Uttar Pradesh (Rural)	Uttar Pradesh (Urban)	Tamil Nadu (Rural)	Difference of rural north (Mann-Whitney test, p value)	
				Versus rural south	Versus urban north
Female view					
General index	0.112	0.138	0.460	0.000	0.044
Children	0.035	0.019	0.410	0.000	0.045
Spending	0.106	0.237	0.403	0.000	0.000
Male view					
General index	0.103	0.150	0.383	0.000	0.011
Children	0.025	0.036	0.325	0.000	0.676
Spending	0.137	0.247	0.382	0.000	0.000

The indices represent the average fraction stating that the wife is the primary decision-maker when one person must be nominated. Joint nominations are not allowed, though a secondary decision-maker can be given. The general index is derived from 10 questions, the children index is an average from 3 questions and the spending index is also an average of 3 questions. The p-values are for a two-sided test.

Table 3. Indicators of Trust, Satisfaction and Congruence

	Uttar Pradesh (Rural)	Uttar Pradesh (Urban)	Tamil Nadu (Rural)	Rural north versus rural south
Female view				
Nothing I wish to change (%)	47.1	49.5	87.8	0.000
Hide at least half a windfall (%)	14.3	5.6	39.8	0.000
Partner would hide at least half a windfall (%)	11.9	8.7	22.8	0.000
Male view				
Nothing I wish to change	35.9	31.5	78.0	0.000
Hide at least half a windfall (%)	14.5	10.9	50.0	0.000
Partner would hide at least half a windfall (%)	15.0	6.9	49.3	0.000
Congruence				
Congruence on primary decision-maker	0.815	0.809	0.551	0.000
Congruence on prime responsibility	0.349	0.316	0.308	0.000
Agreement on wife's annual income (% within 5,000 Rupees)	86.15	73.88	29.81	0.000
Agreement on husband's annual income (% within 5,000 Rupees)	48.09	59.15	34.25	0.000

Notes:

1. The congruence figures are fractions of average congruence across groups of related questions (19 prime responsibility, 9 primary decision-maker). For a household, a figure of 1 would represent that both partners gave the same responses on all relevant questions; a figure of 0 represents disagreement on all responses.
2. Except for the first two congruence questions where a two-sided Mann Whitney test is used the p-values are for a 2-sided Fisher's exact test is employed.
3. The agreement on wife's income variable is for women reporting a non-zero income. Agreement is more common once zero-earning women are included, but the North-South gap remains large and significant.

Table 4. Indicators of normative beliefs: female and male.

	Uttar Pradesh (Rural)	Uttar Pradesh (Urban)	Tamil Nadu (Rural)	Rural north versus south
Female view first (% agree or strongly agree)				
1. A man should have the final say in all family matters	48.97	18.40	78.25	0.000
	56.89	27.35	76.00	0.000
2. If a woman works she should give her money to her	23.58	22.93	66.25	0.000
husband	62.24	62.20	57.00	0.148
3. A woman needs her husband's permission to do paid	94.06	96.53	75.50	0.000
work	83.16	86.60	69.00	0.000
4. It is a woman's job mainly to take care of the home	28.24	23.92	66.00	0.000
and cook for her family	41.65	37.37	55.75	0.000
5. A woman should always follow instructions by elders	75.13	70.93	57.75	0.000
(particularly by her in-laws) whether she likes them or	93.01	90.59	73.00	0.000
not.				
6. A wife should tolerate being beaten in order to keep	35.62	39.20	54.25	0.000
her family together	70.39	69.44	49.00	0.000
7. Boys should get priority when family cannot send all	9.71	7.20	46.25	0.000
children to school	32.12	27.88	53.25	0.000

Table 5. Mean fraction of Endowment Invested.

Female	Uttar Pradesh, Urban	Uttar Pradesh, Rural	Tamil Nadu	All sites.
Investment baseline	0.731***	0.494	0.500	0.575
Female control	0.531	0.538*	0.456	0.508**
Male control	0.656***	0.519	0.444	0.540
Female trust	-	0.697**	0.578	0.638*
Public endowments	0.775***	0.569***	0.381	0.575
Production with investment	0.775***	0.717***	0.481	0.658**
Average	0.694***	0.589***	0.473	0.579

Male	Uttar Pradesh, Urban	Uttar Pradesh, Rural	Tamil Nadu	All sites.
Investment baseline	0.731***	0.681*	0.581	0.664
Female control	0.544	0.606	0.513	0.554***
Male control	0.625	0.606	0.556	0.596**
Public endowments	0.706***	0.600*	0.488	0.598**
Production with investment	0.710*	0.717**	0.604	0.677
Average	0.663***	0.642***	0.548	0.618
Male-female	-	***	***	***

In the 'Uttar Pradesh' columns asterisks indicate statistical difference to corresponding treatment in Tamil Nadu, using a Mann-Whitney test. In the 'All sites' column, asterisks indicate statistical difference to the investment baseline treatment. In the 'male-female' row, asterisks indicate statistical difference to the corresponding female figure and omits the incomplete 'Female trust' treatment from the comparison. *** significant at 1% level, ** significant at 5% level, * significant at 10% level, 2 tailed tests.

Table 6. Women's investment.

Dependent variable: Fraction of endowment invested by women	Basic		Site interactions		With controls	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Constant	0.759***	21.7	0.790***	15.6	0.145	1.31
North, Rural	-0.182***	-5.60	-0.299***	-4.26	0.0547	0.59
South, Rural	-0.314***	-9.71	-0.290***	-4.14	0.304***	3.26
Female control	-0.0769*	-1.88	-0.241***	-3.43	-0.207***	-3.15
Male control	-0.0311	-0.76	-0.0745	-1.05	-0.0464	-0.71
Public endowment	0.0205	0.50	0.0966	1.32	0.0560	0.83
Earned endowments	0.130***	3.12	0.113	1.53	0.0696	1.01
North, Rural x Female control			0.292***	2.97	0.285***	3.15
North, Rural x Male control			0.116	1.17	0.0969	1.08
North, Rural x Public endowment			-0.00061	-0.006	-0.0148	-0.16
North, Rural x Earned endowments			0.176*	1.73	0.167*	1.80
South, Rural x Female control			0.198**	2.02	0.153*	1.74
South, Rural x Male control			0.0114	0.12	-0.0264	-0.30
South, Rural x Public endowment			-0.215**	-2.15	-0.168*	-1.86
South, Rural x Earned endowments			-0.122	-1.22	-0.0928	-1.01
Belief about spouse's investment					0.818***	9.99
North, Rural x Belief					-0.359***	-3.13
South, Rural x Belief					-0.725***	-6.43
Household size					0.00418	0.67
Number of children					0.00538	0.50
Husband's income					-3.32e-07	-0.94
Wife's income					-1.52e-06	-1.38
Husband's age					-0.000337	-1.24
Wife's age					-0.000503	-0.14
Years married					0.000852	0.26
Has no education (dummy)					-0.0296	-1.13
Scheduled tribe dummy					-0.107	-1.40
Scheduled caste dummy					0.0128	0.51
Other group dummy					0.113**	2.14

Living with mother-in-law (MIL)			0.169***	3.59
North, Rural x MIL			-0.178***	-2.78
South, Rural x MIL			-0.214***	-3.58
Works on her own business			0.0958**	2.40
More than ½ day to mother's house			-0.102**	-2.01
Your marriage (omitted: other)				
Husband earns and gives most			0.0424	1.02
Husband earns most and gives some			0.0320	0.79
Both spouses earn money and keep it			0.0362	0.72
Wife must consult before buying sari			-0.0216	-0.90
Best to hand money to wife (1 = strongly agree)			-9.70e-05	-0.49
She has more leisure time dummy			0.0424	1.02
N	600	600	568	
Invested nothing	12	12	12	
Invested all	111	111	100	
Log likelihood	-250.5	-236.2	-132.7	

Notes: *** p<0.01, ** p<0.05, * p<0.1; The omitted caste dummy is OBC = Other backward caste.

Table 7. Men's investment.

Variable: Men's investment	Basic		Site interactions		With controls	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Constant	0.763***	21.71	0.792***	15.34	0.672***	4.79
North India, Rural	-0.0291	-0.90	-0.0673	-0.92	-0.00616	-0.06
South India, Rural	-0.164***	-5.09	-0.211***	-2.95	-0.326***	-3.08
Female control	-0.135***	-3.26	-0.227***	-3.16	-0.193***	-2.65
Male control	-0.0834**	-2.01	-0.138*	-1.92	-0.0830	-1.19
Public endowment	-0.0801*	-1.93	-0.0320	-0.44	-0.0421	-0.60
Earned endowments	0.0286	0.68	-0.0154	-0.21	-0.000241	-0.00
North, Rural x Female control			0.122	1.20	0.146	1.45
North, Rural x Male control			0.0488	0.48	0.0420	0.42
North, Rural x Public endowment			-0.0701	-0.69	-0.00915	-0.09
North, Rural x Earned endowments			0.0899	0.87	0.0766	0.78
South, Rural x Female control			0.152	1.51	0.108	1.12
South, Rural x Male control			0.113	1.13	0.0743	0.79
South, Rural x Public endowment			-0.0720	-0.71	-0.0424	-0.45
South, Rural x Earned endowments			0.0428	0.42	-0.0192	-0.20
Belief about spouse's investment					0.460***	5.53
North, Rural x Belief					-0.124	-1.04
South, Rural x Belief					0.201	1.53
Household size					-0.00219	-0.32
Number of children					-0.0114	-0.98
Husband's income					2.49e-07	0.60
Wife's income					-8.31e-08	-0.07
Husband's age					-0.00337	-1.10
Wife's age					-0.000997	-0.89
Years married					0.00333	1.09
Has no education (dummy)					-0.0110	-0.37
Scheduled tribe dummy					0.0695	0.84
Scheduled caste dummy					-0.0335	-1.21
Other group dummy					0.0981*	1.71
Living within 15 mins:						

Number of husband's relatives			0.000159	0.84
Number of wife's relatives			0.000468	1.36
Wife's time to travel to mother's house			-0.00642	-0.12
Your marriage (omitted: other)				
Husband earns and gives most			-0.0129	-0.22
Husband earns most and gives some			-0.0297	-0.49
Both spouses earn money and keep it			-0.0272	-0.41
Wife must consult before buying sari			0.0271	0.98
Best to hand money to wife (1 = strongly agree)			0.0123	0.67
Leisure (omitted: she has more)				
Equal leisure time			-0.0419	-0.92
He has more leisure			-0.0211	-0.45
N	600	600	551	
Invested nothing	19	19	18	
Invested all	108	108	92	
Log likelihood	-264	-260.2	-176.7	

Notes: *** p<0.01, ** p<0.05, * p<0.1; OBC = Other backward caste.

Table 8 Female Allocation in the Experiment.

Dependent variable: allocation to self (Rupees)	Basic, Random effects		With controls, Fixed effects		With controls, Random effects	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Constant	-11.74	-0.70	64.75***	24.78	5.076	0.20
Own investment	0.927***	5.52			0.723***	5.73
Site (omitted: Urban north)						
Rural North	18.71	0.67			-7.199	-0.53
Rural South	32.12	1.28			-1.374	-0.10
Spouse's investment	0.824***	17.94	0.921***	9.79	0.918***	10.43
Own investment x						
Rural North	-0.243	-0.84				
Rural South	-0.360	-1.28				
Spouse investment x						
Rural North	0.190***	2.92	0.189***	2.68	0.193***	2.78
Rural South	0.0825	1.27	0.233***	3.17	0.243***	3.38
Number of husband's relatives living within 15 mins (/100)			0.68***	4.11	0.73***	4.91
Number of wife's relatives living within 15 mins (/100)			-0.059	-0.31	-0.049	-0.28
More than ½ day to mother's house			-0.122	-1.35	-0.104	-1.27
Leisure dummy (omitted: she has more leisure)						
Equal leisure time			-0.137*	-1.69	-0.146**	-1.97
He has more leisure			-0.416***	-4.58	-0.440***	-5.34
Works on her own business			-0.275**	-2.57	-0.302***	-3.11
Household size					0.638	0.22
Number children					-0.547	-0.12
Husband's income					4.71e-05	0.18
Wife's income					-0.000183	-0.52
Husband's age					-0.563	-0.42
Wife's age					0.556	0.40
Years married					0.0011	0.04
Wife has no education (dummy)					14.19	1.26

Caste (omitted: OBC)				
Scheduled caste			30.83	1.00
Other backward caste			-9.322	-0.93
Other			-5.325	-0.25
Number of groups	120	112	112	
Number of observations	600	560	560	
R^2 within	0715	-	0.738	
R^2 between	0.291	-	0.398	

Notes: *** p<0.01, ** p<0.05, * p<0.1; OBC = Other backward caste. Based on answers from the 'female control' treatment. Variables below 'spouse investment x' to 'household size' are interacted with spouse investment.

Table 9 Male Allocation to Wife in the Experiment.

Dependent variable: allocation to wife (Rupees)	Basic, Random effects		With controls, Fixed effects		With controls, Random effects	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Constant	-51.40**	-2.35	104.6***	44.31	37.02	1.27
Own investment	1.668***	8.44			1.504***	12.25
Site (omitted: Urban north)						
Rural North	-2.663	-0.09			-14.99	-1.03
Rural South	35.18	1.02			-10.01	-0.66
Spouse's investment	1.168***	27.14	1.210***	14.07	1.229***	14.96
Own investment x						
Rural North	-0.0846	-0.31				
Rural South	-0.384	-1.12				
Spouse investment x						
Rural North	-0.180***	-2.96	-0.225***	-3.54	-0.227***	-3.60
Rural South	0.0450	0.74	0.0349	0.54	0.0286	0.45
Number of husband's relatives living within 15 mins (/100)			0.0266	0.98	0.0346	1.37
Number of wife's relatives living within 15 mins (/100)			-0.0498	-0.31	-0.0525	-0.35
More than ½ day to mother's house			0.270**	2.25	0.247**	2.21
Both spouses earn money and keep it			-0.234***	-3.00	-0.280***	-3.84
Wife requires husband's permission to work?			-0.0134	-0.36	-0.0200	-0.58
Wife has no education			0.121**	2.12	0.120**	2.10
Husband has no education			-0.187***	-2.99	-0.181***	-2.90
Household size					-3.318	-1.35
Number children					-0.849	-0.18
Husband's income					0.000250	1.15
Wife's income					-0.000457	-0.92
Husband's age					-0.437	-0.25
Wife's age					-0.872	-0.47

Years married			-0.0116	-0.30
Wife has no education			31.65**	2.45
Husband has no education			-8.331	-0.57
Caste (omitted: OBC)				
Scheduled caste			-25.27	-0.64
Other backward caste			-16.35	-1.42
Other			-8.592	-0.39
Number of households	120	116	116	
Number of observations	600	580	580	
R^2 within	0.811	0.830	0.830	
R^2 between	0.591	0.102	0.691	

Notes: *** p<0.01, ** p<0.05, * p<0.1; OBC = Other backward caste. Based on answers from the 'male control' treatment. Variables below 'spouse investment x' to 'household size' are interacted with spouse investment.