Mine, Your or Ours? The Efficiency of Household Investment Decisions: An Experimental Approach

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Abstract

The family is a universal and enduring institution that forms the basis of many economic decisions. Is decision making within the family efficient? The empirical literature on this issue is inconclusive to date, hence this paper uses a quasi-field experiment to examine this question. The experimental analysis involved real-time observationsof individual investment decisions made by three hundred families in rural South India. Participants' *control* over family income was varied through how they shared earnings from their investment decisions with their spouse, and also through the form of payment. *Information* was varied through what spouses were told about participants' investments options and actual choices, once the decisions were made. We found direct evidence of inefficiency in investment decisions. Both for men and women, investment efficiency was very sensitive to the control they wielded control over family income generated. However, the nature of information their spouse received ex-post had little impact. Strikingly, even when there was no tradeoff between maximizing household and private income, about a third of the men in the sample undercut their private income so as to narrow the income gap with their wives. In all other decisions too, these men were less inclined to maximize household income, and so were their wives. While women did care about control over family income, it was the absolute income, rather than income relative to their husbands that seemed to matter. The findings suggest that family decisions are a mixture of *cooperation and conflict* (Sen(1990)), and have important implications for the design of targeted income transfer programs.

Keywords: Intra-household Models, Familiy, Efficiency, Bargaining, Field Experiment

JEL Classification:

1 Introduction

The family is the most universal and enduring social institution that exists. It is the basic building block in the edifice of institutions that govern social and economic interactions, ranging from marriage and child-rearing to consumption, time allocation to work and human capital investment. Yet, directly observing the inner workings of the institution of the family has not been easy. Despite several decades of study one of the most basic questions remain unresolved: Is decision making within the household efficient? Or are household members willing to destroy collective resources for some private gain? Becker (1981) has argued that efficiency in household decision making has to be the natural presumption. This is not only because of altruism among family members. It is also because they are involved in repeated and long-term interactions with each other, have good information about each others' preferences and choices and face low transactions costs. However, dramatic inequalities within households in the allotment of food and medical care and consequently in health status (noted by Sen(1990) and others) as well as phenomena such as domestic violence and child abuse do cast doubt on this presumption of efficiency. Despite this, empirically *demonstrating* inefficiency in household decision making has proven to be quite difficult.[1] This paper hence takes a different route to addressing the question of efficiency in family decisions, an experimental one. Using real-time observation of individual investment decisions made by three hundred families in rural South India, it provides some of the first direct evidence of (in)efficiency in family decisions.

Theoretical models of the household differ in their assumptions about what households maximize: a common set of preferences (the unitary approach) or a weighted sum of individual preferences(the collective approach).[2] This difference notwithstanding, most models have one common

[1] See Duflo and Udry (2004) for a recent discussion on this issue.

[2] The unitary approach, pioneered by Samuelson(1956) and Becker(1974) imply efficiency since all members maximize the same set of preferences, either by assumption or through inducement provided by an altruistic household head. There are a few strands in the collective household approach, where weights for the family members'preferences depend upon individual bargaining power . The cooperative bargaining framework introduced by McElroy and Horney(1981) and Manser and Browning(1980) assume efficiency, as does the more generalized framework adopted by Chiappori and others(1988, 1992).

feature: they either imply or assume efficiency in the household decision-making process. For sure, there are good reasons to expect efficiency , but also some realities that suggest otherwise(as outlined earlier). Accordingly, there are some notable exceptions to this approach of assuming efficiency in household decision making: Lundberg and Pollak(1993,2003), and more recently Basu(2006).[3] The rich theoretical literature in this area has spawned a large body of research that seeks to empirically characterize household decision-making. While the unitary approach has been all but jettisoned as a result of this work, findings on the efficiency issue have been much less conclusive.

For instance, Chiappori and Browning(1994) derive testable implications of assuming efficiency in the allocation of household's consumption resources on its demand patterns. Testing these implications with Canadian household data, they are unable to rule out efficiency; Thomas and Chen(1995) arrive at a similar conclusion for households in a different setting, Taiwan. However, work by Duflo-Udry(2004) on intra-household insurance against weather shocks suggests a different picture, as does work by Fafchamps and Qusimibing(1998) on the allocation of household chores in Pakistan. Persuasive evidence of production inefficiency has come from Udry(1996)'s work on household production decisions in Burkina Faso[4] – while recent work by Akresh(2005) suggests that production decisions in all other areas of Burkina Faso are in fact efficient. All in all, it seems reasonable to conclude, with the available empirical findings based on survey data, that the jury is still out on the issue of intra-household efficiency.

In this paper, we therefore choose to take a different and more direct approach to addressing the issue, an experimental one.[5] There a several advantages to such an approach. For one,

[3]Lundberg and Pollak(1993) present a model where efficient outcomes are one of several possible equilibria. Lundberg and Pollak(2003) and Basu(2006) presents frameworks where spouses' decisions are inefficient in the short run because they affect not only their current outcomes, but also their future bargaining power.

[4]Udry(1996) finds that plots owned by women receive lower than the optimal inputs (labor and fertilizer), relative to men's plots, to the tune of about 30%.

[5]There is a recent crop of papers that uses experimental methods to address household issues. Peters et al(2004) studies intra-family altruism in a public goods experiment with family members and strangers, Ashraf(2006) looks at the effect of communication between spouses on consumption/savings decisions and Robinson(2006) studies efficiency of intra-household insurance of members' consumption shocks.

household decisions are observed on a real time basis. Hence there is no need to infer it ex-post from reported data on household allocation decisions about consumption or production. Second, survey data on sensitive questions such as intra-household bargaining tend to often elicit responses that are perceived as being 'correct' in the cultural and social milieu in which respondents live. These responses may not correlate well with people's actual behavior.[6] An additional point worth highlighting is the reason for focus here on investment, rather than consumption decisions. With consumption decisions, participants can make changes in allocation of regular household expenditures (outside the experiment) in ways that compensate for the decisions made during the experiment. Since the latter are not observed by the experimenter, decisions made during the experiment may not reflect participants' actual choices. This was not a problem with investment decision treatments designed, since the scope for substitution outside the experimental setting did not exist. Participants simply had an opportunity to earn additional income for their household, over and above that from their usual sources.

No doubt, one common concern with studying decisions experimentally is that participants may find the setting 'artificial' and this may influence their behavior. Various aspects of the experiment were designed with as much regard to this issue as possible. It was conducted as a quasi-*field* experiment in the Anantpur district of Andhra Pradesh, India with a sample of about 300 households. The female participants recruited were members of self-help-groups (SHGs) started by the Social Education and Development Society(SEDS), a non-governmental organization that has operated in the area for twenty-five years.[7] Accordingly, the experiment was conducted on the premises of SEDS, a setting that all participants were familiar with. The sample consisted of women from 38 SHGs scattered over 32 villages and their spouses. Particular care was taken to select and schedule participating villages such that there was no contamination of the experiment through information leakage. In keeping with the local area customs, experiment coordinators

[6] Indeed, there was such a gap between participants' answers to preliminary survey questions and their actual decisions in the present experiment.

[7] Self-help groups are voluntary organizations that promote group savings and offer mutual financial support to members. These have been activley promoted by the state government of Andhra Pradesh. Most such groups have only women as members, and no men.

were matched with the sex of the participants as well. In order to maintain the privacy of the participants, the tasks of explaining the experiment instructions to them versus recording their decisions were assigned to different coordinators. Households could earn close to a week's wages – not an insubstantial amount of money, thus making the decisions more real. All investment decisions were made with actual money and payments were made in cash or post office savings accounts[8].

Individual participants were given an initial sum of money (a little over a day's wage), which they allocated across two investment options made – 'red' and 'blue' – the first with a lower (linear) rate of return than the other.[9] Participants made decisions individually, but returns from investment were to be shared with their spouse. They were each presented with four separate investment decisions. The test of efficiency came from a simple trade-off between an investor's earnings for the family and his/her control over those earnings, relative to the spouse. In three of the investment decisions, earnings from the low return option (red) were always paid to the investor in a private account, but those from the high return option were paid to the spouse. The degree of control the investor had over the spouse's earnings was varied through the form of payment to the latter: under 'low' (investor) control, the spouse was paid in a private account; under moderate control, he/she was paid in cash - which made it easier for the investor to gain access to those earnings and finally under 'high' control, the spouse was paid in a joint account with the investor. The fourth investment decision involved no trade-off between efficiency of the investment decision and control over income: earnings from *both* investment options were simply assigned to spouses according to a fixed share, predetermined by the experimenter. All four decisions were *within* subject treatments, hence they had the advantage that unobserved heterogeneity in participants' characteristics were in no way a source of concern.

In addition to control, a secondary goal of the experiment was to examine whether efficiency of individual decisions may be sensitive to what his/her spouse would be told about their investment options and decisions *after* they had made them. Spouses were randomly assigned to one of

[8] Post office savings accounts were chosen over bank accounts based on proximity and familiarity to participants: every village has a post office and is frequented by local residents, whereas only larger villages have banks.

[9] There was no uncertainty in investment returns.

three treatment groups for this. They received either 'full information' about their partner's investment options, actual choices and contribution to their own earnings, 'no information' or 'partial information' only about how much their partner earned for them, but nothing about their options or actual choices. Also, to ensure that efficiency was not affected by investors' inability to discuss their decisions with their spouses, participants in the partial information treatment were given the option to discuss their decisions with their (non-investing) spouse and revise them.

We found clear evidence of inefficiency in decision making by household members of both sexes. Underinvestment in the high return 'blue' option ranged from as low as 1.5% to as high as 35% across different decisions. The driving source of this inefficiency was the desire for greater control over family earnings. Across decisions, women did invest more efficiently (i.e. more in the high return option) than men, but they were equally, and sometimes more responsive than men, to variations in the degree of control over family income.[10] Interestingly, inefficiency was not sensitive to what spouses learnt about the investment options and decisions after the fact – and this was as true for women as for men. Such an absence of gender difference in the effects of information was surprising, given the social context in which the experiment was conducted: domestic violence and alcohol related abuse of women is not uncommon here, and the social stigma attached to being a widow is still considerable.[11] One possible explanation is that spouses don't have much ability to hide information from their spouses, outside the experimental domain. Alternatively, women may discount their husband's ability to punish them once their decisions are made – just as their husbands do. After all, 90% of the women in the sample work outside the home and earn their independent income, which may make the husband's power status as household head more nominal than real.[12]

[10] This inefficiency was not driven by the inability to negotiate decisions with one's spouse or discuss side-payments. Please refer to section 3.1.1 for details.

[11] Divorce is uncommon, given the social stigma and scope for harassment associated with being a single woman.

[12] Recent experimental work by Ashraf(2006) has found that in the Phillippines, family members' consumption/savings decisions are sensitive to the communication they share with their spouse. There are two potential sources of differences in the findings: first, there are important gender differences in the household decision-making roles in the two regions studied; second, her experimental treatments varied not just what but also *when* spouses received information, relative to the timing of decisions.

A related and very intriguing outcome was the decisions made when spouses receive fixed shares of investment returns from *both* options. Here, higher returns to the household yielded higher returns to the individual. Hence a person interested in maximizing personal income had no incentive to invest in the low return option. In this treatment, women invested to maximize absolute income (own and spouse's) – but about a third of the men invested much less in the high-return option when they received a smaller share. In other words, men were willing to undercut their own private income to narrow the income gap with their wives![13] This is especially true in households with more children, and with a larger fraction of female children. It is clear that these husbands suffer some loss of utility when their wife's income is greater than (or even roughly equal to) theirs. Lundberg and Pollak(2003) and Basu(2006) offer one rational explanation for this: Men could be concerned that short run loss in *relative* income may erode their future status as 'head of the household' with its power and privileges.[14] Indeed, we do find that such men in our sample were more reluctant to cede control of family income to their wives in all other decisions as well. Most interestingly, their wives seemed to anticipate this, since they invested more inefficiently than other women too.[15] However, it may seem implausible that one time earnings in an experiment would change the intra-household bargaining power of spouses in any significant way. If so, other behavioral explanations based on men's notions of their wives' 'rightful' or 'legitimate' share of family income need to be considered.

Overall, the picture of the family decision-making process that emerges from these treatments is very much one of 'cooperation and conflict', to use Sen(1990)'s phrase. Our findings here have implications for the design of income transfer programs, especially given husbands' concerns with relative income. There is by now a large body of evidence that documents the favorable impact of income transfers targeted to women on child welfare. However, the experimental results here suggest that too much gender-based targeting may be ill-advised since perceptions of gender

[13] The investment patterns of men and women in other decisions, along with their literacy rates and other observable characteristics, strongly suggest that men's behavior is not driven by confusion or misunderstanding.

[14] Women in the sample do not have such a position to lose – which would be consistent with their decision to maximize household (and personal) absolute income.

[15] Women who maximize household income in the fixed share treatment do not evoke such reciprocity from their husbands.

imbalance in transfers may trigger responses from men that undermine household welfare.[16]

Section 2 describes the setting where the experiment was conducted, as well as details of the experiment design. It explains the rationale for the specifics of the various control and information treatments, as well as the measures taken to ensure internal and external validity. Section 3 describes the main findings on the impact of the various treatments. It also highlights some of the more puzzling outcomes, and alternative possible interpretations of these outcomes. Section 4 concludes.

2 Setting and Experiment Design

2.1 Setting

The experiment was conducted in the Anantpur district of Andhra Pradesh, India in October 2005. Being the second-most drought prone district in the country, it is among the poorest as well. The sample consisted of 300 households, recruited with the help of the Social Education and Development Society(SEDS), a non-governmental organization (NGO) that has operated in the area for twenty-five years. All the female participants recruited were members of self-help-groups (SHGs) started and promoted by SEDS[17]. The set of 85 villages where SEDS operates were stratified by length of SHG membership of its women and groups were chosen from the three strata so created; all married members of 38 SHGs (and their spouses) from 32 of these villages were recruited for participation. Particular care was taken to select and schedule participating villages such that there was no contamination of the experiment through information leakage.

The recruitment process started with a brief initial pre-survey, where women were individually interviewed and invited to participate in the study, along with their spouses. Prospective participants were informed that they would each receive (i) a show-up fee of Rs.50 for participating in

[16] Quisumbing and Maluccio(2000) provide evidence about the favorable effects of such targeted transfers to children. They also cite evidence on adverse reactions of men to transfers targeting women, from household level survey analyses in several developing countries.

[17] Self-help groups are a type of voluntary group savings and mutual support organization, promoted actively by the state government of Andhra Pradesh. Typically, SHGs have only women as members.

'a study on the understanding of financial matters' in the area, and (ii) free transportation to and from the experiment site. Rs. 50 (roughly equivalent to $1) is comparable to men's daily wages and somewhat higher than women's daily wages in the area. At the time of recruitment, those who agreed to participate were informed of the fifteen day window in which the study was to be conducted. The specific dates and times of the experiment for different participant-groups were announced later, with at least a two-day advance notice. Members from each SHG were randomly assigned across all the treatment groups, based on information gathered in the pre-survey. The experiments were conducted on the premises of the NGO over ten days in late October 2005, with 3-4 village groups participating each day.[18]

Insert Table 1 here: Participants' Summary Statistics

2.2 Experiment Protocol

Participants from each group were brought to the experiment location as per an announced schedule. Upon arrival, they were directed to separate waiting areas set up for men and women. At a time, three men and three women (couples) from these waiting areas were each directed to one of six separate rooms. Here, an experiment coordinator outlined the rules of the experiment and the tasks involved. Participants were presented with four decisions, one at a time. Their decisions were recorded by two independent data entry staff (one each for the men and the women). In addition, male participants were administered a survey (very similar to the preliminary survey for women) once they had completed the experiment. Men and women who had completed the experiment were required to wait in separate designated areas, until they were called to receive their payment. When all members of the group had been paid, the entire group was transported back to their village.

[18] The no-show rate (among those who agreed to participate after the pre-survey) was around 10%, at least partly due to rainfall late in the planting season, after a four year drought.

2.3 Experimental Treatments

The primary focus of treatments was on quantifying how, if at all, the efficiency of the income generation decisions of household members was influenced by the degree of control they had over such income. A secondary goal was to examine whether members' decisions were sensitive to the information that their spouses would have about their investment options and choices they made.

Participants were given an initial sum of Rs.50(in the form of ten five rupee coins), to be allocated as they pleased, across two investment options, Red and Blue.[19] Red yielded a return of 50%, so that each rupee invested in it yielded a gross return of Rs 1.50 and Blue yielded a 100% return (i.e. Rs. 2 for every rupee invested). There was no uncertainty in the returns, and all returns were determined and paid out at the end of the experiment itself. Given this linear return structure, it was pretty clear to all participants what they needed to do to maximize their household's income.

Insert Table 2 – Within Subject Treatments: Variations in Investor Control over Household income

Control Treatments: These consisted of four investment decisions for *each* investor, that varied in how the income generated was allocated between her and her spouse, and in the form of payment. (Refer to Table 2). In the 'baseline' case, the investor and spouse received a fixed shares (s and 1-s respectively) of the household's total income from investment in both options Red and Blue, in separate private accounts, $0.3 \leq s \leq 0.7$. With a fixed share, maximizing household income also maximized the amount the investor had control over, i.e. there was no trade-off here between higher household income and investor control over it. In the other three decisions, however, there was such a tradeoff, because of who the income generated from the investor's decisions was paid to, and how. In each case, all income from the low return (red) option was paid to the investor in a private account, while all income from the high return (blue) option was paid to

[19] The use of the experimenter's discretion in determining payment was provided as an option to provide privacy and plausible deniability to participants about the investment choices they had made. Participants were not told what amount would be paid if the die yielded a value of five.

her spouse – either in a private account, in cash or in a joint account with the investor.[20] It is easy to see how the investor's control over her spouse's income would vary here: Income paid to the spouse in a private account would be hardest to gain access to ('low' investor control), cash received by the spouse would be easier to appropriate (being physically available, unlike a private account – 'medium' investor control) while income in a joint account would be the most accessible ('high' investor control). Using these within-subject treatment variations allowed us to quantify how much members of a household valued individual control over its income – measured by the household income they were willing to sacrifice for it.

Insert Table 3 – Across Subject Treatments: Variations in Spouse's Information

Information Treatments: Individuals may like to have a strong say in how household income is spent, but they may nevertheless be concerned about how their partners would perceive, and react to, their choices. If so, their investment choices would be sensitive to what their spouses would know about their options and choices. Since this would affect their behavior in the control treatments above, we created three treatments labeled 'none', 'full' and 'partial' – that varied the information that investors' spouses would receive. (Refer to table 3). Husbands and wives were assigned to the same information treatment. In the 'none' treatment, spouses receive no information about the options or actual investment choices made by their investing partners; in the'full' information treatment, the investment options, actual choices and incomes earned by investors were revealed to the spouse. In the 'partial' information treatment, the spouse was only informed about what his partner earned for him, but not what her options were or what choices she made. Further, investors in the partial information treatment were given the option to discuss their first round decisions with their spouse and change one/more of these if they wished to. The rationale for this 'negotiation' option was to ensure that any inefficiency observed in

[20] All accounts opened were postal savings accounts and not bank accounts. The post office was chosen for the simple reason that all villages have access to a post office (but not banks), hence operating the account for withdrawal/deposits would be easier for all participants. Paperwork for all amounts to be paid into an account on a given day were taken to the post office on the next day, when the accounts were actually opened.

the data was not driven by an inability of spouses to communicate and discuss the decisions with their partner. While both spouses made investment decisions in the first two treatments, only one spouse invested in the 'partial' information treatment.[21] It is important to point out that any information given to a spouse was provided only *after* the investor had made her decisions, and she was aware of this at the time of decision-making. Table 4 presents means for some key participant characteristics, across the three information treatments.

Insert Table 4: Means of Participant Characteristics across Information Treatments

2.3.1 Experiment Instructions

Given the high rates of illiteracy in the population, all instructions and explanations during the experiment were provided orally by trained experiment coordinators.[22] When a subject entered one of the experiment rooms, a coordinator explained to him that he was there to participate in a study on understanding of financial matters in the area, and that he would be presented with four tasks as part of the study. He was also told that his payment (except for his participation fee of Rs.50) would be based on his decisions in *one* of these four tasks, to be chosen randomly with the roll of a die. It was also emphasized that each one of their decisions were equally likely to be chosen for payment, hence they should take them all seriously.[23] Next, the participant was made aware of what information his spouse would be given at the end of the experiment (depending upon the information treatment they were assigned to). Then the coordinator explained the details of the investment options, 'Red' and 'Blue' and gave the participant Rs.50 (in the form of ten five rupee coins) for investment. 'Investment' required the participant to allocate this amount

[21] The rationale for having only one investing spouse here was to ensure that negotiate option did not become a case of mutual 'back-scratching' between investing spouses.

[22] Male coordinators were assigned to male participants, and female coordinators for female participants, on a one-on-one basis. At any given time, there were six coordinators conducting the experiment, apart from support staff for data entry, payment and other logistics.

[23] In the interests of preserving confidentiality about the investor's decisions, there was also a fifth payment option: If the roll of the die yielded a five, the experimenter chose the amount to be paid to both spouses. The presence of this option was clearly communicated to participants – but not the actual amount that would be paid (which was Rs.35 to each spouse in private accounts).

across options red and blue as he desired. The four investment decisions were then presented, one decision at a time (in randomized order). At the end of each decision, a red box and a blue box in which the participant had 'invested' the money provided were taken to the data entry staff, who recorded these investments. When both spouses had completed their independent decisions, the earnings of each spouse was computed. Payments were made privately, on an individual basis.

3 Experiment Outcomes

We now turn to a description of how participants in the study responded to the various experimental treatments. It is useful to keep in mind that in all the treatments, household income is maximized by investing the amount of Rs.50 given entirely in the high return 'blue' option (since it yields a net return of 100% rather than 50% from option 'red').

3.1 Impact of Investor Control: 'Our' income is good, but mine is better!

We begin with table 5(A) and (B) which describes the mean amount invested in option Blue in the 'fixed share' and three control treatments, broken down by gender as well as by the information treatment groups.

Insert Table 5A-B on Investment Means (all investors) here

The first row of Table 5A represents the treatment wherein an investor received a fixed share s of total household earnings from both options Red and Blue. Given this feature here, the absolute amount an individual would control was largest when household income was maximized – i.e. there was a clear incentive provided to invest the entire Rs.50 in the high return 'blue' option. Despite this, the actual investment patterns do not conform to this expectation, mostly for men. On average, their investment in blue for this decision is Rs.7.8 (about 16%) short, with some variation across the different information treatments. Interestingly, such underinvestment is negligible for women –only about Rs2.3 on average. We return to this issue in our discussion below.

In the other three decisions, the numbers suggest that the greater the degree of investor control over the spouse's earnings, the more was the amount invested in the high return option – and by both men *and* women. When the spouse was paid in a private account, affording the investor the least control over the household's income, underinvestment averaged around Rs.15 (30%) – with little variation across the different information groups. Household income was slightly higher when the spouse was paid in cash (which can be more easily appropriated), with investments ranging between Rs.36 and Rs.40. When the return from the high-return option was paid in a joint account controlled by both spouses, the average amount invested in that option rose up to between Rs.40.5 and Rs.46.4. Indeed, the minimum amount invested here was higher than the maximum investment in the previous two treatments. Table 5B reports the number of participants who invested the entire Rs.50 in the high return option, for each of the four decisions.. Not surprisingly, this number is lowest for the low control case and rises with greater investor control over household earnings.

Maximizing Household Income versus Maximizing Household Welfare: Our experiment design here is motivated by the literature on the efficiency of household production (income generation) decisions and the treatments were designed to address this specific question. As a practical matter however, it could be argued that there could be reasons why underinvestment in the high return option may not necessarily be inefficient. For instance, the husband may have self-control problems, say with respect to spending on alcohol – which may end with domestic violence (which even he may regret after the fact). If so, household *welfare* would be maximized by the wife's investing in the lower return option that she controls, rather than maximizing household income. While it is hard to categorically rule out such a scenario, the observed investment patterns offer some suggestive evidence to rule out such a concern. Arguably, self-control problems of the kind described above are likely to be more acute when the husband's earnings are in cash than when they are in a private account. However, wives do not lower their investment in the high return option when the spouse is paid in cash. If anything, both the average investment and the fraction of women investing at full efficiency is slightly higher when men are paid in cash, rather than in a private account(tables 5A and 5B). This suggests that wives decisions to invest inefficiently are are not driven by such

concerns about potential welfare-reducing negative effects of their husbands' higher income.

Insert Table 6A-B on Investment Means (Income Maximizers in Fixed Share Treatment) here

The behavior in the 'fixed share' treatment is intriguing. One immediate concern that comes to mind is that they did not understand the experiment instructions clearly.[24] Since investment decisions based on confusion would contaminate our results, table 6A-B presents the average investment numbers (as in table 5A-B), but only for the subset of investors who put the entire amount of Rs.50 in option 'blue' in the fixed shares treatment. In 6A, a pattern of underinvestment in option blue, similar to that in table 5A exists even in this subset of 'rational' investors. 6B shows that not all 'rational' investors in the fixed share treatment maximize household income in other decisions where their control over income varied. It therefore seems safe to conclude that the observed investment pattern reported in table 4 was not driven by misunderstanding or confusion about the 'fixed shares' treatment among some males.

3.1.1 Who negotiates?

One concern with the results discussed above could be that individuals' behavior was driven by lack of an ability to communicate and discuss their decisions with their spouses. This would be especially concerning, if investors wanted to make 'side-deals' with their spouses, which would increase their incentive to invest the maximum in the high return option. The negotiation option, provided to participants in the 'partial information' treatment alone, was designed to address this specific issue.

Insert Table 7 here: Negotiation with Spouse

[24] On the first four days of the experiment, the fixed shares of spouses were varied between 30- 70%. In light of this concern about misunderstanding the experiment instructions, the fixed shares were uniformly changed to 50% each for husbands and wives, from day five onwards – so as to rule out wrong decisions due to confusion. The investment behavior among men seems to persist on subsequent days, despite this change.

Investors could discuss all their initial decisions with their (non-investing) spouse and revise them, if they so desired. This group consisted of 48 men and 50 women, and table 7 reports who exercised this option and how they invested. Among the 48 men, it turns out that not a single man chose to discuss his decisions with his spouse – but 18 of these men invested the maximum amount of Rs.50 on their own initiative itself. 19 women chose *not* to discuss their decisions, but only 7 among them had underinvested in at least one of the four decisions. Their underinvestment was in fact, considerably higher than that of the women who discussed their decisions with their spouse. Among the 31 women who chose to talk to their non-investing spouses, 21 had already made initial decisions that maximized household income in all treatments (so they were merely seeking their husband's approval on their decisions, possibly). Only one among the ten women who had originally invested less than the maximum in option blue revised her decisions subsequently! Overall, it appears safe to conclude that the inefficiency in spouses' choices were not driven by an inability to communicate with their partners. [25]

3.1.2 Investor Control over Household Income: Regressions

Table 8 reports regression results for the impact of variation in individual control over household income on the amount invested in the high return option 'blue', separately for men and women[26] The table shows that individual control was an important factor in determining whether members maximized their household's income. Column 1 shows when the spouse was paid in a private account, husbands lowered their investment, relative to the fixed share treatment, by as much as Rs.7.30 (given a maximum possible investment of Rs.50). When their wives were paid in cash, the underinvestment, at Rs 6.6, was somewhat lower, and when their wives were paid in a joint account there was hardly any difference in their investment relative to the fixed share treatment.

Insert Table 8 here: Impact of 'Control over Income' on Investment Efficiency

[25] Could consider a probit regression to check if those who have invested efficiently to begin with less likely to negotiate.

[26] The omitted control treatment is the fixed shares case, where there was no tradeoff between maximizing household income and individual control over it.

With women (column 5), the underinvestment, at Rs. 9.40 across all information treatments, seems much sharper than among men.[27] As their control over the income rises to medium and then high, their underinvestment decreases, but the size of the treatment coefficient remains negative and significant. While women's underinvestment is similar to men's when the spouse is paid in cash, they are on average, less confident of their ability to negotiate with their spouses over jointly owned income. This can be inferred from the persistence of a small, but statistically significant underinvestment in option blue in the high control treatment for women. The bottom line is that control over household income is an important factor that influences investment decisions of both men and women across all information categories (although the impact in the partial information treatment for women is not always statistically significant).

3.2 Impact of Information: I don't care what she(or even he) will know.

The next set of regressions describe how individual investment decisions were influenced by the information that was made available to their spouse at the end of the experiment. Table 9 documents these results, first for all decisions combined and then, each of the individual decisions, where spouse shares and control over income differed. The bottom line is that variations in information treatments had little or no effect on individual decisions. This was true not only for men, but somewhat more surprisingly for this region of India, also for women. A priori, it would have been reasonable to posit that women's decisions would be more sensitive to the amount of information provided to their spouses, since the environment they live in is one where there is not only male dominance, but also domestic violence.

Insert Table 9 here: Impact of Information to Spouse on Investment Efficiency

Variations in information treatments may not have had any impact on investment decisions for a few reasons. For one, couples may find it hard to actually hide information from their spouses as a practical matter, no matter what the information treatments in the experiment were. At

[27] However, it must be recalled that unlike men, women do not invest inefficiently in the baseline Fixed Shares treatment – which is the omitted treatment here.

another extreme, the fact that the information was provided to spouses after decisions had been made may make investors' decisions a *fait accompli* – and investors may have believed that there was little their spouses could do to punish them ex-post. After all, it is true that in nearly 90% of households in the sample, both spouses work – and hence they are used to having independent incomes that they control.

A point of significant interest here is the intriguing investment behavior of men in the fixed shares treatment. We find that a 10% increase in the share of the earnings going to the investor increases his investment in the high-return (blue) option by Rs 2.6 (column 6) – and this effect is significant at the 1% level.[28] In other words, men sacrifice not only household income, but even their private income, so as to ensure their wives don't earn too much more than them! Women, on the other hand, are unwilling to sacrifice their personal income to keep this income gap small – hence their income share had little impact on their investments. We explore this issue and related behavior in greater detail in the next section.

3.3 Why do men throw away private income?

In an experimental setting, there are multiple explanations that one must consider to understand what seems, prima facie, to be an 'irrational' decision by over a third of the men in the sample. They are willing to sacrifice their own income, so as to lower their wife's income. Women, on the other hand, seem to care enough about their absolute earnings that there is little inefficiency in their decisions in the fixed shares treatment.

One possible reason is that these men did not understand the intervention very well – possibly due to a low level of literacy. We find that the men who made this 'irrational' decision do not have significantly fewer years of education than other men who maximize income in this treatment (3.08 years versus 3.22 years). The wives of men in this group are also far less educated than their spouses (1.06 years), and yet on average they invested Rs.46.6 in the high return option while their husbands invested only Rs. 25.6. It seems safe to say that the underinvestment is not driven by

[28] Spouses income shares in the fixed share treatment ranged between 30-70%, with increments of 10% from the minimum to the maximum permitted share.

a lack of literacy.

Perhaps it is the case that women, while not stronger on overall literacy, have greater aptitude for financial decision-making. Based on the survey responses, this seems unlikely. As reported by the women, the head of the household is typically their husband – which suggests that financial matters is something that men routinely do. For instance, data from our preliminary survey clearly indicate that decisions on asset purchases are either taken by husbands unilaterally(21%), or husbands and wives jointly(64%) and only very rarely by women alone(4%). It does not seem to be the case that women who are members of SHGs are more assertive of financial rights than other women either – we found no significant effect of length of membership on the efficiency of women's decisions. Also, as explained in a footnote at the beginning of this section, concerns of confusion prompted a change in the treatment design during the course of the experiment: From the fifth day of the experiment,.fixed shares of both spouses were set to 50% whereas they had been varied between 30% and 70% earlier. The underinvestment in the high return option persisted despite this change.

A third candidate explanation is that men simply get lower utility when they earn less than (or even roughly equal to) their wives. This could be because they believe that this accords with their status as 'head of the household'. If this status is derived in part from how much they earn, relative to their wives, it may be more important to them to narrow the gap in their absolute earnings, rather than maximize their own individual income, or overall household income. Basu(2006) outlines a framework where an individual may make decisions that do not maximize household returns in the short run, because allowing higher earnings for his wife today could undermine his bargaining power in the household in future. In the context of our experiment, the wife may focus on maximizing her absolute, rather than her relative earnings, because she does not have such a position of power to cede, to begin with. No doubt, the amounts involved in this experiment seem somewhat small to cause fundamental shifts in intra-household bargaining power. However, it is plausible that such power rests as much on symbolic factors as on substantive ones. Especially if a man is insecure about his status as household head, even a small instance where the wife earns more than her husband could be interpreted as a potential threat to this status,

and be a reason for his inefficient decision.

Insert Table 10 (A)-(B) here: Impact of 'Rational' Husbands and Wiveson Investment Efficiency

If such insecurity is the explanation for a man's decision to undercut his own income in the fixed share case, it is plausible that such insecurity may spill over to the other decisions as well. If so, a question that comes to mind is: Is inefficiency in the other decisions explained by the insecurity reflected in the fixed share decision? Table 10 A-B throws some light on this question. We define "rational husband(wife)" as a husband(wife) who invests the entire Rs.50 in the high return (blue) option in the fixed share treatment. Column (1) shows that unlike ' insecure' husbands, 'rational' husbands invest Rs.5 (10%) more in the high return option on average. Interestingly, columns(2)-(4) reveal that even rational husbands do not like to cede income to their wives in her private account, with low control over it. But they do invest more efficiently when their control over the income is medium or high. Rational husbands also seem to induce greater efficiency in their wives decisions: wives of such men invest almost ten rupees more (20%) in the high-return option when their husbands get paid in a private account! This is also true for the other two control treatments, although less so when the men are paid in cash. However, rational wives do not evoke such reciprocity from their husbands. Table 11(A) and (B) shows that the marginal explanatory power of men's 'rationality' (or insecurity) on their investment behavior is considerable: the explained variation rises from 4% to 12% overall.

3.4 Implications for Income Transfer Programs

Our finding on men's concerns with relative income have implications for the design of income and asset transfers programs. There is by now a large body of evidence that documents the favorable impact of resource transfers targeted to women on child welfare outcomes.[29] However, there is also anecdotal evidence of adverse reactions to welfare initiatives that target women: Schuler et

[29] Lundberg and Pollak(1997) provide evidenceof this from the United Kingdom while Quisumbing-Maluccio(2000) cite several instances based on household survey data from developing countries.

al(1997) report increased incidence of domestic violence against women benefited by micro-credit programs in Bangladesh, while Dey Abbas(1997) reports takeover of irrigation projects assigned to women in Gambia by men and Osmani(1997) cites a case where food security projects targeted to women in Asia resulted in fewer hours of work and more alcohol consumption among men. Our experimental results suggests that, even keeping child welfare in mind, such gender targeted transfers should be used with some discretion. If not, perceptions of strong gender imbalance in resources may trigger adverse responses from men that undermine household income and/or welfare.[30] This implication of our experimental results is consistent with the anecdotal evidence cited above.

4 Conclusion

Theoretical models of the household provide several reasons to expect efficiency in intra-household decision-making, apart from altruism amongst its members: repeated interaction among family members with low transaction costs and good information about each others' preferences and resources, in a stationary environment. At the same time, realities such as highly unequal health and education outcomes across family members, domestic violence and child abuse fly in the face of such an expectation. This issue of efficiency has been difficult to resolve using an empirical approach, given that inner workings of a family are hard to observe.

In an attempt to provide direct evidence of (in)efficiency, this paper has taken an experimental approach, whereby investment decisions of individuals from 300 households were observed real-time. The resulting outcomes provide clear evidence of inefficiency in family members' decisions . The efficiency of both men and women' decisions clearly rise with greater control they (as investors) had over the income so generated – going from as low as 4% to 30%. However, the information their spouse would receive about their investment options and decisions ex-post has little impact on their actual choices. This latter finding is surprising with respect to women's investment decisions, given a social context where they domestic violence is not uncommon. However, given

[30] In fact, we find that, in our sample, it is men from households with a larger number of female children are significantly more likely to undercut their own income to narrow the income gap with their wives.

that almost 90% of the women in the sample work outside the home and independently earn income, it is possible that men's position as head of the household entails less authority than otherwise assumed.

A related and striking finding is that even where there is no conflict between maximising private and household income, over a third of the men in the sample are willing to even undercut their own private income, to narrow the income gap with respect to their wives. On the one hand, such behavior could be explained in 'rational' terms if men perceive a lower relative income as a potential threat to their status as household heads and to their future bargaining power. In our data, we do find that these men are less inclined to cede control over family income to their wives in all other experimental decisions as well. On the other, it could be argued that the amounts involved in such an experiment are too small to make any substantial dent in the existing intra-household balance of power. If so, men's decisions to undercut their private income can possibly be explained by some behavioral 'rules of thumb' they use to allocate resources, based on their perceptions of a wife's 'rightful' or 'legitimate' share.

The overall picture of intra-household decision making that emerges is definitely a mixture of 'cooperation and conflict' resulting in some loss of efficiency in the use of family resources. Our experimental results on men's concerns with relative income also suggest that exclusive targeting of women in income transfer programs could lead to adverse reactions that undermine the intended welfare outcomes.

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Table 1: Summary Statistics			
Variable	**Mean**	**Std. Dev.**	
Family Characteristics			
Years of Marriage	21.31	10.76	
No. of children	2.82	1.44	
Household Income (Rupees)	15741.87	15184.87	
Women who report conflict with spouse			
over financial issues (0=no, 1=yes)	0.0345	0.18	
Joint Family(% Households)	25.33%		
Both spouses work(% Households)	89%		
Personal Characteristics			
Wife's age	36.10	9.80	
Husband's age	43.20	10.99	
Wife's Education (years)	1.36	2.77	
Husband's Education(years)	3.12	4.12	
Number of Participating Households	300		

TABLE 2: 'CONTROL OVER HOUSEHOLD INCOME' TREATMENTS

Seed money for Investment (provided by experimenter) = Rs.50; Household chooses X and Y

Household Income Allocation Treatments	Income from Blue Investment=X, Return=2X			Income from Red Investment=Y=(50-X), Return=1.5Y		
	Recipient	**Paid in**	**Amount**	**Recipient**	**Paid in**	**Amount**
(1) Fixed Share=s, where	Spouse	Pvt. a/c	s.2X	Spouse	Own a/c	s(1.5)Y
(0.3≤ s ≤0.7)	Self	Own a/c	(1-s)2X	Self	Own a/c	(1-s)1.5Y
Investor Control over Spouse's income						
(2) Low	Spouse	Pvt. a/c	2X	Self	Own a/c	1.5Y
(3) Medium	Spouse	Cash	2X	Self	Own a/c	1.5Y
(4) High	Both	Joint a/c	2X	Self	Own a/c	1.5Y

Notes: The two investment options are 'Blue' and 'Red' -- the first with a 100% return, and the second with a 50% return. All treatments are within-subject treatments. In treatment (1) above, both spouses receive a fixed share of income from investments in both options. Hence, the investor does not increase his private income by investing in the lower return option Red. In treatments (2)-(4), the investor gains private income by investing in option Red, but in doing so (s)he lowers household income. There is no uncertainty in investment returns.

TABLE 3: INFORMATION TREATMENTS			
	None	**Full**	**Partial 'Plus'**
Information given to spouse	No information about investor's (a) options (b) choices or (c) earnings	Full information about investor's (a) options (b) choices and (c) earnings	Information about investor's earnings for him/her only -- **PLUS** -- Investor Option to Negotiate (and Revise) own
No. of participants	202	202	98
Both spouses	Yes	Yes	No -- one spouse invests.

Notes: Information treatments are across subjects

Table4: Average Participants' Characteristics across Information Treatments

Participant Characteristics	Information Treatment Groups						F-stat
	None N=101		Full N=101		Partial N=98		
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	
Years of marriage	21.66	(10.9)	19.76	(10.66)	22.52	(10.66)	1.72
Number of Children	2.71	(1.38)	2.86	(1.55)	2.898	(1.38)	0.46
Family type: (3=nuclear, 1=joint)	2.74	(0.50)	2.66	(0.55)	2.735	(0.50)	0.76
Caste:							
Backward	0.58	(0.49)	0.594	(0.49)	0.561	(0.49)	0.11
Scheduled	0.18	(0.38)	0.138	(0.34)	0.132	(0.34)	0.48
Other backward	0.17	(0.37)	0.188	(0.39)	0.214	(0.41)	0.34
Scheduled tribe	0.06	(0.23)	0.049	(0.21)	0.071	(0.25)	0.21
Wife age	36.66	(9.88)	34.36	(9.87)	37.285	(9.47)	2.49
Husband age	43.55	(11.05)	41.31	(11.22)	44.786	(10.48)	2.58
Wife Education (years)	1.29	(2.83)	1.53	(2.88)	1.265	(2.58)	0.28
Husband Education (years)	3.18	(4.19)	3.27	(4.08)	2.918	(4.09)	0.19
Household income (Rs. 000s)	15.52	(9.84)	16.68	(20.74)	15	(12.69)	0.32
Household debt (Rs. 000s)	30.43	(24.65)	28.049	(33.78)	30.18	(26.48)	0.18
Domestic Conflict (0=no, 1=yes)	0.04	(0.19)	0.021	(0.14)	0.041	(0.19)	0.4
Both spouses work (0=no;1=yes)	0.88	(0.32)	0.88	(0.32)	0.91	(0.30)	0.07

Notes: The F-Statistic reported in the last column indicate whether the mean values of each of the listed characteristics differ . significantly from each other. At the 10% level, (critical value=2.32) wife's age and husband's age are found to be significantly different across the treatment groups. These variables have been controlled for in the regressions reported in Table 9.

TABLE 5A: Mean Investment in High return(Blue) Option-- Rupees (Min=Rs.0, Max.=Rs.50)

(ALL Investors)

	INFORMATION (Treatments Across Participants)							
	Husbands				Wives			
	ALL	None	Full	Partial	ALL	None	Full	Partial
	N=250	N=101	N=101	N=48	N=252	N=101	N=101	N=50
CONTROL (Treatments Within Participants)								
Baseline - Fixed Share Treatment[a]	42.2	42.48	41.35	43.44	47.68	48.25	47.45	46.9
Low Control Treatment[b]	34.94	34.65	35.45	34.48	38.31	36.19	38.47	42.3
Medium Control Treatment[c]	35.62	36	36.58	32.81	40.97	40	42.13	40.6
High Control Treatment[d]	41.36	41.15	41.99	40.52	45.36	46.09	44.11	46.4
Overall Mean Investment - Rs.(4 decisions)	38.53	38.57	38.84	37.81	43.08	42.63	43.04	44.05

TABLE 5B: Fraction of Income Maximizing Investors, by 'Control of Income' Treatments

(All Investors)

		Husbands				Wives		
Number of Participants	250	101	101	48	252	101	101	50
Baseline - Fixed Share Treatment[a]	0.68	0.68	0.67	0.69	0.91	0.93	0.89	0.90
Low Control Treatment[b]	0.49	0.47	0.52	0.48	0.72	0.67	0.72	0.82
Medium Control Treatment[c]	0.55	0.54	0.60	0.46	0.78	0.76	0.80	0.78
High Control Treatment[d]	0.69	0.66	0.75	0.60	0.88	0.90	0.85	0.92

Notes: [a] Spouse gets paid a fixed share s of returns from both investment options, 0.3≤ s ≤0.7. [b] Spouse gets paid all returns from High return (blue) option in a private account, investor receives all returns from Low return (red) option in own account. [c] Spouse gets paid all returns from High return (blue) option in cash, investor receives all returns from Low return (red) option in own account. [d] Spouse gets paid all returns from High return (blue) option in a Joint account with investor, investor receives all returns from Low return (red) option in own account.

TABLE 6A: Mean Investment in High return(Blue) Option -- Rupees (Min=Rs.0, Max.=Rs.50)
(Income Maximizers in Fixed Share Treatment only)

			Husbands				Wives	
	N=170	N=69	N=68	N=33	N=229	N=94	N=90	N=45
CONTROL Treatments (Within Participants)								
Baseline - Fixed Share Treatment[a]	50	50	50	50	50	50	50	50
Low Control Treatment[b]	36.89	35.65	36.4	36.37	38.93	35.5	40.28	43.33
Medium Control Treatment[c]	37.82	37.32	39.41	35.61	41.35	39.57	43.33	41.1
High Control Treatment[d]	43.29	41.09	45.22	43.94	46.02	45.96	45.22	47.78
Overall Mean Investment - Rs.(3 decisions)	42.00	41.02	42.76	41.48	44.08	42.76	44.71	45.55

TABLE 6B: Fraction of Income Maximizing Investors, by 'Control of Income' Treatments
(Income Maximizers in Fixed Share Treatment Only)

	ALL	None	Full	Part	ALL	None	Full	Part
CONTROL Treatments (Within Participants)		**Husbands**			**Wives**			
Baseline - Fixed Share Treatment[a]	1	1	1	1	1	1	1	1
Low Control Treatment[b]	0.64	0.59	0.66	0.70	0.76	0.67	0.80	0.87
Medium Control Treatment[c]	0.70	0.67	0.75	0.67	0.82	0.77	0.87	0.82
High Control Treatment[d]	0.82	0.75	0.90	0.82	0.91	0.90	0.90	0.96

[a] Spouse gets paid a fixed share s of returns from both investment options, $0.3 \leq s \leq 0.7$. [b] Spouse gets paid all returns from High return (blue) option in a private account, investor receives all returns from Low return (red) option in own account. [c] Spouse gets paid all returns from High return (blue) option in cash, investor receives all returns from Low return (red) option in own account. [d] Spouse gets paid all returns from High return (blue) option in a Joint account with investor, investor receives all returns from Low return (red) option in own account

TABLE 6C: Mean Investment in High return(Blue) Option -- Rupees (Min=Rs.0, Max.=Rs.50)
(Income Non-Maximizers in Fixed Share Treatment only)

			Husbands				Wives	
	N=80	N=31	N=32	N=25	N=23	N=7	N=11	N=5
CONTROL Treatments (Within Participants)								
Baseline - Fixed Share Treatment[a]	25.63	26.25	23.48	29	24.57	25	26.82	19
Low Control Treatment[b]	32.5	32.5	33.48	30.33	32.17	45	23.64	33
Medium Control Treatment[c]	30.94	33.13	30.75	26.67	37.17	45.71	32.72	36
High Control Treatment[d]	37.25	41.25	35.3	33	38.7	47.86	35	34
Overall Mean Investment - Rs.(3 decisions)	31.58	33.283	30.753	29.75	33.153	40.893	29.545	30.5

TABLE 6D: Fraction of Income Maximizing Investors, by 'Control of Income' Treatments
(Income Non-Maximizers in Fixed Share Treatment Only)

	ALL	None	Full	Part	ALL	None	Full	Part
CONTROL Treatments (Within Participants)		**Husbands**			**Wives**			
Baseline - Fixed Share Treatment[a]	0	0	0	0	0	0	0	0
Low Control Treatment[b]	0.18	0.19	0.24	0.00	0.35	0.71	0.09	0.40
Medium Control Treatment[c]	0.24	0.28	0.30	0.00	0.43	0.71	0.27	0.40
High Control Treatment[d]	0.40	0.47	0.45	0.13	0.61	0.86	0.45	0.60

[a] Spouse gets paid a fixed share s of returns from both investment options, $0.3 \leq s \leq 0.7$. [b] Spouse gets paid all returns from High return (blue) option in a private account, investor receives all returns from Low return (red) option in own account. [c] Spouse gets paid all returns from High return (blue) option in cash, investor receives all returns from Low return (red) option in own account. [d] Spouse gets paid all returns from High return (blue) option in a Joint account with investor, investor receives all returns from Low return (red) option in own account.

TABLE 7: NEGOTIATION WITH SPOUSE

	Men				Women			
	Number of Investors				Number of Investors			
	Total	Negotiation			Total	Negotiation		
		No	Yes			No	Yes	
	48	48	0		50	19	31	
			Before Neg'n	After Neg'n			Before Neg'n	After Neg'n
Invt. in Option Blue								
(a) =Rs.50 (all decisions)		18	n.a.	n.a.		12	21	22
(b) <Rs. 50 (in at least 1 decision)		30	n.a.	n.a.		7	10	9
Mean Invt. in Blue (Rs.):								
-- Fixed Share Treatment		39.5	n.a.	n.a.		42.9	39.5	39.5
-- Low Control Treatment		22.5	n.a.	n.a.		21.4	31.5	36.5
-- Medium Control Treatment		22.5	n.a.	n.a.		21.4	23	23
-- High Control Treatment		38.4	n.a.	n.a.		35.7	42	37

Notes:

In Low, Medium and High Control treatments, spouses were paid in Private accounts, Cash and in a Joint account with the investing spouse respectively. The Negotiation option allowed the investing spouse in each household in the 'Partial Information' Treatment to discuss and change his/her initial set of investment decisions

TABLE 8: IMPACT OF CONTROL ON INVESTMENT EFFICIENCY

	Dependent Variable: Investment in High Return Option							
	MEN				WOMEN			
	Information Treatments				Information Treatments			
Indepenent Variables	**All**	**No Info**	**Full Info**	**Partial**	**All**	**No Info**	**Full Info**	**Partial**
Investor CONTROL-- (Spouse paid in):								
Low Control Treatment[b]	-7.289***	-7.822***	-5.950**	-8.958***	-9.402***	-12.079***	-9.100***	-4.6
	(1.375)	2.156	2.289	2.933	1.344	2.344	1.937	2.894
Medium Control Treatment[c]	-6.606***	-6.485***	-4.800**	-10.625***	-6.932***	-8.267***	-5.900***	-6.300*
	1.31	2.036	2.154	2.88	1.251	2.128	1.711	3.186
High Control Treatment[d]	-0.843	-1.337	0.65	-2.917	-2.530***	-2.178	-3.900**	-0.5
	1.221	2.067	1.984	2.188	0.948	1.51	1.511	2.15
No Information to spouse[e]	0.176				-0.846			
	1.473				1.398			
Partial Information to spouse	-0.411				0.794			
	1.983				1.744			
Constant	42.50***	42.47***	41.33***	43.43***	47.64***	48.26***	47.47***	46.90***
Number of Observations	1000	404	404	192	1000	404	404	200
R^2	0.0375	0.0400	0.0269	0.0647	0.0522	0.0825	0.0422	0.0296

Footnotes: The omitted control treatment here is the Fixed Share case where each spouse gets paid a fixed share s of returns from both investment options. b Spouse gets paid all returns from High return (blue) option in a private account, investor receives all returns from Low return (red) option in own account. c Spouse gets paid all returns from High return (blue) option in cash, investor receives all returns from Low return (red) option in own account. d Spouse gets paid all returns from High return (blue) option in a Joint account with investor, investor receives all returns from Low return (red) option in own account.

[e] The omitted information category is 'Full information' where the investor's spouse is informed about his/her investment options, actual choices and earnings. Under 'partial information' the spouse is only informed of what the investor earned for him/her -- but not about the investor's options or actual choices.

All regressions reported here include individual fixed effects.

* Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level and Standard errors in parantheses.

TABLE 9: IMPACT OF INFORMATION ON INVESTMENT IN HIGH RETURN (BLUE) OPTION

	MEN					WOMEN				
	Control Treatments					Control Treatments				
Information Treatments[a]	**All Treat-ments**	**Fixed share-baseline**	**Low Control[b]**	**Medium Control[c]**	**High Control[d]**	**All Treat-ments**	**Fixed share-baseline**	**Low Control[b]**	**Medium Control[c]**	**High Control[d]**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
	Dependent Variable: Invt. in High Return (blue) Option									
No Information	0.223	1.546	0.187	-0.194	-0.38	-0.593	0.233	-2.578	-2.188	2.101
	[1.194]	[1.883]	[2.535]	[2.654]	[2.239]	-1.166	[1.025]	[2.948]	[2.603]	[2.021]
Partial Information	-0.248	2.562	-0.369	-3.18	0.052	0.836	-1.083	3.611	-1.629	2.458
	[1.521]	[2.166]	[3.234]	[3.505]	[2.777]	-1.389	[1.655]	[3.250]	[3.293]	[2.438]
Share of Earnings		0.260***					0.069			
(Fixed Share)		[0.092]					[0.061]			
Other Controls:										
Husband's age	-0.157	-0.181	0.311	-0.107	-0.691**	0.078	-0.065	0.197	0.082	0.098
	[0.155]	[0.201]	[0.347]	[0.333]	[0.318]	-0.132	[0.126]	[0.320]	[0.314]	[0.223]
Wife's age	-0.015	0.137	-0.664*	-0.012	0.522	-0.074	0.073	-0.228	-0.02	-0.122
	[0.178]	[0.251]	[0.402]	[0.376]	[0.364]	-0.145	[0.144]	[0.361]	[0.339]	[0.239]
Constant	45.703***	31.005***	45.256***	41.267***	50.227***	42.547***	44.671***	38.530***	39.330***	44.184***
	[2.147]	[6.378]	[4.338]	[4.828]	[5.952]	-1.946	[3.217]	[4.925]	[4.585]	[3.135]
No. of Obs.	996	249	249	249	249	1004	251	251	251	251
R-squared	0.01	0.05	0.04	0.01	0.05	0	0.01	0.01	0	0.01

Notes: [a] The omitted information category is 'Full information' where the investor's spouse is informed about his/her investment options, actual choices and earnings. Under 'partial information' the spouse is only informed of what the investor earned for him/her -- but not about the investor's options or actual choices.

In the Fixed Share case treatment each spouse gets paid a fixed share s (between 30% and 70% of returns) from *both* investment options . [b] Spouse gets paid all returns from High return (blue) option in a private account, investor receives all returns from Low return (red) option in own account. [c] Spouse gets paid all returns from High return (blue) option in cash, investor receives all returns from Low return (red) option in own account. [d] Spouse gets paid all returns from High return (blue) option in a Joint account with investor, investor receives all returns from Low return (red) option in own account. Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 10A: "RATIONAL" HUSBAND'S INVESTMENT PATTERNS & INFLUENCE ON WIFE'S

	Dependent Variable: Investment in High Return (Blue) Option									
	MEN					WOMEN				
Indepenent Variables	**All**	**All**	**No Info**	**Full Info**	**Partial**	**All**	**All**	**No Info**	**Full Info**	**Partial**
CONTROL										
Low Control[b]	-7.260***	-7.260***	-7.822***	-5.891**	-8.958***	-9.365***	-10.545***	-12.079***	-9.010***	n.a.[f]
	[1.366]	[1.366]	[2.143]	[2.252]	[2.894]	[1.335]	[1.503]	[2.329]	[1.908]	
Medium Control[c]	-6.580***	-6.580***	-6.485***	-4.752**	-10.625***	-6.706***	-6.807***	-8.267***	-5.347***	n.a.
	[1.301]	[1.301]	[2.023]	[2.119]	[2.841]	[1.262]	[1.378]	[2.115]	[1.772]	
High Control[d]	-0.84	-0.84	-1.337	0.644	-2.917	-2.321**	-2.772**	-2.178	-3.366**	n.a.
	[1.212]	[1.213]	[2.054]	[1.952]	[2.159]	[0.965]	[1.086]	[1.501]	[1.580]	
Information Treatments:										
No Information to spouse[e]	-0.272	-0.374				-0.408	-0.463			n.a.
	[1.471]	[1.318]				[1.384]	[1.339]			
Partial Information to spouse	-1.024	-1.17				1.005	0			n.a.
	[2.017]	[1.775]				[1.712]	[0.000]			
"Rational Husband"		10.233***	7.733***	12.000***	11.727***		5.554***	7.347***	3.791*	n.a.
		[1.246]	[1.725]	[2.077]	[3.106]		[1.553]	[2.346]	[2.036]	
Constant	42.507***	35.617***	37.192***	33.258***	35.375***	47.643***	44.336***	43.248***	44.923***	n.a.
	[1.250]	[1.441]	[1.666]	[1.976]	[2.762]	[0.970]	[1.335]	[1.749]	[1.651]	
Observations	1000	1000	404	404	192	1008	808	404	404	n.a.
R-squared	0.04	0.12	0.09	0.13	0.17	0.05	0.09	0.12	0.05	n.a.

TABLE 10B: "RATIONAL" WIFE'S INVESTMENT PATTERNS & INFLUENCE ON HUSBAND'S

Investor CONTROL										
Low Control[b]	-7.260***	-6.856***	-7.822***	-5.891**	n.a.[f]	-9.365***	-9.365***	-12.079***	-9.010***	-4.6
	[1.366]	[1.549]	[2.143]	[2.252]		[1.335]	[1.336]	[2.329]	[1.908]	[2.857]
Medium Control[c]	-6.580***	-5.619***	-6.485***	-4.752**	n.a.	-6.706***	-6.706***	-8.267***	-5.347***	-6.300*
	[1.301]	[1.460]	[2.023]	[2.119]		[1.262]	[1.263]	[2.115]	[1.772]	[3.145]
High Control[d]	-0.84	-0.347	-1.337	0.644	n.a.	-2.321**	-2.321**	-2.178	-3.366**	-0.5
	[1.212]	[1.412]	[2.054]	[1.952]		[0.965]	[0.965]	[1.501]	[1.580]	[2.122]
No Information to spouse[e]	-0.272	-0.241			n.a.	-0.408	-0.845			
	[1.471]	[1.470]				[1.384]	[1.331]			
Partial Information to spouse	-1.024	0			n.a.	1.005	0.907			
	[2.017]	[0.000]				[1.712]	[1.533]			
"Rational" Wife		-0.787	-1.159	-0.54	n.a.		11.034***	1.873	15.277***	15.056**
		[2.293]	[2.302]	[3.513]			[2.242]	[2.727]	[2.354]	[6.028]
Constant	42.507***	42.744***	43.554***	41.818***	n.a.	47.643***	37.810***	46.524***	33.863***	33.350***
	[1.250]	[2.455]	[2.373]	[3.504]		[0.970]	[2.149]	[2.869]	[2.203]	[5.396]
Number of Observations	1000	808	404	404	n.a.	1008	1008	404	404	200
R^2	0.04	0.03	0.04	0.03	n.a.	0.05	0.09	0.08	0.13	0.11

Notes: [a] "Rational" Husband(Wife) is a husband(wife) who invests the entire Rs.50 in the high return (blue)option when he/she receives a fixed share of household earnings from both investment options. The omitted control treatment here is the Fixed Share case where each spouse gets paid a fixed share s of returns from both investment options. b Spouse gets paid all returns from High return (blue) option in a private account, investor receives all returns from Low return (red) option in own account. c Spouse gets paid all returns from High return (blue) option in cash, investor receives all returns from Low return (red) option in own account. d Spouse gets paid all returns from High return (blue) option in a Joint account with investor, investor receives all returns from Low return (red) option in own account.

[e] The omitted information category is 'Full information' where the investor's spouse is informed about his/her investment options, actual choices and earnings. Under 'partial information' the spouse is only informed of what the investor earned for him/her -- but not about the investor's options or actual choices. Columns with the heading 'All' regressions reported above include individual fixed effects. [f] Only one spouse invests in this information treatment. * Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level and Standard errors in parantheses.

TABLE 11A: IMPACT OF RATIONAL HUSBANDS ON INVESTMENT DECISIONS

	Dependent Variable: Investment in High Return option (Rs.) (Min.=Rs.0; Max.=Rs.50)							
	MEN					WOMEN		
Independent Variables:	All Control	Low Control[c]	Medium Control[c]	High Control[c]	All Control Treatments	Low Control[c]	Medium Control[c]	High Control[c]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
"Rational" Husband[a]	5.057***	3.03	6.648***	5.472**	6.946***	9.906***	4.515	6.417**
	[1.582]	[2.153]	[2.376]	[2.130]	-2.054	[3.171]	[2.957]	[2.519]
No Information[b]	-0.252	0.121	-0.339	-0.533	-0.974	-2.802	-2.176	2.055
	[1.662]	[2.539]	[2.627]	[2.201]	-1.751	[2.903]	[2.609]	[2.007]
Partial Information	-1.337	-0.47	-3.402	-0.138	0	0	0	0
	[2.289]	[3.221]	[3.437]	[2.676]	0	[0.000]	[0.000]	[0.000]
Husband's age	-0.139	0.324	-0.079	-0.663**	0.145	0.196	0.108	0.13
	[0.259]	[0.351]	[0.344]	[0.325]	-0.221	[0.323]	[0.324]	[0.230]
Wife's age	-0.055	-0.665	-0.014	0.515	-0.144	-0.186	-0.076	-0.17
	[0.302]	[0.407]	[0.388]	[0.371]	-0.252	[0.376]	[0.352]	[0.248]
"Rational" Wife								
	42.125***	42.736***	35.739***	48.231***	35.960***	30.502***	37.174***	40.205***
	[3.466]	[4.805]	[5.345]	[5.817]	-3.838	[5.832]	[6.035]	[4.483]
Observations	747	249	249	249	603	201	201	201
R-squared	0.03	0.04	0.04	0.07	0.03	0.06	0.02	0.05

TABLE 11B: IMPACT OF RATIONAL WIVES ON INVESTMENT DECISIONS

"Rational" Wife[a]	-2.452	-1.198	-5.516	-0.76	6.154*	5.686	5.016	7.760**
	[2.763]	[3.533]	[3.579]	[3.273]	-3.143	[3.794]	[3.512]	[3.609]
No Information[b]	-0.033	0.198	0.056	-0.394	-1.089	-2.763	-2.352	1.848
	[1.675]	[2.546]	[2.652]	[2.233]	-1.788	[2.958]	[2.600]	[2.014]
Partial Information	0	0	0	0	1.465	3.597	-1.642	2.439
	[0.000]	[0.000]	[0.000]	[0.000]	-2.128	[3.216]	[3.276]	[2.360]
Husband's age	-0.129	0.47	-0.112	-0.744**	0.133	0.204	0.088	0.107
	[0.291]	[0.395]	[0.371]	[0.369]	-0.219	[0.319]	[0.310]	[0.210]
Wife's age	-0.098	-0.807*	-0.042	0.553	-0.125	-0.229	-0.022	-0.124
	[0.338]	[0.454]	[0.416]	[0.420]	-0.243	[0.360]	[0.335]	[0.225]
Constant	48.785***	44.672***	47.485***	51.806***	34.912***	33.199***	34.627***	36.909***
	[4.203]	[5.498]	[6.224]	[7.080]	-4.522	[6.222]	[5.805]	[4.876]
Observations	603	201	201	201	753	251	251	251
R-squared	0.02	0.04	0.01	0.05	0.01	0.02	0.01	0.03

[a] "Rational" Husband(Wife) is a husband(wife) who invests the entire Rs.50 in the high return (blue)option when he/she receives a fixed share of household earnings from both investment options. b The omitted information category here is 'Full Information' where spouses receive information about investor's options, actual choices and earnings. Under 'No information' they do not receive information about any of these and under 'Partial Information' they are told about the amount the investor earned for them, but not his/her investment options or actual choices. [c]Low, Medium and High (investor) Control treatments had returns from the high return option paid to spouse in a private a/c, in cash and in a joint a/c with the investor respectively. Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%