

# Mine, Yours or Ours? The Efficiency of Household Investment Decisions: An Experimental Approach <sup>\*</sup>

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## Abstract

This experiment sheds light on the impact on household investment efficiency of a social norm that a man should not earn less than his wife. The experiment distinguishes this impact from that due to spouses' desire for control over household resources. Both husbands and wives sacrifice household income (efficiency) for greater control; but, consistent with this social norm, husbands alone behave inefficiently if assigned a *smaller* income share than a spouse. The evidence suggests *spiteful* behavior among such husbands: they are willing to undercut their own income to narrow the gap with their wife's earnings. The magnitude of husbands' inefficiency influenced by this social norm is comparable to that when husbands have the least control over household earnings. These results, taken together with evidence from developed countries, show that this social norm has a persistent effect on household efficiency, distinct from spouses' economic concerns.

**JEL Codes:** D1,O1

**Key words:** Intra-household, Family, Efficiency, Gender, Social Norms, Spite, Field Experiment

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# 1 Introduction

Household decisions routinely involve allocating resource among members with diverse preferences. Economists have long been interested in how members' preferences are weighted (i.e. their bargaining power) in this process, and whether the outcomes achieved are efficient. There is by now a considerable body of work on this issue, with a focus on how *economic* drivers of spouses' bargaining power (such as their incomes, transfers and marriage market options) affect household resource allocation.<sup>1</sup>

But the family is not just an economic entity; it is as much a *social* one. Traditionally, social norms have scripted roles such as the 'provider' (for a man) and the 'home-maker' (for a woman) in most societies. Spouses' bargaining power and hence household efficiency is plausibly influenced by such other factors too, that are not economic or market-based. This paper takes this broader view of the household as a social as well as an economic unit, and examines the independent influence of both types of factors on the efficiency of its decisions.

The repeated nature of family interactions gives rise to multiple equilibria, not all of which need be efficient. As with Tolstoy's famous observation about unhappy families, each inefficient household could be inefficient in its own way. Social norms could set the threat points that affect which one of these equilibria is selected (Lundberg and Pollak (1993, 1994)). They can hence shape the choices couples make – be it about individual occupations, raising children, or the division of chores. Gender norms may even affect the issues that are regarded as appropriate for family members to bargain over.<sup>2</sup> The norm this paper focuses on is one that is widely prevalent across many societies, a norm that 'a man should not earn less than his wife'.<sup>3</sup>

It can be tricky to separate the effects of social norms from those of spouses' economic concerns about income control, on intra-household decision-making efficiency. After all, the decision of whom to marry itself is likely to be jointly influenced by both sets of factors; this holds true for other decisions that precede marriage as well. This paper therefore adopts an experimental approach to capture the effects of these two sets of factors within a simple, unified design framework.

Spouses are asked to make individual investment decisions, one each under four different

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<sup>1</sup>See Chiappori and Donni (2009) and Fiala and He (2017) for recent overviews of this literature. There is no clear consensus on how these economic drivers of spouses' bargaining power affect efficiency: Chiappori-Donni (2009) notes that the empirical literature focused on static decisions finds evidence supporting efficiency, while the one focused on inter-temporal decisions rejects efficiency. It is plausible to argue that decisions of the latter type should have a longer-term impact on household outcomes.

<sup>2</sup>For instance, in her book about women's property rights in India, Agarwal (1997) describes how it would be perceived as 'unseemly' for women in South Asia to lay a claim to their birth family land, legal provisions notwithstanding.

<sup>3</sup>The World Development Report (2012) on gender equality cites findings from their surveys in 19 developing countries; it finds that 'a wife with a higher income was generally seen as a threat to male status rather than a boost to the household economy' (page 171).

experimental conditions that varied their personal control over the household income realized. The efficiency of a spouse's decision is measured by whether it maximizes the household's investment income. In one of these four income-control conditions, spouses are assigned control over a *fixed* share of household investment income, irrespective of their individual investment decisions. By design, this condition rules out spouses' motivation to invest inefficiently to have greater control over household income. Variation in the fixed shares of husbands and wives within this condition is used to study the efficiency effect of the social norm that a man should not earn less than his wife. The other three conditions create varying degrees of a tradeoff between maximizing household income and the individual spouse's control over this income. All investment decisions are made in one of three different information conditions that varied *across* participants, in what their spouses would be told ex-post.

The study has three key findings that enrich the literature on household decision-making. First, it finds experimental evidence of an extreme form of non-cooperation and inefficiency within the household that could reasonably be interpreted as *spiteful* behavior: husbands with a smaller fixed share of household income are willing to undercut their own income only to ensure that their wife does not earn too much more than themselves. While there does exist some experimental evidence of spite, there does not appear to be any documented evidence of it within a household context.<sup>4</sup> Second, the data strongly suggest that this spiteful, inefficient behavior is driven by a social norm that a man should not earn less than his wife. In our data, a wife's share has a significant negative effect on her husband's investment efficiency *only when it strictly exceeds* his, and not otherwise. Third, the results confirm that strategic economic concerns about control over household resources matter: *both* spouses' decisions are more inefficient, the greater the control their partner has over investment income.<sup>5</sup>

Such self-destructive and spiteful behavior of husbands seems at odds with standard preferences depicted in household models. What fits these findings best is the Akerlof-Kranton(2000) model of identity-based preferences shaped by gender norms, including one that a man must not earn less than his wife.<sup>6</sup> Other recent papers in the household liter-

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<sup>4</sup>In a series of experiments conducted in Uttar Pradesh in North India, Fehr-Hoff-Kshetramade (2008) and Brooks-Hoff-Pandey (2018) found that a much greater proportion of high-caste men than low-caste men had spiteful preferences. One experiment involved binary choice dictator games (for instance, a choice between option A (a higher payment for an anonymous recipient, than the dictator) and option B (equal payment for both participants)). The authors found that high-caste players valued the anonymous recipient's higher payoff negatively, while the low-caste players do not. Another experiment involved a repeated coordination game of common interest. The central result was that after suffering a loss from a coordination failure, a high-caste player generally tried to punish his partner by taking the non-cooperative action in the next period, but the low-caste player did not behave this way. As a result, most pairs of low-caste men quickly established the efficient and cooperative convention, while most pairs of high-caste men did not.

<sup>5</sup>This latter finding is consistent with empirical evidence on inefficient allocation of resources across plots controlled by men versus women in Burkina Faso, documented in Udry(1996)'s classic work. In terms of relative magnitudes in our experiment, the inefficiency of husbands with a smaller fixed share than their wife is similar to that when husbands are required to cede all control over household income to their wife.

<sup>6</sup>As these authors note(p.717): "...identity can explain behavior that appears detrimental. People behave in

ature find similar evidence of investment inefficiency driven by spouses' desire for control over household resources: for instance, Iversen et al(2011) and Schaner(2012), in the latter induced by spouses' having different intertemporal preferences. What distinguishes our study is the finding of inefficiency even when there is no gain in the size or share of family income under a spouse's control. In the context of consumption decisions, Dasgupta and Mani(2015) report that social norms on spouses' contribution to joint household goods influence men to allocate less of their earned income to such goods than their wives.

It is striking that social norms about men's earnings leads to household inefficiency with relatively low (experimental) stakes, but the available evidence points to adverse effects on household efficiency in much richer developed countries too. Based on nationally representative panel data from the U.S. over 1990-2004, Bertrand et al(2014) document greater incidence of domestic discord and divorce exactly when a woman's earnings share exceeds her male partner's. They also find that women who earn more spend *more* time on household chores than their husbands, while others with higher earnings potential than their partner take lower-paying jobs. In fact, women were less likely to be paired with men having lower income, in the first place. Consistent with this pattern, Fisman et al(2006) find that, in a dating context, men value women's intelligence and ambition *if and only if* it does not exceed their own.

Overall, the body of available evidence points to an efficiency impact of a social norm that a man must not earn less than his wife, that is pervasive and perhaps even lexicographically dominant, across stages of economic development. Understanding the stubborn persistence of certain social norms, as examined in this paper, is important to formulate effective policies to address the challenges related to female labor force participation, the gender pay-gap, sexual harassment and the proverbial glass ceiling.

Section 2 describes the experimental design and rationale, and details of the setting. Section 3 presents the experimental findings and considers alternative explanations for them. Section 4 discusses the broader implications of the results and concludes.

## 2 Experiment Details: Design and Setting

### 2.1 Experimental Design

The experiment aimed to examine two key drivers of household decision-making efficiency, based on spouses' investment decisions: social norms about the relative earnings of husband and wife and the desire for personal control over household income. The design varied some conditions within participants and one condition across participants. Each participant faced

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ways that would be considered maladaptive or even self-destructive by those with other identities. The reason for this behavior may be to bolster a sense of self or to salve a diminished self-image."

a sequence of decisions, one each under four experimental conditions that varied spouses' control over household income realized from their investment decisions. These decisions were made under one of 3 separate information conditions that varied *across* participants.

The investment decision a participant faced in each of the 4 income-control conditions was always the same: how to allocate 50 rupees between two options, Red and Blue, with returns of 50%, and 100% respectively.

Table 1, column (1) shows how his (or her) control over the income realized varied across these 4 conditions. In the baseline 'fixed shares' condition, the decision-maker received a fixed share  $s$  of the family's total investment income from Red *and* Blue *combined*; the decision-maker's spouse received the rest  $(1-s)$ . Payments were made into individuals' private accounts.

Insert Table 1 here

In the other 3 decisions, the decision-maker received in a private account all payoffs *only* from the Red option. The spouse received all payoffs *only* from the Blue option, and in one of three ways:

- a private account (*low* control for the decision-maker),
- cash (*medium* control for the decision-maker), OR
- a joint account with the decision-maker (*high* control for the decision-maker)

Participants made all investment decisions in one of three information conditions, to which they were randomly assigned: 'None', 'Full' or 'Partial'. These conditions varied the information made available to the decision-maker's spouse ex-post about the decision-maker's investment options, choices and earnings. The 'None' condition was silent on all three, the 'Full' information condition offered details on all three and the 'Partial' condition reported only how much the decision-maker had earned for his/her spouse. All payouts were made in full at the end of the experiment itself, with no uncertainty in the returns.

**Rationale for Experimental Design:** It is useful to spell out how the design features described above help separately measure the impact of the economic and social drivers of household decision-making efficiency.

*Fixed Shares Condition and Social Norms:* (Refer to Table 1) When a decision-maker is assigned a fixed share of family investment income, any observed inefficiency in investment decisions cannot be explained by a preference for greater control over household income – by design. As seen in row 1 of Table 1 (column 2), a decision-maker who invests  $B$  into the Blue option receives  $s(2B + 1.5(50-B)) = s(0.5B + 75)$  – i.e. an amount that is linearly increasing in the option Blue investment. Thus, investing in the Red option would reduce the household payoffs, without increasing the fraction under the decision-maker's control;

he would simply receive the same fixed share  $s$  of a smaller pie. Given this observation, the variation in husbands' versus wives' shares in this condition was used to examine the influence of the social norm that 'a husband should not earn less than his wife'. The share  $s$  ranged between 30% and 70%, in 10% increments.

The share was varied on the first 5 days of the (9-day) experiment only; on subsequent days, all spouses received equal shares of household income from this decision.<sup>7</sup> During the first 5 days, shares were assigned with the aim that the fraction of participants receiving each particular share was balanced within each day and across information environments. Table S1.1 in the supplementary online appendix S1 shows that the number of participants receiving each of these different shares was well-balanced over this period.

*Other Income-control conditions* : The assumption underlying this feature of the design was that a spouse's payoff in cash is more physically accessible to the investment decision-maker than the spouse's payoff in a private account, while any payoff in a joint account is equally accessible to him as to her. Thus, the spouse's control varied across the three conditions. Across these, the decision-maker traded off a smaller household investment income from option 'Red' that he controls against higher returns (from option 'Blue') that his spouse controls, to varying degrees.

#### *Information Conditions:*

(Refer to Table 2 below). These (across-participant) conditions were motivated by survey and field-experimental evidence that information asymmetries between spouses can affect their choices (Bloch and Rao(2002) and Ashraf et al(2014)). Any information offered to a decision-maker's spouse was provided only *after* decisions were made, to capture how the threat of subsequent retaliation by an informed spouse could affect investment.<sup>8</sup> Table S1.2 in the supplementary online appendix S1 presents means for some key participant characteristics, across the three information environments.<sup>9</sup>

The decision-makers in the 'Partial' information environment were given the option to discuss all their initial investment decisions with their spouse (and revise them). The purpose of this 'negotiation' option was to ensure that any inefficiency in the investment decisions was not driven by spouses being unable to communicate and discuss the decisions with their partner. At the same time, there was a concern that allowing such communication may create an opportunity for symmetric *quid-pro-quo* arrangements between spouses making individual

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<sup>7</sup>All results pertaining to this decision are reported both for the full sample, as well as the five day subsample. (See section 3 and the Supplementary Appendix for details).

<sup>8</sup>No doubt, information flows between family members could also influence efficiency among family members for other reasons – for instance, by affecting how they communicate with and persuade each other over family decisions. See Ashraf(2009) on this, where the design varied information environments *prior* to spouses' decisions.

<sup>9</sup>Two of these characteristics are significantly different across the three information treatments, husband's age and wife's age. Therefore control were introduced for these variables in the regressions that study the impact of the information environment.

investment decisions within the experiment. Hence, either husbands or wives were randomly chosen to make investment decisions in the Partial Information condition. Among couples assigned to the other two information conditions *both* spouses made individual investment decisions.

Insert Table 2 here

Hence, the number of decision-making spouses in the Partial Information environment was roughly half of that in the Full and No information conditions. Table 2 lays out the within and across-participant conditions described in this section and provides details of the sample size within each cell.

## 2.2 Experiment Setting, Protocol and Instructions

### 2.2.1 The Setting

The experiment was conducted in the Anantpur district in the state of Andhra Pradesh, India. Being the second-most drought prone district in the country, it is among the poorest as well. The sample consisted of 300 couples, 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<sup>10</sup>. The set of 85 villages where SEDS operates were stratified by the duration of SHG membership of its women and 38 SHGs (from 32 villages) were chosen for participation, across all the strata created.<sup>11</sup> All married members of the participating SHGs and their husbands were recruited.<sup>12</sup> 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 ‘a study on the understanding of financial matters in the area, and

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<sup>10</sup>Self-help groups are a type of voluntary group savings and mutual support organization. They are promoted actively by the state government of Andhra Pradesh, resulting in widespread participation. Typically, SHGs have only women as members.

<sup>11</sup>Three strata were created, one each for membership durations of up to 3 years, 3-5 years and more than 5 years. Box et al(2005) highlight the benefits of stratification in increasing the possibility of detecting small treatment differences. See Bruhm & McKenzie(2008) for a broader discussion on the benefits of the use of stratification as a technique for randomized experiments.

<sup>12</sup>Married participants would likely regard their interaction in the experimental as part of a repeated one, rather than as a one-shot game. This aligns well with the underlying motivation for this experiment, which is to get a snapshot of actual (and repeated) decision-making within the family.

(ii) free transportation to and from the experiment site. Rs. 50 (roughly equivalent to \$1) is comparable to men's daily wages and is somewhat higher than women's daily wages in the area. Consistent with such low wage rates and high poverty, Table 3 shows that the fraction of participating households in which both spouses work outside the home is close to 90%. The level of education is also very low, for women and men. Interestingly, hardly any women in our sample report conflicts with their spouse over financial issues.

Insert Table 3 here

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. The experiments were conducted on the premises of the NGO over 9 days in October 2005, with 3-4 village groups participating each day. Participants were familiar and comfortable with this location, since they come here frequently for various activities of the NGO.<sup>13</sup>

### 2.2.2 Protocol and Instructions

Participants from each group were brought to the experiment location on their appointed participation date, as per a pre-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. Given the high rates of illiteracy in the population, all instructions and explanations were provided orally by trained experiment coordinators.<sup>14</sup> 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' among the area residents, 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 his decisions was equally likely to be chosen for payment, hence he should take them all seriously.

In the interest 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,

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<sup>13</sup>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.

<sup>14</sup>The gender of the coordinator was matched to that of the individual participant. Husbands and wives participated in the experiment at the same time, in separate rooms.

in private accounts). Thus, participants could plausibly claim to their spouses that the final outcome was based not on their own choices, but that of the experimenter.

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 the couple was assigned to). Then the coordinator explained the details of returns of the investment options, ‘Red’ and ‘Blue’ and quizzed him to make sure he could correctly work out the returns from various amounts.

He then gave the participant Rs.50 for investment (in the form of ten 5-rupee coins). 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 independent data entry staff, who recorded these investments. Men and women who had completed their investment decisions were required to wait in separate designated waiting areas, while their earnings were computed. Payments were made privately. Accounts opened were in the form of post office savings accounts rather than bank accounts.<sup>15</sup> When all members of a group had been paid, the entire group was transported back to their village. It must be pointed out here that the set-up and conduct of the experiment made it virtually impossible for spouses to know about each other’s tasks and options at the time of decision-making, other than any information the experimenter chose to provide at the end of the proceedings. (Refer to Table 2 for the information conditions).

### 2.2.3 Design Issues with Artefactual Field Experiments

Using the classification of field experiments outlined in Harrison-List(2004), we would characterize our experiment as an ‘artefactual’ field experiment. A major concern with such experiments is that participants may find the decisions or the setting artificial and so the results observed may not hold true in real life outcomes. Levitt-List(2007) discuss various ways in which this may bias the experimental results, as compared to natural field experiments. We address these concerns below, in the context of our experiment.

The first is that lack of anonymity may bias lab participants’ actions in the direction of choices that the experimental coordinators observing them would approve of. In our context, social norms are such that people would approve of a family with little domestic conflict.<sup>16</sup> If so, this should bias our participants to behave more efficiently and the outcomes we observe should be interpreted as a lower bound on the inefficiency that would actually exist within the household. The fact that the participants chosen for a study on intra-household

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<sup>15</sup>The post office was chosen because all villages have access to a post office (but not banks), which would make operating the account equally easy for all participants.

<sup>16</sup>This is likely reflected in our survey data too, where less than 3% of the women in our sample report any conflict with their husbands over financial matters – which is not entirely consistent with their behavior in the experiment.

decision-making are spouses in real-life helps allay two other common concerns. Specifically (as already noted in footnote 12), it is not a problem that our participants would regard the experimental game not as a one-shot game, but rather as a repeated one. By construction, the sample of spouses (rather than the usual one consisting of students) is very representative of the population we wish to study.

It is true that participants in this study are most likely poorer than average (given their willingness to show up for the announced fee which was roughly equivalent to a day's wages for unskilled labor). However, it is not clear that poverty should systematically bias efficiency, upwards or downwards. Another issue that Levitt & List(2007) raise is that choice sets in a laboratory setting may be artificially constrained, which may distort participants' decisions. In our context, the investment decisions presented allowed participants considerable flexibility in how they could apportion their investment across the two options. Some investors were also allowed the option to negotiate/discuss all their decisions with their spouse, before finalizing their investments. Finally, the stakes were large enough (close to 2 days of individual earnings) to make the decisions real and consequential for participants, even if they do not encounter such situations in their daily life. All investment decisions were made with actual money, which made the decisions more real as well.

### 3 Empirical Results

Given the linear return structure, it was pretty clear to all participants what they needed to do to maximize their household's total income: invest the entire Rs.50 in the high return 'Blue' option. Therefore, the main dependent variable examined is the amount that the individual invests in the high-return (Blue) option.

Insert Table 4 here

Table 4 reports the mean investment in the Blue option out of a maximum of Rs.50, for each of the four decisions.<sup>17</sup> Note that any shortfall relative to this amount indicates investment inefficiency.

Looking across rows 2-4 within each column, it is seen that lower control over household returns is associated with lower investment in option Blue. At the lowest level of control (row 2), men invest only Rs.34.94 (an underinvestment of 30%) while women put in Rs.38.32 (an underinvestment of 24%). The investment pattern under Fixed shares(Row 1) is not fully

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<sup>17</sup>The differences in mean investment level across different rows are statistically significant at the 1% level in all cases, with the following exceptions: Among men, the differences between (i) low and medium control and (ii) fixed shares and high control are not statistically significant. Among women, the difference between low and medium control decisions is significant at the 10% level.

efficient either, especially among men.<sup>18</sup> Thus, on average, decisions that affect the size of economic resources under a spouse's control more adversely are less efficient – but the absence of control considerations do not lead to maximum efficiency.

To verify that the investment means are not driven by decisions among a small fraction of households, Figure 1 reports the fraction of husbands and wives who maximized efficiency, for each of the four decisions. It shows that, with lower control, the fraction of men and women who invest efficiently, decreases. Further, a third of the men in the sample do not maximize household income even when their share of it is fixed. This implies that they are foregoing income not just for their wife, but some that would have been under their own control too.

Given this puzzling behavior, some plausible reasons for inefficiency that could be specific to our experimental context were checked for. Literacy rates in our experiment setting are low, hence one reason for inefficiency could be that the men did not understand the investment rules clearly. However, literacy differences between efficient versus inefficient investors do not explain the observed behavior.<sup>19</sup> One possible reason for greater financial literacy among women could be their exposure to SHG membership itself. To allay this concern about women in our sample, the duration of SHG membership was included a control in all of the regression tables; the results are robust to the duration of women's membership. Thus, our results are not driven by lower financial literacy or exposure to financial decision-making among men.<sup>20</sup> Also, the rules of the investment game were explained individually to each participant, with follow up questions to verify that they had been understood clearly. There is thus no good reason that men should be particularly confused about the rules, relative to women.

Another possible reason for inefficiency is that participants find the stakes too small to take the fixed share investment decision seriously. There are a few reasons why this seems unlikely. First, the returns from any single decision (i.e. participants' expected experimental earnings) are not so meagre: up to twice the daily wages for a man, so the loss from inefficiency can be up to half a day's wages. Second, the stakes are no different between the fixed share decision and the other three investment decisions. In the latter, spouses' choices show a systematic inverse relationship between their control over returns and their investment efficiency – which suggests that they are in fact taking those decisions seriously. At the other

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<sup>18</sup>These patterns are stable across all the information environments. Please refer to Table S1.3 in the supplementary online appendix S1 for details.

<sup>19</sup>Men who invested inefficiently in the fixed shares decision do not have significantly fewer years of education than other men who do (3.08 years versus 3.22 years). Furthermore, their wives, with much less education (1.06 years), invested much more efficiently too (Rs.46.6 vs. husbands' Rs. 25.6, on average).

<sup>20</sup>The survey data for the sample show that financial decisions such as asset purchases are either made by husbands unilaterally (21%), or husbands and wives jointly (64%) – and only very rarely by women alone (4%). In the remaining 11% of households, someone else in the joint family made asset purchase decisions.

extreme, if these stakes were regarded as too modest, (so that there is no real effect on spouses' long-term bargaining power within the household) it makes it all the more remarkable that men are willing to lose own income only to deny their wife a modest, one-time monetary gain.

Having ruled out these plausible contextual concerns, we next examine the efficiency effects of spouses' individual shares of control over household returns.

### 3.1 Social Norms, Gender Identity & Investment Choices

It is admittedly hard to fit husbands' self-destructive behavior observed in the Fixed Shares decision into a standard rational choice framework. However, Akerlof-Kranton's(2000) model of identity offers one possible explanation, based on adherence to social norms. Their model amends standard preferences to include two components, one based on consumption but also another identity-driven component: individuals lose utility when they take actions that go against "behavioral prescriptions" for their gender (or other social category that they identify with). What may such prescriptions consist of in the household context? The authors offer some examples: for instance, that 'men should not do *women's work* in the home or that 'men should earn more than their wives'. We investigate the latter possibility in explaining men's behavior in the Fixed Shares decision.

Figure 1 showed that 32% of husbands and 9% of wives invested inefficiently in the fixed shares case. In fact, this inefficiency is much higher among husbands who controlled a smaller fraction than their wife, where this fraction rises to 58%. In comparison, among women who controlled a smaller share of household income than their husband, this fraction is 20%. The mean investment among among wives with smaller shares is Rs. 44.90 while among husbands with smaller shares it is as low as Rs. 34.71. This latter amount is slightly *lower* than the mean investment level among all husbands in the Low Control decision(Rs. 34.94). Also, of the husbands who invest efficiently, 81% had an assigned income share of 50% or higher. Overall, there is significantly higher inefficiency among husbands when they are assigned a smaller share of household income than their wives.

To examine the impact of the wife's share on a husband's investment more systematically, a linear regression specification of the form below was estimated :

$$y_i = \alpha + \beta Share_i + \gamma X_i + \epsilon_i \quad (1)$$

In equation(??),  $y_i$  is the amount invested in the high return Blue option by the individual participant from household  $i$  in the Fixed shares decision.  $Share_i$  represents the fixed income share of individual  $i$ 's spouse, for which a couple of variants are considered. One is the actual fixed share of the investor's spouse, the other is a dummy variable that equals 1 when

the wife's share strictly exceeds her husband's.  $X_i$  is a set of household or individual specific controls.

Insert Table 5 here

Table 5 reports the results from our analysis. Investment efficiency among wives does not seem to be influenced by their husband's share (column (1)). In contrast, column(2) shows a negative and significant effect of a wife's share on her husband's investment: a 10% increase in the wife's share reduces a husband's investment in the high-return option by Rs 2.6. To check whether this effect exists across all parts of the share distribution, the sample was split into two-subsamples: one where a wife's share is less than or equal to the husbands's and another where her share strictly exceeds his. There is no effect of the share *within* each sub-sample (columns (3) and (4)). However, when a dummy variable is used for whether the wife's share strictly exceeds her husband's, there is a significant negative impact on his investment (column(5)). There is no attenuation in the size of the coefficient from the inclusion of various household specific controls(column(6)).

Finally, a specification with household fixed effects, including observations on both husband's and wife's investment . The advantage of this approach is that any unobservable characteristics of a household that may affect behavior of husbands or wives can be accounted for. There is clear evidence that an individual is more inefficient when his spouse's fixed share is larger. Given the results for wives and husbands reported columns(1) and (2) respectively, it can be inferred that this effect is driven by husbands' inefficient behavior.(column(7)). It is also robust to the inclusion of individual-specific controls on age, education and household income share(column(8)).<sup>21</sup>

By way of robustness checks, it was verified that the shares assigned to spouses are not systematically correlated with key observable household characteristics. Table S1.5 in the supplementary online appendix S1 shows that households where the wife's share exceeds 50% are no different from those where it does not. The set of criteria used for this purpose are the same as those used to verify random assignment across the information treatments. In addition, concerns with omitted variable bias were addressed, following the method outlined in Bellows and Miguel(2008). It was estimated that, in order to explain away the causal effect of the share dummy variable, the effect of unobserved (omitted) variables would have to be over 6 times greater than the estimated effect with the observed household control variables.<sup>22</sup> This suggests that the observed coefficient on the share dummy variable cannot

<sup>21</sup>Table S1.4 in the supplementary online appendix S1 shows that these results are also true for the first five day-subsample of participants.

<sup>22</sup>The intuition underlying this approach is as follows: If including controls substantially attenuates the coefficient estimates on the share dummy variable, then it is possible that inclusion of more controls would reduce the estimated effect even further. If, on the other hand, the inclusion of controls has no effect on coefficient

easily be explained by omitted variables.<sup>23</sup> Overall, the results and robustness checks provide persuasive evidence that husbands' behavior becomes inefficient when their wife's share exceeds their own, but not otherwise.

### 3.1.1 Other Investment Decisions

Next, the other three investment decisions of husbands who are inefficient under the Fixed shares case is examined. The reasoning here is that husbands who care enough about adhering to the social norm to undercut their own income would care more about the income share under their control in these other decisions too. After all, they actually lose some control by being more efficient in these three cases, unlike under Fixed shares. If, instead, it is found that the men who undercut their own income under Fixed shares are more efficient in the other decisions, this weakens the case for our earlier explanation based on the social norm. The following regression specification is estimated for each of the other three decisions:

$$y_i = \alpha + \beta \text{spiteful\_man}_i + \gamma X_i + \epsilon_i \quad (2)$$

where the second(and main) right-hand side variable is a dummy variable that equals 1 when the man from household  $i$  is 'spiteful' – i.e., he invests less than the full Rs.50 in the Blue option in the Fixed shares condition – and 0 otherwise. The household level control variables  $X_i$  are the same as used in equation(?) and reported in table 5. Table 6 reports the findings.

Insert Table 6 here

Spiteful husbands are found to be more inefficient than other husbands in all the other household decisions. Relative to other husbands, their inefficiency is more pronounced (and

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estimate magnitudes, then one can be more confident in suggesting a causal interpretation to the estimated relationship. Bellows and Miguel(2008) formalize this intuition by deriving the ratio of the “influence” of omitted variables relative to the observed control variables that would be needed to fully explain away the coefficient on the variable of interest. Accordingly, the statistic estimated is  $\frac{\hat{\beta}_F - \hat{\beta}_R}{\hat{\beta}_F}$  where  $\hat{\beta}_F$  represents the estimated coefficient on the share dummy variable from a regression with the full set of controls (column (6)), and  $\hat{\beta}_R$  is the coefficient of interest from a regression with a restricted set of controls (column(5)). The resulting value of the test-statistic  $\frac{\hat{\beta}_F - \hat{\beta}_R}{\hat{\beta}_F} = 6.1$ . See section III and Appendix A in Bellows & Miguel (2008) for further details.

<sup>23</sup>An issue to address here is whether the absence of inefficiency in women's investment when their husbands receive a smaller share is inconsistent with the presence of the social norm being studied. Two reasons suggest that it is not inconsistent. One, it is possible that this norm is more strongly tied to a male identity than a female one. As anthropologist Prem Chowdhry (2015) has noted, “Possession and control of land, money, and women are associated with izzat [male honor.”] Second, as outlined in Akerlof-Kranton(2000), suppose individuals get utility from two factors: material resources and norm adherence. For women, norm violation is compensated for by greater material resources under their control – not so for men. Given this trade -off for women, their efficient behavior is consistent with their commitment to the norm. Of course, factors other than social norms operating at the community, household or even individual level (such as threats to self-esteem)could influence spouses' decision-making outcomes too. (Crocker and Canevello(2012), Zelizer(2005))

statistically significant) under medium and high control over the wife’s income (Columns(4)-(7)), than under low control. Under low control, it is simply that all husbands are more concerned about their bargaining power, and hence less willing to cede income to their wife(columns(2) and (3)). Overall, it seems a fair description to say that spiteful husbands are more inefficient, because they care more about asserting their control over family returns. In this sense, their behavior in the other decisions is consistent with the norm-based explanation offered for the Fixed shares case.<sup>24</sup>

To summarize, there is persuasive evidence to suggest that the inefficiency of husbands’ investment decisions under Fixed shares is due to the influence of a social norm that a husband should not earn less than his wife. It seems unlikely that husbands’ inefficiency arises because they perceive a one-time larger share for their wife during the experiment, as setting a precedent or ‘giving her ideas’ about how the family division of bargaining power could be different from the status quo.

### 3.2 Control over Household Income and Investment Efficiency

This sub-section looks at whether and how a desire for control over household income (spouse’s earnings) affects investment efficiency. The following linear specification is estimated, using data from decisions (2)-(4) in Table 1, corresponding to low, medium and high control for the decision-maker:

$$y_i = \beta D_{ji} + \alpha + \epsilon_i \quad (3)$$

Here,  $y_i$  is the number of rupees invested by individual  $i$  in the high return (Blue) investment option,  $D_{ji}$  is a dummy variable for decision  $j = \{L, M, H\}$ (with low, medium or high control respectively) of a person from household  $i$ .<sup>25</sup> The omitted case is the Fixed shares decision; it serves as a benchmark given that a spouse’s bargaining power is entirely exogenous to his/her decision. Separate regressions are carried out for men and women.

Insert Table 7 here

Table 7 shows that, for both men and women, inefficiency is greatest under low control and smallest under high control. Both for men and women, the differences between the coefficients for low versus high control are significant at the 1% level; although the level of statistical significance for the low versus medium control coefficients is weaker, they are in the expected direction as well. Overall, these results confirm findings from other research

<sup>24</sup>Table S1.6 in the supplementary online appendix S1 reports similar results for the first five-day sub-sample as well.

<sup>25</sup>Since these variations in control over income are within-subject, standard errors are clustered at the individual level. We also include individual fixed effects and control for the rank order of each of the decisions.

that household savings and investment decisions are less efficient if the decision-maker's control over family resources is weakened.

### 3.3 Impact of Information

The results reported in previous tables have already accounted for differences in the information environment faced by participants. As seen from the results in Table 5 (for the Fixed shares decision) and Table 7 (for the decisions with Low, Medium and High investor control), the information made available to spouses ex-post has little impact on investment decisions. This is confirmed in the results reported in Table 9 separately for men and women, under each of income-control conditions.

These results could emerge for two reasons. One is that, irrespective of information treatment, investors expect that their spouses will be able to infer their actions from the outcomes. However, as described in detail in section 2.3.1, various aspects of the experiment protocol make such inference virtually impossible. The other explanation in this context, is that investing spouses do not fear retaliation by their spouse for their lack of efficiency, when their investment decisions are a *fait accompli*. There are several reasons why this is plausible in our context: Both men and women work in nearly 90% of households in the sample, so they are used to having income that they have individual control over. Further, there is no clear norm of one person being in charge of the household financial planning and budgeting, male or female.<sup>26</sup> Hence, a vast majority of households in the area of study do not have a convention of either spouse handing over income to the other.<sup>27</sup> Also, note that the results here are quite consistent with those of Ashraf(2009), where ex-ante communication between spouses does not induce more family-favoring choices, if spouses make their decisions individually, after such communication.

### 3.4 Additional Concerns & Alternative Explanations

#### *Negotiation between Spouses*

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. Investors may want to make side-deals with their spouses that would increase their incentive to invest efficiently. The negotiation option, provided to participants in the 'partial information' treatment was designed to address this specific issue. Investors could discuss all their initial decisions with their non-investing spouse and revise them, if they so desired. This

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<sup>26</sup>For instance, on savings decisions and asset purchase/sale decisions, 57% and 64% of women respectively report that decisions on these matters are made jointly by both spouses. For decisions on food, health and education, the fraction of women reporting joint decision-making ranges from 57% to 61%.

<sup>27</sup>2% of men and 24% of women report handing over their income entirely to their spouse.

group consisted of 48 men and 50 women, and table 8 reports who exercised this option and how they invested.

Insert Table 8 here

Among the 48 men, it turns out that not a single man chose to discuss his decisions with his spouse! About 63% of these men invested with less than full efficiency. 62% of the 50 women in this treatment chose to talk to their husbands, but under a third of them had made any inefficient decision originally, and only one of them revised her decisions subsequently. Even among the other 38% who chose *not* to discuss their decisions, only a little over a third had underinvested in one or more of the four decisions originally. One reason for this lack of interest in negotiation among participants (especially men) could be that they did not expect to achieve binding commitments about how to allocate household income by negotiating with their spouse. In other words, it appears plausible that there is limited commitment to mutual spousal agreements in these households. Overall, it seems safe to conclude that the inefficiency in spouses' choices was not driven by an inability to communicate with partners.

#### *Maximizing Household Income versus Maximizing Household Welfare*

The definition of efficiency has implicitly assumed that maximizing household income will maximize household welfare, but there could be circumstances under which the two may not always coincide. 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.

In the present case, 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 greater 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. Rather, wives invest more when their husbands get paid in cash rather than in a private account, the difference being significant at the 10% level. This suggests that wives' decisions to invest inefficiently are not driven by such concerns about potential welfare-reducing effects of their husbands' higher income.

#### *Alternative Explanations*

Among the alternative factors that may explain our results, one that merits attention is some form of mental accounting, as described by Thaler(1990), i.e. spouses earmark amounts placed in specific accounts for different types of expenditure; this may be their reason for investing in the Red and Blue options, rather than only the latter. However, such earmarking does not explain why our participants systematically invest more money in the Red option when they have lower control over the investment returns. Neither does it explain, in the case

of husbands, why they should place more in this option when their wife’s share specifically exceeds half – especially given that this lowers the absolute returns available in both accounts.

A second possible explanation to consider is that participants are applying some rule of thumb that they should invest in both options – but this one too succumbs to the same critiques as the mental accounting explanation. Besides, rules of thumb are more likely to be applied when decision problems are particularly challenging. In our context, participants were consistently able to spell out which allocation would maximize returns when they were told about the rates of return from the Red and Blue options – *before* they learnt the sharing rules for the returns from these options for individual decisions.

Finally, risk diversification could not have been a reason for investment in both options either, given that there was no uncertainty in the returns.

## 4 Discussion & Conclusion

This paper offers experimental evidence of how social norms play an important role in household decision-making and its efficiency, distinct from economic concerns about control over resources. Specifically, it shows how a social norm that a man must not earn less than his wife results in an extreme form of non-cooperation – spiteful behavior by husbands. Men with fixed smaller family income shares make investment decisions that undercut their own income only to ensure that their wife did not earn too much more than themselves. The magnitude of investment inefficiency due to this social norm is comparable to that in experimental conditions where husbands have the lowest control over their wife’s experimental income. Women’s investment efficiency is also affected by how much control they wield over the family’s earnings, but it is not affected by the social norm. Such evidence runs counter to the predictions of a standard bargaining framework of the household literature – and can be explained only in a framework where gender identity-based social norms influence spouse’s choices.

There is a significant body of real-world case studies and observational data that are consistent with our evidence, inasmuch as men’s behavior suggests that their identity within the household is challenged by greater economic status of the wife. To take just one example, in developing countries, income transfer programs targeted towards women have documented adverse reactions from husbands, some of it in the form of domestic violence.<sup>28</sup> Furthermore,

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<sup>28</sup>See, for instance, Schuler et al(1997) and Angelucci(2008) on increased domestic violence from micro-credit access and Opportunidades cash transfers in Bangladesh and Mexico respectively. Dey Abbas(1997) and Quisumbing and Maluccio(2000) document other adverse reactions of men to income opportunities for women. It must be acknowledged that these examples of inefficiency may not necessarily be cases where women’s earnings *exceed* their husband’s as a result of such increased resources. This may explain other evidence to the contrary, which shows that domestic violence decreases with transfers (Hidrobo et al(2017) or a lower gender wage gap(Aizer(2010).

it is not clear that the influence of this norm changes substantially with economic development either – as the U.S. national evidence from 1990-2004 discussed in the introduction shows (Bertrand et al (2014)).<sup>29</sup> Even the last U.S. recession in 2010, where seventy five percent of job losses affected men, has triggered discussions in mainstream newspapers about the sustainability of marriages where women earn a greater part of the income.<sup>30</sup> McMillan and Gartner (1999) find that an American woman with an unemployed spouse faces a greater threat of domestic violence when she is herself *employed*, rather than unemployed.

As the World Development Report (2012) acknowledges, there could be many reasons why gender-based social norms that may trigger spiteful or inefficient behavior remain so stubborn in their influence. (Box 4.7, page 174). In some cases, it may simply be driven by how widespread the practice of such norms may be; or it could be driven by the power of those who benefit from such social norms. It could even be driven by ‘pluralistic ignorance’ – where ‘members of a group may privately reject a norm, but assume (incorrectly that most others accept it’. Burzstyn et al (2018) document a clear case of this last effect: They find that a vast majority of young married men in Saudi Arabia support female labor force participation – but substantially underestimate the level of support by other similar men, including their neighbors. Randomly correcting these beliefs leads to increased job search efforts by women.

More work to understand the mechanisms that underlie the persistence of norm-related behaviors within specific cultural settings is an important and potentially fruitful avenue of future research. Given the persistent and pervasive influence of certain gender norms, integrating such research into the policy-making process can be valuable. It could yield useful insights to tackle challenges related to women’s labor force participation and economic development in poorer societies as well as issues such as the gender pay gap, sexual harassment, occupation choice and family leave policy in developed countries.

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<sup>29</sup>See also for Hochschild’s (1990) book *The Second Shift* on the persistence of gender differences in occupation choice and division of household chores in the United States.

<sup>30</sup>See ‘Alpha Wives: The Trend and the Truth’ – New York Times, 24th January 2010.

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TABLE 1: INCOME CONTROL CONDITIONS			
Seed Money for Investment = Rs.50, Decision-Maker (DM) chooses Investment in 'Blue'(B) and 'Red' options (50-B)			
DM's Control over Household Income	DM's payoff (always received in his/her private a/c)	Spouse's payoff	Spouse's payoff received in
(1) Fixed Share, $s$ ( $0.3 \leq s \leq 0.7$ )	$s(2B + 1.5(50-B))$	$(1-s)(2B + 1.5(50-B))$	Pvt. a/c
(2) Low	$1.5(50-B)$	$2B$	Pvt. a/c
(3) Medium	$1.5(50-B)$	$2B$	Cash
(4) High	$1.5(50-B)$	$2B$	Joint a/c with DM
<p>Source: Experimental Data collected by Mani(2019), <i>World Bank Economic Review</i>.</p> <p>Notes: There are two investment options 'Blue' and 'Red' -- the first with a 100% return, and the second with a 50% return. In the Fixed Shares condition, the DM receives his/her assigned share of total returns from both the Blue and Red options. In the Low, Medium and High Control cases, the DM receives all payoffs from the 'Red' option and his/her spouse receives all payoffs from the 'Blue' option, with the higher rate of return. There is no uncertainty in the rate of return on investment. All Control conditions are within-subject. DMs were placed in one of three mutually exclusive information environments for all their decisions -- see Table 2 for details on these.</p>			

TABLE 2: INCOME-CONTROL &amp; INFORMATION CONDITIONS -- SAMPLE SIZES

	NO information+	FULL information+	PARTIAL Information+	TOTAL <sup>^</sup>
<b>4 Income-Control conditions</b>	101 Men 101 Women (couples)	101 Men 101 Women (couples)	48 Men 50 Women ( <i>Either</i> man or woman in each couple)	250 Men 252 Women (from 300 couples)
<b>N: Number of DMs</b>	202	202	98	

Source: Experimental Data collected by Mani(2019), *World Bank Economic Review*.

Notes:

\* (1) Income-Control conditions vary *within* participants; Information Conditions vary *across* participating households.

+ (2) Information pertains to what the DM's spouse was told after the experiment about the DM's investment options, choices and earnings. The 'No information' and 'Full information' conditions pertain to what was divulged on these three aspects. The Partial Information condition reported only the DM's earnings for the spouse. The DM in the Partial Information condition was given the option to discuss his/her decision with the spouse as well.

<sup>^</sup> (3) Among households assigned to the first two information conditions, both spouses individually made investment decisions. Among households assigned to the Partial information condition, *either* the husband *or* the wife made investment decisions. As a result, the total number of DMs is lower than the total number of couples who participated in the experiment..

**TABLE 3: SUMMARY STATISTICS**

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>
<b>Family Characteristics</b>		
Years of Marriage	21.31	10.76
No. of children	2.82	1.44
Annual Household Income (Rupees)	15741.87	15184.87
Fraction of 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%	
<b>Personal Characteristics</b>		
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 4: MEAN INVESTMENT IN HIGH RETURN 'BLUE' OPTION (Rupees)			
	ALL	MEN	WOMEN
INVESTOR CONTROL OVER INCOME	N=502	N=250	N=252
	(1)	(2)	(3)
<b>Fixed Share</b>	44.95	42.2	47.68
(Investor's payoff = $s [(\text{'Blue'} + \text{'Red'}) \text{ returns}]$ ; Rest to Spouse, $(.3 \leq$	(11.42)	(13.24)	(8.44)
<b>Low Control</b>	36.63	34.94	38.32
(All 'Blue' returns to Spouse in Pvt. Account; All 'Red' returns to In	(19.27)	(18.33)	(20.06)
<b>Medium Control</b>	38.30	35.62	40.98
(All 'Blue' returns to spouse in Cash; All 'Red' returns to Investor)	(18.77)	(18.85)	(18.35)
<b>High Control</b>	43.37	41.36	45.36
(All 'Blue' returns to spouse in Joint a/c with investor; All 'Red' return	(14.93)	(15.92)	(13.63)
<b>Overall Mean Investment - (across 4 decisions)</b>	40.81	38.53	43.09
	(16.75)	(17.03)	(16.18)
Source: Experimental Data collected by Mani(2019), <i>World Bank Economic Review</i> .			
Notes: The maximum possible investment in option Blue is Rs.50. Standard deviation of amount invested in 'Blue' is reported in brackets. All payoffs to the investor are paid in a private account. There are 2 fewer observations for men than women because 2 families in which husbands alone were designated as participants (under the Partial Information treatment), did not show up for the experiment.			

TABLE 5: SOCIAL NORMS AND INVESTMENT UNDER FIXED SHARES

	Dependent Variable							
	Wife's invt. In high return 'Blue' option				Husband's Investment in High Return 'Blue' option			
					Husband & Wife's invt. In High return Blue Option			
Independent Variables:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fixed Share of Investor's Spouse <sup>a</sup>	-0.069 [0.061]	-0.260*** [0.092]	0.156 [0.119]	-0.53 [0.447]			-0.175** [0.076]	-0.163** [0.071]
No Information <sup>b</sup>	0.728 [1.103]	1.388 [1.910]	2.274 [1.966]	-4.566 [5.162]	1.153 [1.876]	0.519 [1.871]		
Partial Information	-0.573 [1.626]	2.151 [2.119]	3.343 [2.107]	-3.096 [5.762]	2.145 [2.047]	2.261 [2.123]		
Wife's share strictly exceeds husband's (dummy variable)					-9.482*** [2.402]	-9.633*** [2.365]		
High Caste Dummy(1=BC/OC; 0 = SC/ST)						-3.399 [2.185]		
Household Income (Rs. 000s)						0.057 [0.039]		
Wife's education level						0.136 [0.354]		
Husband's Education level						0.142 [0.220]		
Wife's age						0.404 [0.265]		
Husband's age						-0.268 [0.188]		
Number of children						-0.382 [1.025]		
Number of girl children						-1.615 [0.994]		
Nuclear Family (Dummy)						4.591* [2.443]		
SHG Membership date						0.001* [0.001]		
Education								-0.22 [0.330]
Age								-0.604*** [0.181]
Share of Household Income								-0.895 [2.543]
Constant	43.941*** [3.469]	55.385*** [5.364]	34.400*** [5.597]	78.239** [30.077]	44.151*** [2.417]	19.578 [14.960]	54.050*** [4.371]	78.879*** [7.442]
Observations	252	250	198	52	250	244	500	500
R-squared	0.01	0.04	0.02	0.08	0.09	0.16	0.61	0.66

Source: Experimental Data collected by Mani(2019), *World Bank Economic Review*.

Notes:

a Spouses' Fixed Shares range between 30% and 70%, with 10% increments.

b The omitted information category here is 'Full Information' where spouses receive all information about investor's options, actual choices and earnings.

All regressions include controls for the randomly assigned rank order of the Fixed Shares investment decision. Robust standard errors are reported in brackets. \* Significant at 10% level; \*\* significant at 5% level; \*\*\* significant at 1% level.

TABLE 6: SPITE AND INVESTMENT EFFICIENCY IN OTHER (3) DECISIONS

Dependent Variable: Investment in High Return 'Blue' option (Rs.) (Min.=Rs.0; Max.=Rs.50)

Dependent Variable: Investment in High Return Date Option (Yes/Minor Role/Minor Role)							
	MEN						
Independent Variables:	Control over income (all conditions)	Low Control <sup>c</sup>	Low Control <sup>c</sup>	Medium Control <sup>c</sup>	Medium Control <sup>c</sup>	High Control <sup>c</sup>	High Control <sup>c</sup>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
"Spiteful" Husband <sup>a</sup>	-5.525*** [1.534]	-3.592* [2.103]	-2.931 [2.377]	-7.338*** [2.312]	-7.879*** [2.512]	-6.231*** [2.084]	-4.567** [2.303]
No Information <sup>b</sup>	-0.798 [1.706]	-0.822 [2.545]	-0.04 [2.557]	-0.999 [2.585]	-0.86 [2.711]	-1.003 [2.248]	-0.382 [2.240]
Partial Information	-2.146 [2.271]	-1.022 [3.298]	-1.046 [3.428]	-4.097 [3.347]	-4.648 [3.507]	-1.729 [2.623]	-0.646 [2.821]
Constant	39.905*** [1.954]	36.732*** [3.604]	48.450*** [17.361]	42.531*** [3.156]	26.413 [18.041]	40.684*** [4.407]	34.815** [16.881]
Number of Observations	750	250	244	250	244	250	244
R-squared	0.02	0.01	0.08	0.04	0.08	0.04	0.1
Controls for Family Characteristics <sup>d</sup>	No	No	Yes	No	Yes	No	Yes
Individual Fixed Effect	Yes	N/A	N/A	N/A	N/A	N/A	N/A

Source: Experimental Data collected by Mani(2019), *World Bank Economic Review*.

Notes:

a A "Spiteful" husband is one who invests less than the entire Rs.50 in the high return 'Blue' option in the Fixed shares decision.

b The omitted information category here is 'Full Information' where spouses receive information about investor's options, decisions and earnings.

c Under the Low, Medium and High (investor) Control conditions, returns from the Blue option were paid to an investor's spouse in a private account, in cash and in a joint account with the investor respectively. Returns from the Red option were paid to the investor in a private account in all three cases.

d Controls for Family Characteristics are the same as those included in Table 5, column(6). Please refer to Table 5 for details.

All regressions include controls for the randomly assigned rank order of the individual investment decisions.

Robust standard errors in brackets. \* significant at 10% level; \*\* significant at 5% level; \*\*\* significant at 1% level

TABLE 7: IMPACT OF CONTROL ON INVESTMENT EFFICIENCY			
Dependent Variable: Investment in High Return Blue Option (Max)			
Independent Variables	Combined	MEN	WOMEN
Investor Control over Income <sup>a</sup> :	(1)	(2)	(3)
Low Control Condition <sup>b</sup>	-8.282*** [1.108]	-7.254*** [1.574]	-9.355*** [1.530]
Medium Control Condition <sup>c</sup>	-6.647*** [1.046]	-6.577*** [1.490]	-6.796*** [1.454]
High Control Condition <sup>d</sup>	-1.584* [0.863]	-0.837 [1.401]	-2.397** [1.117]
Constant	45.590*** [1.113]	42.253*** [1.533]	48.999*** [1.515]
Number of Observations	2008	1000	1008
R <sup>2</sup>	0.44	0.43	0.42

Source: Experimental Data collected by Mani(2019), *World Bank Economic Review*.

Notes:

a The omitted Control over Income condition 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 the 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.

All regressions reported here include individual fixed effects and control for the order rank of the decision. Robust Standard errors are in brackets, clustered at the individual level. \* Significant at 10% level, \*\* Significant at 5% level, \*\*\* Significant at 1% level

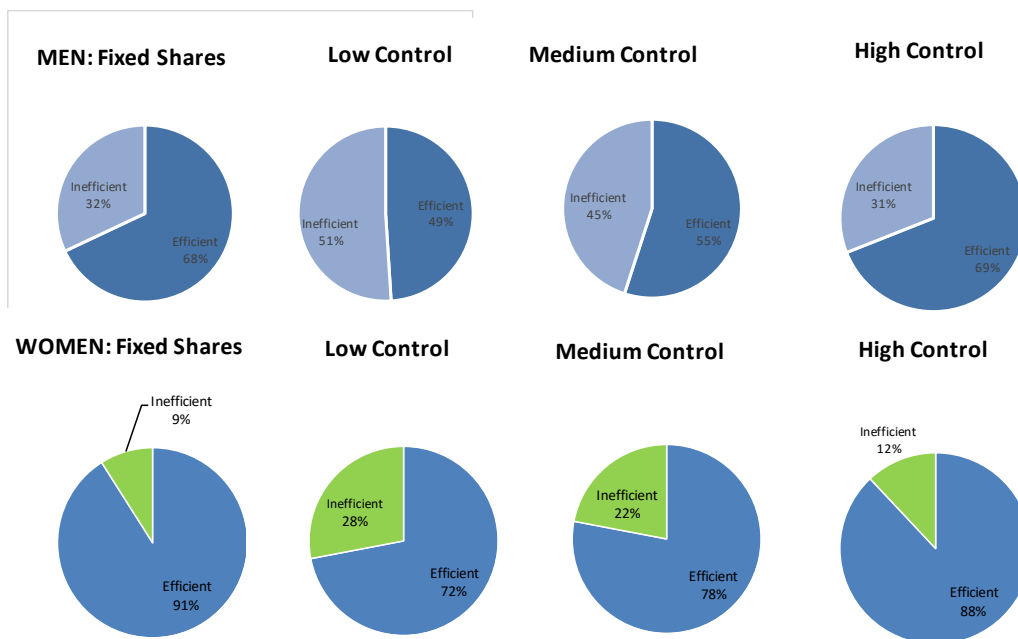
TABLE 8: NEGOTIATION WITH SPOUSE						
Men				Women		
	Number of Investors			Number of Investors		
	Total	Negotiation		Total	Negotiation	
		No	Yes		No	Yes
	48	48	0	50	19	31
		Before Neg'n	After Neg'n		Before Neg'n	After Neg'n
Invt. in Option Blue						
(a) =Rs.50 (all decisions)	18	n.a.	n.a.	12	21	22
(b) <Rs. 50 (in at least 1 decision)	30	n.a.	n.a.	7	10	9
Mean Invt. in Blue (Rs.):						
-- Fixed Share Condition	39.5	n.a.	n.a.	42.9	39.5	39.5
-- Low Control Condition	22.5	n.a.	n.a.	21.4	31.5	36.5
-- Medium Control Conditi	22.5	n.a.	n.a.	21.4	23	23
-- High Control Condition	38.4	n.a.	n.a.	35.7	42	37
Source: Experimental Data collected by Mani(2019), <i>World Bank Economic Review</i> .						
Notes: The Negotiation option allowed the investor in each of the 98 households assigned to the 'Partial Information' Enviroment to discuss his/her initial set of investment decisions with his/her spouse and change them. In the Low, Medium and High Control conditions, spouses were paid in a Private account, Cash and in a Joint account with the investing spouse respectively.						

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

Dependent Variable: Investment in High Return (blue) Option									
Control over Income' Conditions					Control over Income' Conditions				
MEN					WOMEN				
Independent Variables	Fixed Shares	Low Control <sup>b</sup>	Medium Control <sup>c</sup>	High Control <sup>d</sup>		Fixed Shares	Low Control <sup>b</sup>	Medium Control <sup>c</sup>	High Control <sup>d</sup>
Information Treatment	(2)	(3)	(4)	(5)		(8)	(9)	(10)	(11)
--- No Information		0.187 [2.535]	-0.194 [2.654]	-0.38 [2.239]			-2.578 [2.948]	-2.188 [2.603]	2.101 [2.021]
--- Partial Information		-0.369 [3.234]	-3.18 [3.505]	0.052 [2.777]			3.611 [3.250]	-1.629 [3.293]	2.458 [2.438]
Wife's Share of Earnings (Fixed Shares Case)									
Other Controls:									
Husband's age		YES	YES	YES			YES	YES	YES
Wife's age		YES	YES	YES			YES	YES	YES
Constant		45.256	41.267	54.78			38.53	39.33	44.184
No. of Obs.		249	249	249			251	251	251
R-squared		0.04	0.01	0.05			0.01	0	0.01

Source: Experimental Data collected by Mani(2019), *World Bank Economic Review*.

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%



**FIGURE 1: FRACTION OF HOUSEHOLDS WHERE SPOUSES INVEST INEFFICIENTLY**

Source: Experimental Data collected by Mani(2019), *World Bank Economic Review*.

Notes: In the case of *Fixed Shares*, the fraction of inefficient investors varies by whether a decision-maker's share is lower than his or her spouse's or not, as follows:

When husband's share lower than wife's: Men -- 58%; Women -- 10%

When wife's share lower than husband's: Men -- 41%; Women -- 20%