



Private lives: experimental evidence on information completeness in spousal preferences

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Abstract

Experimental work using real married couples has shown that efficiency in intra-household allocations is influenced by information asymmetry between spouses. We conduct a lab-in-the-field experiment in rural India to test the extent to which lack of complete information on spousal preferences related to a bundle of private goods can affect allocation dynamics as well as expectations about allocations. We first show that there exist information asymmetries in spousal preferences, and that our information intervention helps reduce gendered misperception in beliefs about allocations and actual allocations, especially for men. However, information on spousal preferences does not significantly affect the final allocation decision, suggesting that husbands and wives may be responding to existing gender norms. We outline implications for experimental work on intra-household bargaining, and for policy.

Keywords Information asymmetry · Beliefs · Intra-household bargaining · India

JEL Classification D13 · D82 · C93

1 Introduction

Do spouses know about each other's preferences? Literature in the domain of intra-household resource allocation and bargaining suggests that information asymmetry over preferences could be a source of loss of efficiency at the level of the household (Baland & Ziparo, 2018; Munro, 2017). As such, the ability of spouses to coordinate and achieve efficiency could be attributed to the (concordance of) their preferences

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and beliefs (Cochard et al., 2016). Cooperative outcomes are also more likely when there is absence of information asymmetry and spousal characteristics are similar (Iversen et al., 2011). We report findings from a lab-in-the-field experiment with real spouses and real consumption decisions in rural India to examine whether spouses know about each other's preferences and beliefs. If spouses do not know about each other's (private and household) consumption, it could potentially have adverse consequences, in particular for women (Fletschner & Mesbah, 2011). For example, having asymmetric information about preferences for consumer durables (which are largely indivisible goods) could create frictions in decision-making, and affect household welfare (Doepke & Tertilt, 2019). This could further be exacerbated by gendered norms around decision-making, which imply that the female's consumption preferences are not adequately reflected in expenditures.¹ Furthermore, there is emerging evidence of gender differences in beliefs about specific household decisions, such as sanitation (Augsburg et al., 2023). This could lead to a gendered misperception of beliefs about what spouses expect of each other when it comes to maximizing household efficiency jointly. A large part of recent work in the domain of intra-household resource allocation deals with the effects of information on household decision efficiency (Ashraf, 2009; Castilla & Walker, 2013; Cochard et al., 2016; Hoel, 2015; Mani, 2011; Munro et al., 2014). As Munro (2017) notes, there are mixed findings in experimental work that tests the role of information on intra-household efficiency. Our paper ascribes closely to the theoretical model described in Doepke and Tertilt (2019), where private information about preferences plays a role in household bargaining outcomes. Our paper is also closely related to work on spousal disagreements as a measure of intra-household bargaining power (Ambler et al., 2019), as we measure changes in allocation decisions between spouses before and after information on spousal preferences is provided. This work also fits into current literature on the role of beliefs and their concordance with actions, which has been shown to differ between men and women and have implications for household outcomes (Castilla et al., 2022). Our study adds to this work using a real purchase task and measuring beliefs about spousal actions in the context of consumption decisions. Finally, this paper is also aligned with work on willingness-to-pay for exercising agency when there is an opportunity to obtain a consumption bundle aligned with individual preferences (Afzal et al., 2022). Although we do not measure the premium on knowledge and implementation of preferences, we show that having this information could play a role in decision-making, as it is important for household outcomes (De Rock et al., 2022). Our study also departs from Afzal et al. (2022) in using a comprehensive and expanded set of household consumption items.

In a typical collective model of household decision-making (Browning & Chiappori, 1998), the household maximizes the (weighted) sum of the individual members' utilities subject to a budget constraint. In practice, the weights on individual utility functions (i.e., their bargaining power) are difficult to measure, and are often proxied using some measure of women's empowerment (asset

¹ There is also additional work on the influence of gender roles on intra-household labor allocation decisions (Couprie et al., 2020).

holdings, decision-making autonomy, employment status, etc.). In the context of incomplete information, each member does not have information about the utility function of the other, and therefore, forms beliefs about them. Belief formation of what one expects the other to do (especially within dyads with familiarity) in such contexts could be driven by anchors, availability of information, patriarchal gender norms, as well as consensus bias (Sarkar & Bose, 2018). However, as Castilla (2019) shows with field experiments in India, income hiding between spouses is driven by strategic concerns. Providing information about spousal preferences could play a role in how these beliefs are formed, as well as downstream impacts on household efficiency (Afzal et al., 2022; Castilla et al., 2022). However, our experimental design does not test strategic hiding of preferences, and rather examines the gendered misperception of beliefs and whether spouses coordinate in a way that reflects their relative position within the household. To this end, we test two adjacent hypotheses: (a) there are no gender differences in spousal beliefs; and (b) the relative bargaining power over consumption choices affects consumption allocations within the household.

We examine these competing hypotheses using a lab-in-the-field experiment with married couples in rural India, varying information and eliciting beliefs about spousal consumption in an allocation task with real commodities. Our work contributes to the literature on the effects of information on preferences and the role of beliefs in intra-household decision-making (Afzal et al., 2022; Castilla et al., 2022; Doepke & Tertilt, 2019). Our lab-in-the-field experiment is novel on two counts: first, we use a real consumption decision task between married couples from Tamil Nadu, a state in south India. Second, we are able to account for spousal beliefs around intra-household resource allocation, extending work in this area to measure relative bargaining power within the household and how it differs between men and women. Finally, whereas several experiments in this domain study outcomes using variations on the trust, public goods, and cooperation games, ours builds in more context using a real consumption decision task.

We first present evidence that there exist gendered misperception of beliefs among spouses in our sample, implying that men believe that their spouse will spend more than what they actually do. Next, we show that providing information on spousal consumption decisions reduces the difference between expected and final allocations, but only for men. This implies that there is some coordination underlying the decision-making process, which is captured in our experiment. Furthermore, this result suggests that information on spousal consumption decisions does not significantly affect spousal beliefs, potentially reflecting a stronger relative bargaining position. Finally, we find that when spouses have information on preferences, the intention to implement a specific preference does not significantly affect how much they deviate from their own initially stated preference. This result holds true for both men and women, suggesting that even if there is some spousal coordination at play, there may not be any gender differences.

The remainder of the paper is organized as follows. Section 2 provides context and outlines the experimental design. Key summary statistics and the empirical framework is laid out in Sect. 3. Section 4 contains the results and a discussion. Section 5 concludes.

2 Experimental design

We designed a two-person sequential game with asymmetric information based on a standard bargaining game (e.g., Muthoo, 1992, 1996) following the collective bargaining model (e.g., Basu, 2006). First, men and women state their initial preferences for a given set of commodities subject to an (equal) budget constraint. Following this, they were randomly assigned to either receive information on their spouse's intent-to-buy or received no information. The former can be interpreted as a coordination game that reveals relative bargaining positions, where spouses having updated their beliefs, also provide an estimate of what they expect their spouses to allocate, and choose their final allocation. In a sense, the latter (where no information is exchanged), allows us to test whether beliefs about spousal allocations are indeed accurate and if they differ by gender.

The experiment was implemented in two villages in rural Tamil Nadu, a large state in the south of India.² We used previously collected survey data from these two villages to identify eligible households from which married couples could be recruited.³ A random sample of households was drawn from a list of all households residing in the village, aiming to capture diversity in participation status in a large-scale public workfare program (e.g., female-only participated, male-only participated, both participated, and neither participated). Trained enumerators visited households and provided an invitation to participate in the experiment, assigning a time slot for participation. Men and women arrived at the experiment venue together and enumerators verified their information against survey data to check for marital status. A brief household questionnaire that collected data on household characteristics and risk and time preferences was also administered. A total of 30 recruiters (including two lead experimenters) who were fluent in Tamil as well as English were trained to implement the protocol.⁴

The experiment was run with 231 married couples. Once they arrived together at the site, participants provided informed consent to participate in the experiment. All couples were provided with a fixed show-up fee of INR 100 each, and INR 50 (10 five-rupee tokens) each to participate in a decision-making task. Participants were told that all payments will be made individually to each participant in cash

² Family relations, gendered norms, and women's status differs markedly in south India compared to households in Northern states in India (Jejeebhoy & Sathar 2001; Munro et al., 2014), where women in the south have had better access to education, employment, and therefore, typically have more say in household decisions relative to their counterparts in the North. This is directly related to changes in decision-making and bargaining that have been traced back to changes in relative endowments of husband and wife (Beblo & Beninger 2016).

³ There is a possibility that information about the experimental protocol may have leaked within the village given that sessions took place over multiple days. To mitigate this possibility, care was taken to schedule as many sessions on a single day and to organize households by the street they resided in. This was done given that residences in villages are typically organized along caste lines in rural India, and that communication across caste groups residing in different streets may have been minimal. We also provided instructions to couples at the time of debrief not to pass on information about the details of the experiment to others.

⁴ More details on the experimental protocol as well as questionnaires can be found in Appendix A.

(including the show-up fee) at the end of the experiment. The endowment of INR 100 (~USD 1.5) was framed as a collective endowment with equal division between the man and woman. Men and women were assigned to same-gender experimenters sitting in different corners of the room and informed that their spouse was participating in the same task (experimental instructions and forms are available in the supplementary material). The venue was arranged to prevent any communication and maintain privacy of the participants' decisions.

Participants were asked to observe the sample product of commodities⁵ displayed on a table with respective price tags (written in the local language) and were allowed to gauge the quality of the products by handling them (photo in Appendix B). The commodities that participants could purchase were:

1. Food: (a) Rice (INR 15) in half-kilogram bags of superior quality; (b) Salt (INR 10) in half-kilogram bags, of superior quality.
2. Health: (a) (Paracetamol (INR 15) in one strip of ten tablets; (b) Pain Relief Balm (INR 10) in 5 sachet packs.
3. Education: (a) Notebooks (INR 15) per unit; (b) Pens (INR 10) per unit.
4. Sanitation: (a) Soap (INR 10) per unit; (b) Toothpaste (INR 10) per unit.

Participants could thus take home INR 50 each of commodities on sale and were guaranteed the INR 100 in show-up fee. Care was taken not to prompt or guide the participants in any way; experimenters helped them only with calculation to ensure that expenses did not exceed the endowment. Similarly, they were informed that any unspent amount was not redeemable in cash. To facilitate the decision-making and calculation, participants were instructed with an example. Within the time interval of 2–3 min, participants were first asked to indicate their intention-to-buy the commodities, followed by the experimental treatment (described in the following section). Thereafter, participants placed their final order and exchanged tokens with the experimenter. After this final order was placed, participants were also asked to state their expected beliefs about spouses' final order.

2.1 Experimental treatment

We randomly assigned 102 couples (204 individuals) to the *full-information* treatment group that followed the same procedure as the control (*no-information*) group, except that they were told that their intention-to-buy list would be shared with their

⁵ These real commodities were selected after focus-group discussions (FGDs) to determine the most common choice set for individuals who would be the potential participants. These reflected household commodities under four categories that men and women each identified as preferred commodities for the household. On the basis of these discussions (held 2 months prior), it was decided to offer two commodities per 'category' for individuals to choose from. These commodities were offered at market prices. Tablets were included as FGDs revealed that a large subset of the sample were involved in manual labor where painkillers are commonly used to alleviate pain.

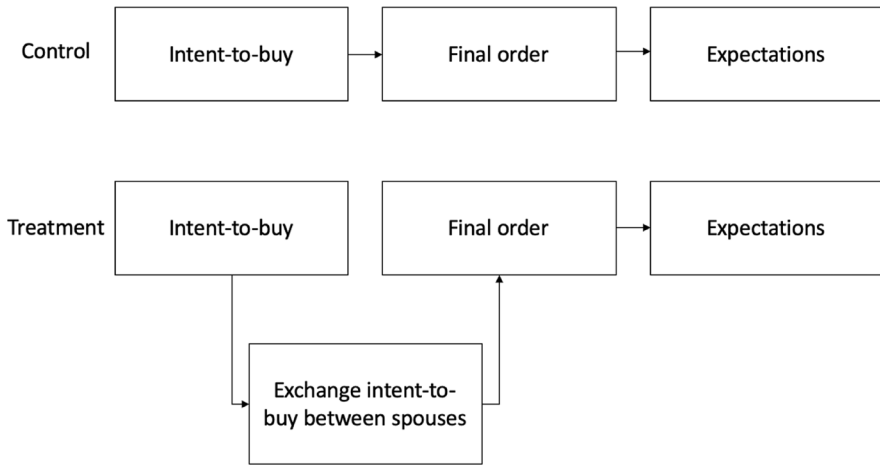


Fig. 1 Schematic representation of the control and treatment conditions

spouse, and they would receive information about their spouses' intention-to-buy list after making their own intention-to-buy list (see Fig. 1).⁶

Participants in both treatment groups submitted an intention-to-buy form, a final-order form and an expectation-form at the central table. Commodities purchased as per their final-order form were put into a bag and handed to the participants along with the show-up fee. Table 1 shows that individuals assigned to the information group did not differ significantly in basic household characteristics from those in the control group.⁷

Consistent with prior work on gender differences in consumption preferences in developing countries, we observed that women preferred the food bundle (consisting of rice and salt) more than men. In contrast, men preferred education-related items such as pens and notebooks more. These findings indicate that there are gender-specific consumption preferences for these commodities, similar to studies for different choice sets in the past (Duflo, 2003; Van den Bold et al., 2013).

⁶ In the no-information group, while we did not explicitly tell participants that their intent-to-buy list would not be shared with their spouses, we did emphasize that their decisions were private and only known to them for the duration of the experiment. This has some implications for whether our experiment can capture strategic hiding of preferences between spouses, the fact that their decisions would be revealed to each other after the experiment concludes suggests that spouses may not be able to effectively hide information about their preferences in the no-information group. This is a limitation of our experiment, and we are grateful to an anonymous referees for highlighting this.

⁷ Results of t-test for equality of means between these two groups show the absence of statistically significant differences for the characteristics under consideration. We also collected measures of subjective well-being, happiness, risk aversion, and impatience. Of these, only data on risk aversion were used in further analyses owing to superior data reliability of these measures. This is on account of poor comprehension of the survey questions, since this component was not pre-tested with a rural sample.

Table 1 Randomization and balanced table

	Mean ^b		T statistics (<i>p</i> value)	Observations
	Control group (<i>N</i> = 258)	Treatment group (<i>N</i> = 204)		
Age	46.1	44.45	0.953 (0.342)	402
Household size	3.63	3.85	− 1.139 (0.256)	399
Years of education	5.74	6.12	− 0.786 (0.433)	298
High risk aversion ^a	0.857	0.789	1.702 (0.089)	376
Caste identity	226	177	0.494 ^c (0.482)	391
			Pearson Chi-squared	
Scheduled caste	33	32	0.41	67
Other backward castes	181	145	0.22	314

^aResponse to a hypothetical lottery question: choice between option 1 that guarantees you an income of INR 50,000 per month (risk averse) and option 2: an equal chance of receiving either INR 100,000 per month or INR 25,000 per month, depending on how lucky you are (risk-loving). The limitation of this measure is that players who are only slightly risk averse may prefer the lottery over the guaranteed income, since the risk-premium may be large enough to compensate them for taking the risk

^bAdjusted for cluster at household level

^cPearson Chi-square; Chi-square was not used for Scheduled Tribe and Other Caste since expected cell values were below five (McHugh, 2013)

3 Empirical framework

The bargaining outcome for each individual is interpreted as deviation from the initial intended choice from the final consumption for each of the eight commodities. The experimental data were constructed in the panel format where each individual had eight decision-nodes ($462 \times 8 = 3696$), along with their demographic variables and treatment group. The deviation ranges between $[-50, 50]$. The lowest extreme value of the variable for a commodity indicates that the individual changed his or her initial preference of spending the whole amount on that commodity completely and did not buy it at all. Zero value of the deviation indicated that individuals continued with their initial preferences for a particular commodity. If an individual had no intention-to-buy a particular commodity but finally placed an order for it worth INR 50, the deviation indicator takes the value 50. All the interim values are feasible. In order to control for price effects, we also computed the same measures for quantities purchased at the intention, final order, and expectation stages of the experiment. To test if choices were made randomly and test for incentive compatibility, we provide a quantile plot (Figure A.1).⁸

Table A.1 in the Supplementary appendix summarizes the experimental outcomes by commodity. These are the intention-to-spend (purchase allocation and

⁸ We show that allocation choices were not random by plotting the allocation decisions (Intent and Final) against a discrete uniform distribution using quantile plots. The graphs show that allocations choice across commodities are not equally distributed or equally likely across allocation amounts.

quantities), final allocation (purchase allocation and quantities), deviation between final and intention-to-spend (purchase allocation and quantities), absolute values of deviations, and the difference between the expectation of spouses' final allocation and their actual allocation (difference (E)). Each of these are defined in the note to Table A.1. We find no significant differences (except for pen and soap) between the information and no-information group on these outcomes across commodities separately.

We use a simple OLS model to test whether information on spousal preferences induces some coordination as measured by the asymmetry between beliefs and final allocations as well as the difference between final allocations and intent-to-buy. The reduced form model is estimated as

$$|\text{Expect}_i - \text{Intent}_{-i}| = \alpha + \beta_1 \pi_i + \beta_2 \pi_i \times \text{Intent}_{-i} + \beta_3 X_i + V_i + \varepsilon_{ij} \quad (1)$$

$$|\text{Final}_i - \text{Intent}_i| = \alpha + \beta_1 \pi_i + \beta_2 \pi_i \times \text{Gender}_i + \beta_3 \text{Gender}_i \beta_4 X_i + V_i + \varepsilon_{ij} \quad (2)$$

We are specifically interested in two experimental outcomes as defined in Table A.1: the absolute difference between expectations and intent-to-buy of their spouse ($|\text{Expect}_i - \text{Intent}_{-i}|$) and differences in purchase allocations from intent-to-buy ($|\text{Final}_i - \text{Intent}_i|$). The outcomes of interest for the i th participant are averaged across all commodities, π_i is a dummy variable that takes a value of one if the participant belonged to the full-information group, and zero if belonging to the no-information group. In the first specification (Eq. 1), we include an interaction term with spousal intent-to-buy (denoted by Intent_{-i}) and run these separately for husbands and wives. In the second specification (Eq. 2), we also include an interaction term with gender (denoted by Gender_i). Individual and household characteristics (age, squared age, years of education, household size, and risk preferences) enter through a linear term X_i across both specifications. V_i is the village fixed effect.

The interaction effect is of particular interest as it will tell us whether coordination is different by gender (i.e., whether wives coordinate more or less than their husbands. We hypothesize that gender may mediate how information affects experimental outcomes via at least two channels: first, husbands may have better information of wives' preferences than wives' have on husbands. Second, it could be that wives are responding to the information provided as if they were taking orders from their husbands (consistent with them being aware that the choice they make in the lab is exposed to their spouse, and thus possibly reflecting what they expect to happen outside the lab).

If information on spousal consumption choices matter, then we expect to see better predictions (correct guesses) of the purchase order of their spouse. In line with work on relative bargaining power within the household (Basu, 2006), men may expect their wives agree with their stated consumption choices (Ambler et al., 2019; Castilla et al., 2022), while women in a weaker bargaining position may not (i.e., men report low, or zero deviations having observed their wives' intent-to-buy, signaling their superior bargaining position).

Finally, in the absence of communication and information about spousal consumption choices, individuals may have formed beliefs about their partners' final

choices and would have aligned their choices accordingly. If expectations about their partner's final order are well accounted in the initial preferences by the individual, he/she may not change his/her preferences while placing the final order for the commodities, resulting in no deviations from intent-to-buy choices.⁹ Among couples who had information on spousal preferences, we test whether the difference between final allocations and their own intent-to-buy are indeed anchored to their spouse's intentions.

4 Results and discussion

4.1 Gendered misperceptions in beliefs

Using data from the no-information group alone, we find that participants are not perfectly able to predict their spouse's final allocations. On average, the absolute value of the difference between expected allocation amount and final allocation is 4.36, which is statistically significantly different from 0 ($t = 30.47$; p value < 0.01). In terms of gender differences, we find that this difference is significantly higher for men (4.56) than for women (4.17) in the no-information group ($t = -1.39$, $p_{\text{lower}} = 0.08$). This is in line with findings from Afzal et al. (2022), who show that men often incorrectly guess their spouses' choices. Our finding suggests that men have less information on their spouse's preference a priori, which indicate intra-household inequalities with potential downstream consequences for behavior.

Results in Table 2 show that information on spousal preferences significantly affects men's beliefs about how their spouse will allocate endowments across commodities. The key dependent variable here is the individual belief about partners' consumption choice minus the *actual* choice made by the partner, presented in absolute terms and averaged across commodities. The treatment effect shows that information reduced the absolute difference between expected allocation and final allocations by 1.35 on average for men. There is no corresponding effect that we find for women, suggesting that beliefs about spousal consumption choices differ significantly between men and women. Columns 3 and 4 report the results without the interaction term of treatment and spouse's intent-to-buy. Here, we find a statistically significant treatment effect of information provision for both men and women—information provision reduced gendered beliefs significantly, but more so for men.¹⁰

⁹ As Munro (2017) suggests, this could be on account of 'unspecified circumstances' that imply some prior knowledge or experience that are unobservable to the experimenter. This is explored further when we discuss the results.

¹⁰ There could also be other explanations (beyond bargaining theory) for this finding. For example, there is work that suggests gender differences in the ability of individuals to understand another's thoughts, intentions, and emotions (Adenzato et al., 2017). Given that men seem less informed but willing to change their behavior in response to information, it is possible that such behavior lines up with studies that explore the theory of mind (ToM) when monetary incentives are present (Ridinger and McBride 2015).

Table 2 Effect of information on difference between beliefs and final allocations

Variables	(1)	(2)	(3)	(4)
	Female	Male	Female	Male
Information	-0.198 (0.806)	-1.357* (0.698)	-0.875*** (0.314)	-1.104*** (0.325)
Information × spouse intent-to-buy	-0.0473 (0.0489)	0.0160 (0.0391)		
Constant	4.501** (1.888)	4.241* (2.325)	4.860*** (1.856)	4.262* (2.323)
Observations	231	231	231	231
R-squared	0.117	0.106	0.113	0.105

Results of OLS estimations of average absolute difference between spousal expectations and final allocations on treatment presented in columns 1–4 by gender. All estimations included additional controls of age, squared-age, years of education, household size, social group, risk preferences, and household monthly per capita consumption expenditure and are run at the participant level. Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3 Differences between final and intent-to-buy

Variables	(1)	(2)
	Absolute difference	Average of Abs Diff
Information	0.101 (0.292)	0.101 (0.296)
Female	0.275 (0.261)	0.275 (0.264)
Information × female	0.0166 (0.356)	0.0166 (0.361)
Constant	-0.947 (1.172)	-0.843 (1.176)
Observations	3,696	462
R-squared	0.030	0.057

Dependent variable in column 1 is the absolute value of the difference between participant's final allocation and their own intent-to-buy, estimated for each commodity. Dependent variable in column 2 is the average of the absolute value of the difference between final allocation and intent-to-buy across all commodities. Estimation in Column 2 is run at the individual level with household fixed effects. All estimations included additional controls of age, squared-age, years of education, household size, social group, risk preferences, and household monthly per capita consumption expenditure. Estimation in column 1 also includes commodity fixed effects. Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3 tests whether information results in a change between the final allocation and intent-to-buy (individual purchase decisions). Here, the unit of observation is the absolute value of the difference between each participant's intent-to-buy and final allocation. We find no statistically significant effect of information on individual purchase decisions. We also run this estimation separately for men and women and find that the effect of information on absolute differences between final allocations and intent-to-buy is not statistically significant, suggesting that information provision does not influence final purchase decisions. One explanation for this is that information on spousal preferences may be endogenized (as new information within

Table 4 Role of intent-to-buy of spouse in purchase allocations (treatment group only)

Variables	(1) Female	(2) Male
Spousal preference (intent-to-buy)	-0.0629 (0.0417)	-0.000343 (0.0323)
Constant	1.152* (0.601)	0.0389 (0.574)
Observations	816	816
R-squared	0.036	0.019

Dependent variable is the difference between participant's final allocation and their own intent-to-buy, estimated for each commodity. All estimations included additional controls of age, squared-age, years of education, household size, social group, risk preferences, and household monthly per capita consumption expenditure and commodity fixed effects. Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

the lab does not affect allocations significantly) or down to 'unspecified circumstances' that can only be covered with more exhaustive experimentation (Munro, 2017). It is also plausible that the lack of treatment effect is on account of the protocol that generates bargaining in different spheres or merely reflects coordination between participants and their spouses.¹¹

4.2 Coordination between spouses and gender differences

Finally, we use data from information group participants only to check whether changes in purchase decisions vary by the intent-to-buy of the spouse (Table 4). For example, if a participant observes that their spouse is already purchasing a particular commodity, they might coordinate to choose similarly or differently, varying by their individual preferences. We find no statistically significant impact of the intention of the spouse, but there is a small negative coefficient for women (which is zero for men). This implies that initial stated spousal preferences appear to have no quantifiable change on final purchase decisions. We also report additional robustness checks on a range of experimental outcomes in the appendices (Tables A.2–A.4). This suggests that there is no gender difference in how spouses might coordinate to maximize household efficiency when each others' consumption choices are known.

5 Concluding remarks

Using a real allocation task with real married couples from rural India in a lab-in-the-field experiment, we are able to show that information on spousal preferences significantly changes expectations of spousal allocation, but not actual decisions. Our paper is thus able to comment on how married couples may have differing

¹¹ We are grateful to an anonymous referee for suggesting this.

beliefs over spousal consumption choices. Furthermore, we find no evidence that men and women coordinate differently with regard to consumption choices when presented with information about each others' preferences. Our findings are, however, in line with the overall ambiguous effect of information-sharing documented in the literature by Munro (2017).

This study was not without limitations. For example, it is possible that there was some leakage of experimental protocol within the village, which could explain why information on spousal preferences did not significantly affect final allocations. However, since only invited married couples could take part in the experiment, such spillovers are not likely to have substantially affected participant behavior in the lab. Furthermore, we did not gather accurate or reliable data on existing intra-household decision-making between men and women as well as any other measures of information on spousal preferences that may exist outside the lab. Including such data in the analysis may help better describe channels through which these effects operate within the household. Finally, the design of the experiment does not allow for strategic hiding of preferences (as couples will likely not be able to hide their final decisions at the end of the experiment) and also masks *how* coordination between husbands and wives takes place. If both wives and husbands know this, then wives responding to husbands' stated preferences but not vice versa is the best way to solve the coordination conundrum.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s40881-023-00148-0>.

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Author contributions Conceptualization: AT, HK; methodology: AT, SK, HK; formal analysis and investigation: SK, AT; writing—original draft preparation: AT, SK; writing—review and editing: HK, AT; funding acquisition: AT; resources: AT, HK, SK; supervision: AT, HK.

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Availability of data, code and material All data associated with this paper are available at <https://www.pep-net.org/datasets-pieri-12792>. Code associated with this paper is available at <https://osf.io/3b475/>. All material are available in the appendix.

Declarations

Conflict of interest The authors declare no conflict of interest.

Ethics approval This study received ethics approval from an accredited Institutional Review Board (IRB) prior to commencement.

Consent to participate All the participants in this research study provided written informed consent prior to participation. A copy of the consent form is available in the supplementary material.

References

- Adenzato, M., Brambilla, M., Manenti, R., De Lucia, L., Trojano, L., Garofalo, S., Enrici, I., & Cotelli, M. (2017). Gender differences in cognitive theory of mind revealed by transcranial direct current stimulation on medial prefrontal cortex. *Scientific Reports*, 7(1), 41219. <https://doi.org/10.1038/srep41219>
- Afzal, U., D'Adda, G., Fafchamps, M., & Said, F. (2022). Intra-household consumption allocation and demand for agency: A triple experimental investigation. *American Economic Journal: Applied Economics*, 14(3), 400–444. <https://doi.org/10.1257/app.20200672>
- Ambler, K., Doss, C., Kieran, C., & Passarelli, S. (2019). He says, she says: Spousal disagreement in survey measures of bargaining power. *Economic Development and Cultural Change*. <https://doi.org/10.1086/703082>
- Ashraf, N. (2009). Spousal control and intra-household decision making: An experimental study in the Philippines. *American Economic Review*, 99(4), 1245–1277. <https://doi.org/10.1257/aer.99.4.1245>
- Augsburg, B., Malde, B., Olorenshaw, H., & Wahhaj, Z. (2023). To invest or not to invest in sanitation: The role of intra-household gender differences in perceptions and bargaining power. *Journal of Development Economics*, 162(November 2021), 103074. <https://doi.org/10.1016/j.jdeveco.2023.103074>
- Baland, J.-M., & Ziparo, R. (2018). Intra-household bargaining in poor countries. In S. Anderson, L. Beaman, & J.-P. Platteau (Eds.), *Towards gender equity in development* (pp. 70–96). Oxford University Press.
- Basu, K. (2006). Gender and say: A model of household behaviour with endogenously determined balance of power. *The Economic Journal*, 116(511), 558–580. <https://doi.org/10.1111/j.1468-0297.2006.01092.x>
- Beblo, M., & Beninger, D. (2016). Do husbands and wives pool their incomes? A couple experiment. *Review of Economics of the Household*. <https://doi.org/10.1007/s11150-016-9342-0>
- Browning, M., & Chiappori, P.-A. (1998). Efficient intra-household allocations: A general characterization and empirical tests. *Econometrica*, 66(6), 1241. <https://doi.org/10.2307/2999616>
- Castilla, C. (2019). What's yours is mine, and what's mine is mine: Field experiment on income concealment between spouses in India. *Journal of Development Economics*, 137(January 2017), 125–140. <https://doi.org/10.1016/j.jdeveco.2018.11.009>
- Castilla, C., Masuda, Y., & Zhang, W. (2022). Intra-household allocation, beliefs, and communication between spouses in Kenya. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4291607>
- Castilla, C., & Walker, T. (2013). Is ignorance bliss? The effect of asymmetric information between spouses on intra-household allocations. *American Economic Review*, 103(3), 263–268. <https://doi.org/10.1257/aer.103.3.263>
- Cochard, F., Couprie, H., & Hopfensitz, A. (2016). Do spouses cooperate? An experimental investigation. *Review of Economics of the Household*, 14(1), 1–26. <https://doi.org/10.1007/s11150-014-9276-3>
- Couprie, H., Cudeville, E., & Sofer, C. (2020). Efficiency versus gender roles and stereotypes: An experiment in domestic production. *Experimental Economics*, 23(1), 181–211. <https://doi.org/10.1007/s10683-019-09612-3>
- De Rock, B., Potoms, T., & Tommasi, D. (2022). Household responses to cash transfers. *Economic Development and Cultural Change*, 70(2), 625–652. <https://doi.org/10.1086/713539>
- Doepke, M., & Tertilt, M. (2019). Does female empowerment promote economic development? *Journal of Economic Growth*, 24(4), 309–343. <https://doi.org/10.1007/s10887-019-09172-4>
- Duflo, E. (2003). Grandmothers and granddaughters: Old-age pensions and intrahousehold allocation in South Africa. *The World Bank Economic Review*, 17(1), 1–25. <https://doi.org/10.1093/wber/lhg013>
- Fletschner, D., & Mesbah, D. (2011). Gender disparity in access to information: Do spouses share what they know? *World Development*, 39(8), 1422–1433. <https://doi.org/10.1016/j.worlddev.2010.12.014>
- Hoel, J. B. (2015). Heterogeneous households: A within-subject test of asymmetric information between spouses in Kenya. *Journal of Economic Behavior & Organization*, 118(October), 123–135. <https://doi.org/10.1016/j.jebo.2015.02.016>

- Iversen, V., Jackson, C., Kebede, B., Munro, A., & Verschoor, A. (2011). Do spouses realise cooperative gains? Experimental evidence from rural Uganda. *World Development*, 39(4), 569–578. <https://doi.org/10.1016/j.worlddev.2010.09.011>
- Jejeebhoy, S. J., & Sathar, Z. A. (2001). Women's autonomy in India and Pakistan: The influence of religion and region. *Population and Development Review*, 27(4), 687–712. <https://doi.org/10.1111/j.1728-4457.2001.00687.x>
- Mani, A. (2011). Mine, yours or ours? The efficiency of household investment decisions: An experimental approach. 64. *CAGE Online Working Paper Series*. Coventry. <http://wrap.warwick.ac.uk/57668>.
- McHugh, M. L. (2013). The chi-square test of independence. *Biochemia Medica*, 23(2), 143–149. <http://www.ncbi.nlm.nih.gov/pubmed/23894860>.
- Munro, A. (2017). Intra-household experiments: A survey. *Journal of Economic Surveys*. <https://doi.org/10.1111/joes.12196>
- Munro, A., Kebede, B., Tarazona-Gomez, M., & Verschoor, A. (2014). Autonomy and efficiency: An experiment on household decisions in two regions of India. *Journal of the Japanese and International Economies*, 33, 114–133. <https://doi.org/10.1016/j.jjie.2013.10.009>
- Muthoo, A. (1992). Revocable commitment and sequential bargaining. *The Economic Journal*, 102(March), 378–387. <https://doi.org/10.2307/2234522>
- Muthoo, A. (1996). A bargaining model based on the commitment tactic. *Journal of Economic Theory*, 69(1), 134–152. <https://doi.org/10.1006/jeth.1996.0041>
- Ridinger, G., & McBride, M. (2015). Money affects theory of mind differently by gender." Edited by Nico W. Van Yperen. *PLoS ONE*, 10(12), e0143973. <https://doi.org/10.1371/journal.pone.0143973>
- Sarkar, S., & Bose, A. S. (2018). Partially altruistic choice in presence of consensus bias. *Journal of Quantitative Economics*, 16(3), 853–861. <https://doi.org/10.1007/s40953-018-0117-8>
- Van den Bold, M., Quisumbing, A. R., & Gillespie, S. (2013). Women's empowerment and nutrition: An evidence review. 01294. *IFPRI Discussion Paper*. IFPRI Discussion Paper. <https://doi.org/10.2139/ssrn.2343160>

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