

**What's Yours is Mine, and What's Mine is Mine:
Bargaining Power and Income Concealing between Spouses in India**

Carolina Castilla¹

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PRELIMINARY AND INCOMPLETE

Abstract:

Hiding of income had become an increasingly relevant concern when designing development policy as empirical studies continue to observe this behavior. In this paper I develop a model that allows me to derive empirically testable hypotheses to explain whether bargaining power affects income hiding. The model results indicate that there exists a strictly positive threshold level of bargaining power that needs to be overcome in order to induce revelation of unobserved resources. This hypothesis is tested through a field experiment in India where individuals in established marriages were asked to play several rounds of an ultimatum game where bargaining power and information were experimentally varied. Results indicate men are more cooperative than women: they are both more likely to reveal unobserved resources and to allocate them towards the household account. However, a spouse that chooses to conceal contributes significantly less towards the household account relative to spouses in the private information treatment.

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¹ *Corresponding author:* Carolina Castilla. *Postal Address:* 13 Oak Drive, Hamilton, NY 13346. *Email:* ccastilla@colgate.edu. *Acknowledgments:* The author would like to thank Ayush Pant for excellent research assistance in the field; and Takao Kato, Benjamin Anderson, Jeff Baldani for feedback on the experimental design. The survey and experiments were supported by grants from Colgate University.

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1. Introduction

The allocation of resources within the household has historically been viewed as either the result of a single household member (unitary or common preference model) or the result of a cooperative decision among the collective of household members. It is often argued that, because families involve long-term, repeated interactions and caring, households will realize opportunities for Pareto improvement and thus households will eventually reach efficient allocations (see Browning et al., (2008) for a review of the literature on the subject). However, recent empirical evidence has documented non-cooperative behavior as a result of asymmetric information among households with migrants (Chen (2009); de Laat (2009)), as well as among households living under the same roof whether they are subject to asymmetric information or not (Boozer et al. (2009); Ashraf, (2009); Castilla & Walker (2013; 2014); Robinson (2011); Schaner (2012; 2013); Kinnan (2012); Mani (2011)). Ashraf (2009) examines whether spouses would conceal savings by varying the information environment. She finds that hiding occurs when information over the husband's expenditure choices or outcomes are kept private, however, she is unable to document whether hiding results in underinvestment in household public goods. Household public goods can be thought of as those that benefit all members independently of

who provides them, for instance investment in children's human capital, such as education and health, provides welfare to both spouses even if it is the mother that makes sure her child gets the proper nutrition. Further, bargaining power (or the influence each spouse has over how money is allocated) depends on both, the amount of resources of each spouse, and on cultural norms and socio-economic characteristics. Anderson and Eswaran, (2009) find that the influence of additional resources on bargaining power of women is small compared to idiosyncratic or cultural sources of bargaining power in Bangladesh.

There has been an increasing interest in examining intra-household decision making using experiments in recent years. These experiments can be classified in three different categories: experiments interested in testing across household models (Kebede et al. (2011); Munro et al. (2008); Munro et al. (2011)); experiments interested in testing across spousal preferences within the household (Bateman & Munro (2005); Cochard et al. (2009); Dasgupta and Mani, (2013); Carlsson et al. (2012)), and dictator games (Hoel, (2013); Iversen et al. (2011)). Mani (2013) is the most similar to the present research. She conducted field experiments among established couples in Andhra Pradesh, India. The goal of her experiments was to test whether information and control over resources yields inefficient allocations. Her results indicate that spouses are willing to trade control for efficiency, but she does not find evidence that information matters. Mani's experiments and mine differ (among other things) in the timing of the information treatment: while she varies the information given to spouses over the way resources were allocated ex-post, I vary the pre-allocation information environment. In contrast, I find significant differences in allocations across information treatments. The model I present can be used as a general way to interpret the differences in the effect of asymmetric information across results from field experiments across countries and cultures.

In this paper I examine the possibility of partial cooperation, where spouses are cooperative with respect to the allocation of observable income, but not necessarily with respect to unobservable income. For instance, when the one spouse receives a monetary transfer that is unobservable to his or her spouse, she faces a trade-off between keeping it, or letting her spouse know about the transfer. If she discloses the unobservable resources, she can increase her bargaining power such that allocations would tend to be more favorable towards her. Depending on the responsiveness of bargaining power to the revelation of additional income, she could choose to allocate the unobservable resources at her discretion, without having to bargain with her spouse. If this is the case, and the spouse does not wish to inform his husband or wife about the existence of additional resources, she would have to allocate the unobservable income towards goods that are not easily monitored. Thus, in deciding to reveal or hide income, the spouse with the information advantage faces a trade-off between increasing her own discretionary spending and increasing her bargaining power. When culture overweighs that spouse's share of total household resources there are less incentives to reveal as bargaining power will be less responsive. However, if she did not have to restrict the goods she purchases they both could be made better off.

This paper extends the literature by comparing intra-household allocations between household and private goods under three different information environments, one of which allows one spouse to choose to conceal income from his or her spouse. I examine the interaction between private information regarding monetary transfers and the distribution of bargaining power between spouses as causes of income-hiding and underinvestment in household public goods. I start by modeling the household allocation decisions in two stages: first, the spouse with less bargaining power receives a monetary transfer and decides whether to hide or reveal it. In

the second stage, spouses bargain over how to allocate the sum of their observable resources between private and public good consumption. The model results show there is a threshold change in bargaining power that needs to be overcome to induce revelation. In order for bargaining power to not respond significantly enough to overcome this threshold, there must be other sources of bargaining power that do not respond to monetary incentives, such as cultural norms. To examine this hypothesis, I conduct laboratory experiments in the field with established couples in India where both bargaining power and information over monetary transfers are exogenously determined.

The field experiment and survey were conducted in Dehradun and Almora districts, in the mountain region of Uttarakhand State, in India among 200 married couples, 100 couples in each location. Dehradun and Almora differ in the cultural norms that determine women's bargaining power in the household. Both Dehradun and Almora are patriarchal societies that at the same time exhibit differences in the decision making power of women. Since both locations are close to each other and in the same state, other socioeconomic conditions are very similar allowing me to examine the effect of cultural sources of bargaining power. The goal of the experiments is to contrast the results of a laboratory experiment in the field across two societies with different cultural sources of bargaining power for women, as well as where monetary bargaining power and information over monetary transfers were exogenously varied in the experimental design.

The experiment consisted of an ultimatum game where spouses were taken into separate rooms, not allowed to communicate, and given a significant endowment (equivalent to one day's wage each) to distribute between three alternatives: (i) their private account, (ii) their spouse's account, and (iii) a joint "household" account. The joint account represents the household public good and thus expenditures in children, food, etc. The money in the joint account is increased by

50% and divided 50 -50, such that investing in the joint account is wealth maximizing for the household, but not privately. There were 2 sets of treatments implemented jointly: the information and the bargaining-power treatment. The total household endowment (sum of both spouses' endowments) and the distribution of that endowment between spouses varied across 7 rounds. By doing so, variation in the distribution of bargaining power within the experimental environment is allowed; where the share of the total amount of endowments measures the monetary source of bargaining power. The variation in the cultural source of bargaining power comes from variation across districts in the decisions made by women obtained through a set of survey questions. The information treatment was implemented as the possibility to receive some additional resources through a lottery. One randomly chosen spouse received an additional transfer with a 50% probability. The observability of this transfer by the other spouse was randomly varied by the experimenter. There were 3 information treatments: (i) complete information, where the availability and amount of the transfer was informed to both spouses; (ii) private information, where the availability and amount of the transfer was kept private from the non-recipient spouse, (iii) private-with-option-to-disclose treatment, where the recipient of the transfer had the option to disclose or conceal the transfer from his or her spouse.

The experimental results indicate that asymmetric information over money results in inefficient allocations as it decreases the amount contributed towards the household good, which is household-welfare maximizing. Further, when a spouse has private information over money, the contribution towards the household good decreases whether the spouse chooses to conceal or does not have the option, suggesting there is no compensation in contributions in response to non-cooperative behavior. These results are robust across genders. The contribution towards the household good is increasing in spouses' own share of endowments increases. However, a

spouse that chooses to conceal, who is less cooperative as a result, contributes significantly less towards the household account relative to spouses in the private information treatment. Finally, I find that men are more cooperative than women among those who choose to reveal the lottery outcome, and this is driven by men in Dehradun. The results are consistent with the theoretical model.

2. Incentives to Hide Income: Theoretical Framework

Consider a household with two family members, the wife (f) and the husband (m). Both family members have preferences over consumption of one private (or personal) good, denoted x_i , and one household public good, Q . The household resource allocation decision is made in two stages. In the first stage the husband receives two forms of income, Y_m which is common knowledge to both spouses and T which is not observed by his wife, while the wife receives Y_f which is also common knowledge. For simplicity, it is assumed that T and the husband's private consumption choices are observable with probability zero by his wife, she does not invest in monitoring m 's income², and f can infer the presence of additional income through the public good allocation, which is perfectly observable. Therefore, asymmetric information over income is introduced by allowing a portion of spouse m 's income (T) to be unknown by the wife. We can think about this as being a result of the allocation of labor hours towards farming two different plots of land which vary in the degree of the wife's ability to monitor production. The husband distributes the total number of hours he allocates towards productive activities between working in plots whose

² This assumption is not trivial, but it can be justified if the opportunity cost of spending time monitoring her husband's plot is too high relative to spending time in productive activities of her own, such as working his own land. The model can be extended to incorporate both time allocation decisions and a cost of monitoring.

yields can be easily monitored by his wife, such as plots they farm jointly or that are owned by her family, and plots where income is not easily monitored, such as those farmed by the husband alone or the ones that are located further away from their house.

Both family members face the same price for private goods which is normalized to 1, and p is the price for the household good. Preferences over own consumption are represented by a utility function, U_i which is assumed to be separable in x_i and Q :

$$U_i = U(Q, x_i) = u(x_i) + v(Q) \quad \text{for } i = f, m \quad (1)$$

The functions $u(\cdot)$ and $v(\cdot)$ satisfy the standard assumptions that $u' > 0$, $v' > 0$, $u'' < 0$, $v'' < 0$, and $u'(0) = \infty$. $v'(0) = \infty$, implying x_i and Q are normal goods. Both spouses have the same functional form for simplicity, though differ in the private goods they prefer, such that $x_f \neq x_m$. The household public goods are assumed to be non-rival in utility, so they are of the Samuelson type. For instance, a clean house provides utility to both members of the household, while food provides utility only to the person who consumes it.

To derive the equilibrium allocations that result when spouses bargain over household and private consumption, I draw from the Browning and Chiappori (1998) collective bargaining model, where it is assumed they can negotiate binding agreements with zero transaction costs. The cooperative bargaining equilibrium is solved by backwards induction, so first I find the optimal public good allocation and private expenditure shares conditional on the amount of income that is revealed, and then derive the conditions that must be met for spouse m to reveal the transfer. In the second stage, following Browning, Chiappori and Weiss (2011) the objective function of the collective household is the bargaining power weighted sum of each member's utility:

$$C = \mu\{u(x_m) + v(Q)\} + (1 - \mu)\{u(x_f) + v(Q)\} \quad (2)$$

Where $\mu = \mu(Y_f, Y_m, I, z)$ is the bargaining power of spouse m and $(1 - \mu(Y_f, Y_m, I, z))$ is the bargaining power of spouse f . This is the weight given to each spouse's utility in the household welfare function when bargaining, and it is partially determined by each spouse's income (which influences outside options), as well as distribution factors³ (z) such as resources originally brought into the marriage and cultural norms on gender roles. The unobservable income only influences bargaining power when it is disclosed, such that $I = T$ if spouse m reveals, and $I = 0$ if he hides. I do not specify a functional form for μ in order to avoid making further assumptions about the relative influence additional resources would have over other factors that contribute to determine bargaining power, but are unaffected by changes in the quantity of resources. Thus, the bargaining weight is used as a generic way to incorporate the existence of an outside option if spouses fail to reach a bargaining agreement (threat point). Consistent with both non-cooperative equilibria within marriage, as well as divorce threat points, income increases spouse m 's bargaining power.

The household's problem when income is fully revealed is to maximize (2) subject to the aggregate budget constraint $x_f + x_m + pQ \leq Y_f + Y_m + I$. This is solved assuming the participation constraints do not bind, i.e. assuming that both spouses are better off cooperating than under the threat points⁴.

$$\max_{Q, x_m \geq 0} \quad \mu(Y_f, Y_m, T, z)\{u(x_m) + v(Q)\} + (1 - \mu(Y_f, Y_m, T, z))\{u(Y_f + Y_m + T - x_m - pQ) + v(Q)\} \quad (3)$$

The Kuhn-Tucker first-order conditions of the problem in (4) are:

³ Any variable that has an impact on the decision process but affects neither preferences nor budget constraints is termed a distribution factor. In theory, a large number of variables fit this description. Factors influencing divorce, either directly (for example, the legislation governing divorce settlements and alimony payments) or indirectly (for example, the probability of remarriage, which itself depends on the number of available potential mates – what Becker calls marriage market factors (Browning, Chiappori and Weiss, 2011)).

⁴ This is not a strong assumption given that spouses are bargaining over all allocations, such that the public good provision will be efficient (at least when all income is revealed).

$$\frac{\partial c}{\partial Q} = v'(Q) - (1 - \mu)pu'(Y_f + Y_m + T - x_m - pQ) \leq 0$$

$$\frac{\partial c}{\partial x_m} = \mu u'(x_m) - (1 - \mu)u'(Y_f + Y_m + T - x_m - pQ) \leq 0$$

$$Q \left[\frac{\partial c}{\partial Q} \right] = 0; x_m \left[\frac{\partial c}{\partial x_m} \right] = 0; Q, x_f \geq 0 \quad (4)$$

Solving this system yields the demand for the household public good and the demand for private consumption. The optimal demands respond to changes in aggregate income (i.e. income pooling feature) and to changes in individual income through its resulting changes in bargaining power.

Proposition 1: *In equilibrium:*

$$\text{Case (i): If } T \text{ is revealed, } \frac{\partial Q}{\partial Y_f} = \frac{\partial Q}{\partial Y_m} = \frac{\partial Q}{\partial T} > 0, \frac{\partial x_m}{\partial Y_f} = \frac{\partial x_m}{\partial Y_m} = \frac{\partial x_m}{\partial T} > 0, \text{ and } \frac{\partial x_f}{\partial Y_f} = \frac{\partial x_f}{\partial Y_m} = \frac{\partial x_f}{\partial T} \leq 0$$

$$\text{Case (ii) If } T \text{ is not revealed, } \frac{\partial Q}{\partial Y_f} = \frac{\partial Q}{\partial Y_m} > 0, \frac{\partial x_m}{\partial Y_f} = \frac{\partial x_m}{\partial Y_m} > 0, \text{ and } \frac{\partial x_f}{\partial Y_f} = \frac{\partial x_f}{\partial Y_m} \geq \leq 0 \text{ and } \frac{\partial Q}{\partial T} =$$

$$\frac{\partial x_f}{\partial T} = 0, \frac{\partial x_m}{\partial T} > 0.$$

When spouse m hides his unobservable income, in order to avoid detection he must allocate it all towards private consumption which is not monitored by the wife. Spouses bargain over household and private consumption given only the resources that are common knowledge, i.e. $Y = Y_f + Y_m$, such that household good consumption and spouse f 's private consumption does not respond to changes in T . In the first stage, the husband must decide whether to reveal the unobservable income or to hide it from his wife. If he hides, he can get more private expenditure relative to the case where he reveals and pools all of his resources. If he reveals, he can increase his household good consumption and bargaining power, but both his private and household good consumption will be effectively taxed by bargaining power.

Proposition 2: *Given Y_f , Y_m and T , there exists a strictly positive threshold change in bargaining power $\bar{\Delta\mu}$ such that for any $\frac{\partial\mu}{\partial T} < \bar{\Delta\mu}$ spouse m has incentives to hide*

Corollary 1: *Given Y_f , Y_m and T , as μ approaches zero, the threshold level of bargaining power $\bar{\Delta\mu}$ is strictly negative, whereas when μ tends to 1 it is positive.*

In Proposition 2, the husband compares the change in utility per unit change in T when he reveals and when he hides. In equilibrium, there exists a strictly positive threshold change in bargaining power needed to induce revelation. Corollary 1 indicates that the threshold level of bargaining power is increasing in initial bargaining power, implying that the threshold is more difficult to overcome as initial bargaining power increases. The result is intuitive because if spouse m 's bargaining power is low, he is less likely to influence household allocations towards his preferences and thus his private consumption is “taxed” more severely, but at the same time, any increase in bargaining power makes him significantly better off. Conversely, when bargaining power is high, the public good allocation is going to be close to what he prefers, thus on the margin the benefit per unit of income of revelation is not as high.

3. Experimental Design

Setting:

The experiment was conducted Dehradun and Almora districts, in Uttarakhand, India between and June 2012. These two districts are similar in geographical and economic characteristics, but

differ in the cultural view of women's decision-making roles. Dehradun is a patriarchal society, while in Ranikhet women have more bargaining power. The sample consists of 200 established couples, half from Dehradun and the other half from Ranikhet.

In Deharadun District, the experiments were run in 9 villages of the Sahaspur block of Vikasnagar tehsil. These villages were Shankerpur-Hakumatpur, Kainchi-wala, Dhoomnagar, Ramsawala-Abdullapur, Julo, Jagatpur Khadar, Sabbhawala, Bhauwala- Bhagwanpur and Rajawala⁵. The society is largely patriarchal across villages, communities and religions. The head of the household is usually the most senior male member. Men are responsible for working for cash, and women are rarely allowed to find employment outside the household. In the richer households, men usually run their own businesses, other than agriculture (such as cattle-rearing, shops, flour mills, transportation, etc.). Such households own large pieces of lands and agricultural incomes form a significant share of their total incomes. In some other middle to higher middle-income class families, men might also be involved in government services. Some of the younger men also work as industry workers in Selaqui. Among the poorer households, men work as casual labor in neighboring villages, usually in construction or as field laborer during harvest season.

Women are mostly involved in household chores and child rearing. However, majority of the women also work in the fields and contribute significantly to cattle rearing. While both may add income to the household, they are not typically woman's personal income. Men are usually involved in the purchase of the inputs and the transportation of the produce (so that they

⁵ Shankerpur, Kainchiwala and Sabbhawala are three of the biggest villages in the region but have significantly different profiles from each other. Shankerpur and Sabbhawala accommodate people from different religious and cultural backgrounds, while Kainchiwala is predominantly occupied by Himachalis. Majority of the people in these regions are Hindus. The poorer families in these villages usually stay in mud and thatch houses and cultivate on community land and dried up riverbeds. The richer households own acres of land and usually run one or two side businesses as well. Julo and Dhoomnagar are the smaller of these villages. Ramsawala-Abdullapur is a predominantly Islamic area with around 90% of the population being Muslim. Garhwalis usually populate the remaining villages.

ultimately receive the income), and assist their wives in these activities. It is for this reason that most women claim to earn no income despite active participation in household economic activities. Those women that work for income are not allowed to leave the premises of the village. They either run small businesses from home (such as tailoring and small departmental stores) or work as assistants in government primary schools.

In Almora District, the experiment was run in select 8 villages in Tarikhet block of Ranikhet tehsil in the Kumaoni ranges of the Himalayan mountains in the state of Uttarakhand. The villages were Chaukuni, Kalona, Mauna, Moan, Mangchawda, Banoliya, Biswa, and Khadi Bazaar⁶. In principle, the society is patriarchal even in this region. Yet, it masks a more complex household arrangement than what appears at first sight. The villages are small and there is hardly any scope for employment within the same village (except for casual work such as masonry or field labor during harvest season but these are seasonal in nature). Even the cities nearby offer only limited job opportunities because the cities are small and there are usually no industries. This motivates men to move out of their homes in search of employment or government jobs (since women are not expected to work outside their homes). Those who do move to the cities or are hired into permanent government jobs (for example as army-men, clerks, etc.) are only able to return to their homes during holidays or weekends. This makes women the sole financial managers of the household. Men “hand over” their entire income to their wives and trust them to make the correct savings-expenditure decisions. In fact women take active part in financial decision-making even in those households where husbands don't work outside of their homes.

⁶ Ranikhet is located at an altitude of 6,132 feet above sea level. It is a commercial tourism center with a number of villages in the suburban areas surrounding the main city. Chaukuni is the closest village to the city and has relatively higher standards of living as compared to neighboring villages. It is also one of the bigger villages in the area. However, villages in the mountains are significantly smaller than in plains in terms of the total area. The village community is close-knit and individuals usually assist each other in various chores. Mostly Hindu Kumaonis reside in these villages. They usually belong to the particular social class called Thakurs. Thakurs have traditionally been farmers and cattle-rearers.

Moreover, only are women responsible for field work and cattle-rearing. These income sources are more likely the woman's personal income. However, one should not confuse this apparent financial independence of women with actual higher status of women. Women are subject to discrimination and subjugation within the household. Instances of domestic violence are believed to be higher in the mountainous regions. There are also instances of husbands "stealing" money for personal use saved by their wives. Moreover, social customs still require dowry to be given at a daughter's wedding and the celebration of a son's birth.

Originally recruiting was attempted by inviting spouses to attend experimental sessions in a specific location. This strategy was unsuccessful even after offering incentives to attend. As a result recruiting was done door-to-door⁷. Thus the sample is most similar to those used in laboratory experiments, and under the assumption that selection is not systematically different across treatments (and locations), internal validity can be attained.

Experimental Protocol and Tasks:

Enumerators knocked on the door, asked if both spouses were home and if they were willing to answer some questions about managing of household finances⁸. No information about potential earnings or that they would receive an LED lamp was provided prior to spouses agreeing to

⁷ Uttarakhand, and in particular the districts examined have not been subject to research participation previously, thus it is even harder to recruit. In Dehradun 1 in 40 households agreed to participate. In Ranikhet the response rate was similar, except for the first two villages where it was 1 in 4 households.

⁸ Enumerators first knocked on the door/call out someone if the door is open/ look for household members in the nearby fields or in the cowshed. When someone appeared they said the following: "Namastey aunty-ji/uncle-ji! We are members of the S.P.D. (Society of People for Development) that runs the paper factory and the dairy near the dried up river bed (in Shankarpur). [Include description of the kind of work that S.P.D. does in case they don't know] S.P.D. has received a new project on how couples make financial decisions within the household, and we are working on the same. We would like to ask you and your husband/wife a few questions about management of household finances. Do you have children aged between 3-18 years? Is your husband/wife at home right now? Are you willing to spare 30-45 minutes for our study?"

participate. Respondents were first asked if they had children aged 3 – 18 years old, and were only interviewed if they have children in this age range.

Three types of responses were observed: (1) Negative (including No/not interested/husband not available and is usually back late at night/husband will not be interested), in which case enumerators left; (2) I should consult with my spouse, in which case enumerators waited for spouse, explained the purpose and waited for an answer that could be positive, match (1) or (3); and (3) Husband/wife not available at home right now but will be available on (some particular day). For the last set of respondents, a preferred date and time was recorded when they could participate and enumerators returned at the set date and time.

Upon agreement to participate, each spouse was asked to join an enumerator of his or her own gender in separate rooms. First, spouses were asked to participate in a set of experiments and explained they could earn money depending on their choices. Later they answered a set of survey questions. Each household was randomly assigned to an information treatment: (i) complete, (ii) private or (iii) private with the option to reveal. The experimenter outlined the rules of the experiment and the tasks involved. Each spouse played two practice rounds, was encouraged to ask clarifying questions and experimenters verified the tasks were understood. In spontaneously offered feedback immediately after the practice rounds and after the game, no respondent said they had found the game unclear or confusing. Participants were presented with seven decisions, one-at-a-time; their decisions were recorded by two independent data entry staff, one per spouse. The order of tasks was randomly chosen to be either ascending or descending in Player A's share of the total household endowment. Each spouse was randomly assigned to a role, either A or B.

Participants' tasks involved playing a modified version of the ultimatum game using the strategy method. Spouses were first informed of their own (ω_i) and their spouse's (ω_j) endowment. The total household endowment (sum of both spouses' endowments) and the distribution of that endowment between spouses were varied across the 7 decisions. Player A was given the opportunity to play a lottery with 50% chance of winning 75 additional rupees. The spouse in role B was informed of the outcome of the lottery depending on the information treatment. After being informed of the lottery results, each spouse independently, privately and simultaneously made a proposal for the split of their share of the household endowment between three alternatives: (i) own personal account (x_i); (ii) spouse's account (x_j); and (iii) household account (g). The different accounts were put in context using examples of expenditures we had found through the pilot study (and field workers experience) to be in the personal or household expenditure categories⁹. The resources allocated towards the household account (public good) were multiplied by 1.5 and divided 50:50, whereas the resources in each spouse's private accounts were multiplied by 1. The experimenters with each spouse submitted the proposed split to each other and present the proposed splits one-at-a-time to the other spouse, who then decides whether to accept or reject them. No feedback was allowed as all offers were made initially by each spouse, without giving the other spouse the opportunity to accept or reject them before the next offer was made. After all decisions were made, each respondent rolled a die to determine which of the 7 decisions was paid¹⁰. At the end of the session experimental subjects answered a survey and then were informed privately of their own payoffs.

⁹ First, you can keep something for your personal expenses (like bangles, bindi, lipstick, clothing, etc.). Second, you can keep something for your husband's personal expenditure (for example bidhi, cigarette, tobacco, clothing, etc.). Lastly, you can keep something for the household expenses, which includes expenditure on children. This could include money for buying daily ration, vegetables, paying children's school fees and meeting other household demands.

¹⁰ If the die roll was equal to 1, the largest payment between decision 1 and 7 was paid.

Definition 1:

Players: Player A is eligible to win a lottery prize; Player B.

Actions or Strategies:

Stage 1: Player A's action space is contingent upon the information treatment. If in the Private-with-option-to-Disclose (*POD*) treatment, Player A decides whether to disclose (*D*) or conceal (*C*) the lottery prize in the event that she wins. If in the Complete (*CI*) or Private (*PI*) Information treatments, Player A does not have the option to choose what to do with the lottery prize. Thus Player A's action space is $a_1 \in \{D, C|T, H\}$ where $T \in \{CI, PI, POD\}$ and $H \in \{75, 0\}$ depending on the outcome of the coin toss (Heads = prize, and Tails = no prize). Player B does not make any decisions in this stage.

Stage 2: Player A's action space is $a_{A,2} \in \{x_A, x_B, g | \omega_A, \omega_B, a_1\}$ and Player B's action space is $a_{B,2} \in \{x_A, x_B, g | \omega_A, \omega_B, a_1\}$.

Stage 3: Player A's action space is $a_{A,3} \in \{A, R | \omega_A, \omega_B, a_1, a_{B,2}\}$ and Player B's action space is $a_{B,3} \in \{A, R | \omega_A, \omega_B, a_1, a_{A,2}\}$.

Payoffs: Were computed according to the following formula in the event of an accepted offer,

$\pi_i = x_i + (g) * \frac{1.5}{2}$,¹¹ or are equal to each spouse's endowment in the event of a rejected offer.

Steps were taken to minimize the threat for conflict between spouses after the experiment as a result of the concealing of information and/or the offers made. There was no feedback as spouses were proposing splits of their own endowments, such that they could not retaliate as a result of an aggressive, unfair or inconsiderate offer. To avoid spouses being able to trace the

¹¹ Where g = amount allocated towards common "household" account, and x_i =amount allocated to spouse's i private account.

money back to a decision that could cause conflict, the outcomes of the different decisions were kept private from both spouses unless they were chosen to be paid and each spouse rolled a different die such that they were not necessarily receiving payment for the same decision. All payments were made in private.

Experimental Treatments:

The experimental design consisted of 2 sets of treatments implemented jointly: (1) the information environment is a between-couple treatment, while (2) bargaining-power is a within-couple treatment. The information treatments are as follows:

Table 1: Information Treatments

Information Environment	Lottery Prize Eligible (Player A)	
	Wife	Husband
Private with option to Disclose (POD)	T1	T2
Private Information (PI)	T3	T4
Complete Information (CI)	T5	T6

Across all information treatments, Player A (lottery eligible spouse) flipped a coin. If heads, he or she won Rs. 75, if Tails Rs. 0. In all cases Player B knew there was a 50% probability that Player A got a Rs. 75 prize. In the POD treatment, Player A stated what he or she wanted to do (disclose or conceal) in the event of winning the additional rupees after flipping the coin. Player A was informed that if the prize was concealed it went directly into his or her private account and it was not be eligible to be considered in the allocation offer between the

three accounts. If the prize was revealed, it was eligible to be allocated between the three accounts, and his or her spouse would also be informed about it¹². The results from the coin toss stage conditional on Player A's decision to disclose or conceal the transfer were informed to the experimenter in Room B. In the Complete Information treatment, the experimenter in Room A, (where Player A was) gave the experimenter in Room B the results of the lotteries specifying the decisions for which Player A had additional money. In the Private Information treatment no information was given to Player B about the result of the lotteries.

Table 2: Distribution of Resources

Endowment (Player B – Player A) ^{1/}	Distribution of Resources ^{2/}				Change (%)	Household Endowment
	Without Lottery Prize		With Lottery Prize, If known or revealed			
	Player B	Player A	Player B	Player A		
255 - 45	85	15	68	32	17	300
150 - 75	67	33	50	50	17	225
195 - 105	65	35	52	48	13	300
150 -150	50	50	40	60	10	300
120 - 180	40	60	32	68	8	300
105 - 195	35	65	28	72	7	300
150 - 225	40	60	33	67	7	375

1/ Amounts in Indian Rupees.

2/ Percentages of total household endowment

¹² In addition, we will give you an opportunity to earn Rs.75 extra for each of the seven rounds. Note that this opportunity is not being given to your spouse. This will be done by a flip of a coin. If the coin-toss results in Heads, we will give you extra Rs.75 for that round. You will then have to make a decision on whether to reveal or conceal the amount from your husband. Revealing the result to your husband will allow you to make decision of a greater total amount (original + Rs.75), however, it also means your spouse will know that you are getting a greater share and he or she may/may not leave less for you in his personal decision. At the same time concealing the extra amount from your husband means that you will keep the entire amount for your personal expenses. You will not be able to allocate it to your husband or to the household. Think of this as some extra money you've earned during the day as bonus and now it is up to you whether you want to tell your spouse about it or hide it from him/her.

The bargaining power treatment consists of 7 different distributions of endowments between spouses. The total household endowment (sum of both spouses' endowments) and the distribution of that endowment between spouses were varied across the 7 decisions. The order of tasks was randomly chosen to be either ascending or descending in Player A's share of the total household endowment. The different bargaining power treatments allow for a ceteris-paribus comparison across information treatments, gender and endowment distributions of efficiency in allocation of resources in the household.

4. Empirical Strategy and Results:

Let $x_{s,h,r}^g$ indicate the amount allocated towards the household account by spouse s in household h in round r and $x_{s,h,r}^{own}$ indicate the amount allocated towards spouse s private account. We then estimate reduced-form Engel equations of the amount allocated to each account as a function of spouse s own share of the household endowment, the information treatment indicators and some controls using a random effects model as the information treatment does not vary across rounds.

$$x_{s,h,r}^g = \delta_1^g T_h^{Pr} + \delta_2^g T_h^{Pr-D} + \delta_3^g T_h^{Pr-C} + \beta w_{s,h,r} + \theta X_{s,h,r} + \sum_{s=1}^n \alpha_s + \sum_{r=1}^7 \sigma_r + \varepsilon_{s,h,r}$$

Where T_h^{Pr} is an indicator variable equal to 1 when spouse s is in the Private Information treatment; T_h^{Pr-D} is an indicator variable equal to 1 when spouse s chooses to disclose the lottery outcome; T_h^{Pr-C} is an indicator variable equal to 1 when spouse s chooses to conceal the outcome of the lottery; $w_{s,h,r}$ is the share of the household endowment of spouse s ; $X_{s,h,r}$ is a matrix of control variables including gender, the outcome of the coin toss, and district.

Hypothesis 1:

Case (i): Spouses that choose to disclose the lottery outcome chooses allocations that are no different from those under perfect information $\delta_2^g = 0$.

Case (ii): Spouses that choose to conceal the lottery outcome chooses allocations that are no different from those under private information $\delta_1^g = \delta_3^g \neq 0$.

If Hypothesis 1 holds, it implies that spouses do not compensate for non-cooperative behavior through higher allocations towards the household good. Thus, this is a test of whether spouses allocate money efficiently. The results are presented in Table 3 for the treatment effects of information on the amount allocated towards the household account and the spouse's own account.

The results in Panel (a) indicate that the allocations towards both, the household and their own private accounts, do not differ across spouses that choose to disclose the lottery outcome and those in the complete information treatment. Likewise, spouses that choose to conceal the additional transfer act no differently than those in the private information treatment. The experimental design implies that if spouses choose to conceal or are in the private information treatment, the additional transfer goes towards the lottery eligible spouse's own account, while there are no restrictions on how the rest of the money is allocated between accounts. When given the opportunity to hide money, conditional on the same distribution of endowments, spouses contribute less money towards the household account. Thus, asymmetric information over money causes inefficient allocation of resources. Interestingly, these results are driven by the spouse with the information advantage (Player A). Regardless of treatment, Player B exhibits no difference in the distribution of resources contributed towards the household account. However, the allocation towards their own account is significantly lower among subjects in Player B's role when the the spouse chooses to conceal. This suggests that Player B anticipates her spouse would

act non-cooperatively and thus compensates by contributing less money towards her own account.

In Panel (b) I test for differences of the treatment effects on allocations across genders. The results suggest there are no differences on the effect of private information on the amount contributed towards the public good across genders. Men, however, contribute less towards their own account when they choose to reveal the additional transfer to their wives. There are significant and large differences in allocations across districts. In Almora District, where women have more bargaining power within the household, the contributions towards the household good are larger, and the contributions towards the private account are lower, suggesting spouses are more cooperative there.

Table 3: Effect on Information on Allocations

	Panel (a): Information Treatment Effects						Panel (b): Information Treatment Effects by Gender					
	HH Account			Own Account			HH Account			Own Account		
	All	Player A	Player B	All	Player A	Player B	All	Player A	Player B	All	Player A	Player B
Own Share	1.464***	1.575***	1.362***	0.764***	0.953***	0.646***	0.494***	0.510***	0.470***	0.265***	0.303***	0.228***
Endowment	(0.043)	(0.061)	(0.061)	(0.036)	(0.048)	(0.047)	(0.013)	(0.018)	(0.020)	(0.011)	(0.014)	(0.015)
Private	-7.628**	-19.73***	4.592	11.84***	26.74***	-3.059	-11.94**	-24.63***	1.494	14.55**	31.30***	1.419
	(3.101)	(4.221)	(4.202)	(3.065)	(3.308)	(2.687)	(4.146)	(5.551)	(5.834)	(4.706)	(4.812)	(3.872)
Private - Reveal	2.312	3.639	0.920	-0.142	-0.613	-0.036	-1.675	0.534	-4.930	4.248	4.745	1.868
	(3.469)	(4.746)	(4.326)	(2.464)	(3.512)	(2.775)	(4.277)	(5.842)	(5.273)	(3.629)	(4.943)	(3.771)
Private - Conceal	-10.46**	-21.46***	1.278	11.65**	31.88***	-7.040**	-9.839*	-18.59**	0.260	11.42	29.22***	7.396
	(3.642)	(5.318)	(5.132)	(5.214)	(5.339)	(2.568)	(5.420)	(7.669)	(7.919)	(8.059)	(7.895)	(6.568)
Private X Male	-	-	-	-	-	-	8.530	9.841	6.087	-5.479	-9.257	-5.299
							(5.938)	(8.181)	(8.057)	(5.979)	(6.373)	(5.338)
Private-Reveal X Male	-	-	-	-	-	-	6.997	5.354	10.68	-9.240*	-11.39*	-4.354
							(6.606)	(9.209)	(8.171)	(4.824)	(6.785)	(5.491)
Private-Conceal X Male	-	-	-	-	-	-	1.869	-3.156	4.691	1.807	7.029	-6.126
							(7.221)	(11.12)	(9.806)	(10.42)	(9.528)	(7.962)
Gender	2.188	3.848	1.301	-3.598	-7.611**	2.599	-3.127	-0.969	-4.727	1.225	-1.192	-0.001
(=1 if Male)	(2.571)	(3.540)	(3.395)	(2.425)	(2.723)	(2.214)	(4.379)	(5.950)	(5.576)	(3.250)	(4.535)	(3.757)
Coin Flip	12.32***	22.85***	1.672	20.43***	40.91***	-0.205	11.05***	21.57***	0.466	19.73***	40.16***	-0.719
(=1 if Heads)	(1.444)	(2.163)	(1.577)	(1.624)	(2.189)	(1.133)	(1.374)	(1.977)	(1.585)	(1.607)	(2.163)	(1.212)
Almora District	15.27***	15.82***	14.63***	-3.995*	-3.373	-4.771**	12.34***	12.99***	11.79***	-5.570**	-4.958*	-4.477**
	(2.580)	(3.532)	(3.406)	(2.422)	(2.729)	(2.203)	(2.477)	(3.467)	(3.276)	(2.364)	(2.665)	(2.142)
Constant	-6.215*	-8.678*	-3.918	-1.652	-12.26***	5.219*	-0.732	-1.302	0.803	-3.659	-11.83**	10.00**
	(3.464)	(4.941)	(4.683)	(2.785)	(3.669)	(3.054)	(3.651)	(5.229)	(4.785)	(2.981)	(4.162)	(3.540)
N	2799	1399	1400	2799	1399	1400	2799	1399	1400	2799	1399	1400
R-squared	0.4197	0.4449	0.4292	0.3078	0.4979	0.2446	0.4901	0.5521	0.4404	0.3469	0.543	0.2406

Note: Robust standard errors in parentheses.

Random Effects model.

Table 3 shows that allocations towards the household account and the spouses' own account are increasing in their own share of endowments. One of the hypotheses derived from the model was that hiding will occur when the change in bargaining power is not significant enough to compensate for the loss in private expenditure. In Table 4 I test this hypothesis by including interactions with monetary bargaining power and information treatment. Monetary bargaining power is varied across spouses and rounds allowing me to test for differences in contributions towards the household and the spouses' private accounts using fixed effects model.

$$x_{s,h,r}^g = \beta w_{s,h,r} + \sum_{j=1}^3 \delta_j^g T_h^j \times w_{s,h,r} + \theta X_{s,h,r} + \sum_{s=1}^n \alpha_s + \sum_{r=1}^7 \sigma_r + \varepsilon_{s,h,r}$$

Where T_h^j is an indicator variable equal to 1 when spouse s is in information treatment j where $j \in \{PI, CI, POD\}$; $w_{s,h,r}$ is the share of the household endowment of spouse s ; $X_{s,h,r}$ is a matrix of control variables including gender, the outcome of the coin toss, and district.

Hypothesis 2:

If there is no threshold change in monetary bargaining power needed to induce revelation, no difference in allocations exist by information treatment, thus $\delta_1^g = \delta_2^g = \delta_3^g = 0$.

In Panel (a) results of the interaction between the information treatment and the own share of endowments are presented. Spouses' that choose to conceal the additional transfer contribute significantly less money towards the household account and more towards their own accounts. Note that the contribution towards their own private account is also significantly different from spouses in the private treatment group, thus this difference is not driven by the experimental design. These results are driven by Player A, while there are no differences in allocation by Player B regardless of information or bargaining power treatment. This is

interesting, as Player B does not seem to respond in anticipation to his or her spouse's potential behavior.

In Panel (b) I allow for differences on the treatment effects of bargaining power and information by gender. There are no differences in the effect of private information on household or private account contributions by gender: both men and women allocate less money towards the public good account and more towards their private accounts when they conceal the lottery outcome from their spouse. Interestingly, men are more cooperative than women when they reveal the outcome of the coin toss. Men in the role of Player A in this information treatment contribute significantly more than women towards the household account and significantly less towards their own account. It is possible that they do so because outside of the laboratory they know they will have control over all resources, or it could be that men in these villages are indeed more altruistic than women.

Table 4: Effect on Information and Bargaining Power on Allocations

	Panel (a): Two-way Interaction, (BP) and Information						Panel (b): Three-way Interaction, BP, Information and Gender					
	HH Account			Own Account			HH Account			Own Account		
	All	Player A	Player B	All	Player A	Player B	All	Player A	Player B	All	Player A	Player B
Own Share	1.503***	1.680***	1.287***	0.865***	0.913***	0.688***	1.503***	1.681***	1.287***	0.865***	0.913***	0.688***
Endowment	(0.084)	(0.124)	(0.106)	(0.060)	(0.090)	(0.061)	(0.084)	(0.124)	(0.106)	(0.060)	(0.090)	(0.061)
Private X Own Share	-0.001	-0.107	0.154	-0.170*	-0.000	0.000	-0.105	-0.260	0.098	-0.115	0.159	0.206
	(0.110)	(0.157)	(0.150)	(0.089)	(0.123)	(0.100)	(0.132)	(0.185)	(0.188)	(0.116)	(0.153)	(0.138)
Private-Reveal X	-0.035	-0.110	0.075	-0.060	-0.017	-0.064	-0.173	-0.308*	-0.005	0.123	0.209	-0.118
Own Share	(0.112)	(0.160)	(0.151)	(0.087)	(0.119)	(0.107)	(0.145)	(0.183)	(0.219)	(0.120)	(0.135)	(0.171)
Private-Conceal X	-0.170**	-0.411**	0.007	0.128	0.529***	0.126	-0.183	-0.377**	-0.033	0.078	0.480**	0.207
Own Share	(0.086)	(0.132)	(0.110)	(0.107)	(0.130)	(0.097)	(0.130)	(0.178)	(0.182)	(0.164)	(0.186)	(0.168)
Private X Own Share							0.208	0.314	0.107	-0.109	-0.330	-0.399
X Male	-	-	-	-	-	-	(0.142)	(0.187)	(0.212)	(0.133)	(0.163)	(0.151)
Private-Reveal X							0.272*	0.401**	0.158	-0.359**	-0.460***	0.093
Own Share X Male	-	-	-	-	-	-	(0.149)	(0.191)	(0.223)	(0.123)	(0.140)	(0.182)
Private-Conceal X							0.051	-0.046	0.100	0.077	0.077	-0.156
Own Share X Male	-	-	-	-	-	-	(0.169)	(0.262)	(0.225)	(0.210)	(0.237)	(0.194)
Coin Flip	12.33***	22.98***	1.563	20.47***	40.82***	0.038	12.29***	22.92***	1.537	20.44***	40.87***	0.241
(=1 if Heads)	(1.484)	(2.240)	(1.617)	(1.645)	(2.240)	(1.261)	(1.495)	(2.264)	(1.629)	(1.659)	(2.261)	(1.246)
Constant	-0.647	-5.916*	5.919*	-2.440	-6.232**	6.605**	-0.644	-5.877*	5.898*	-2.448	-6.275**	6.564**
	(2.445)	(3.246)	(3.352)	(2.207)	(2.623)	(2.422)	(2.435)	(3.220)	(3.347)	(2.190)	(2.570)	(2.393)
N	2799	1399	1400	2799	1399	1400	2799	1399	1400	2799	1399	1400
R-squared	0.4199	0.4466	0.4301	0.3086	0.4978	0.2426	0.4218	0.4499	0.4311	0.3121	0.5034	0.2502

Note: Robust standard errors in parentheses.

Fixed Effects model.

These hypothesis can further be tested by contrasting households where men control most of the household resources versus households where this is not the case. I estimate separately the same equation for households in Dehradun and Almora and find that this result is driven by households in Dehradun. At this point I cannot use the survey data to use measures of bargaining power to econometrically test for differences in the effect of information by gender across households were women have more bargaining power (because the data is not yet clean). However, I am able to present some descriptive statistics of the differences in decision making power as self-reported by women across districts. It seems that in Dehradun men are less likely to be the only income earners in the household, with twice as many women working for Income relative to Dehradun. Furthermore, while in both districts few women have much autonomy over decisions, in Dehradun women are more than twice as likely to decide whether to work outside of home, fertility gifts to relatives and savings. These results put in context by the descriptive statistics provide suggestive evidence that at relatively high levels of bargaining power, men with even higher bargaining power are less cooperative than men with less bargaining power.

Table 5: Effect on Information and Bargaining Power on Allocations (wives response)

<i>Members of the HH that work for Income</i>	Dehradun	Almora
Husband and Wife	19	10
Husband Only	53	72
Wife Only	1	1
Husband and Other than Wife	16	12

<i>Proportion of HHs where respondent decides</i>	Dehradun	Almora
Whether to work outside of Home	17	8
How many children to have	4	1
Major Household Purchases	6	5
Gifts to respondent's relatives	16	1
Sell land	2	0
Savings from Household Money	7	0

5. Conclusions

I illustrate the incentives to hide income when household resources are not perfectly observed by both spouses through a simple model. I show there exists a strictly positive threshold of change in bargaining power that needs to be overcome in order to induce revelation. This is consistent with the notion of bargaining power being a function of distribution factors unaffected by the presence of additional resources. Because revelation depends on the responsiveness of bargaining power to the transfer and bargaining power is partially determined by cultural norms, hiding will likely be observed in societies where the spouse with the information advantage has greater autonomy. Further, the threshold change in bargaining power needed to induce revelation is increasing in the wife's initial bargaining power. This implies that in societies where the norm is for women to have little autonomy (most of the developing world) women would be more cooperative than men. For instance, giving government transfers to women will not result in inefficient allocations, even when other sources of income may not be easily monitored by the husband. However, in societies that favor women autonomy, such as matrilineal regions in Ghana or India, women will be more likely to conceal income from their husbands. Interestingly, the result stated in Corollary 1 is consistent with empirical findings in Ghana (Castilla and Walker, 2013) where the culture is matrilineal, and in the Philippines where women that have more control over household decisions are equally likely to hide as men in a similar position (Ashraf, 2009).

The experimental results are consistent with the theoretical model. The experimental results indicate that asymmetric information over money results in inefficient allocations as it decreases the amount contributed towards the household good, which is household-welfare

maximizing. Further, when a spouse has private information over money, the contribution towards the household good decreases whether the spouse chooses to conceal or does not have the option, suggesting there is no compensation in contributions in response to non-cooperative behavior. These results are robust across genders. The contribution towards the household good is increasing in spouses' own share of endowments increases. However, a spouse that chooses to conceal, who is less cooperative as a result, contributes significantly less towards the household account relative to spouses in the private information treatment. Finally, I find that men are more cooperative than women among those who choose to reveal the lottery outcome, and this is driven by men in Dehradun.

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Appendix A: Proofs

Proof of Proposition 1:

Totally differentiating (3) yields the following system:

$$\begin{bmatrix} v''(Q) + p^2(1-\mu)u''(x_f) & p(1-\mu)u''(x_f) \\ p(1-\mu)u''(x_f) & \mu u''(x_m) + (1-\mu)u''(x_f) \end{bmatrix} \begin{bmatrix} dQ \\ dx_m \end{bmatrix} \\ = \begin{bmatrix} p(1-\mu)u''(x_f) - pu'(x_f)\mu'(T) & p(1-\mu)u''(x_f) - pu'(x_f)\mu'(T) & p(1-\mu)u''(x_f) - pu'(x_f)\mu'(T) \\ (1-\mu)u''(x_f) - \mu'(T)[u'(x_f) + u'(x_m)] & (1-\mu)u''(x_f) - \mu'(T)[u'(x_f) + u'(x_m)] & (1-\mu)u''(x_f) - \mu'(T)[u'(x_f) + u'(x_m)] \end{bmatrix} \begin{bmatrix} dY_f \\ dY_m \\ dT \end{bmatrix}$$

Where the determinant is given by:

$$D = p^2\mu(1-\mu)u''(x_f)u''(x_m) + \mu v''(Q)u''(x_m) + (1-\mu)v''(Q)u''(x_f) > 0$$

Comparative statics are:

$$\begin{aligned} \frac{\partial Q}{\partial Y_f} &= \frac{\partial Q}{\partial Y_m} = \frac{\partial Q}{\partial T} = \frac{p\mu(1-\mu)u''(x_f)u''(x_m) - p\mu'(T)[\mu u'(x_f)u''(x_m) + (1-\mu)u'(x_m)u''(x_f)]}{D} > 0 \\ \frac{\partial x_m}{\partial Y_f} &= \frac{\partial x_m}{\partial Y_m} = \frac{\partial x_m}{\partial T} = \frac{(1-\mu)v'''(Q)u''(x_f) - \mu'(T)v'''(Q)[u'(x_f) + u'(x_m)] - p^2(1-\mu)\mu'(T)u'(x_m)u''(x_f)}{D} > 0 \\ \frac{\partial x_f}{\partial Y_f} &= \frac{\partial x_f}{\partial Y_m} = \frac{\partial x_f}{\partial T} = \frac{\mu v'''(Q)u''(x_m) + \mu'(T)v'''(Q)[u'(x_f) + u'(x_m)] + p^2\mu\mu'(T)u'(x_f)u''(x_m)}{D} < 0 \\ &\text{iff } \mu v''(Q)u''(x_m) < \mu'(T)\{v''(Q)[u'(x_f) + u'(x_m)] + p^2\mu u'(x_f)u''(x_m)\} \quad \blacksquare \end{aligned}$$

Proof of Proposition 2:

Spouse m hides the transfer from f if and only if

$$\begin{aligned} \left. \frac{\partial U_m}{\partial T} \right|_R &= \frac{v'(Q^R)}{D} \{p\mu(1-\mu)u''(x_f^R)u''(x_m^R) + [p(1-\mu)u'(x_m^R)u''(x_f^R) + p\mu u'(x_f^R)u''(x_m^R)]\mu'(T)\} + \\ &\frac{u'(x_m^R)}{D} \{(1-\mu)v''(Q^R)u''(x_f^R) - [u'(x_f^R)v''(Q^R) + u'(x_m^R)v''(Q^R) + p^2(1-\mu)u'(x_m^R)u''(x_f^R)]\mu'(T)\} < \\ &u'(x_m^H) = \left. \frac{\partial U_m}{\partial T} \right|_H \end{aligned}$$

$$\text{Where } D = p^2\mu(1-\mu)u''(x_f^R)u''(x_m^R) + \mu v''(Q^R)u''(x_m^R) + (1-\mu)v''(Q^R)u''(x_f^R) > 0$$

Simplifying the above expression yields

$$\begin{aligned} \mu'(T) &< \frac{1}{M} \{u'(x_f^H)[p\mu v''(Q^R)u''(x_f^R) + p^2\mu(1-\mu)u''(x_f^R)u''(x_m^R) + (1-\mu)v''(Q^R)u''(x_m^R)] \\ &\quad - (1-\mu)u'(x_f^R)v''(Q^R)u''(x_m^R) - p\mu^2(1-\mu)u'(x_f^R)u''(x_f^R)u''(x_m^R)\} \equiv \bar{\Delta\mu} \\ &\text{where } M > 0. \end{aligned}$$

$$\begin{aligned} \frac{\partial \mu}{\partial T} &< \frac{1}{M} \{\mu u'(x_m^H)v''(Q^R)u''(x_m^R) + p^2\mu(1-\mu)u''(x_f^R)u''(x_m^R)[u'(x_m^H) - \mu u'(x_m^R)] + \\ &\quad (1-\mu)v''(Q^R)u''(x_f^R)[u'(x_m^H) - u'(x_m^R)]\} \equiv \bar{\Delta\mu} \end{aligned}$$

Where,
$$M = -u'(x_m^R)\{v''(Q^R)[u'(x_f^R) + u'(x_m^R)] + p^2(1 - \mu)u'(x_m^R)u''(x_f^R) + p^2\mu(1 - \mu)u'(x_m^R)u''(x_f^R) + p^2\mu(1 - \mu)u'(x_m^R)u''(x_f^R)\} > 0$$

A strictly positive threshold change in bargaining power such that m hides exists iff,

$$\mu u'(x_m^H)v''(Q^R)u''(x_m^R) + p^2\mu(1 - \mu)u''(x_f^R)u''(x_m^R)[u'(x_m^H) - \mu u'(x_m^R)] + (1 - \mu)v''(Q^R)u''(x_f^R)[u'(x_m^H) - u'(x_m^R)] > 0$$

Proof of Corollary 1:

Taking limit $\mu \rightarrow 0$ approaches zero:

$$\lim_{\mu \rightarrow 0} \bar{\Delta\mu} = \frac{v''(Q^R)u''(x_f^R)[u'(x_m^H) - u'(x_m^R)]}{-v''(Q^R)[u'(x_f^R) + u'(x_m^R)] - p^2u'(x_m^R)u''(x_f^R)} < 0$$

Taking the limit as $\mu \rightarrow 1$:

$$\lim_{\mu \rightarrow 1} \bar{\Delta\mu} = \frac{u'(x_m^H)v''(Q^R)u''(x_m^R)}{-v''(Q^R)[u'(x_f^R) + u'(x_m^R)] - p^2u'(x_f^R)u''(x_m^R)} > 0. \quad \blacksquare$$

Appendix B: Instructions

In this survey, you will have to make decisions on how to split some amount of money into three accounts: a personal account, a spouse's account and a common household account. We will ask the same question to your spouse but with different amount. This procedure will be repeated seven times and at the end, based on your decisions, we would pay you for one of the seven rounds. This game will be followed by a survey about the current socio-economic conditions of your household. The entire procedure, the game plus the survey, will take around 45 minutes to complete and you will have to sit in separate rooms. Apart from the monetary prize that you can win through participation, we will also gift you an LED ashlight at the end of the survey. Do you wish to participate? Please note that we will not reveal your personal decisions or information about the household will not be revealed to anyone and is purely for research purposes. Moreover, you will only be represented by an arbitrary household number since we will not ask you your names.

“Uncle-ji/ Aunty-ji we will begin with the bargaining game. In this game, we will offer you seven different amounts of money and each time you will have to split it into three parts. First, you will keep something for your personal expenses (like bangles, bindi, lipstick, etc.). Second, you will keep something for your husband's personal expenditure (for example bidhi, cigarette, tobacco, etc.). Lastly, you will keep something for the household expenses, which includes expenditure on children. This could include money for buying daily ration, vegetables, paying children's school fees and meeting other household demands. You can divide your share of money in any way you want, keeping zero for some particular account in any round. Note, however, that your husband will also be doing the same exercise in the other room. However, for

each round he will have a different total share of income. The idea is to see how you make decisions when you have different bargaining powers. Think of this as you and your husband getting different amounts of money in the house from a day's work and these amounts can vary. At times your incomes are higher, at other times they are lower. We want to see how you manage your finances in each of the scenarios, good or bad.

In addition, we will give you an opportunity to earn Rs.75 extra for each of the seven rounds. Note that this opportunity is not being given to your husband. This will be done by a flip of a coin. If the coin flip results in a Heads, we will give you extra Rs.75 for that round. You will then have to make a decision on whether to reveal or conceal the coin toss outcome to your husband. In case, your coin lands a Heads then revealing the result to your husband will allow you to make decision of a greater total amount (original + Rs.75). However, revealing to your husband means that your husband now knows that you are getting a greater share and he may/may not leave less for you in his personal decision. At the same time concealing the extra amount from your husband would mean that you have kept the entire amount for your personal expenses. You will not be able to allocate it to your husband or to the household. Think of this as some extra money you've earned during the day as bonus and now it is upto you whether you want to tell about it to your husband or hide it from him.

In order to assist you in the game, we will give you some fake notes that you can put them in these three bowls as you wish. The three bowls represent your personal account, your husband's account and the household account. Distribute the money you have into these three accounts as you wish. Note that the lowest denomination note is Rs. 5 note. In each round, we will also tell you how much decision is in the hands of your husband. Likewise, your husband

will be informed about your revealed endowment in each round. When making your decision think about these aspects and how much your husband will potentially keep in the three accounts.

Once this is done, we will present your decisions to your husband (taking care of your reveal/conceal decisions) and ask him whether he likes/accepts or dislikes/rejects your decisions. This will not have any further repercussions as the game will end and we will not tell you about his accept/reject decisions. However, you will also get the opportunity to tell us whether you like or dislike each of his seven decisions. The game ends after this. We will then simply ask you survey questions about your household. During the survey questionnaire, we will bother you again with a similar game-type question 3. At the end, based on your decisions and a die roll, you will win one of these amounts. Similarly, your husband will win a separate amount based on his decisions. So please be reminded that you are playing for money and your decisions will have an impact on how much you win. Play wisely. There is no set formula for winning this game. As we had told you before, we will also give your household one LED flashlight for taking out time for us and participating in the survey.”

The following steps were conducted in order for bargaining games:

- (a) Player A and Player B simultaneously observe the seven rounds of resources available to each after the description of the experiment.
- (b) Player A tosses the coin seven times and then decides whether to reveal or conceal the result of the coin toss. In treatments T5 and T6 the spouse will always be informed of the entire amount and the total amount (original share+Rs.75) will be available to Player A. In the treatments T3 and T4 it will be allocated automatically towards the owners private account.

- (c) The experimenter informs Player B the outcome of the transfer stage for all 7 decisions (depending on the treatment). In treatments T5 and T6 Player B is always informed of the entire amount, i.e. win/loss in each of the seven rounds. In the treatments T3 and T4 Player B is never informed about the coin toss outcomes.
- (d) After being informed of the transfer results, each experimental subject privately and simultaneously makes a proposal for the split of its own share of resources that are observed (including the transfer if received if known) for each of the 7 decisions.
- (e) The experimenters submit the proposals to the experimental subjects spouse (i.e. exchange the two experiment sheets), who then decide whether to accept or reject them.