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Hidden income and its impact on expenditure patterns in Uganda

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ABSTRACT

This study presents quantitative insights into the willingness of women and men to hide income from their spouse, how socio-demographic and psycho-social factors correlate to the willingness to hide income, and how hiding that income influences expenditure patterns. Using data from 422 households in rural Uganda and employing an established revealed preference approach, the Becker-DeGroot-Marschak (BDM) mechanism, we show that both women and men seek to hide income from their spouse at substantial potential cost. We report an average willingness to pay (WTP) of 49% of the endowment offered, with 99% of the participants stating a positive WTP for hidden income. The correlates with demand for hidden income differ in terms of size and significance across genders and include perceived marriage quality, self-control, savings group membership, and empowerment over purchasing decisions. Results show that women who received income in private have a higher public to private spending ratio and higher transfers to their social network. Our study contributes to the literature on intra-household resource allocation in developing countries by studying the demand for hidden income between co-habiting spouses, correlates with the demand for hidden income, and the link between hidden income and subsequent spending patterns in rural Uganda.

1. Introduction

Intra-household financial decision making in developing countries plays a crucial role in the success of policy and program interventions (Fiszbein and Schady 2009). Given this role, there has been a growing interest in understanding financial flows within the household with specific reference to how spouses interact to control and manage those flows. For example, Munro (2018), Doss and Quisumbing (2020), and Deschênes et al. (2020) provide notable reviews of research on intra-household decision-making, highlighting the key role of income hiding as a mechanism to retain control over private consumption choices by spouses.

The role that hidden income plays in household dynamics and welfare outcomes is important for several reasons. Firstly, there exists a potential efficiency implication: to hide income, partners may choose lower-return income earning options and/or to incur financial costs (Fiala and He 2017; Castilla 2019). Secondly, when spouses choose a resource-allocation strategy to avoid sharing, household public goods are also more likely to be under provided (Doss and Quisumbing 2020). Finally, understanding the reasons and correlates of income hiding provides insights into ways that cooperation might be encouraged and sustained within households. Hence, improving understanding of these elements can inform intervention designs to enhance the achievement of development objectives (Malapit 2012; Cherchye et al. 2017; Munro 2018).

A wide range of literature deals with the identification of hidden income for households in developing areas and examines the impact of hidden income on consumption choices of spouses. This literature is largely underpinned by two quantitative methodological approaches: a survey-based approach and an experimental approach (Deschênes et al. 2020). The survey-based approach has a long history, relying on self-reported socio-economic factors, savings, and expenditure choices. These surveys provide the foundation for our current understanding of household bargaining and expenditure patterns (Udry 1996; Quisumbing and Maluccio 2003; Rangel and Thomas 2005; McPeak and Doss 2006; Bobonis 2009). Experimental methods, in contrast, apply laboratory experiments in field settings to isolate and test for specific behaviors, such as income and/or consumption hiding.

This project has been approved by the Office of Research Ethics, Compliance and Integrity, University of Adelaide (H-2019–181). This experiment was registered with the AEA RCT web registry with ID AEARCTR-0004877.

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In recent years, the limitations of survey-based measures, including self-report biases, endogeneity concerns, and selection issues, have spurred a growing number of studies that use controlled experiments combined with survey data. This approach provides deeper insights into behaviors related to hidden income, allowing for detailed and robust measurements of preferences for hiding income, the strength of these preferences, and the quantification of the decision's distortive role on resource allocation. On the other hand, experimental games have been used in various countries, including India (Castilla 2019), Kenya (Jakiela and Ozier 2016), Macedonia (Almas et al. 2018), the Philippines (Ashraf 2009), Senegal (Boltz et al. 2019), and Uganda (Fiala and He 2017).

A small range of key studies provide a clear understanding of the current state of knowledge and methods within the experimental literature examining income hiding within the household in developing countries. For example, varying the observability of endowments by spouses in a lab-in-the-field experiment in the Philippines, Ashraf (2009) finds that both male and female participants tend to allocate more money to private accounts when a portion of the endowment is private (hidden from spouse). Using a similar approach in India, Castilla (2019) shows that a quarter of the participants choose to keep money in their private accounts when given the opportunity.

Experimental findings, many of which are reviewed by Deschênes et al. (2020), suggest a consistent inclination among spouses to conceal income, even at the cost of reduced household earning potential. While strength of preference for hidden income and the impacts of hidden income on consumption patterns have been widely independently tested, they have rarely been combined within a single study. To build on these studies, clarifying not only preferences for hiding income but also the relationship between the strength of preference for hiding income and subsequent consumption patterns is key. Learning how the amount of hidden income translates to changes on consumption that focuses on household benefits as compared to consumption that primarily benefits the individual provides adds crucial information to this literature. Early research on this topic suggests there are significant differences in expenditure patterns between male and female spouses, with these differences becoming more pronounced when income is hidden (Rubalcava et al. 2009). However, experimental evidence is relatively scarce on whether hidden income received by women leads to better household outcomes compared to hidden income received by men (Castilla and Walker 2013; Boltz et al. 2019).

Equally important is the lack of information on the correlates of high or low preference levels for hidden income. Questions around the 'correlates' of preferences for hidden income remain largely unanswered in the literature (Deschênes et al. 2020) yet are highly relevant because they are increasingly linked to bargaining power, women's empowerment, and poverty (Almas et al. 2018; Doss and Quisumbing 2020; Karlan et al. 2014; Garbinsky et al. 2021). Consequently, there is a gap in information that could guide policies aimed at mitigating or encouraging hidden income strategies, or in managing the impacts of hidden income on consumption patterns.

Applying the Becker-DeGroot-Marschak (BDM) auction mechanism (Becker et al. 1964), this study analyzes data from 422 households in rural Uganda. Our approach provides a quantitative measure of strength of preference for hiding income, i.e. willingness to pay (WTP) to hide income, and a quantitative comparison mechanism regarding consumption choices for those receiving hidden income compared to those receiving income in the presence of their spouse. Relying on a comparison of the stated WTP and a randomly drawn value, the BDM mechanism provides a randomization mechanism for selection into different treatment groups allowing a comparison of treated individuals (hidden income) with untreated ones (unhidden income).

Data from the BDM experiment, a follow-up expenditure diary, and a questionnaire on a range of demographic and behavioral factors are used to answer the following research questions: (i) How much are spouses willing to pay to hide income from their partner? (ii) Are women more willing to pay to hide income than men? (iii) Does WTP to hide income as a fraction of the total reward offered diminish in the size of reward offered? (iv) What are the correlates of WTP to hide income? (v) Are there differences in how privately received versus unhidden income is spent? (vi) Are there gender differences in how the recipients of hidden income exploit information to shift resource allocations?

Our results show that respondents are willing to pay on average 49 % of the total endowment offered to hide income from their spouse, with only three respondents stating zero WTP to hide income. WTP to hide income does not differ across genders or reward values offered. In addition, results show significant associations between psycho-social survey measures as correlates of income hiding and that the importance and/or effect of these correlates differ across the two genders. Perceived marriage quality is associated with a higher WTP whilst membership in savings groups is associated with a lower WTP for women but not men. On the other hand, conscientiousness, a measure of self-control, is associated with lower WTP statements for men but not women. Attitudes towards women's empowerment and women's roles in purchasing decisions are positively associated with a higher preference for hidden income overall.

Our empirical analysis shows that women have a statistically significant tendency to shift consumption after obtaining hidden income. Women who receive hidden income have a higher public to private spending ratio than women who did not. Treated women (with hidden income) report higher transfers to social networks in relation to total spending relative to untreated women. Men, on the other hand, show no consistent significant behavioral changes as a result of receiving hidden income in our experiment.

This study contributes to the literature in important ways. Firstly, we build on the evidence around preferences for hidden income amongst members of households in developing countries by quantifying WTP to hide income from one's spouse in rural Uganda (Ashraf 2009; Castilla 2019; Fiala and He 2017). Second, we add to the literature by testing the efficiency of household behavior, where 'efficiency' is defined as the ratio of income received to the potential income that can be received by a household in the experiment. Positive levels of WTP to hide income are interpreted as inefficiency arising from non–cooperation thereby invalidating the assumption of cooperative household models. In a comprehensive review of studies on efficiency of household behavior, Munro (2018) reports an average of 75 % efficiency rate across studies (Munro et al. 2014; Kebede et al. 2014).

We also contribute to the literature through the use of the BDM mechanism to elicit WTP for hidden income. Most of the experimental studies testing efficiency rely primarily on experimental games such as voluntary contribution, public goods, and dictator games played with co-habiting couples (Iversen et al. 2011; Mani 2020). Our approach which relies on an established revealed preference mechanism has several benefits in this context. First, it provides a measure of strength of preference (rather than just presence of preference) for hidden income. Second, it provides a randomization mechanism that facilitates causal analysis of the impact of hidden income on subsequent expenditure patterns for the recipients of hidden income. Taking advantage of the exogeneity introduced by the BDM mechanism (conditional on WTP to hide income), we examine how receiving hidden income affects expenditures relative to receiving the income in the presence their spouse.

While several researchers make use of this experimental method to consider the demand for control of income in the household, only few have used it to jointly describe the demand for hidden income and to subsequently use the random lottery method embodied in the BDM to generate an identification strategy for the effect of hidden income on consumption choices. Specifically, making use of the BDM mechanism in a lab experiment in Senegal, Boltz et al. (2019) document positive levels of stated WTP to hide income from kin. Their approach of eliciting WTP to hide income from kin, i.e. using the BDM mechanism in a lab in the field, is similar to our approach of eliciting WTP to hide income from spouse. Our approach, i.e. eliciting WTP at homestead, provides

potentially greater privacy to the respondent and our study further examines of the impact of hidden income on consumption choices. Relatedly, using the BDM method in a case study in Macedonia, Almas et al. (2018) elicit women's WTP to receive a cash transfer otherwise made to their husband. They find that participants demonstrate positive levels of WTP with 7 % of women willing to forgo more than 90 % of the full amount of the transfer to be the recipient of the transfer instead of their husband. Their study is concerned with control over income rather than information asymmetry between spouses, however. Castilla and Walker (2013) do not use the BDM method but instead analyze the effect of randomly allocated private (versus public) rewards on expenditure patterns amongst Ghanaian households, showing that recipients of the private windfall increase gifts to their social network. Within a similar rural context in Uganda, Fiala and He (2017) find that approximately 40 % of participants are willing to choose less profitable options to ensure they, rather than their spouse, receive a windfall the following day. However, they do not investigate the causal impacts on expenditure patterns.

Lastly, we examine the relationships between strength of preference for hidden income to various behavioral and psycho-social factors derived from a follow-up survey. To the best of our knowledge, no experimental study examined psycho-social correlates including perceived marriage quality and conscientiousness of WTP to hide income from spouse. Significant correlations are found mostly for socio-cultural and psycho-social factors indicating that social and behavioral factors (and interventions) may be important in supporting demand for hidden income.

The remainder of this paper is organized as follows. The next section describes the experimental framework used in this research, while Section 3 describes the empirical methods. Section 4 presents background, data, and descriptive statistics. Results are presented in Section 5, whereas discussed in Section 6. The final section presents conclusions and limitations to this research.

2. Experimental methods

2.1. Testing the non-cooperative model using the Becker, De-Groot, Marschak (BDM) mechanism

In this study, we use the BDM mechanism (Becker et al. 1964) to assess the Willingness to Pay (WTP) of participants to receive the experimental reward in absence rather than in presence of their spouse (hidden versus unhidden). The WTP statement embodies both a robust test of the efficiency principle (WTP=0) and a quantification of the extent of inefficiency associated with non-cooperative household bargaining outcomes for cases where the WTP>0.

The BDM mechanism operates as a single-bid, single-player auction mechanism with a randomly selected strike price that determines 'success' (WTP is higher than the strike price) or failure (WTP is lower than the strike price). In the BDM experiment participants are asked to state a maximum amount they are willing to pay to purchase a product (in this case to receive the experimental reward in private). A price is then randomly drawn from a distribution of prices chosen to cover the range of anticipated bids. If the stated WTP value is greater than or equal to the randomly drawn price, the participant is successful (receives the reward in private minus the randomly drawn price). Else, the WTP value is less than the randomly drawn value and the participant fails (receives the full reward amount but in front of his/her partner).

The BDM mechanism is incentive-compatible in that the respondents can achieve the best outcome by acting according to their true preferences. This is because the stated WTP maximizes the participants' expected rents from the experiment due to the uniform strike price mechanism. Specifically, participants generate positive rents for any strike price up to their true WTP and negative rents for strike prices above that, if and only if they state a WTP value that reflects their true WTP value. If a respondent states less than their true WTP, there is a chance that the price drawn will fall between their stated value and their true WTP – meaning they would be unsuccessful in receiving hidden income, despite being willing to pay the randomly selected price for that outcome. On the other hand, if they state a higher WTP than their true WTP, the randomly selected price may again fall between the stated and true WTP value meaning that the respondent would purchase the hidden windfall, but at a cost higher than they are truly willing to pay. Thus, the random price mechanism generates incentive compatibility for recipients to reveal their true WTP.

The BDM mechanism also provides a useful randomized selection mechanism into different treatment groups (hidden income versus unhidden income recipients) through the operation of the randomized price mechanism. The random market price mechanism of the BDM means that cases where the WTP is higher than 0 % and lower than 100 % of the full reward offered (0 %<WTP<100 %), the receipt of income hidden or unhidden from partner depends both on the WTP statement and on the random price draw. We use this random draw feature to generate a random allocation, with known probability, of the experimental reward either hidden from or known by participant's partner. This quasi-random allocation of rewards allows for a direct comparison of expenditures on private versus household goods for respondents stating similar WTP values but who were allocated randomly to receiving a hidden reward or not. Thus, the determination of the treatment (hidden reward) through the BDM mechanism, provides an exogeneity device that allows us to make causal inferences over the role of asymmetric information about resources between spouses on actual spending patterns of participants in this study. The key condition that this quasi-exogeneity mechanism relies on is that individuals with similar WTP levels, but different outcomes are compared (rather than individuals with different WTP levels).

2.2. Implementation details on experimental procedures

The BDM mechanism (Becker et al. 1964) was conducted with either the male or female primary decision maker in the (de-facto) married households. Rewards offered in the experiment were either 15,000 or 30,000 UShs (~4 or 8 USD), worth approximately 1.5 or 3 days of casual labor wages, respectively. Two different rewards were offered to test whether WTP is increasing in the amount offered. Endowments received by participants, at 27 % of median weekly household expenditures and 48 % of mean weekly household expenditures, were substantial with respect to household expenditures. The rewards were also large in comparison to recently published studies using respondents in Uganda e.g. Fiala and He (2017) offer 2,000 UShs to participants in Uganda. Note, however, that both rewards (even the largest reward of 30,000) are still small enough to easily hide as the rewards consisted of a maximum of 5 bills.

The participants in the BDM mechanism were informed that they would receive a reward as a lump-sum payment at the end of the task they were to undertake that day, and that they would have the opportunity to receive the reward in private or in presence of their spouse. The participants were then introduced to the BDM mechanism and how it related to their reward and to the likelihood of their receiving money in private versus in front of their partner. Participants undertook at least one training round to ensure understanding of the process. Additional training rounds were offered based on the enumerators' assessment of participant understanding from check questions. Note, however, that no explicit understanding test was undertaken, and we are thus unable to speak to any gender differences in understanding achieved. A full outline of the experimental procedure is provided in the Appendix.

We made an appointment with the households two days before the experiment to ensure both partners were, in principle, available for the experiment. We only interviewed households where both partners were at least within the village at the time of the experiment. If the partner of the participant was not at the homestead at the time of the experiment, we reached him/her through telephone before we started the interview

to make sure that the partner would stay within reach (e.g in the village). If the partner of the participant was not reached through phone or not in the position to be at homestead in a short amount of time, the interview did not take place. We did this to make sure that the partner was available in case the participant ended up receiving the money in presence of their partner – thus substantially reducing potential confounding with trust (i.e. that the money would actually be paid to them in front of their partner at a later date). As an alternative, the survey team were allowed to call the spouse of the participant to tell that their spouse was receiving a transfer on the phone (for those who would receive an unhidden reward). However, we are not aware of any instance where this happened.

In the experiments, it is often difficult to adequately deal with post-experimental effects (e.g. spouses providing post-experimental compensations to each other). The scrutiny effect also increases when both couples take part in experiments since they have priors over each other's options and potential payoffs (Munro 2018). Interviewing only one spouse in private was thus critical to give participants adequate anonymity whilst stating their WTP. In no case was the spouse of the participant present at the time of the interview. Respondents were interviewed in a separate area where partners could not see or hear each other and with no other adults or older children present (i.e. only infants or very young children).

If at homestead, the partner of the participant was told that we would ask some questions to their partner about how they made decisions regarding their household, that it was important to interview men and women separately, and that we randomly selected either the male or female decision maker in the household. In the case of a private payment the money was given directly to the participant at the end of the study, without their spouse present. In the case of a public payment, the partner was called to attend the interview before the payment was made to the participant in presence of their spouse.

Note also that there was no particular reason why ex-ante the spouse of the respondent should expect that the respondent would receive any monetary compensation or reward for participating in our interviews. This is primarily because the households in our sample are contracted with the largest coffee buyer in the area and members of farmer groups. These farmer groups meet regularly for agricultural extension meetings (within the framework of contract farming schemes). They were also interviewed within the framework of coffee-related research projects and did not receive any compensation for those interviews.

To minimize information spillovers through neighbors regarding the BDM mechanism experiment, only 1–5 households per village (depending on the size of the village) were selected to be interviewed, and all the households in a given village were interviewed consecutively on the same day. Interviewing only one household per village was infeasible (logistics and cost). We nonetheless tested if there is any difference between small villages (with one respondent) versus larger villages (with more than one respondent) but did not detect any meaningful difference.

3. Empirical methods

3.1. Assessing WTP to hide income

Differences in the WTP statement were analyzed between genders and between the two levels of reward amount offered (15,000 UShs versus 30,000 UShs) using simple mean-difference tests and with graphical methods. The hypotheses associated with this component were:

H1: mean WTP=0.

Spouses are not willing to pay a positive amount to hide income from spouse i.e. the cooperative household hypothesis.

H2: mean WTP (women) = mean WTP (men).

The willingness to pay to hide income is uniform across genders.

H3: mean WTP (high reward) = mean WTP (low reward).

The willingness to pay to hide income is uniform across reward levels.

3.2. Impact of hidden income on expenditures

Economic theory underpinning the non-cooperative household bargaining model (Ulph 1988; Chen and Woolley 2001) suggests that demand for receiving hidden income is associated with preferences for private consumption that differs from that demanded by the household overall or by the spouse as the main bargaining partner in a household. The high level of demand for receiving hidden income is suggestive of a difference in consumption for those who receive income in the absence compared to those who receive income in the presence of their spouse. Retaining income as hidden, and the associated individually discretionary expenditure, has been suggested to be more likely when the recipient has low bargaining power in the household and/or where household or spousal norms for expenditures differ substantially from their own (Castilla and Walker 2013). Hence, under severe budget constraints and different preferences over consumption, we think that spouses in our context may also be inclined to keep income hidden when they wish to increase their private consumption instead of sharing income. To confirm this is this is the case, the field team recorded the amount of expenditure participants undertook in the week following the initial experiment across a range of categories using an expenditure diary. This provides a measure of expenditure as an outcome of having a hidden income windfall versus an unhidden income windfall, and by gender of the treated spouse.

The null hypothesis is that treated household (one with hidden income) and untreated households (one with unhidden income) do not have different post-experimental public-to-private expenditures. To test this hypothesis, we take advantage of the random price mechanism within the BDM mechanism. The BDM mechanism offers a close to ideal environment in which the WTP value can be elicited, and subsequently used to identify the spending by a treated individual in comparison to an untreated one. The key limitation to comparisons between treated and control respondents is then only that the final reward received differs for those receiving the reward with their spouse present (full possible reward as no payment for privacy is required) compared to those receiving the hidden reward (reward minus the 'price' generated by the BDM mechanism). Note that this limitation could, in-principle, be overcome through the use of a baseline payment that does not vary according to the outcome of the BDM experiment but would induce other undesirable effects (e.g. a potential increase in willingness to gamble the residual in the BDM and thus potentially overstate WTP). It can also be considered against the non-deception norm in economic experiments.

At the upper tail of the WTP distribution the issue of comparability is potentially more pronounced with two factors combining to reduce the validity of considering treatment effects using matching approaches: (1) the fact that the tails have high selectivity for unhidden/hidden income for low/high WTP statements respectively, and (2) for very high statements of WTP the selectivity issue is compounded by large potential differences in net reward paid for those receiving hidden income (low net reward if price is high but still less than WTP) and those receiving the reward in public (full reward). With this in mind, two strategies are adopted.

Firstly, we undertake a matching process using a trimmed dataset for which there is low support for treated and control observations. Specifically, observations with less than 10 % WTP or greater than 90 % WTP to keep the endowment hidden (4 % of observations) were discarded. This process ensures that matching and subsequent analyses are conducted between treated and control respondents with relatively similar levels of final endowments.

Secondly, a matching equation for treatment (receiving income in private) is estimated including the WTP (percent of total potential endowment) as the key endogenous variable. Gender (binary with

female = 1) and reward total endowment size (30,000 or 15,000 shillings) were matched exactly. Other matching variables included were number of children, income, a measure of perceived empowerment in expenditure choices by the spouse, a marriage quality index and, a measure of self-control (Big 5 Conscientiousness index). Four different matching methods were applied to consider sensitivity to matching methods. The key method used is the Genetic Matching (GM) algorithm. The GM algorithm identifies optimal weights that provide for treatment and control cohorts that effectively match across analyst-chosen variables. The method is described in full by Ho et al. (2011) and is focused on providing for flexible post-hoc analysis (i.e. the matching process is analysis-independent). Nearest Neighbor and Propensity Score Matching approaches are also undertaken to provide for insights on the robustness of the matching process with respect to matching procedure although the latter does not allow for exact matching (on the basis of gender and reward level type). We note that our matching approach is primarily focused on achieving effective balance on core experimental and demographic variables as exogeneity in treatment, conditional on WTP, derives from the BDM mechanism.

To test the impact of receiving hidden income on the ratio of private to public expenditures we use matching methods combined with bootstrap comparisons of means for treatment and control cohorts with a range of sub-setting criteria. We ensured that comparison of treatment effects was conducted in zones of support for both those receiving hidden income and those receiving unhidden income. Specifically, a trimming process was undertaken for those households with very low and very high WTP statements. We chose to use the region with WTP greater than 10 % and lower than 90 % of WTP as these areas indicated substantial support for both hidden and unhidden income recipients. Figure 1 shows these zones of support.

The GM approach to matching produced the best balance outcomes with all target variables below or within an acceptable range of less than or equal to 0.14 standard deviations for the normalized difference (Franklin et al. 2014). Nearest Neighbor and Optimal Matching approaches were also undertaken and included as separate treatment effect analyses in the results.

Matching with replacement resulted in only three control observations being unmatched (<1% of the trimmed dataset) leaving 129 control and 272 treated observations. Pre-matching and post-matching standardized mean differences (SMDs) along with the percent improvement in SMDs post-matching are shown in Table A.2. Results show substantial improvements in balance across all variables excepting number of children with final SMDs being less than 0.11 standard deviations for all variables. While number of children shows a decrease in balance it remained well within standard guidelines for balance i.e. having a standardized mean difference below 0.1 (Franklin et al. 2014). Variance ratios were also acceptable (ranging between 1.07 and 1.79).

All treatment comparisons (i.e. the Average total Treatment Effect or ATE, and the Average Treatment effect on the Treated or ATT) are estimated using clustered standard errors based on sub-classes derived from the matching process.

3.3. Correlates of stated WTP

The correlates of WTP for hidden income are estimated using simple OLS. The dependent variable in each case is WTP for hidden income presented as the ratio of WTP to the value of the total reward offered (effectively the percentage of WTP out of the total offered reward). We use full-sample regressions to assess sample-wide relationships. Two additional regressions based on sub-samples, one of only women and the other of only men, are also conducted to consider heterogeneity in correlates of WTP statements across male and female subsamples.

4. Background, data and descriptive statistics

4.1. Background

Our study site, the district of Kapchorwa, is located on the slopes of Mount Elgon in eastern Uganda (Figure 1). Kapchorwa is a high-altitude region located close to the equator that has fairly consistent rainfall and temperatures across the year. It is a relatively densely populated area with an average population density of about 310/km^2 but is considered remote, being over 6 hours of drive on poor-quality roads to the capital of Kampala.

Livelihoods in the Kapchorwa region are predominantly agricultural (crop production and livestock rearing) (Kimaiyo et al. 2017). Kapchorwa is well suited for Arabica coffee production due to its fertile volcanic soils, elevation, and climate. Consequently, many farming households in the district engage in coffee farming. Annual and perennial horticulture are also common with the latter including matoke (plantain), avocado and more. Some timber plantations are present (mostly small-scale). Despite having growing conditions that are ideally suited to low-input, year-round production the region remains one of the least developed areas of the country.

Most residents of Kapchorwa are Sebei. Kapchorwa borders Kenya, which is a home to Kalenjin, a large ethnic group to which the Sebei belong. The Sebei people are also known as Sabiny and speak Kupsabiny, a Kalenjin language. The Sabiny have a distinct language and culture

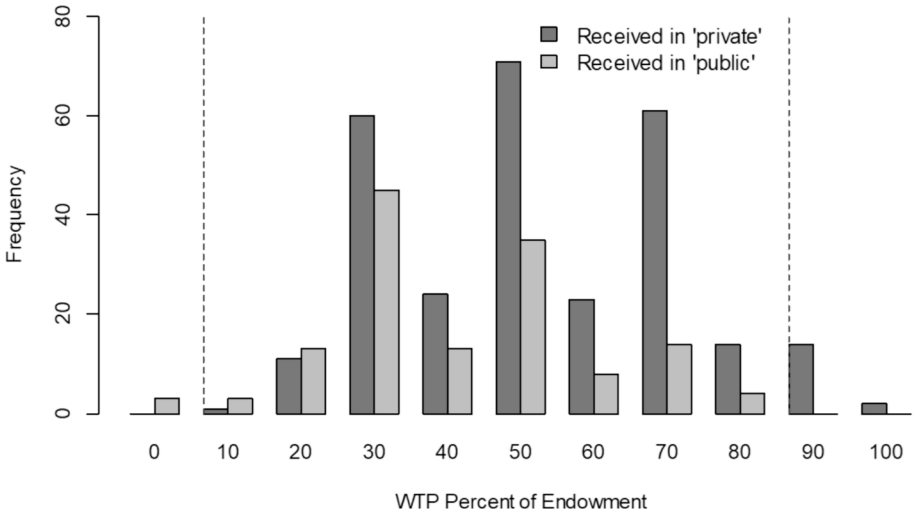

Figure 1. Distribution support for respondents receiving hidden income or unhidden income from the BDM experiment.

relative to the larger ethnic groups of Uganda, with a strong sense of separate cultural identity and need for its preservation (Stephens et al. 2006). The Sebei sub-region is geographically isolated and largely mountainous, with one all-weather road to the district town of Kapchorwa (Kwagala 2013). The Sebei lead a simple lifestyle, are relatively peaceful with limited criminal offenses. Violent crimes like homicide and assault are rare and clans play an important role for offenses that threaten physical safety (Benintendi 2004).

Apart from coffee farming, households engage in day laboring and petty trading and services, which can be pursued by the individuals alone or couples together (Kimaiyo et al. 2017). There is a relatively sex-segregated pattern of labor and control of income. In this context, men are considered the head of the household and in control of household income. Intra-household transfers typically occurs from husband to wife mainly for household needs and occasionally in the form of gifts. The marital contract implies that the husband provide an allowance for household needs to their wives. Women predominantly work on farms seasonally or take other casual labor work. Household income is not necessarily pooled and women often keep the money that they earn. Women tend to not have any large assets (e.g. livestock) of their own and do not inherit land from their own families. Hence, most women rely on the money given by their de-facto husband.

Sebei women marry early in their mid-teens whereas men traditionally marry closer to their thirties (Benintendi 2004). Polygamy, referring to a union in which a man is (de-facto) married to more than one woman, is a common marital arrangement. In our setting, co-wives do not co-habit. Instead, each wife resides in a different house. The husband may choose to stay where he wishes, but has to provide for all wives. Divorce is not common. A man may divorce his wife for, among others, refusal to have intercourse, refusal to cook or she is from an inappropriate clan, whereas a wife's father must agree if she seeks a divorce. It is only upon the repetition of complaints that a divorce is seen as the appropriate solution (Benintendi 2004). In the event of divorce, the children live with the father although the mother retains her rights and obligations around children (Benintendi 2004). There are also strong norms against women's going out at night and drinking – a typical form of socialization for men in the area (Benintendi 2004).

4.2. Data

The households in our sample were randomly drawn from over 1500 coffee-growing household using two-step random sampling. Our sampling involved a random selection of farmer groups first and then a random selection of households therein. This larger sample of 1500 households was obtained from a different study involving a randomly selected sample of coffee-farming households in the region. The original list of coffee-farming households (in farmer groups) was obtained from the largest coffee exporter, which has operated in the study area for 20 years, within the framework of a coffee-focused research project (see Arslan et al. (2022) for more information). The final sample for our study consists of 422 households dispersed over 120 villages in the district of Kapchorwa. Gender of the respondent was selected at random to ensure balance in the sample of female and male participants (Figure A.2).

The experiment and follow-up survey were undertaken in November 2019. Each household was visited twice. The BDM activity was conducted during the first visit. After completion of the BDM experiment, participants were asked to answer a short questionnaire on socio-demographic characteristics. One week after the experiment, participants were visited again to answer another short questionnaire on their spending across different consumption categories in the past week and to answer a range of Likert-scale questions related to psycho-social conditions.

4.2.1. WTP

A core outcome variable in this study is the WTP for hiding income, providing both an indicator of the presence of inefficiency associated with household bargaining between spouses (WTP>0) and a measure of the extent of inefficiency. WTP for hidden income is both a measure of strength of preference by the spouse to hide income from their partner and a measure of potential household loss of efficiency since it quantifies how much the participant is willing to forgo household income to ensure that the partner remains unaware of the existence of the reward earned. We use the ratio of stated WTP to the full reward *(R)* offered in order to account for the fact that we offered two rewards, one 15,000 UShs and one 30,000 UShs to different participants (randomly selected).

4.2.2. Correlates of WTP

To analyze the factors that explain household inefficiency (as measured by WTP), we included a range of measures in the follow-up survey covering psycho-social measures and socio-demographic factors. Perceived marriage quality, which can be considered an indicator of contentment with the partnership arrangement, is measured with an index variable constructed considering dimensions of marriage in the psychology literature. Following Bradbury *et al.* (2010), marriage quality variable is based on Likert-scale responses to 5 questions which capture marital satisfaction on different levels, such as partner's psychological availability, affection, conflict resolution ability, verbal agression, and physical aggression. The answers were recorded on a 7-point scale where 1 is strongly disagree and 7 is strongly agree. Reverse-coding was used for the last two components which are negatively correlated with (the first three components of) marital satisfaction as in the original study. Answers to all 5 questions were summed and normalized which generated a marriage quality index varying between 0 and 1.

Empowerment over purchasing decisions is based on 7-point Likert-scale responses to say/input in decisions regarding the following categories: major household expenses, minor household expenses, children-related expenses, health-related expenses, leisure or enjoyment expenses, personal/individual expenses, work and farm related expenses, saving, borrowing, and lending. Answers to all questions were summed and normalized to vary between 0 and 1.

Questions related to perceptions towards women's empowerment in the community are based on Likert-scale responses to three statements: "Women should have the right to leave their husband if he beats them", "Women should have an equal right to men to inherit land", and "Girls should be educated through secondary school". Answers were on a 7-point Likert-scale and were summed across these questions for each respondent to indicated perceptions of women's empowerment from a social perspective and then normalized to vary between 0 and 1.

Behavioral measures included conscientiousness (self-control), risk preferences, altruism, and trust. The 'Big 5′ questionnaire is used to assess conscientiousness with responses on a 5-point Likert scale is used (Goldberg 1993). Following the original study, reverse coding was used where necessary e.g. for qualities negatively associated with self-control. Answers to all 5 questions were summed and normalized which generated a conscientiousness index taking value between 0 and 1.

Risk preferences were measured using standard questions, such as "How would you rate your willingness to take risks in general/farming/with your life?". Altruism is measured using a sum of 5-point Likert scale responses to a range of hypothetical altruistic scenarios while trust using likert scale responses to the 'lost wallet' question amongst others. These variables were also normalized to vary between 0 and 1.

Membership in savings groups is a binary variable indicating whether the respondent is a member of a local savings groups or not. A social network measure, called social network engagement, is also used to proxy preferences for engagement with social groups as a method to maintain social networks. This variable is a simple sum of binary indicators of engagement in various social groups including village councils, producer groups, and religious groups (i.e. a count variable ranging between 0 for no social group engagement at all to 10 potential

Table 1
Details of the key variables used in the consideration of the impact of hidden income on expenditure patterns.

Variable Name	Calculation	Rationale
PUBLIC_EXPENDITURES	SPEND_HOME_CONSUMABLES + SPEND_HEALTH_HH, + SPEND_CHILDREN, + SPEND_AG_BUSINESS, + SPEND_HH_TRANSFER	Refers to the use of funds for expenditures that primarily benefit the household as a whole and/or other household members. Examples include food, rent, medication, school-related expenses for children, money used for farm or business which contribute to household income and any money given to other members of the household.
PRIVATE_EXPENDITURES	SPEND_SELF_CARE, + SPEND_SELF_BEAUTY, + SPEND_SELF_SOCIAL, + SPEND_SELF_HEDONIC	Refers to the use of one's available funds for expenditures or transfers that primarily benefit oneself rather than being primarily beneficial for the household. Examples include expenditures on items such as beauty and self-care products, clothing, gambling and/or alcohol, food eaten out but can also include private savings.
OUTSIDE_TRANSFERS	SPEND_OUTSIDE_TRANSFER	Refers to the funds given/transferred to others who are not members of the household.
SAVINGS	SPEND_SAVINGS + SPEND_DEBTS	Refers to the funds set aside for future expenses. Examples include contributions to savings groups.

Note: Total expenditures were calculated as the sum of all expenditures, savings and debt payments recorded in the expenditure diary.

social groups).

Other covariates include socio-demographic characteristics: respondent's age in years, respondent's educational attainment in years, number of years of marriage/living together, if the household exercises polygamy (binary), household size, if the respondent works for payment (binary), annual household income in UShs, and smartphone ownership (binary). Smartphones were not very common in the area at the time of study. It is a proxy for wealth along with access to information and exposure to different norms (e.g. through social media).

4.2.3. *Spending arising from hidden income*

A key question of this study is whether participants who received their reward in private versus in the presence of their partner have different spending behaviors. To this end, we asked the participants to report on the amount of expenditure they undertook in the week following the initial experiment across a range of categories. The expenditures captured are those made by the individual respondent, not by the household. Answers regarding expenditures were recorded into categories such as home consumables, children-related expenses, health-related expenses, gifts/transfers to household members, transfers to social network, pleasure goods, and farm- and business-related expenses which were aggregated into broader categories for the purposes of our analysis.

Three dependent variable categories are considered as providing insights into the role of hidden income on financial flows within/from the household: private versus public expenditures; outside transfers (i.e. transfers to social networks); and savings. We use private expenditure to refer to expenditures primarily beneficial for the individual undertaking them. Public expenditure on the other hand is used throughout to refer to the expenditures that are primarily beneficial to the household overall and other household members.

For private versus public expenditures, we consider three measures: public expenditures (e.g. expenditures on household goods/services) private expenditures (e.g. expenditures on the self), and the ratio of public to private expenditures. For outside transfers and savings, treatment effects are estimated for the levels of the variable and the variable as a ratio to total weekly expenditures. In all three categories, our preferred measure are the ratio formulations. A primary consideration for the use of ratios is the difference in BDM payments between the low and high reward groups along with varying levels of hidden payments (full reward minus the randomly drawn price) in contrast with fixed public payments (full amount). Ratios also have another benefit in that they remove the overall levels of expenditure in both those groups from comparison. The variables used to generate the key hypothesis variables for the impact of hidden income on expenditures are detailed in Table 1.

4.3. *Descriptive statistics*

Table 2 presents sample characteristics. Of the 422 respondents in the sample 217 (51 %) are women. There are large differences in socio-demographic characteristics of women and men in our sample. The average age is 41 years for women and 46 years for men. On average, women have 7.6 years while men have 10.6 years of education. 45 % of women and 59 % of men work for payment. Average household size is 7. Average annual household income is around 2.7 million UShs (~720 USD). Polygamy is a common marital arrangement with over 20 % of the respondents reporting polygamous relationships (data collected were concerned solely with the wife who resided in the homestead where the survey took place). In line with the tradition that women do not inherit land, female participants own much less land. In fact, only a handful of women own land in our sample.

Women are more likely to be a member of a savings group than male participants. There are also large and statistically significant differences between female and male participants in psycho-social variables including perceived marriage quality, conscientiousness, attitudes towards women's empowerment, and pro-social preferences.

Table A.1 in the Appendix focuses on descriptive differences between treatment and control households i.e. those who received hidden income compared to those receiving unhidden income. On average, the two groups are balanced on most characteristics except educational attainment and probability of working for payment (both are significant only at the 10 % level). The similarity in socio-economic characteristics of households that received hidden income compared to those who received unhidden income shows that our quasi-random allocation of treatment worked as intended. We do not ex-ante expect unobservable characteristics to be unbalanced across the quasi-randomly selected treatment groups other than what is captured with stated WTP.

5. Results

5.1. *Willingness to pay (WTP) to hide income*

Table 3 summarizes the WTP to hide income (as a fraction of the full reward) elicited using the BDM mechanism. Overall, we report an average WTP of 49 % of the full reward offered, with only three respondents (1 % of the sample) stating zero WTP to hide income. As a result, we reject our first hypothesis that WTP for hidden income is zero. We interpret positive levels of WTP to hide income as inefficiency arising from non-cooperation which invalidates the assumption of cooperative household models. This is in line with the findings in the literature: Munro (2018) reports an average of 75 % efficiency rate across studies in his review study.

The mean WTP was 48 % of the offered reward amount for male respondents whereas over 50 % for female respondents. The difference in mean WTP between female and male respondents was not significantly different from zero (p-value = 0.15) which results in a failure to reject our second hypothesis. Given the insignificant gender differences in WTP, the amount of money received from the experiment is also not

Table 2
Sample Characteristics.

	Mean Total (N=422)	Mean Female (N=217)	Mean Male (N=205)	Female-Male Mean Difference p-value
Age in years	43.66	41.25	46.23	0.00
Highest education in years	9.02	7.56	10.58	0.00
Number of years of marriage	22.49	22.33	22.65	0.73
Polygamous HH (0/1)	0.23	0.28	0.19	0.03
HH size	7.29	7.06	7.54	0.05
Works for payment (0/1)	0.52	0.45	0.59	0.00
Annual HH income in million UShs	2.72	2.28	3.18	0.00
Smartphone ownership (0/1)	0.19	0.18	0.20	0.58
Land self-owned (in acres)	0.23	0.06	0.42	0.00
Marriage quality	30.01	29.07	31.00	0.00
Conscientiousness	28.98	29.91	27.99	0.00
Attitudes: women's empowerment	15.17	16.89	13.33	0.00
Empowerment over purchasing decisions	60.60	54.10	67.52	0.00
Member of a savings group (0/1)	0.60	0.72	0.47	0.00
Social network engagement	1.00	0.50	1.53	0.00
Altruism	21.02	20.28	21.82	0.00
Trust	3.13	2.74	3.54	0.00
Risk preferences	19.90	18.44	21.46	0.00

Notes: 0/1 indicates binary variable.

Table 3
Summary of WTP as a ratio of the potential reward offered (%).

	Full sample (N=422)	Women (N=217)	Men (N=205)	High reward (N=207)	Low reward (N=215)
WTP (%)	49.02	50.55	47.90	47.80	50.79
Std. deviation	0.91	1.34	1.24	1.25	1.33
Difference p-value	–	0.146		0.101	

significantly different for both groups (around 19,000 UShs).

We also fail to reject our third hypothesis as the difference in mean WTP between those offered the high reward amount (48 %) and the low reward amount (51 %) is marginally insignificant (p-value = 0.101).

As an additional exploration, Figure 2 presents the distribution of stated WTP across genders and across the potential reward value offered. No meaningful difference is observed in distribution of WTP stated by men compared to that stated by women. The distribution of WTP for the high reward tends to be more peaked and right-skewed compared to the WTP distribution for low rewards, but overall respondents perceive the fair 'price' for hidden income as being proportional to the amount offered rather than as a direct monetary value. The concentration of bids in the 30 %, 50 %, and 70 % categories (which represent monetary amounts of 5,000 UShs, 10,000 UShs, 15,000 UShs and 20,000 UShs) indicates some anchoring of WTP at values that are round numbers.

5.2. Correlates of WTP to hide income

Results for the regressions of WTP (percent of total possible reward) are presented in Table 4 for the full sample along with results for regressions using only subsets comprised of women and men respectively. Partial correlations are also provided in Appendix Table A.7 for an easy interpretation of the relationship between WTP and a given factor. Results shown in Table 4 indicate a strongly differentiated profile of correlates for WTP for hidden income for men compared to women. Key results are presented in this section whilst interpretations are elaborated in the discussion section below.

Marriage quality is positively associated with stated WTP for hidden income or negatively associated with Pareto efficiency of households as measured by the WTP for hidden income. But the results are driven by the female subsample. For women, a key factor explaining WTP is perceived marriage quality. Women who report higher marriage quality stated higher WTP for hidden income.

Relatedly, empowerment over purchasing decisions is positively associated with a WTP for hidden income for all groups (whole sample, women-only, men-only). Despite sounding counter-intuitive at first, we think this result can be explained by the possibility of lower perceptions of the possibility of sanctions. For example, if a woman is sufficiently empowered and perhaps married to a man with more positive attitudes towards women's empowerment, it might be easier for her to get away with hiding money.

Perceived women's empowerment is also positively associated with stated WTP for the whole sample, but not significant for either of the subsamples. The loss of significance over subsamples is due partly to lower statistical power, but the coefficients are still positive for both subsamples confirming the positive relationship. Additionally, the coefficients seem smaller which arises from inclusion of other covariates in the analysis as some covariates have differing (positive or negative) effects for the two subsamples. This argument is supported by partial correlations between perceived empowerment and WTP (without inclusion of covariates) which are positive and significant and thus highly consistent in both subsamples (Table A.7).

Conscientiousness, an indicator of an ability to implement self-control, is negatively correlated with WTP to receive hidden income for men only. It appears that men, but not women, have a significantly higher propensity to seek hidden income when they have lower levels of self-control. Altruism and risk preferences are not statistically significantly correlated with WTP overall. However, the coefficients are significantly different from zero when we focus on subsamples. In fact, both coefficients are positive for men and negative for women. Partial correlations between altruism and WTP for male and female subsamples are also insignificant (Table A.7).

Being a member of a savings group is negatively associated with WTP to hide income from spouse for women, and not men. In particular, being a member of a savings group reduces women's WTP to hide income by approximately 4.5 percentage points. Regarding the relationship between WTP and financial situation, employment has a significant and positive effect on WTP to hide income for men but not women. Men who work off-farm state a WTP level of more than 7 percentage points

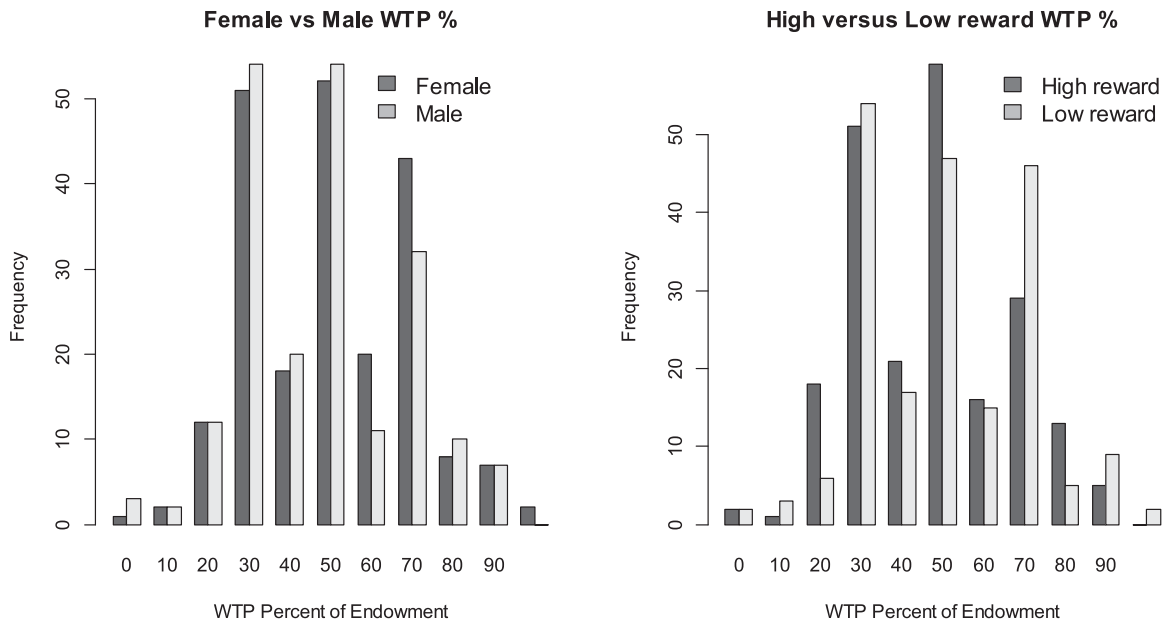

Figure 2. Comparisons of WTP (% of potential reward) across gender and reward value. Notes: WTP as a fraction of the full reward (endowment) offered. High reward is 30,000 UShs. Low reward is 15,000 UShs.

Table 4
Correlates of WTP (%) hidden income. OLS estimations.

	WTP (%)		
	Full sample	Female only	Male only
Marriage quality score	0.488*	0.908***	0.104
	(0.254)	(0.289)	(0.593)
Conscientiousness score	−0.326	0.452	−1.190**
	(0.308)	(0.442)	(0.478)
Perceived women's empowerment	0.927***	0.586	0.014
	(0.295)	(0.467)	(0.495)
Empowerment over purchasing	0.259***	0.289***	0.439***
	(0.070)	(0.104)	(0.113)
Member of a savings group (0/1)	−0.996	−4.503*	1.645
	(1.924)	(2.710)	(2.757)
Social network engagement	−0.520	−0.374	1.740
	(1.124)	(1.767)	(1.568)
Altruism score	−0.190	−0.798*	0.824**
	(0.278)	(0.421)	(0.401)
Trust score	0.693	0.853	−0.159
	(0.532)	(0.814)	(0.783)
Risk score	0.101	−0.020	0.523**
	(0.154)	(0.193)	(0.261)
Employed (0/1)	1.297	1.597	7.359**
	(1.995)	(2.703)	(3.185)
Log (annual HH income in millions Ushs)	−0.542	0.126	−1.139
	(1.175)	(1.573)	(1.859)
Smartphone ownership	−3.237	−10.472***	4.354
	(2.504)	(3.434)	(3.556)
Land self-owned (in acres)	0.731	0.281	0.728
	(1.259)	(2.998)	(1.415)
HH size	−0.271	−0.215	−0.269
	(0.380)	(0.509)	(0.595)
Polygamous (0/1)	1.199	−0.851	3.284
	(2.192)	(2.801)	(3.410)
Years married	0.161	0.010	0.072
	(0.173)	(0.260)	(0.247)
Education in years	−0.134	−0.060	−0.288
	(0.223)	(0.313)	(0.315)
Age in years	−0.205	−0.097	0.032
	(0.172)	(0.269)	(0.244)
Intercept (constant)	23.466	9.553	12.947
	(16.285)	(21.170)	(27.758)
R-squared	0.088	0.156	0.2
Observations	419	216	203

Notes: (0/1) indicates binary. Standard errors in parentheses. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

higher than men who do not work off-farm. We also find that ownership of smartphones is strongly negatively associated with women's WTP for hidden income indicating a potential role for technology in providing for greater freedom in expenditure choices of individuals. Lastly, we do not observe a meaningful relationship between WTP for hidden income and other demographic variables including age, education, number of years of (de-facto) marriage, being in a polygamous union, or household size.

5.3. *Effect of hidden income on expenditure patterns*

5.3.1. *Estimated effects for public to private expenditure ratio*

We consider three variables for comparison regressions for the effects of private versus public expenditures for treated and control participants: (i) expenditures on public (household) goods/services, (ii) expenditures on private expenditures, and (iii) the ratio of public (household) expenditures to private (self) expenditures. We believe, however, that the third one (the ratio of public to private expenditures) provides a more efficient identifier of effect due to the level variables (option i and ii) being generally tied to overall expenditures (and so including a large amount of variance that may be uncontrolled for) and due to the possibility that changes in public expenditures come as a trade-off with private expenditures.

We use three different matching methods, including the presence of covariates or not, and testing for subset effects for men and women. Results presented here are for covariate-adjusted regressions for the ATE for ratio of public to private expenditures measure only. Results for levels variables of private expenditures and public expenditures are included in the Appendix. Covariates included age of the respondent, household acres of land owned, education level of the respondent, household income per annum, what reward type was offered (high (30,000 Ushs) = 1, low (15,000 Ushs) = 0), and the WTP percent. There are no substantial differences for either the ATT comparisons or regressions without including additional covariates.

Table 5 shows the ATE for the ratio of public to private expenditures, our preferred measure. In all cases a higher value of the estimate indicates a propensity for treated respondents (i.e. those receiving a private reward) to increase public expenditures and/or decrease private expenditures more than control respondents (those receiving the reward in front of their spouse). Across all cases for the full sample there is strong evidence for a positive ATE of the ratio of public to private

Table 5
Results for the ATE for ratio of public to private expenditures (Treatment = Hidden Income).

	Genetic algorithm (full matching with replacement)	Nearest Neighbor (with replacement)	Propensity Score Matching	Unmatched (raw data)
		Full sample (N=404)		
Estimate	2.33*	3.16**	3.04**	2.47
Lower bound (95 %)	4.99	5.63	5.8	6.3
Upper bound (95 %)	−0.32	0.69	0.29	−1.35
		Female subsample (N=213)		
Estimate	3.37**	4.24***	3.6**	2.91
Lower bound (95 %)	3.28	4.02	4.97	6.52
Upper bound (95 %)	−1.29	−0.49	−0.22	−2.54
		Male subsample (N=191)		
Estimate	0.99	1.77	2.38*	1.99
Lower bound (95 %)	6.58	7.21	6.72	7.58
Upper bound (95 %)	0.17	1.28	0.48	−1.76

Notes: SMD refers to Standardized Mean Difference. * is an aggregate distance measure incorporating all differences.

expenditures, indicating a rejection of the hypothesis that public to private spending does not differ across treated and untreated households. The estimate, around the value of 3, indicates that treated respondents had a 3 times higher ratio for public to private expenditures than control respondents. This pattern is not continued for the male and female subsets.

The middle and lower sections of Table 5 show that the effect is driven exclusively by the female respondents. The female subset ATE results show strong support for a large and positive treatment effect with treated women having more than 4 times higher values for their ratio of public to private expenditures compared to female control respondents. There is no such effect for men. Male subset results show all estimates being statistically insignificant – indicating that men did not substantially change expenditure allocations across public and private good/service categories in response to receiving hidden income.

The results for the ATE for public and private expenditures comparisons are presented Table A.3 and Table A.4, respectively. In almost all cases the estimates of public and private expenditure are insignificant. There is some indication that the magnitude and direction of effect may be different for women (positive and large) compared to men (close to zero) but these results are not significant for public expenditure comparisons.

5.3.2. *Estimated effects for outside transfers*

For the effect of receiving hidden income on outside transfers (i.e. transfers to respondents' social network) we consider two comparison regressions for treated and control participants: (i) the level of outside transfers and (ii) the ratio of outside transfers to all expenditures. Table 6 shows the ATE results for the ratio of outside transfers to all expenditures only. Results for the levels variable (expenditures on outside transfers) are presented in the Appendix. The results shown in Table 6 provide further support for treatment effects occurring for women, but not for men, for the effect of receiving hidden income on outside transfers.

The ratio formulation, our preferred measure, shows that there is a consistent statistically significant effect across all matching methods for women increasing relative transfers to their social network. These results indicate a potential coping strategy for claims on income by the spouses of women through extending loans or 'grants' to their social network. This phenomenon has been observed in other settings (e.g. Anderson and Baland 2002; Castilla and Walker 2013).

We present the results for the ATE of the levels of outside transfers in Table A.5. Results are mixed with strong evidence from the Genetic Algorithm matching method for positive ATE on outside transfers for the overall sample and for the female subset sample even more strongly. However, the strong result is not carried across to other methods for the overall sample and is only significant for the PSM approach in the case of the female subset. In all cases we see no evidence of changes to outside transfers based on the receipt of a private reward for men.

5.3.3. *Estimated effects for savings*

Regarding the effect of receiving hidden income on savings, we are interested in two comparison regressions for treated and control participants: (i) the level of savings and (ii) the ratio of savings to all expenditures. Table 7 shows results for the ATE of the ratio of savings to total expenditures, whereas results for the levels representation of savings expenditure are shown in the Appendix.

Results show no statistically significant effects for any combination of subset and matching algorithm and, in combination with the results above, are suggestive that these data cannot provide support for any

Table 6
Results for the ATE of receiving hidden income on the ratio of outside transfers to all expenditures (Treatment = Hidden Income).

	Genetic algorithm (full matching with replacement)	Nearest Neighbor (with replacement)	Propensity Score Matching	Unmatched (raw data)
		Full sample (N=404)		
Estimate	0.01*	0.02**	0.01*	0.01
Lower bound (95 %)	0.03	0.03	0.03	0.04
Upper bound (95 %)	0	0	0	−0.01
		Female subsample (N=213)		
Estimate	0.03*	0.03**	0.03**	0.03
Lower bound (95 %)	0.01	0.01	0.01	0.03
Upper bound (95 %)	−0.01	0	−0.03	−0.03
		Male subsample (N=191)		
Estimate	0	0	−0.01	0
Lower bound (95 %)	0.05	0.06	0.06	0.06
Upper bound (95 %)	0	0	0	−0.01

Notes: All comparison estimates include clustered standard errors using subset clustering based on subsets from matching procedures.

Table 7
Results for the ATE of receiving hidden income on the ratio of savings to all expenditures (Treatment = Hidden Income).

	Genetic algorithm (full matching with replacement)	Nearest Neighbor (with replacement)	Propensity Score Matching	Unmatched (raw data)
		Full sample (N=404)		
Estimate	0.03	0.04	0.03	0.06
Lower bound (95 %)	0.25	0.25	0.13	0.28
Upper bound (95 %)	−0.19	−0.17	−0.08	−0.17
		Female subsample (N=213)		
Estimate	−0.03	−0.05	−0.05	−0.02
Lower bound (95 %)	0.63	0.67	0.32	0.42
Upper bound (95 %)	−0.42	−0.37	−0.09	−0.12
		Male subsample (N=191)		
Estimate	0.1	0.15	0.11	0.15
Lower bound (95 %)	0.1	0.13	0.21	0.25
Upper bound (95 %)	−0.17	−0.23	−0.31	−0.3

Notes: All comparison estimates include clustered standard errors using subset clustering based on subsets from matching procedures.

effect on the savings respondents, male or female, in response to the receipt of hidden income (Table 7).

Table A.6 shows the results for the ATE of hidden income on the savings of experiment participants. Overall, there are few statistically significant effects on the ATE for savings across regression comparisons with matched and unmatched data. The sole exception is a negative effect on savings for women when using the genetic algorithm and nearest neighbor matching procedures (significant at the 5 % and 10 % level, respectively). These results provide weak evidence indicating a negative effect on savings when women receive hidden income.

6. Discussion

Our analysis presents a range of results related to the demand for hidden income, the socio-demographic and psycho-social correlates for that demand, and the impact of receiving hidden income on small range of potential expenditure choices related to household versus private expenditures, savings, and transfers to one's social network. Major patterns in these results include:

i) Women and men both seek to hide income from their spouse as indicated by their positive WTP for hidden income.
ii) There are differences between men and women in terms of the socio-demographic and psycho-social correlates of demand for hidden income.
iii) There are gender differences in the impact of receiving hidden income on subsequent expenditure patterns.

We explore these key results with reference to specific instances that are significant and have relevance to the literature below.

The growing literature on the quantification of demand by spouses for income hidden from their spouse and family/kin supports two main insights. First, demand for hidden income is both present and large. Second, it is consistent across the range of cohorts considered in this literature. While much of the literature relevant to this study focuses on poor households in developing countries (see Deschênes et al. 2020), there is also a large literature within more developed countries that highlights common patterns of 'financial infidelity' amongst the partners in romantic relationships in which resources are pooled to some extent by those partners (see Garbinsky et al. 2020 for a review and description of financial infidelity). Our own results provide further support for the persistence of demand for hidden income across both a range of contexts and across women and men. Specifically, our results show no statistically significant differences in their demand for hidden income (as indicated by stated WTP values for hidden income) with both groups showing strongly positive demand levels. Our results align largely with the literature that demonstrates spousal willingness to lower overall household income levels to obtain some income as hidden from one's spouse (e.g. Castilla and Walker 2013). These are indications that the non-cooperative model of the household has strong support, at least in the domain of income and consumption behaviors.

Our subsequent analysis of the impact of receiving hidden income on expenditure choices of the individual focused on four main patterns hypothesized a-priori: (1) expenditures on public (i.e. household-targeted) consumption items; (2) expenditures on private consumption items; (3) savings, and; (4) transfers to one's social network. The most consistent effects related to the ratio of public to private expenditures and to the tendency to transfer more money to one's social network when receiving hidden income. It appears that all major results were driven by the women subsample with men having no consistent significant effects for hidden income on these expenditure variables across the matching methods applied. These results indicate that hidden income generates significant changes in expenditure patterns for women but not men in our sample. Similar findings were obtained by Boltz et al. (2019) who found that the effects of hidden income were generally lower on men than on women in their study on households in Senegal. The authors attributed these results to greater claims by the partner on income held by women compared to men. This reasoning fits with our anecdotal insights into cultural norms in the region wherein men often appear to retain substantial assets and income sources that are not subject to the household claims or which can be used as sources of hidden income. Our results are also similar to a range of results showing that women receiving hidden income tend to spend a greater proportion of that hidden income on household goods/services compared to men receiving hidden income.

Similarly, women have their own strategies to obtain independence in consumption decisions from their spouse in our study region. In the area of this study, funds held by women that are used for private consumption are associated with a specific term in the local language of Kupsabiny: 'jesuwye'. Contextually, jesuwye refers to private savings for oneself for which one's spouse is unaware. This indicates that there are cultural norms around hidden consumption and that hidden income and expenditures are somewhat normalized in the region. Our results indicate some possible caveats to this apparent 'equalizing' norm. Specifically, the contrast in effects of hidden income on expenditure patterns of women (significant) to those of men (insignificant) suggests that men may already have substantial sources of hidden income whilst women having less ability to obtain hidden income.

As presented in Table 2, there are notable differences in private asset (in particular land) ownership between genders. Men own more land independently of the household and are more likely to have off-farm employment relative to women (p-values for the differences < 0.001). Men also state a higher household income than women, indicating the potential for women having strong unobservability over elements of

income that men receive and perceive as household income. There are also differences in the expenditure patterns of women and men. For example, men allocate, on average, 92 % of all private spending on socializing and pleasure goods. This aligns with Castilla and Walker (2013), who found that men increased social network gifts after receiving hidden income. Conversely, only half of women's private expenditures go to their social network, with women, unlike men, increasing network transfers after receiving hidden income. This could reflect the relative independence of co-habiting spouses in Eastern Africa (Fapohuda 1988) and women's efforts to evade their husbands' claims (Castilla and Walker 2013).

Finally, we find significant differences between correlates of WTP for women compared to men. A key factor explaining WTP is perceived marriage quality for women, but not men. This result can be explained by the complex dynamics in the area (women's dependency on their husband, strong gender norms, and the stigma surrounding divorce). The variable capturing marriage quality focuses on conflict resolution and violence. Hence, we think that in a higher-quality marriage, a woman is not 'afraid' of her husband and so is relatively sure that there will be no serious consequences of being found with hidden income (e.g. violence). It will thus be easier to 'get away' with hidden income, which can explain the higher tendency to hide income otherwise given in the presence of and controlled by the husband.

The coefficient of conscientiousness (self-control) is negative and significant for men. Men seem to have a significantly higher tendency to seek hidden income when they have low levels of self-control. One can imagine that men with higher levels of conscientiousness are more likely to prefer future benefits for immediate rewards. Given that control over money is less of an issue for men than women on average, men with higher self-control (who perhaps engage in reasonable financial decisions in general) might not have strong incentives to hide money at a significant cost.

For women, being a member of a savings group is negatively associated with WTP for hidden income. This can be explained by that women who already have access to savings devices have a lesser incentive to pay for hidden income. This is in line with literature indicating that participation in a savings group is a strategy employed by married women to protect their savings against claims by their husband (Anderson and Baland 2002).

The altruism coefficient is statistically insignificant over the full sample and over the two subsamples with no covariates (Table A.7). However, in the full specification presented in Table 4 altruism is significantly correlated with WTP. One might imagine that the gender difference in the direction of correlation stems from different norms around control of money and perhaps intentions around how to spend the money received. Women with less altruistic tendencies e.g. those who have a strong preference to spend the money for themselves or on personal items, might report higher WTP to lower their chances of receiving the reward in the presence of their partners as women might have a higher need to keep the reward hidden to have control over it relative to men. For men, however, it might be less about the control over money and more about spending the money for themselves. Men in our sample have a much higher spending for socializing with friends, for instance. Hence, more altruistic men who have the intention to spend the windfall for/with others (e.g. socializing with friends and buying them a drink), might have less at stake in case of loss of hidden income. Field teams did report the observation that men were more comfortable and had fun during the experiment whereas women were particularly concerned with keeping money hidden. Although the relationship is not immediately clear, this might also explain the positive correlation between risk preferences and WTP. Given that the BDM mechanism has the random draw component, if these men consider the experiment more of a game, they might be more likely to take the risk of giving up on a larger fraction of the reward.

7. Conclusion

This study employs the Becker-De Groot-Marschak (BDM) method as a revealed preference approach to gauge the WTP of 422 spouses in rural Ugandan households to receive an experimental reward as 'hidden income' (without their spouse present) versus unhidden (in front of their spouse). Determining the WTP for hidden income quantifies potential efficiency losses in households since WTP reflects the extent individuals are willing to sacrifice household income to secure the remaining amount as hidden income. On average, households were willing to give up 49 % of the reward to keep it hidden, indicating substantial and statistically significant potential efficiency losses. No significant gender differences in WTP for hidden income are observed, nor did the size of the rewards affect participants' responses.

We considered a range of socio-demographic and psycho-social variables as correlates of WTP and find distinct gender-based differences. For women, high marriage quality and not being a member of a savings club are linked to higher WTP for hidden income. For men, self-control is negatively correlated with WTP for hidden income. Additionally, empowerment is associated with decreased household efficiency as measured by WTP for hidden income overall.

Additionally, women who received hidden income reported a higher ratio of public-to-private expenditures and more significant transfers to their social network compared to those receiving unhidden income. This suggests that women might leverage information asymmetries within the household to conceal money, possibly to avoid their husbands' claims. On the other hand, while men predominantly spent on socializing and pleasure goods, they were not significantly affected by the income endowment presented in this study. We propose two possible explanations for these results, one that is contextual to the region and one that is related to statistical power. In the first case, a possible explanation is that men already have substantial sources of hidden income and that the endowment received merely goes into a general 'pool' of hidden income streams held by men. In such a case, observing changes in behaviors related to hidden income becomes more difficult due to a larger pre-existing pattern of behavior. By the same argument, our findings of no impact on men from our hidden income treatment may be simply due to men having a larger overall budget for expenses. Hence, in the case, a stronger change is needed to detect effects of hidden income on men's consumption behaviors. Both cases indicate a need for more detailed consideration of income and consumption dynamics.

Overall, our findings indicate that current savings products may not effectively shield earnings from kin 'taxation' or spousal claims over their partner's income (see Jakiela and Ozier 2016 for research on kinship claims over income). In addition, savings tools may come 'too late' to be effective, often occurring after income has been observed by kin suggesting a need for more focus on how income is received by spouses.

This study represents an important contribution to the household behavior literature. The research employs an established method in a novel context to elicit WTP to conceal income from a spouse, examines the correlates of willingness to pay for hidden income separately for men and women, and analyzes the impact of receiving hidden income on household allocations. The literature consistently reports large inefficiencies and non-cooperation within the household in developing countries. Our study supports these general findings and adds to this by jointly testing the demand for hidden income, the impact of hidden income on expenditure patterns and expenditure pattern differences between men and women spouses.

Several potentially fruitful directions have been indicated from this research. Firstly, there are clear indications that men and women have different patterns of expenditure that reflect different levels of concern for household welfare. The expenditure patterns associated with hidden income appear to reflect these concerns. Identifying in greater detail the existing income streams, and associated consumption patterns, held by

the spouses would likely help explain some of our results. Secondly, the study is limited in terms of being able to observe income and consumption dynamics across the spouses. A more detailed application of longer-term diary-based income and consumption tools tied to randomized endowments would generate deeper insights into income and consumption dynamics related to hidden and unhidden income at an individual level. Finally, we note the apparent importance of perceptions related to cultural norms (e.g. perceived women's empowerment), marriage quality, and the role of independent employment in demand for hidden income. These perceptions are related to empowerment issues but also appear to be strongly tied to the efficiency of household income and consumption choices. More detailed research that seeks to merge descriptive elements (e.g. from a diary measure) with causal methods (e.g. randomized endowments) and integrates intra-household and cultural norms considerations would provide more thorough insights.

Key limitations of this study relate to the short duration of the post-experiment expenditure diary (collected for a week following the experiment in November 2019) and to the relatively small sample size located in a distinct region of Uganda. We note that, even accounting for our efforts to minimize responder effects, there may also be social desirability and recall biases in self-reported expenses. Finally, while the diary measure used for expenditure measures has been shown to be effective in measuring changes in consumption/savings (see Garbinksy *et al.* 2021), there has not been any effort made to calibrate this tool with actual expenditures yet.

CRediT authorship contribution statement

Cansın Arslan: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Daniel Gregg:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Randy Stringer:** Writing – review & editing, Supervision, Resources, Project administration, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A

Figure A1. District of Kapchorwa in eastern Uganda

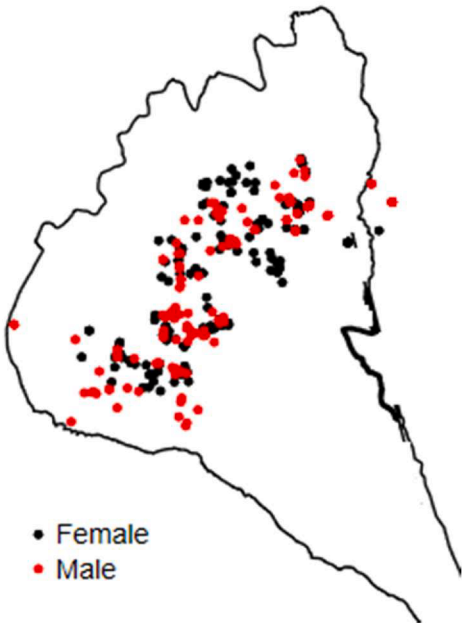

Figure A2. Geographical distribution of the sample across Kapchorwa. Notes: Some households look outside the district because of relatively low-quality GPS capture in the mountainous study area.

Table A1
Sample Characteristics of Treated (Private rewards) versus Control (Public rewards).

	Mean	Mean	Mean	Private-Public Mean Difference p-value
	Total (N=422)	Private (N=283)	Public (N=139)	
Age in years	43.66	41.24	46.21	0.000
Highest education in years	9.00	7.55	10.52	0.000
Number of years of living together	22.51	22.38	22.65	0.759
Polygamous HH (0/1)	0.23	0.28	0.19	0.027
HH size	7.32	7.09	7.55	0.058
Works for payment (0/1)	0.52	0.45	0.59	0.004
Annual HH income in million UShs	2.72	2.28	3.18	0.002
Smartphone ownership (0/1)	0.19	0.18	0.20	0.514
Land self-owned (in acres)	0.25	0.06	0.45	0.000
Marriage quality (0–1)	0.82	0.82	0.83	0.454
Conscientiousness (0–1)	0.50	0.51	0.49	0.198
Attitudes: women's empowerment (0–1)	0.65	0.66	0.63	0.148
Empowerment over purchasing decisions (0–1)	0.49	0.48	0.50	0.326
Member of a savings group (0/1)	0.59	0.57	0.64	0.162
Social network engagement (0–10)	0.25	0.24	0.27	0.392
Altruism (0–1)	0.45	0.47	0.42	0.024
Trust (0–1)	0.24	0.22	0.27	0.145
Risk preferences (0–1)	0.50	0.50	0.50	0.763

Notes: 0–1 refers to a range between 0 and 1. 0/1 indicates binary variable.

Table A2
Pre-matching and post-matching standardized mean difference results.

	Pre-Matching			Post-Matching			Percent improvement
	Means Treated	Means Control	SMD	Means Treated	Means Control	SMD	
Distance*	0.7	0.59	0.7	0.7	0.68	0.1	93
Experimental variables							
WTP %	51.78	43.21	0.5	51.78	50.58	0.07	86
High reward (0/1)	0.53	0.48	0.11	0.53	0.51	0.04	0
Female (0/1)	0.56	0.45	0.22	0.56	0.56	0	100
Household variables							
Number of children	4.98	4.92	0.03	4.98	4.92	0.03	−6
Income	2.57	2.96	−0.16	2.57	2.43	0.06	63
Behavioral and social conditioning variables							

(*continued on next page*)

Table A2 (*continued*)

	Pre-Matching			Post-Matching			Percent improvement
	Means Treated	Means Control	SMD	Means Treated	Means Control	SMD	
Empowerment over expenditures	3.7	4.02	−0.11	3.7	3.48	0.08	31
Marriage quality	29.85	30.15	−0.07	29.85	30.08	−0.05	25
Conscientiousness	29.15	28.61	0.16	29.15	29.03	0.04	78

Notes: SMD refers to Standardized Mean Difference. * is an aggregate distance measure incorporating all differences.

Table A3
Results for ATE for public expenditures (Treatment = Hidden Income).

	Genetic algorithm (full matching with replacement)	Nearest Neighbor (with replacement)	Propensity Score Matching	Unmatched (raw data)
	Full sample (N=404)			
Estimate	1039.7	10316.89	4396.97	−2121.96
Lower bound (95 %)	19901.15	31801.18	31034.55	24991.33
Upper bound (95 %)	−17821.76	−11167.4	−22240.61	−29235.25
	Female subsample (N=213)			
Estimate	7682.07	25994.7**	11788.81	2617.3
Lower bound (95 %)	16822.27	18611.63	21151.82	24710.71
Upper bound (95 %)	−31823.25	−38292.22	−30172.57	−39524.92
	Male subsample (N=191)			
Estimate	−7500.49	−9840.29	−4510.37	−7407.1
Lower bound (95 %)	28861.38	49740.17	42064.6	35737.41
Upper bound (95 %)	−13497.24	2249.24	−18486.97	−30502.81

Notes: All comparison estimates include clustered standard errors using subset clustering based on subsets from matching procedures.

Table A4
Results for ATE for private expenditures (Treatment = Hidden Income).

	Genetic algorithm (full matching with replacement)	Nearest Neighbor (with replacement)	Propensity Score Matching	Unmatched (raw data)
	Full sample (N=404)			
Estimate	−1879.48	−593.86	−376.41	−1812.23
Lower bound (95 %)	538.94	1990.58	2430.09	1785.47
Upper bound (95 %)	−4297.9	−3178.29	−3182.92	−5409.94
	Female subsample (N=213)			
Estimate	−1724.08	48.73	1035.99	−817.07
Lower bound (95 %)	1386.85	2122.59	2175.96	1339.75
Upper bound (95 %)	−5545.41	−4962.68	−6332.75	−7183.78
	Male subsample (N=191)			
Estimate	−2079.28	−1420.04	−2078.4	−2922.02
Lower bound (95 %)	802.54	2874.03	4239.97	3577.69
Upper bound (95 %)	−4250.7	−2776.57	−2167.98	−5211.83

Notes: All comparison estimates include clustered standard errors using subset clustering based on subsets from matching procedures.

Table A5
Results for the ATE of a private reward on outside transfers (transfers to social network) (Treatment = Hidden Income).

	Genetic algorithm (full matching with replacement)	Nearest Neighbor (with replacement)	Propensity Score Matching	Unmatched (raw data)
	Full sample (N=404)			
Estimate	504.57	1070.71***	688.53***	663.33
Lower bound (95 %)	1106.51	1697.73	1155.97	1582.48
Upper bound (95 %)	−97.37	443.69	221.09	−255.83
	Female subsample (N=213)			
Estimate	683.91	1511.67***	1352.23***	1022.41*
Lower bound (95 %)	958.71	1163.59	894.28	1351.69
Upper bound (95 %)	−410.73	−156.1	−1116.76	−825.92
	Male subsample (N=191)			
Estimate	273.99	503.75	−111.24	262.88
Lower bound (95 %)	1570.76	2490.52	2003.47	2145.19
Upper bound (95 %)	−202.94	532.83	700.99	−100.38

Notes: All comparison estimates include clustered standard errors using subset clustering based on subsets from matching procedures.

Table A6
Results for the ATE of a private reward on savings (Treatment = Hidden Income).

	Genetic algorithm (full matching with replacement)	Nearest Neighbor (with replacement)	Propensity Score Matching	Unmatched (raw data)
	Full sample (N=404)			
Estimate	−1923.89	920.45	−1549.51	−3432.13
Lower bound (95 %)	14745.31	16494.18	9257.87	13447.65
Upper bound (95 %)	−18593.08	−14653.28	−12356.9	−20311.9
	Female subsample (N=213)			
Estimate	−10418.43**	−6079.24	−8457.94	−9940.97
Lower bound (95 %)	49861.83	50853.31	35849.14	23821.84
Upper bound (95 %)	−31866.47	−31013.19	−22298.55	−16168.99
	Male subsample (N=191)			
Estimate	8997.68	9920.06	6775.29	3826.43
Lower bound (95 %)	−1351.94	5519.13	6692.47	10678.44
Upper bound (95 %)	−19484.93	−17677.62	−23608.35	−30560.38

Notes: All comparison estimates include clustered standard errors using subset clustering based on subsets from matching procedures.

Table A7
OLS estimations for correlates of WTP for hidden income as the dependent variable. Separate regressions estimated variable-by-variable (univariate).

	Partial correlations (estimated as univariate models with intercept)			Full model (each variable included in the model – as per Table 4)		
	Whole sample	**Female only**	**Male only**	**Whole sample**	**Female only**	**Male only**
Marriage quality score	0.244	0.540**	−0.535	0.488*	0.908***	0.104
	(0.232)	(0.254)	(0.571)	(0.254)	(0.289)	(0.593)
Conscientiousness score	−0.541**	−0.293	−1.142***	−0.326	0.452	−1.190**
	(0.274)	(0.389)	(0.419)	(0.308)	(0.442)	(0.478)
Perceived women's empowerment	0.589**	0.729	0.435	0.927***	0.586	0.014
	(0.263)	(0.461)	(0.416)	(0.295)	(0.467)	(0.495)
Empowerment over purchasing	0.192***	0.187*	0.384***	0.259***	0.289***	0.439***
	(0.0615)	(0.0978)	(0.0957)	(0.070)	(0.104)	(0.113)
Member of a savings group	−0.554	−5.260*	2.205	−0.996	−4.503*	1.645
	(1.856)	(2.705)	(2.705)	(1.924)	(2.710)	(2.757)
Social network engagement	−0.556	−1.825	1.610	−0.520	−0.374	1.740
	(0.950)	(1.687)	(1.526)	(1.124)	(1.767)	(1.568)
Altruism score	−0.0822	−0.719*	0.400	−0.190	−0.798*	0.824**
	(0.231)	(0.368)	(0.307)	(0.278)	(0.421)	(0.401)
Trust score	0.800*	0.737	1.054*	0.693	0.853	−0.159
	(0.443)	(0.766)	(0.567)	(0.532)	(0.814)	(0.783)
Risk score	0.223	0.115	0.539**	0.101	−0.020	0.523**
	(0.140)	(0.179)	(0.236)	(0.154)	(0.193)	(0.261)
Employed (0/1)	2.132	2.593	2.451	1.297	1.597	7.359**
	(1.820)	(2.464)	(2.744)	(1.995)	(2.703)	(3.185)
Log (annual HH income in mill. Ushs)	−0.849	−0.973	0.0968	−0.542	0.126	−1.139
	(1.043)	(1.362)	(1.736)	(1.175)	(1.573)	(1.859)
Smartphone ownership	−3.742	−9.335***	1.871	−3.237	−10.472***	4.354
	(2.333)	(3.163)	(3.396)	(2.504)	(3.434)	(3.556)
Land self-owned (in acres)	0.194	1.135	0.505	0.731	0.281	0.728
	(1.208)	(3.015)	(1.400)	(1.259)	(2.998)	(1.415)
HH size	−0.322	−0.203	−0.357	−0.271	−0.215	−0.269
	(0.369)	(0.500)	(0.551)	(0.380)	(0.509)	(0.595)
Polygamous (0/1)	1.767	−0.679	4.508	1.199	−0.851	3.284
	(2.150)	(2.742)	(3.451)	(2.192)	(2.801)	(3.410)
Years married	−0.00405	−0.152	0.167	0.161	0.010	0.072
	(0.0986)	(0.131)	(0.148)	(0.173)	(0.260)	(0.247)
Education in years	−0.122	0.120	−0.234	−0.134	−0.060	−0.288
	(0.181)	(0.258)	(0.278)	(0.223)	(0.313)	(0.315)
Age in years	−0.0826	−0.141	0.0380	−0.205	−0.097	0.032
	(0.101)	(0.145)	(0.152)	(0.172)	(0.269)	(0.244)
Observations	419	216	203	419	216	203

Notes: (0/1) indicates binary. Standard errors in parentheses. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

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