Unitary or Noncooperative Intrahousehold Model? Evidence from Couples in Uganda

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We present an overview of the evidence regarding the unitary, collective and non-cooperative models of household decision making and discuss how they can affect individual and household welfare. We then discuss the results of an artefactual experiment conducted in Uganda with spouses in order to test whether household members maximize common preferences, or instead are willing to pay a significant cost to hide money from their spouse. We find that both the unitary and non-cooperative models exist in the intra-household decision making process and that a "one-size fits all" model of household decision making is unlikely to be satisfactory. JEL codes: D13, J12, O12

The decision-making process within the family has great implications for both individual outcomes, like health and education, and public policies. However, some of the basic questions about the family decision-making process remain unclear. Theoretical models of household behavior offer different assumptions about what households maximize: the unitary approach (Samuelson 1956; Becker 1965) assumes that households maximize a common set of preferences where all income is pooled and the identity of the income recipient does not affect household decisions, while the collective approach (McElroy and Horney 1981; Manser and Brown 1980) assumes that the household members maximize a weighed sum of individual preferences where the identity of the individual controlling resources affects decisions, and bargaining power depends on control of allocation. Both of these approaches however can lead to a Pareto optimal outcome. Under the noncooperative household production model, the household bargaining process can lead to important inefficiencies (Carter and Katz 1997; Fafchamps 2001).

We first present an overview of the evidence regarding the unitary, collective, and noncooperative models and discuss how they can affect individual and

household welfare. The scope of the evidence of when the unitary model does not hold presents strong evidence that intrahousehold bargaining is an important issue in many contexts.

We then present the results of an artefactual experiment conducted in Uganda with spouses in order to test whether household members maximize common preferences or instead are willing to pay a significant cost to hide money from their spouse. In sum, 731 couples are offered the tradeoff between maximizing household income or paying a penalty to gain greater control over that income. We find that both the unitary and noncooperative models exist in the intrahousehold decision-making process and that a "one-size fits all" model of household decision making is unlikely to be satisfactory.

Our work is very close to that of Zou (2015), who conducts an artefactual experiment in Burkina Faso in which married individuals reveal their relative valuation of spouse's earnings over their own. Our contribution to the literature lies in that we use a specific experimental design that can directly investigate whether couples share the same preference or not, and we provide direct evidence that both unitary and noncooperative models exist, which gives credit to the popularity of the intrahousehold bargaining model.

The remainder of this article is structured as follows. In section 1 we discuss existing evidence of the unitary model of the household. We present the experimental design in section 2 and the results in section 3. Section 4 concludes.

I. Evidence of the Unitary Model

There is growing evidence that the unitary household model fails to describe intrahousehold decision making. Recent research lends strong support to an intrahousehold model that considers the existence of other individuals in the households that, through a bargaining process, play a complex role in household decision making. This document presents a short outline of the literature that explores when the unitary model is not sufficient to describe household behavior.

There is a broad literature on how household bargaining impacts household decision-making in different fields. One implication of household bargaining is on household expenditure. Hashemi et al. (1996) finds that being a member of Grameen Bank or BRAC (Bangladesh Rural Advancement Committee) increases the involvement in household decisions and in making purchases. Holvoet (2005) presents evidence that group-based lending for women in South India has a positive effect on household decision-making regarding loan use and money management. In Ghana, Doss (1996) shows that using the assets held by women in the households as a measure of bargaining power has implications for household expenditure decisions.

Some studies show the impact of household bargaining on consumption of specific goods. De Brauw et al. (2013) study conditional cash transfers (CCTs) given to women in Brazil and find impacts on the purchase of household durable of goods. In the same line and also for Brazil, Polato e Fava and Arends-Kuenning

(2013) show how bargaining power in the household influences the decision of buying household production durables goods or entertainment durable goods. For Côte d'Ivoire, Duflo and Udry (2004) show that rain shocks can affect household bargaining power, leading to an impact on expenditure. Based on the idea that in many African countries there is some gender specialization in farming crops, it finds that shocks that increase the output of "female crops" shift the expenditures to all types of food (except staples), but if the shock affects the output of "male crops," it has no effect on the purchase of food. Rubalcava et al. (2009) study the CCTs PROGRESA program in Mexico and find that poor rural women that have resources under their control are more likely to spent on investment on children and in small-scale livestock. Based on the same data, Bobonis (2009) includes in the analysis a variation attributable to localized rainfall shocks. He also finds that income changes for women are positively related with expenditure on children's goods. However, the rainfall shock does not have a significant effect on household expenditure. For United Kingdom, Lundberg et al. (1997) also show an impact on the expenditure on children, particularly on children's clothing and on women's, when a child allowance is transferred to wives.

Peters (2011) studies a family planning program in Bangladesh and finds that women treated by the program are less likely to be able to make certain purchases without their husband's permission. In this case, the program is one that endows men with a new asset because the program is provided in certain random areas, and in Bangladesh married women moved in with their husbands. Other studies that find that the introduction of a family planning and health program decreases the bargaining power of treated women include Orrefice (2007) and Chiappori and Orrefice (2008).

The literature also stresses the impact of household decision-making on labor supply and time allocation. Oreffice (2007) studies the impact of legalization of abortion in some states of the United States and finds that it affects household bargaining, and its effect is a decrease in labor supply of married women and an increase in their husband's labor supply. Heath and Tan (2014) find the opposite effect in India when bargaining power is given by an inheritance law that improve women' situation to inherit property. Gray (1998) shows for some states of United States that marital-property laws determine how unilateral-divorce laws affect household bargaining. He finds that wives increase their labor supply and this change reflects changes in home-production hours and in leisure time. However, based on the same data, Stevenson (2008) shows that any unilateral divorce law increases wives labor supply. The same effect is found in Iversen and Rosenbluth (2006) in their study for several countries (most established democracies, some east European countries, and the Philippines). In the study of Holvoet (2005), where credits were given to women, is shown that group-based lending for women also affects time allocation to women. For the United States, Friedberg and Webb (2005) study the effect of spouse's relative wages as a measure of household bargaining on time used during the weekend. They find that when the wives' relative wage increases, they enjoy more leisure time and

dedicate less time to household work. In the same line, Bittman et al. (2003) find that in the United States and Australia women decrease the time in household work if their earnings increase.

There is also evidence that household bargaining affects investment and agriculture supply. Yilmazer and Lich (2015), based on data for the United States, find that different risk preferences of wife and husband affect the household portfolio asset allocation, and consequently, the level of risk of investment depends on the risk tolerance of the spouse with more power bargaining. With respect to the impact on agriculture supply, Lim et al. (2007) present evidence for Ethiopia, measuring bargaining power as the value of livestock each spouse would have in the event of a divorce. The study finds that women's bargaining power influences negatively in cash crop production if the earnings of the cash crop are controlled by the husband and it is based on the wife's work.

Fertility, education, health, and nutrition of children have also been found to be affected by household bargaining. For fertility, the evidence can be found in Thomas (1990), which finds an impact on children's survival in Brazil; Rasul (2008) shows that for Malaysia and China the impact depends on the commitment to future actions in the marriage; and Ashraf et al. (2014) for Zambia finds that it depends on moral hazard, specifically in asymmetric information in the use of contraception. Regarding education, health, and nutrition of children, de Brauw et al. (2013) find that CCTs given to women in the "Bolsa Familia" program in Brazil increase the decision-making power of women in contraception use, as well as children's school attendance and health. Additionally, for Brazil, Thomas (1990) finds that unearned income in hands of women has more effect on household health than income in the hands of the husbands, and Thomas (1993) shows that income in general in the hands of women is positive related to expenditure on household education and health. Park (2007) studies the resource allocation of children's nutrition and education in Indonesia; he shows that for children's nutrition the unitary model is rejected while for education the results are mixed. Maluccio and Quisumbing (2003) show a positive correlation between indicators of female bargaining power and expenses on food and education for Bangladesh, Ethiopia, Indonesia, and South Africa.

The impact of household bargaining is also observed in domestic violence. In studies where microcredits given to women were analyzed, the impact was mixed. There are some studies that find a decrease in domestic violence (Hashemi et al. 1996; Kabeer 2001), while others find that microcredits or any means that make women richer increase it (Goetz and Sen Gupta 1996; Rahman 1999; Bloch and Rao 2002; Balasubramanian 2013). Literature also finds an effect on policy preferences, for example, the work of Iversen and Rosenbluth (2006) finds that increase in women's labor participation has an effect on women's policy preferences. This is driven by the idea that women will try to improve their exit options from the marriage and their household bargaining, and they will choose the policies that fit best with their preferences.

Some more general studies include Kebedea et al. (2014), who runs an experiment with couples in Ethiopia where information about endowments is varied. He finds that information improves efficiency in only some treatments, meaning information is context dependent. Husbands' expectations of their wives contributions are higher than their wives' actual contributions, and wives' expectations of their husbands' are lower than their husbands' actual contributions. Carlsson et al. (2009) find differences in risk preferences when spouses make decisions separately and together. The couples' risk preferences become more similar the richer the spouses and the higher the relative income contribution of wives. And Ashraf (2009) looks at the effect of observability and communication on financial choices of married individuals in the Philippines. When choices are private, men put money into their personal account. When choices are observable, men commit money to consumption for their own benefit, but when spouses are able to communicate, men put money into their wife's account.

II. Experimental Design and Data

The experiment we describe here is designed to understand how control over income becomes an issue when preferences over money usage differs between spouses. We study the role of this factor using a design where participants are required to allocate money across two investment options. This question is inspired by Mani's (2011) work in India that found participants were willing to accept a low return option over a high return option in order to have greater personal control of money over their spouse.

The experiment is conducted in Northeast and Central Uganda. After completing a simple survey of respondent's demographic and income we asked individuals if we can meet with their spouse the next day to ask the same questions. If they said yes, the enumerator read the following:

> Thank you very much for letting us meet with you and your partner. Before I go, I have one final question. This question involves real money. I have 2,000 USH to give you for your time. You can choose to invest the money in two businesses. Let's call them business A and business B. If you invest in business A, the money will be doubled to 4,000 USH. I can pay this money to you now in cash. If you invest in business B, the money will be tripled to 6,000 USH. Another member of our research team will then give this money to your partner tomorrow at their business. Which investment would you prefer to make?

We believe this game is credible for three reasons. First, this data collection was part of a larger panel data collection where individuals had been visited four times previously. Second, the amount offered in the game is relatively large at about half a day's income for the average person. Finally, we test for whether income of the individual is correlated with the decision in the game and find no relationship.

In this game, the investor faces a tradeoff between generating larger household income and greater control over that income. We believe the interpretation of the game is quite straightforward: if both husband and wife prefer higher household

income, the unitary model is validated, and if either of the spouses prefers greater control rather than greater income, then the noncooperative household model is supported. We ask main respondents first, track their spouse's basic information and answer to the above game later, and then match the spouse's choices to investigate whether they share the same set of preference or not.

In sum, 731 married couples participated in the game; 60 percent of the primary participants are female. For the female subgroup, 8.8 percent of the participants are 18–23 years old, while people ranging from 24 to 35 comprise 66.8 percent. In addition, 14.9 percent are between 36 and 41 years of age, and the remaining 9.6 percent are from 41 to 50 years of age. For the male main respondents, 12 percent are aged from 18 to 23, 65.2 percent are aged from 24 to 35, 11.1 percent are aged from 36 to 41, and the remaining 11.7 percent aged from 41 to 50. About 82 percent of participants have completed primary school education, and 6.17 percent of participants have completed secondary school or have higher education level. There are 2.82 children in each household on average.

III. EXPERIMENTAL RESULTS

The results of the games are presented in table 1. There are several features worth noticing. First of all, about 37.7 percent couples choose to invest in the business that generates higher profits instead of choosing lower-return business and keeping the money to themselves. This presents some validation of the unitary household model. However, 17.9 percent of couples jointly prefer greater control over income to greater income, indicating that both husband and wife hope to have greater control and more bargaining power in household decision-making.

The remaining 44.4 percent of couples have different preferences: one pursues higher income while the other one pursues higher control over that income, invalidating the assumption of unitary model. The contradicting preferences over income and control among couples suggest that couples compete for bargaining

TABLE 1. Game Summaries

	Pooled		Wives		Husbands	
	N	Percent	N	Percent	N	Percent
Trust spouse=1	236	0.324	90	0.241	146	0.416
Trust spouse=0, Trust primary=0	230	0.377	123	0.399	107	0.354
Trust spouse=1, Trust primary=0; or Trust spouse=0, Trust primary=1	271	0.444	135	0.438	136	0.45
Trust spouse=1, Trust primary=1	109	0.179	50	0.163	59	0.195

Notes: Trust spouse takes the value of 1 if they sent the money to their spouse. It takes value 0 if they decided to keep the money themselves at a cost.

power and the decision-making process within the household might be very complicated, which is also the reason why the household bargaining affects both the individual outcomes, like education, health, labor supply, as well as public policies like income transfer, and so forth, as evidenced by the various empirical studies.

Another feature worth noticing is that women and men have significant preferences over higher income and greater control. In sum, 41.6 percent of male respondents prefer higher income to greater control, while only 24.1 percent female respondents choose higher income rather than greater control. Moreover, 52 percent of the female respondents are trusted by their spouses, while 41.1 percent of the male respondents are trusted by their spouses, suggesting that male participants are more likely to choose higher income yet female respondents are more likely to choose higher control over income. This conclusion is similar to some other studies claiming that women are more cautious with money and they prefer to keep money by themselves because they are afraid that their husbands might use money unwisely.

IV. CONCLUSION

Theoretical models have different assumptions about the intrahousehold decision process. There are many alternative empirical studies rejecting the unitary model and supporting the noncooperative approach, which assumes that spouses have different preferences and depend on bargaining power to allocate household resources. We conduct a game among 731 couples in Uganda to investigate whether couples have different preference over higher income and greater control over that income. Experiment results suggest that there is no "one-size fits all" model. There are households in which couples both prefer higher income and the unitary model fits well, while there are also couples that forgo overall efficiency and pursue higher individual power over money, which lends credit to the cooperative household model. Moreover, women tend to prefer higher control over income than men, and this indicates that women are more likely to feel unsafe to let their husbands dispose of money at will.

There is growing strong evidence in the literature that shows whether the unitary or noncooperative model of household decision-making holds has significant implications for household welfare. However, what determines the type of household decision-making process is still unclear, and future studies can move forward in this direction to explore the factors impacting different intrahousehold decision-making models.

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