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Measuring and Changing Control: Women's Empowerment and Targeted Transfers

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Measuring and Changing Control: Women's Empowerment and Targeted Transfers*

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Abstract

This paper studies how targeted cash transfers to women affect their empowerment. We use a novel identification strategy to measure women's willingness to pay to receive cash transfers instead of their partner receiving it. We apply this among women living in poor households in urban Macedonia. We match experimental data with a unique policy intervention (CCT) in Macedonia offering poor households cash transfers conditional on having their children attending secondary school. The program randomized whether the transfer was offered to household heads or mothers at municipality level, providing us with an exogenous source of variation in (offered) transfers. We show that women who were offered the transfer reveal a lower willingness to pay, and we show that this is in line with theoretical predictions.

Keywords: gender, empowerment, cash transfers, intra-household.

JEL codes: D13, O12, J16

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1 Introduction

Most conditional cash transfer programs around the world select a woman in the household to be the recipient of the transfer (Fiszbein et al., 2009). The argument frequently used in support of targeting transfers to women is not only that such transfers promote gender equality and empower women, but also that children in turn benefit from such an equalization and empowerment.

Policy interventions shifting the relative income of women versus men within households have been shown to have an effect on different family decisions (Lundberg et al. (1997) and Ward-Batts (2008) use the 1979 UK Reform of Child benefits, Attanasio and Lechene (2002, 2014) use Mexican Progresa). However, there is limited evidence on the exact mechanism linking targeted money transfers to women and their empowerment within the household. Some studies suggest that one possible channel through which targeting payments to women affects family decisions is by changing the control of resources within the household and the decision power of each household member.

Understanding this mechanism is central, given strong evidence that the amount of resources that each household member contributes to the family affects its collective decisions (for a literature review, see Duflo, 2012). The collective models suggest that targeting payments to a precise household member might result in different outcomes if individuals have different preferences and the targeted payment affects the relative decision power within the household (Browning and Chiappori, 1998; for empirical applications, Thomas, 1990; Hoddinott and Haddad, 1995; Lundberg et al., 1997; Doss, 2006; Ward-Batts, 2008). However, there is no clear consensus on the precise mechanism through which households make decisions and allocate consumption when receiving a cash transfer.

This paper uses a novel identification strategy to measure women's willingness to pay to receive transfers themselves versus transfers to the spouse, implemented through an economic experiment in urban areas of Macedonia. The women selected to participate in the experiment are subject to a sequence of choices where they can either choose an amount X for themselves or an amount Y for their spouse (where X is usually smaller than Y). The experiment identifies the values that makes the participants indifferent between receiving X or letting their spouse receive Y, which gives us the respondent's willingness to pay for receiving a transfer instead of having their partner receive it.

This willingness to pay measure can be matched with data used to study a nationwide cash transfer program. In particular, all participants in the economic experiment are women in households eligible for the Macedonian "Conditional Cash Transfer (CCT) for Secondary School Education", which provides cash transfers to

poor households conditional on having their children enrolled in secondary school. In the three years prior to the experiment we ran, the operation of the program was not uniform across municipalities. In one group of randomly selected municipalities, the CCT was paid to the mother figure in the household, while in the remaining municipalities, the transfer was paid to household heads (generally a man). The random assignment of the program modality across municipalities provides an exogenous source of variation in the amount of resources potentially controlled by each household member, for about three years before the laboratory experiment takes place. All women participating in the experiment also participated in at least one round of a household survey, containing detailed information on demographics, consumption, income and living conditions.

Taken together, the laboratory, field, and survey data, constitute a unique dataset which allows the identification of the empowerment effect, i.e. the effect of gender specific transfers on women's bargaining position in the household. Our findings indicate that targeted transfers have a significant effect on female empowerment.

The rest of the paper is organized as follows. Section 2 describes the economic experiment. Section 3 describes the basic theoretical framework. Section 4 describes the data in more detail and gives descriptive statistics and Section 5 discusses the empirical analysis. Section 6 concludes.

2 Measuring control: a lab experiment in the field

In the past few decades, many surveys have included batteries of questions aimed at measuring the extent to which women are empowered within the family. A typical set of questions, used in many different contexts, asks respondents to identify who is in charge of certain decisions, determining for example expenditures on different household consumption items, schooling, or various investments. Possible answers to these questions are either that the wife is in charge, the husband is in charge, or spouses decide jointly. In many datasets, answers to these questions are often bunched on the 'both' categories, and very limited variation is obtained.

In the context of conditional cash transfers, for instance, the PROGRESA evaluation survey included several of these questions. This CCT did not seem to have shifted the answers to these questions (see for instance Adato et al., 2000). Therefore, if one were to interpret those results literally, one would conclude that the CCT, despite being targeted to women, did not empower them. Yet, many studies (such as Attanasio and Lechene, 2014) find that PROGRESA and other similar programmes did shift the position of women in the family in a substantive fashion.

One possible explanation of the failure of observing programmes such as PROGRESA shifting measured empowerment appeals to measurement issues. Adato et al. (2000), for instance, write: "*Women's status is difficult to quantify in the context of large household surveys like the ENCASEH and ENCELs. These surveys have several questions which attempt to tease out various aspects of women's status and bargaining power, such as attitudes towards women's roles, questions on who within the household takes major responsibility for certain household decisions, questions on the disposition of women's income, and questions on women's mobility and freedom of movement. Nevertheless, household surveys are blunt instruments with which to examine intrahousehold relations, because the context of such decisions is often unstated, and without adequate understanding of the socio-cultural context, survey results can easily be misinterpreted.*"

One contribution of this paper is to propose an alternative quantitative measure of women's empowerment within the household. This measure is based on observing women's behaviour and choices in a lab setting. In particular, in the experiment that we describe in detail below, we offer to transfer a particular amount of cash to a woman's husband, and identify the amount she is willing to pay so that the transfer is given to her instead.

The reason why this is a measure of female empowerment is simple. In a unitary setting women should not be willing to pay anything to keep the transfer themselves, and should try to maximize the transfer. On the other hand, the weaker the position of the woman in the household (the lower her control of resources), the more she should be willing to pay to obtain control of that transfer. In the next section, we make this intuition precise within the framework of the collective model of Chiappori (1992). The remaining of this section describes in detail the experiment we performed.

The experiment consists of a series of choices between two alternatives, which the respondent is asked to make in sequential rounds. In the first round of questions, the respondent is asked to choose between an amount, A, paid to them, or another amount B paid to their spouse. Since B is kept constant across rounds we refer to it as the 'stake' of the experiment. If the respondent in the first round chooses A (money for herself), the amount A in the following round is reduced by 75% of the original amount. If the respondent again chooses money for herself, the already reduced amount A is again reduced by 75% in the second round. If the woman continues to choose money for herself, we keep reducing the amount by 75%, till the resulting amount is smaller than 20 MKD.[1]

[1]The amounts are expressed in Macedonian Denars (MKD). Throughout the text,we consider the exchange rate 0.0181079 USD/MKD.

If, however, in the first round the participant chooses B (having the spouse receive the money) over A, the amount A is increased by 50 MKD in the next round. If the participant again chooses B, the amount A is once again increased by 50 MKD. If the participant again chooses to have their partner receive the transfer, the experiment stops.[2]

Consider now the case where the respondent changes her choice when the value of A changes. If, in one round, the participant switches from A (keeping the money) to B (giving it to the spouse) or vice versa, the amount A offered in the next round is set to be the average between two amounts: 1) the amount offered in the current round, and 2) the amount offered in the last round where the respondent made a decision different from the current one. Therefore, the amount offered to respondents increases or decreases depending on whether they switch from either receiving the transfer, or having the spouse receive it, and vice-versa. This procedure continues as long as the difference between two consecutive amounts A is larger than 20 MKD. The decision to introduce a stopping rule of 20 MKD rather than smaller amounts is to avoid asking consecutive questions on amounts that are very similar in terms of their monetary value, and for which would not be distinguishable by the respondent in any meaningful way.

We piloted this algorithm and its details extensively. The experiment was run on a computer, and with a program making all the computations described above as the experiment progressed. As a consequence, respondents faced alternatives in the new round immediately after a decision was made and confirmed. Screenshots taken from the software are presented in Appendix A.1. The algorithm was designed in order to identify the participant's indifference point between the two alternatives of receiving the money or having the spouse receive it. Some examples of the mechanics of the algorithm are presented in Figure 1.

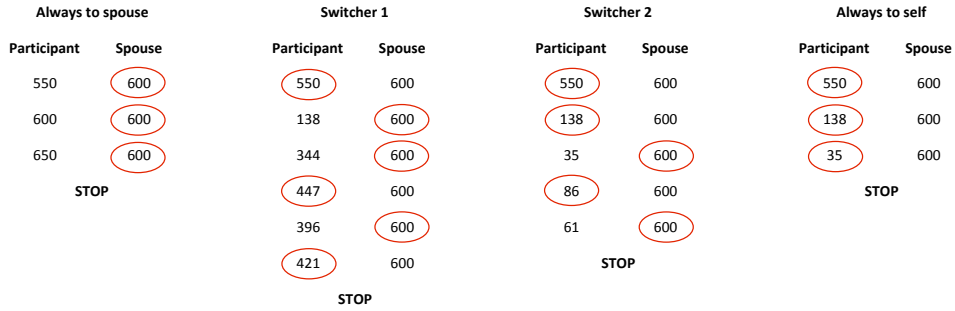
Respondents were told that one round of choices and their associated decision would be randomly selected to determine the actual payment at the end of the game. After the incentivized experiment, respondents were also asked to repeat the game with a different set of choices, which were not incentivized but hypothetical, and where payments were 10 times as large as the original one.

The starting value for B (the stake) was randomized among nine amounts,[3]

[2]The reason to stop the amount A from increasing further was to avoid situations in which the amount would become too high. At the same time, we do allow the amount A to become larger than the amount B in order to collect information for women that present a negative willingness to pay, e.g. collect information for those that would be willing to be paid in order to not having their spouse receive the money.

[3]Appendix D.2 presents a test for whether the willingness to pay is a function of the stakes. Results show that for both incentivized and non incentivized cases, the willingness to pay is uncorrelated to the stakes, both when testing the coefficients individually and jointly.

Figure 1: Algorithm for the determination of offered amounts: some examples



Note. The graph presents four possible combinations of respondent's answers. From the left, the first shows a case in which the respondent choose to always give the money to the spouse. The second and the third show cases in which the respondent switches after the first question. The fourth shows instead a case in which the respondent always keep the offered money.

ranging from 400 MKD (7.24 US $) to 800 MKD (14.49 US $). The starting value for A was then defined to be (B - 50 MKD), allowing the experiment to start from an initial offer for which it is costly for the woman to keep the amount for herself. The different starting points and their value in US $ are presented in Table 1.

Protocol As we discuss in more detail below, participants in the experiment were also respondents to the household survey that was collected for the evaluation of the Conditional Cash Transfer program in Macedonia. Women were invited to participate in the experiment using contact information previously collected (phone numbers), or through visits to their homes. The invitation stated that they were asked to participate in an interview about the needs of women in their social stratum, and that they would be financially compensated for their time.

Each interview was carried out in a room where only the respondent and a female assistant were present. Participation in the experiment did not involve any monetary costs for the respondents. A driver picked up participants at their dwelling or at an agreed meeting point, and took them to the office in the town where the experiment was carried out.[4] In addition, participants were given 300 MKD as a show-up fee. We report further details on the experiment and its protocol in Appendix A.

In terms of size of the incentive, stakes ranged from 42 to 84 percent of total daily household expenditure, which is roughly 950 MKD in the sample. Relative to

[4]The decision to cover transportation cost was made to avoid that heterogeneity in this cost would influence the outcome of the experiment. In addition, we selected only participants living 10 km away or less from the closest urban settlement, such that distance would not be an important factor in participants' answers.

wages,[5] the minimum offered stake corresponds to roughly 52 percent of the daily net wage for a woman who has completed secondary school, and 68 percent for a woman with completed primary school only. The maximum offered stake corresponds to 103 percent and 136 percent respectively.

Following the incentivised version of the experiment, participants were asked to answer a non-incentivized version of the experiment, where the amounts were larger compared to the incentivized version. In this case, we asked the participants to choose across alternatives, thinking of the situation as if it corresponded to a real life scenario. Similarly to the incentivized version, initial values for B were randomized between nine amounts, ranging from 4000 MKD (72.43 US $) to 8000 MKD (144.86 US $). The starting value for A was then defined by B - 500 MKD.

Table 1: Starting points

Incentivized		**Non-incentivized**	
Respondent	Partner	Respondent	Partner
350 (6.34)	400 (7.24)	3500 (63.38)	4000 (72.43)
400 (7.24)	450 (8.15)	4000 (72.43)	4500 (81.49)
450 (8.15)	500 (9.05)	4500 (81.49)	5000 (90.54)
500 (9.05)	550 (9.96)	5000 (90.54)	5500 (99.59)
550 (9.96)	600 (10.86)	5500 (99.59)	6000 (108.65)
600 (10.86)	650 (11.77)	6000 (108.65)	6500 (117.70)
650 (11.77)	700 (12.68)	6500 (117.70)	7000 (126.76)
700 (12.68)	750 (13.58)	7000 (126.76)	7500 (135.81)
750 (13.58)	800 (14.49)	7500 (135.81)	8000 (144.86)

Note. Main units are expressed in Macedonian Denars (MKD), while in parenthesis we report the correspondence with United States Dollars (USD). Exchange rate used for conversion is 0.0181079 USD/MKD.

3 Interpreting the Measures: A Theoretical Framework

The measurement tool that we described in the previous section, should identify how much a woman is willing to give up in order to gain control of an amount otherwise offered to her husband. While it is intuitive that such a measure should be related to the bargaining power of a woman within the household, it is useful

[5]Daily net wages for different educational levels are estimated using data provided by the Macedonian State Statistical Office. Gross wages by educational level were available for October 2010 (source: *2010 Structure of Earnings of Employees*) and net/gross wages were available for October 2010 and July 2014 (sources: *Average monthly net wage paid per employee*, *Average monthly gross wage paid per employee*). We made use of the net/gross wage ratio at October 2010 to build net wages by educational level. We then computed wages by educational level in 2014, by using the nominal growth rate of wages from October 2010 to July 2014. At the time of the interview, the net daily wage for a woman with completed primary school is estimated at 590 MKD, while for a woman with completed secondary school is estimated at 770 MKD.

to consider an explicit model of intrahousehold allocation of resources to interpret our measure precisely. In this section, we consider the collective model as such a framework, show how our measure could be interpreted within the context of such a model, and how it relates to some of the parameters of that model.

3.1 The collective model

We assume that household decisions are carried out by two decision makers, the woman (A) and her spouse (B), who decide how to allocate total household expenditure to different goods, either publicly or privately consumed. Let Q be the quantity consumed of a public good, say spending on children, and let q_A and q_B be quantities consumed of private goods for the woman and her spouse. The household budget constraint is given by:

$$PQ + p_A q_A + p_B q_B = x = x_A + x_B \tag{1}$$

where P, p_A, and p_B are the prices for public and private consumption goods. x is total household expenditure and, in this context where we do not consider savings, equals income, which in turn is given by the sum of person A and person B's incomes, x_A and x_B, respectively. Individual preferences are defined over private goods and public goods, and we assume that there is no direct caring for the spouse: $u^A(Q, q_A)$ is the utility function for person A, and $u^B(Q, q_B)$ is the utility function for person B.

A unitary model assumes that choices are made according to a "unitary" household utility function $\tilde{U}(Q, q_A, q_B)$. A natural assumption is to impose that the household utility function respects individual preferences such that it can be represented by a weighted sum of individual preferences (Samuelson, 1956; Browning et al., 2014):

$$\tilde{U}(Q, q_A, q_B) = \mu u^A(Q, q_A) + (1 - \mu) u^B(Q, q_B). \tag{2}$$

In the unitary model, the weight μ is fixed and does not vary with prices or income. In this case, we can derive market demands in the usual way. The demand for each individual commodity depend on prices and total household income only, and is independent of the distribution of income within the household. Such demand functions satisfy the Slutsky conditions.

The collective model, on the other hand, assumes that resources are allocated efficiently, but it allows the weights μ to depend on prices, income, and distribution factors. The distribution factors are, in line with the literature, defined as variables that have an impact on the decision process, but affect neither preferences nor the budget constraint. Distribution factors play a fundamental role in distinguishing the

collective model from the unitary model. Such variables, within the unitary model, should influence the allocation of household resources and, as a consequence, should not influence any household demands. An often used example of a distribution factor is the share of income controlled or generated by one of the spouses.

In the collective setting, the household utility function can therefore be expressed as:

$$\tilde{U}(Q, q_A, q_B) = \mu(P, p_A, p_B, x, \mathbf{z})u^A(Q, q_A) + (1 - \mu(P, p_A, p_B, x, \mathbf{z}))u^B(Q, q_B) \quad (3)$$

where $\mathbf{z}$ is a vector of distribution factors.

The collective model has been used to understand the effects of targeting cash transfers to women (see, for example, Attanasio and Lechene, 2002, 2014 and Schady and Araujo, 2006). Targeted cash transfers affect not only total income, but also how it is distributed among household members. Within the framework of the unitary model, these transfers would affect household decisions only through the effect that they have on total income and the budget constraint. In a collective model, instead, a targeted cash transfer could also affect each household member's bargaining power, both through x and through the woman's share of income. If the latter is a distribution factor and therefore affects the weights μ, then transfers will have an effect on commodity demands over and above any effects operating through total household income. As we discuss below, the context we study is that of a cash transfer that was targeted to women in some municipalities, while in others it was targeted to the person who is registered in the welfare center as the head of household, who is their husbands in the large majority of cases.

The experiment we have executed and described above induces respondents to consider explicitly the tradeoff between the total amount of resources available to the household and those controlled by them. In what follows we make this link explicit. Before doing that, however, we note that while the collective model assumes *efficiency*, it does so *conditional on given weights* $\mu()$. Therefore, while women choosing an $s > 0$ are effectively sacrificing some resources, they are doing so, within the theoretical model we are considering, to change the weights μ. These choices are therefore not inconsistent with the collective model. A choice of $s > 0$ is, however, inconsistent with the unitary model.

3.2 Identification of empowerment effects

Define the woman's share of total household income as $f = \frac{x_A}{x_A + x_B}$. We construct f for each household using survey data. We assume that f is a distribution factor and that, as such, it affects μ. We also assume that the weight μ is affected by, in addition to f, total resources x and a vector of distribution factors $\mathbf{z}$, other

than f. The vector $\mathbf{z}$ may contain both observable and unobservable variables. Within the collective model, the level of utility ultimately obtained by member k in the household is given by the indirect utility function (from here and onwards we simplify by setting all prices to 1):

$$v^k(x, \mu(x, f, \mathbf{z})) = u^k(q_k^*, Q^*), \qquad k = A, B$$

where (q_k^*, Q^*) are the quantities maximizing equation (3) subject to the household budget constraint. Relative to the indirect utility function that one would derive from a unitary model, we note that this expression depends on μ and, through it, on the distribution factors f and $\mathbf{z}$.

Our experiment offers a transfer either to the woman or to her spouse, and identifies the woman's willingness to pay to be the recipient of the transfer. Let s denote her willingness to pay as a share of the total amount offered E. We define f' to be the value of f that we would observe if the woman receives a transfer of $(1-s)E$:

$$f' = \frac{x_A + (1-s)E}{x_A + x_B + (1-s)E}, \tag{4}$$

where x_A and x_B are other incomes for the wife and the spouse (which exist outside of the experiment). Similarly, define f'' to be the woman's share of resources when the husband receives a transfer E:

$$f'' = \frac{x_A}{x_A + x_B + E}. \tag{5}$$

Since the transfer also affects the household's total income, we define x' the resources available when the wife receives $(1-s)E$, and x'' the resources available when the husband receives E:

$$x' = x_A + x_B + (1-s)E, \tag{6}$$

$$x'' = x_A + x_B + E. \tag{7}$$

The experiment identifies s as the amount the respondent is willing to pay to be the transfer recipient. At this level of s the respondent is indifferent between receiving $(1-s)E$, or having her husband receiving E:

$$v^A\left(x', \mu\left(x', f', z\right)\right) = v^A\left(x'', \mu\left(x'', f'', z\right)\right) \tag{8}$$

The left hand side corresponds to the indirect utility of the wife when she receives an amount $(1-s)E$ and her share of total income increases to f'. The right hand side is the indirect utility of the wife when her partner receives an amount E and her share decreases to f''.

The main purpose of the experiment described above was to identify a measure of the bargaining power of women within a couple. It is therefore important to examine how the elicited s would be affected by changes in the existing bargaining power of women, within the framework of the collective model. Our survey data contains measures of f and z, and is collected in an environmment where one of the components of x (the CCT) is randomly assigned to either one of the spouses. Given the direct relationship between f and s, and given the assumption that μ depends on the share of income controlled by women, we would like to know how s varies with f, which is the proportion of income generated by the wife just prior to the experiment.

In order to see how s is determined, it is useful to start from a particular level of utility $\overline{v} = v^A(x, \mu(x, f, z))$, and consider small deviations in the income of each spouse, by E in the case the transfer in the experiment is given to the husband, or by $(1-s)E$ when the transfer is given to the wife.

Assuming that E is small, we start by differentiating the indirect utility function for the wife, v^A, with respect to the amount of resources she receives, x_A, and we denote this by Δ_A^A:

$$\Delta_A^A = \frac{\partial v^A}{\partial \mu}\left(\frac{\partial \mu}{\partial f}\frac{\partial f}{\partial x_A}\Delta x_A + \frac{\partial \mu}{\partial x}\Delta x_A\right) + \frac{\partial v^A}{\partial x}\Delta x_A \tag{9}$$

This derivative is relevant for the left-hand-side of equation (8), which we expect to be approximately equal to $\overline{v} + \Delta_A^A$ at the level of s determining indifference. We also differentiate v^A with respect to x_B, resources controlled by the husband, giving Δ_B^A :

$$\Delta_B^A = \frac{\partial v^A}{\partial \mu}\left(\frac{\partial \mu}{\partial f}\frac{\partial f}{\partial x_B}\Delta x_B + \frac{\partial \mu}{\partial x}\Delta x_B\right) + \frac{\partial v^A}{\partial x}\Delta x_B. \tag{10}$$

Equation (8) implies that, when $\Delta x_A = (1-s)E$ and $\Delta x_B = E$, we have $\Delta_A^A = \Delta_B^A$. In addition, if we use $\frac{\partial v^A}{\partial f} = \frac{\partial v^A}{\partial \mu}\frac{\partial \mu}{\partial f}$ and $\frac{\partial v^A}{\partial x} = \frac{\partial v^A}{\partial \mu}\frac{\partial \mu}{\partial x} + \frac{\partial v}{\partial x}$ we get:

$$\frac{\partial v^A}{\partial f}\left(\frac{\partial f}{\partial x_A}\Delta x_A - \frac{\partial f}{\partial x_B}\Delta x_B\right) + \frac{\partial v^A}{\partial x}(\Delta x_A - \Delta x_B) = 0. \tag{11}$$

Finally, since $\frac{\partial f}{\partial x_A} = \frac{x_B}{(x_B+x_A)^2}$, $\frac{\partial f}{\partial x_B} = \frac{-x_A}{(x_B+x_A)^2}$, and $\Delta x_A = (1-s)E$, $\Delta x_B = E$, we can write:

$$\frac{\partial v^A}{\partial f}(1 - s(1-f)) = sx\frac{\partial v^A}{\partial x} \tag{12}$$

where f is the value of the share of resources controlled by the wife just before the experiment.

By totally differentiating equation (12), we can establish how the elicited s varies with f. From the expression, however, it is clear how this depends on the shape of

the indirect utility function. From looking at equation (8), it is also intuitive that the sign of this relationship should be ambiguous. An increase in f should lead to an increase in both sides of equation (8). The question is which side is likely to increase by more. If the increase in $v^A\left(x', \mu\left(x', f', z\right)\right)$ is larger than the increase in $v^A\left(x'', \mu\left(x'', f'', z\right)\right)$, then s needs to increase to restore equality in this expression. The opposite happens when the increase in $v^A\left(x', \mu\left(x', f', z\right)\right)$ is smaller than the increase in $v^A\left(x'', \mu\left(x'', f'', z\right)\right)$.

Therefore, only under specific functional form assumptions does $\frac{\partial s}{\partial f}$ have an unambiguous sign. In particular, consider the preference specification investigated by Chiappori and Ekeland (2009), namely, the Linear Expenditure System (LES). With LES preferences, it can be shown that if the effect of woman's share of income on μ is linear or concave, the willingness to pay decreases in this share.[6]

Proposition 1. *Under the assumption of LES preferences and Pareto weights that are linear or concave functions of f, the effect of f on s is negative.*
For proof see Appendix E.

Similarly, it is also not possible to predict the sign of the response of s to an increase or decrease in any other distribution factor, z (or in total expenditure, x). Just like in the case of f, if μ increases unambiguously with z, then an increase in z leads to increases in both sides of equation (8). Again, whether s rises or falls in response depends on which side of this equation is more sensitive to increases in z.

4 Data

We are able to match the data from the experiment and subsequent survey with the data from a more extensive household survey carried out for the evaluation of the CCT during winter 2013. In this section, we describe the main features of our data.

4.1 Macedonian CCT for Secondary Education

The lab interview was conducted on a sample of women living in households eligible for the Macedonian Conditional Cash Transfer for Secondary School Education. It is a social protection program aimed at increasing secondary school enrolment and completion rate among children in the poorest households of the population. It was first implemented by the Macedonian Ministry of Labour and Social Policy in Fall 2010 and provided cash transfers to poor households conditional on having school-age children attending secondary school at least 85 percent of the time. The program was offered to the beneficiaries of the Social Financial Assistance (SFA) benefit,

[6] For convex functional forms however, this may or may not be true.

which is the most significant income support program in the country, accounting for around 0.5 percent of GDP and 50 percent of total spending on social assistance. SFA is a means-tested monetary transfer granted to people who are fit for work, but nevertheless are unable to support themselves. The amount determined for the household depends on household size and time spent in SFA, varying from 1 825 MKD per month (around 40 USD) for a one-member household, to 4 500 MKD (around 98 USD) for households with 5 or more members. The actual payment to the household is the difference between the determined amount and household income.

During the first three years of the CCT program (school years 2010/11, 2011/12 and 2012/13), an experiment was designed to test whether gender-targeted transfers generate differential outcomes in terms of household decision making and human capital investment. The 84 municipalities in the country were randomly assigned to one of two groups.[7] In the first group, payments of the CCT were made to the mother of the child, while in the second group they were made to the household head, who is generally male.[8]

Three waves of a household survey were collected to study the impacts of this experiment on household outcomes: one baseline and two follow-up surveys. Each survey contains detailed information on a variety of household characteristics and outcomes (demographic characteristics, expenditures on durable and non durable goods, housing) and individual level information on household members (education, health, labour supply, time use). We add several sources of income to construct total household income: labour income, income from financial assistance,[9] and assistance from family and friends. When available, we use income information for a given household from up to two survey rounds. The wife's income share is then defined as the share of total parental income that can be attributed to the woman in the household, such as, for example, the wife's labour income, or income coming from the wife's relatives. Sometimes it is not clear how to attribute a particular source of income to a household member. In the case of the SFA subsidy, for example, we

[7]Random assignment was done after stratifying the sample of municipalities by population size. The Republic of Macedonia is divided into 84 municipalities, which were first divided into 7 groups depending on population size, and then randomized into two groups, one of which has 42 municipalities and where the payment of the transfer is done to the mother of the child, and the other which also has 42 municipalities and where the payment is transferred to the household head, regardless of gender.

[8]According to the rulebook for acquiring the right to financial assistance, the household head is determined by the following ordered rules: if there is an employed person in the household, the household head would be the employed person; if there is a pensioner, the household head would be the pensioner; if no employed person or pensioner exist in the household, the household head is the unemployed person representing the household; for all other households, the Social Welfare Centre selects the household head as the person representing the household.

[9]This includes assistance from the CCT program.

attribute it to the household head, since the household head is the legal recipient of this transfer. However, our results are robust to different definitions of income shares. We discuss these issues in detail in Appendix D.3.

In order to build the CCT transfer, we match administrative data from the CCT program with each child enrolled in the program and being part of the survey and we compute the amount of money transferred to each household in the first three years of the program. We then assign the CCT income to the household member eligible to the transfer.[10]

4.2 Lab interview

During the summer 2014, we invited a subset of the urban women who were sampled for the evaluation of the CCT to participate in the lab experiment. These women resided in urban areas, and had to live with a partner.[11] An area is defined as urban if it is within a 10 kilometres radius from an urban settlement, as defined by Macedonian law. In particular, an urban settlement is defined as a "compactly built up residential area with a population exceeding 3000, which has a developed structure of various economic activities, which has over 51 percent of the workforce working in the secondary and tertiary sector, which has an urban physiognomy of zones for residence, recreation and green area (parks), town square, street infrastructure, communal services, and which acts as a functional center for the surrounding populated places".

The experiment was carried out in 43 settlements,[12] and an office location for the experiment was arranged in each of these settlements. By doing it in an office one avoids having to carry out the experiment in the household dwelling, where answers could have been affected by the family environment, and where it could be difficult to isolate the woman from the presence of the husband.

Out of 906 selected women, 768 participated in the lab interview, giving a fairly high response rate of 84.8 percent. In Appendix C we show that we cannot distinguish the response rates in municipalities where the CCT transfer is paid to the wife from that of municipalities where it is paid to the head of household.[13]

At the end of the lab interview, we conducted an additional short survey. The

[10] The software used to implement the CCT requires entering the full household roster and delivers automatically the payment based on the randomization rule. We therefore do not observe cases in which the recipient of the payment in the administrative data is different from what was defined by the randomization of the payment modalities.

[11] As the aim is to study the control over resources between spouses, we excluded households with only one parent.

[12] 10 out of the 43 are independent municipalities, which together form the capital city Skopje.

[13] The main predictors of response rate in our sample are husband's employment, ethnicity, and for those who have the information available, baseline expenditure levels.

survey included further questions about depression, domestic conflicts and violence, prospects for future work opportunities, networks for financial assistance, division of power in the household, and private goods consumption by the participant and her spouse (cell phone bills, food for children, cigarette and alcohol consumption for both adults).[14] Our sample includes a set of households eligible for the first year of the CCT (the 2010/2011 academic year),[15] and another set of households eligible for the third year of the program (the 2012/2013 academic year).

Table 2 presents the summary characteristics for participants in the experiment in terms of age and education, ethnicity, household size, and other household attributes. It also tests whether there are differences in these characteristics for households residing in municipalities with different payment modalities for the CCT. On average respondents are 44 years of age and have 7.5 years of education. Their partners are slightly older (47 years old) and have higher levels of education (8.5 years of education). Average household size is about 4.7, 2.5 of whom are children, and the vast majority of couples are legally married (98 percent). Since all households in the experiment (and in the CCT) are recipients of SFA we expect very few adult members to report to be working in the month prior to the interview. Only 9 percent of women and 19 percent of men report any employment during that period and around 14 percent of households is involved in farming and breeding. In terms of living standards, 90 percent of households have access to public water and electricity.

Figure 2 presents the distribution of respondents by their willingness to pay to get control of the transfer in the experiment. The willingness to pay is measured as share of the stake in the experiment.[16]

5 Empirical analysis

Among participants, women residing in municipalities where the CCT payment was made to the mother have potentially been empowered by a shift in their household income share when compared to women living in municipalities where the CCT was paid to the household head. In this section, we test whether the payment modality of the CCT during the years previous to the laboratory experiment described above affect the amount a woman is willing to pay to make sure that she, rather than her partner, receives a particular amount of cash.

[14] The full questionnaire can be found in Appendix A.2.

[15] Condition of eligibility was to be a recipient of SFA at the time of the launch of the program and to have a least one child in secondary school age.

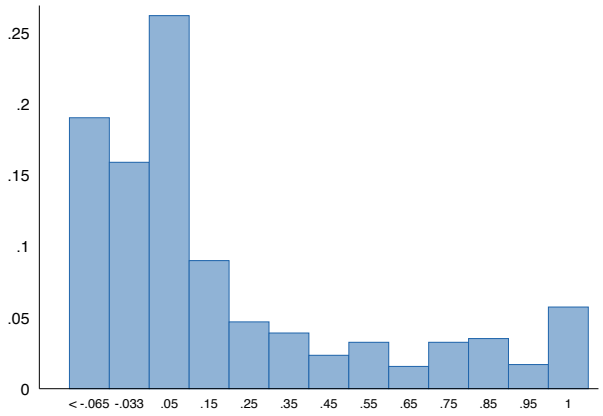
[16] To analyse the correlation between the willingness to pay and self-reported measures of decision making and domestic violence we perform principle component and factor analysis using different indicators. The analysis is presented in Appendix D.1.

Table 2: Respondent characteristics and randomization balance

	Payment to Household Head (1)	Difference with Payment to Mother (2)
Age (husband)	47.19	-0.26
	(0.49)	(0.65)
Age difference (h-w)	3.28	-0.31
	(0.27)	(0.37)
Schooling (husband)	8.45	0.19
	(0.31)	(0.36)
Schooling difference (h-w)	0.96	-0.26
	(0.18)	(0.30)
Albanian	0.25	0.06
	(0.07)	(0.11)
Macedonian	0.47	-0.05
	(0.07)	(0.10)
Roma	0.18	0.02
	(0.05)	(0.07)
Turk	0.10	-0.02
	(0.04)	(0.04)
Household members	4.70	-0.04
	(0.12)	(0.16)
Number of children	2.51	0.08
	(0.09)	(0.15)
Legally married	0.98	-0.01
	(0.01)	(0.01)
Worked (wife)	0.09	0.00
	(0.03)	(0.03)
Worked (husband)	0.18	0.02
	(0.04)	(0.05)
Male household head	0.84	-0.01
	(0.03)	(0.05)
Muslim	0.56	0.03
	(0.07)	(0.10)
Farmer / breeder	0.14	0.01
	(0.04)	(0.05)
Access to public water and electricity	0.90	0.01
	(0.02)	(0.03)
Living in Skopje	0.29	0.00
	(0.11)	(0.16)
Living in main settlement	0.77	0.02
	(0.05)	(0.07)
Observations	768	768
Enrolled in CCT (2012/2013)	0.64	-0.05
	(0.03)	(0.04)

Note: Standard errors clustered at municipality level are presented in parenthesis (*** p<0.01, ** p<0.05, * p<0.1). This table shows estimates of a linear regression of the variables indicated in the first column on the treatment indicator $mother_j$ and a constant. Column (1) presents estimates for the constant. Columns (2) presents instead estimates of the coefficient for the treatment indicator $mother_j$. The inclusion of seven dummies for the randomization strata (each dummy indicating a quantile for the municipality in the distribution of the population) doesn't affect the results.

Figure 2: Willingness to pay



Note. The graph presents the distribution of respondents by the share the respondent is willing to pay in order to receive the payment. The left bar is representing all responses smaller or equal to -0.065, which is the largest value of censored share and is defined as - 50 MKD divided by the maximum stake, 800 MKD.

The design of the CCT intervention in its early years, which randomly assigned the identity of the recipient of the transfer (mother vs head of household) across municipalities, allows a simple comparison between residents of municipalities where the transfer is offered to mothers, and residents of municipalities where the transfer is instead offered to household heads. Let $mother_j$ be an indicator variable taking value 1 if the cash transfer is offered to mothers in municipality j, and zero otherwise. The outcome of interest is the respondent i's (living in municipality j) willingness to pay for keeping the cash in the experiment, denoted s_{ij}.

We estimate the following relationship:

$$s_{ij} = \beta_0 + \beta_1 \, mother_j + X_i' \beta_{\mathbf{2}} + V_j' \beta_{\mathbf{3}} + \epsilon_{ij} \tag{13}$$

where X_i is a vector of respondent, spouse, and household characteristics, V_j is a vector of settlement and municipality characteristics, and ϵ_{ij} is the error term. We estimate this equation using least squares, but allowing for within municipality correlation in the ϵ_{ij} (so we cluster standard errors at the municipality level). The variables in X include household head's and partner's education, age and gender, ethnicity and religion of the household, and household size and composition. Municipality controls include regional dummies, an indicator for whether the respondent resides in the main settlement of the municipality, and whether it is part of the capital city (Skopje).

In columns (1)-(3) of table 3 we present estimates of β_1 using different combinations of controls. All estimates are negative and statistically significant, indicating

that in municipalities where mothers are the recipient of the CCT (and therefore are potentially more empowered), women are on average willing to pay a lower amount to keep the cash from the laboratory experiment, than in municipalities where the CCT recipient is the head of household (and therefore, the level of empowerment of women is potentially smaller).

A large proportion of women report extreme values for s_{ij} (either 0 or 1). Columns (4)-(6) of table 3 examine what happens when we exclude these extremes from our analysis. Although we are using a substantially smaller sample size, our results are essentially unchanged.

Not all women in the sample are actual recipients of the CCT, because there imperfect take-up of the program. In order to go beyond intent-to-treat estimates of table 3 and estimate the impact of receiving a transfer paid to the mother as opposed to receiving a transfer paid to the head of household (as opposed to the impact of residing in different types of municipalities), we need to address two potential sources of endogeneity in the take-up to the program.

The first concern is that program participation is voluntary. In the year of the CCT program just preceding the survey, only 60 percent of all eligible households enrolled in the program. Such low take-up of the program is directly related to the decision of not enrolling the child in secondary school, which is a condition for receiving the transfer.[17].

The second concerns it that the there is a proportion of households where the person registered as the household head in the social welfare centre is the mother, and the choice of who to declare as household head could be driven by unobservables that also affect the outcome. Notice however that this decision is taken potentially prior to the introduction of CCT, and is related to the application to SFA.

In order to address these concerns we estimate the impact of targeting cash transfers to mothers on their willingness to pay to keep all the cash in the lab experiment using instrumental variables (IV), where the instrument is the modality of payment in each municipality, $mother_j$. We focus on two different measures of take-up of the CCT program: the wife's income share, and the total income from the CCT received by the mother in the first three years of the program. We denote these endogenous regressors by d_{ij} below.

[17]There is also a set of households who do not participate in the CCT because they lost the right to SFA, and therefore they indirectly lost the right to apply to the CCT program. We will not address this issue explicitly. However, when we match the eligible SFA population in 2010 (baseline) and the eligible SFA population in 2013 (second follow-up), we obtain fairly high match rates across different types of municipalities, suggesting that the severity of this problem may be uncorrelated with the identity of the CCT recipient.

Table 3: ITT estimates of the effect of targeting payments on willingness to pay

	Dep.var.: Willingness to pay					
	Include all observations			Exclude always keep and always give		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	OLS	OLS
Payment to mother	-0.057**	-0.053**	-0.053**	-0.059***	-0.056***	-0.056***
	(0.025)	(0.024)	(0.024)	(0.021)	(0.020)	(0.020)
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity controls	No	Yes	Yes	No	Yes	Yes
Stake controls	No	No	Yes	No	No	Yes
R^2	0.054	0.073	0.074	0.060	0.082	0.082
Observations	768	768	768	576	576	576

Note: Standard errors in parenthesis are clustered at municipality level (*** p<0.01, ** p<0.05, * p<0.1). The table presents estimates using equation 13 for the effect of targeting payments to mothers on the willingness to pay. Dependent variable is willingness to pay defined as the share of transfer the respondent is willing to give away to receive the money instead of the partner receiving the money. Payment to mother is a dummy variable equal to one if the household resides in a municipality where the CCT transferred the money to mothers. In Columns (4)-(6) we restrict the sample by excluding the respondents who decided to always keeping the money offered or always giving it to their partner. Controls include age and education of partner's, the gender of the household head, religion and ethnicity of the household, regional dummies, indicator variables for the type of settlement and indicator variables for the stake.

We estimate the following model:

$$\begin{aligned} s_{ij} &= \beta_0 + \beta_1 d_{ij} + X_i'\beta_{\mathbf{2}} + V_j'\beta_{\mathbf{3}} + \epsilon_{ij} \\ d_{ij} &= \theta_0 + \theta_1 mother_j + X_i'\theta_{\mathbf{2}} + V_j'\theta_{\mathbf{3}} + \omega_{ij} \end{aligned} \tag{14}$$

where X_i is a vector of household characteristics, V_j is a vector of municipality characteristics, and ϵ_{ij} and ω_{ij} are household-specific error terms. As above, we compute standard errors accounting for clustering at the municipality level.

We start by focusing on the mother's income share as the main endogenous variable. The lower panel of Table 4 shows that the policy instrument $mother_j$ strongly predicts the wife's income share, which is 19 percentage points higher in municipalities were mothers are paid the CCT, compared to municipalities where the CCT was transferred to household heads. Our IV estimates shows that wife's income share has a significant effect on the willingness to pay to keep the money in the lab experiment. Shifting all income from the male partner to the female partner in the household would decrease this willingness to pay by about 25 percentage points. A slightly larger effect is observed when we exclude from the sample those respondents who decided to either always keep the money offered or to always give it to the partner, but overall, results are robust either to the inclusion of controls in the model, and to the treatment of extreme values. If we use instead as the explanatory variable of interest the total CCT transfer received by the mother in the first three years of the program, we estimate that an increase of 100MKD in the transfer to the mother reduces her willingness to pay measure by around 0.4 percentage points.[18]

5.1 Censoring of willingness to pay

The data from our lab experiment is left and right censored, since we could not elicit willingness to pay over an infinitely large support. On one hand, a respondent may have been willing to receive an even larger compensation than the maximum proposed in the experiment for giving away the cash to the partner instead of receiving it herself. On the other hand, we never allow the willingness to pay to go above 1, which could happen, if the respondent is willing to pay in order to avoid having the partner receive the money).

The exact censoring points in our data are different depending on the stakes.[19]

[18] We obtain similar results when the endogenous variable is the number of years in which a mother received transfers from the CCT. See Appendix D.4.

[19] For example, when the initial stake is 600 MKD and the respondent always keep the money, the willingness to pay is right censored at 0.9375 (i.e.$(600 - 37.5)/600$). If the respondent always gives the money to their partner the answer is instead left censored at -0.083 (i.e.$(600 - 650)/600$). Table B2 presents censoring points for each stake both in terms of last amount offered to the respondents and in terms of the corresponding willingness to pay.

Table 4: Effect of wife's income share and CCT transfer on willingness to pay

	Dep.var.: Willingness to pay			
	Include all observations		Exclude always keep and always give	
	(1)	(2)	(3)	(4)
	IV	IV	IV	IV
Wife's income share	-0.271**		-0.314***	
	(0.109)		(0.114)	
Wifes's CCT income		-0.005**		-0.005***
		(0.002)		(0.002)
Controls	Yes	Yes	Yes	Yes
Observations	768	768	576	576
First stage results:				
Payment to mother	0.196***	10.663***	0.177***	10.672***
	0.022	0.786	0.024	0.903
R^2	0.442	0.321	0.439	0.315
F test of excluded instrument	80.146	183.897	52.738	139.577

Note: Standard errors in parenthesis are clustered at municipality level (*** p<0.01, ** p<0.05, * p<0.1). The table presents estimates for equation 14 on the effect of wife's income share, defined as the share attributable to the wife of total household income, and on total CCT transfer to the woman on willingness to pay. Dependent variable is willingness to pay defined as the share of transfer the respondent is willing to give away to receive the money instead of the partner receiving the money. Endogenous variables are instrumented using the dummy variable Payment to mother which is equal to one if the household resides in a municipality where the CCT transferred the money to mothers.In Columns (3)-(4) we restrict the sample by excluding the respondents who decided to always keeping the money offered or always giving it to their partner. Controls include age and education of partner's, the gender of the household head, religion and ethnicity of the household, regional dummies, indicator variables for the type of settlement and indicator variables for the stake.

The underlying willingness to pay (s_i^*) is therefore not observed beyond bounds which are determined by the initial stake (S_i) and by the rules of the experiment. In addition, the exact realization of s_i is never observed as the software is designed to stop when the difference between two consecutive offered amounts with opposite decisions (either to keep the amount or to give it to the partner) is smaller than 20 MKD.

In this section we estimate the full distribution of willingness to pay using the censored data and a maximum likelihood procedure which tries to fit a mixture of normals to the data, accounting for the censoring in the data. We estimate separate models for respondents living in the two different types of municipalities, distinguished by the identity of the recipient of the CCT.[20]

The top panel of figure 3 presents a comparison of the fitted distribution s_i for women residing in the two groups of municipalities. It is clear that those residing in municipalities where the CCT is paid to the mother have a lower s_i. The bottom panel of the figure shows the non-parametric density fit to the raw data, which has more limited support because of the censoring. The two pictures are very similar.

Table 5 presents the estimated parameters of the distributions. Since we fit a mixture of three normals, we report the weight on each of the three components, and the mean and standard deviation of each component. In addition, at the top of the table, we also report the overall mean and standard deviation of the mixture.

In order to test for equality of means of s_i across the two groups of municipalities, we assume independence between these groups, and we use a standard two tailed t-test. There is a 6 percent difference in s_i for respondents in each type of municipality, which is statistically different from zero. The estimates from this parametric model are similar from the regression estimates from the previous section, which didn't account for censoring of the observations, providing further evidence of the robustness of our results.

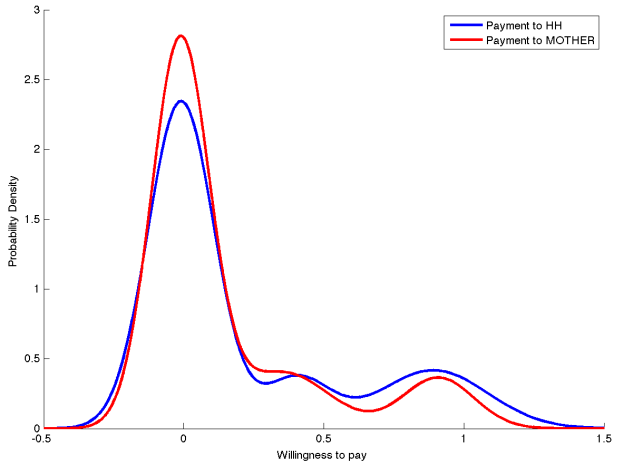
6 Conclusion

Identifying the empowerment effect of targeted money transfer is fundamental to understanding the effect of targeting women as an instrument for empowering women within households. In this paper we presented a novel identification strategy to measure women's willingness to pay for receiving transfers. We reported results from an economic experiment among female urban recipients of SFA who are also

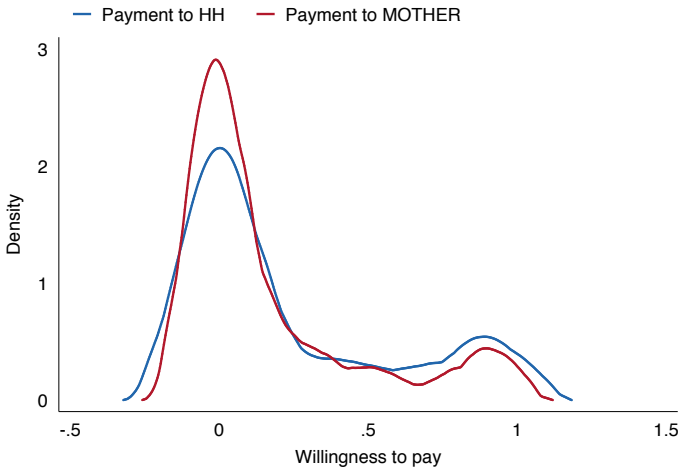
[20] Appendix B discusses in details the methodology used to estimate the parameters of the distribution. We report the result for an unconditional version of the maximum likelihood estimation. We extend the estimation using a version conditional on observable characteristics and the results are unchanged.

Figure 3: Distribution fit for willingness to pay: comparison of treatment groups

Panel A. Parametric



Panel B. Non-parametric



Note. The figure shows a comparison of the distribution estimated for the two treatment groups (payment to household head and payment to mother). In Panel A, the distribution fit is computed assuming a mixture of three Normal distributions and estimating the parameters using Maximum Likelihood and imposing multiple censoring points. Estimated mixture weights and components parameters are presented in Table 5. In Panel B, the distribution fit is estimated non-parametrically using Kernel density.

Table 5: Parameters of parametric fit for willingness to pay: distribution

	Payment to HH (1)	Payment to Mother (2)
Mixture distribution		
Mean (μ)	0.217	0.155
	(0.020)	(0.017)
Standard deviation	0.388	0.332
First component		
Weight (w_1)	0.690	0.718
	(0.028)	(0.052)
Mean (μ_1)	-0.010	-0.012
	(0.009)	(0.010)
Std. deviation (σ_1)	0.117	0.103
	(0.010)	(0.009)
Second component		
Weight (w_2)	0.107	0.166
	(0.037)	(0.056)
Mean (μ_2)	0.402	0.354
	(0.044)	(0.065)
Std. deviation (σ_2)	0.1189	0.165
	(0.035)	(0.061)
Third component		
Weight (w_3)	0.203	0.115
	(0.035)	(0.019)
Mean (μ_3)	0.890	0.909
	(0.046)	(0.026)
Std. deviation (σ_3)	0.194	0.127
	(0.056)	(0.029)
Observations	768	768
Test for equality of means[a]:		
Difference in means ($\mu_{HH} - \mu_M$)		-0.062**
t-test (p-value)		2.38 (0.017)

Note. Standard errors in parenthesis. The distribution fit is computed using parametric distributional assumption (assuming a mixture of three Normal distributions) and estimating parameters using Maximum Likelihood and imposing left / right censoring points and bounds for each observation. [a] Test for equality of the mean in the two groups is carried out assuming independence between the two groups and using a $t - test = (\mu_{HH} - \mu_M)/\sqrt{s.e.(\mu_{HH})^2 + s.e.(\mu_M)^2}$ where μ_{HH} is the mean for the individual living in municipalities where the CCT payment was transferred to household heads and μ_M where the CCT payment was transferred to Mothers.

part of a household that was offered a CCT.

Targeted transfers alter household decision making through (at least) two channels. First, the transfer has an effect on total household income which may affect bargaining positions for men and women directly. Second, the transfer has an effect on the share of resources attributable to each household member. The experiment identified the values that make the women indifferent between receiving the transfer and letting their spouse receive it, providing information about the trade-off the women makes between household income and empowerment. Our results showed that women are, on average, willing to sacrifice some household income to receive the money and gain more power over resources. Note that this result means that the unitary model is generally rejected in our study. Our results further showed that having already been empowered by the CCT (i.e., residing in a municipalities where women were offered the CCT) leads, on average, to a lower willingness to sacrifice household income to gain power.

References

Adato, M., B. de la Briere, D. Mindek, and A. R. Quisumbing (2000). The impact of progresa on women's status and intrahousehold relations. Technical report, IFPRI. http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/125438.

Attanasio, O. and V. Lechene (2002). Tests of income pooling in household decisions. *Review of Economic Dynamics 5*(4), 720–748.

Attanasio, O. P. and V. Lechene (2014). Efficient responses to targeted cash transfers. *Journal of Political Economy 122*(1), 178–222.

Browning, M. and P.-A. Chiappori (1998). Efficient intra-household allocations: A general characterization and empirical tests. *Econometrica*, 1241–1278.

Browning, M., P.-A. Chiappori, and Y. Weiss (2014). *Economics of the Family*. Cambridge University Press.

Chiappori, P.-A. (1992). Collective labor supply and welfare. *Journal of Political Economy*, 437–467.

Chiappori, P.-A. and I. Ekeland (2009). The microeconomics of efficient group behavior: Identification. *Econometrica 77*(3), 763–799.

Doss, C. (2006). The effects of intrahousehold property ownership on expenditure patterns in ghana. *Journal of African Economies 15*(1), 149–180.

Duflo, E. (2012). Women empowerment and economic development. *Journal of Economic Literature 50(4)*, 1051–79.

Fiszbein, A., N. R. Schady, and F. H. Ferreira (2009). *Conditional cash transfers: reducing present and future poverty*. World Bank Publications.

Hoddinott, J. and L. Haddad (1995). Does female income share influence household expenditures? evidence from côte d'ivoire. *Oxford Bulletin of Economics and Statistics 57*(1), 77–96.

Lundberg, S. J., R. A. Pollak, and T. J. Wales (1997). Do husbands and wives pool their resources? evidence from the united kingdom child benefit. *Journal of Human Resources*, 463–480.

Samuelson, P. A. (1956). Social indifference curves. *The Quarterly Journal of Economics*, 1–22.

Schady, N. R. and M. Araujo (2006). Cash transfers, conditions, school enrollment, and child work: Evidence from a randomized experiment in ecuador. *World Bank Publications 3*.

Thomas, D. (1990). Intra-household resource allocation: An inferential approach. *Journal of Human Resources*, 635–664.

Ward-Batts, J. (2008). Out of the wallet and into the purse using micro data to test income pooling. *Journal of Human Resources 43*(2), 325–351.

Appendices to "Measuring and Changing Control: Women Empowerment and Targeted Transfers"

A Design: experiment and survey

This appendix shows the design implemented in full. A.1 shows the screenshots for the experiment.

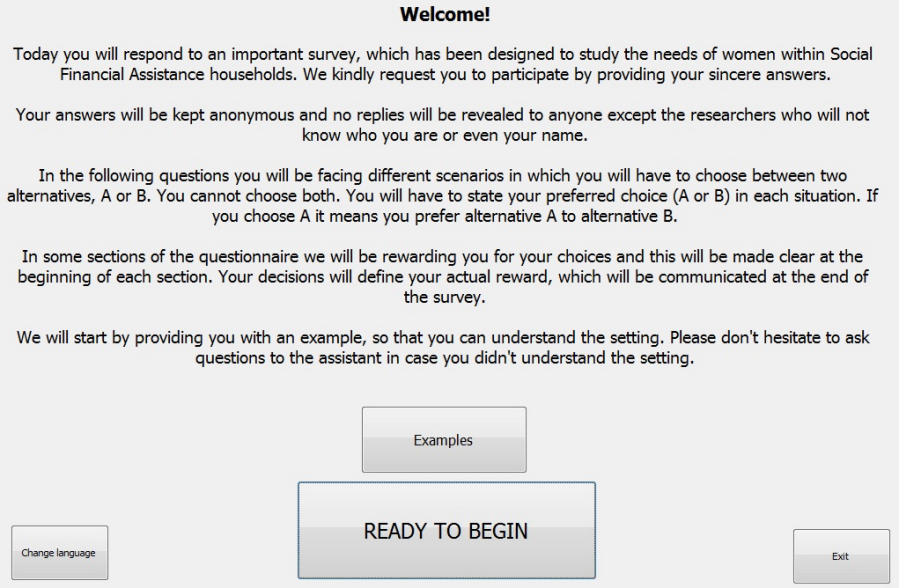
A.1 Experiment

At the beginning of the session, the following instruction was read by the respondent together with an assistant. The assistant was present throughout the experiment to collect the answers and go trough the questions with the respondent.

> *Today you will respond to an important survey, which has been designed to study the needs of women within Social Financial Assistance households. We kindly request you to participate by providing your sincere answers. Your answers will be kept anonymous and no replies will be revealed to anyone except the researchers who will not know who you are or even your name.*
>
> *In the following questions you will be facing different scenarios in which you will have to choose between two alternatives, A or B. You cannot choose both. You will have to state your preferred choice (A or B) in each situation. If you choose A it means you prefer alternative A to alternative B.*
>
> *In some sections of the questionnaire we will be rewarding you for your choices and this will be made clear at the beginning of each section. Your decisions will define your actual reward, which will be communicated at the end of the survey.*
>
> *We will start by providing you with an example, so that you can understand the setting. Please don't hesitate to ask questions to the assistant in case you didn't understand the setting.*

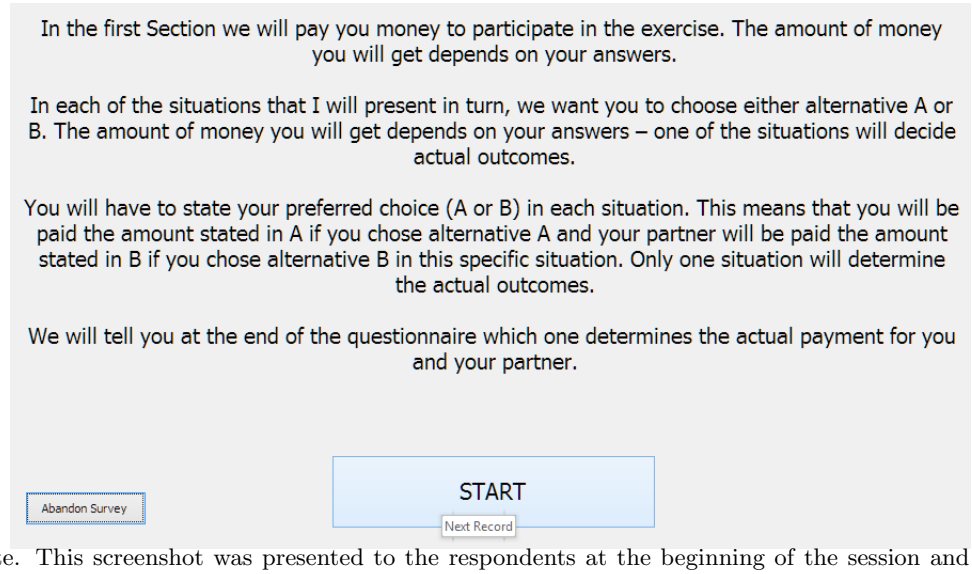
Once the session is started, the respondent is presented with different examples and is therefore introduced to each section at the beginning of them. Figures A1 to A3 show screenshots of the experiment setting.

Figure A1: Introduction to the experiment



Note. This screenshot was presented to the respondents at the beginning of the incentivized section of the experiment.

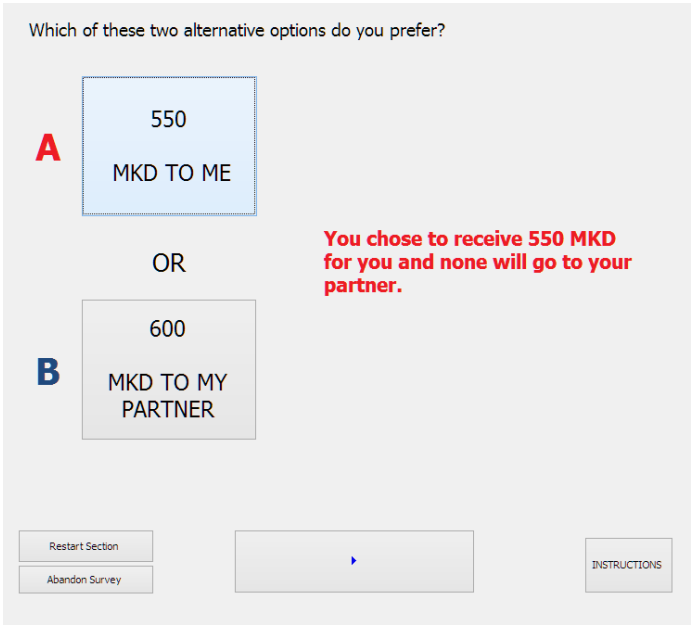
Figure A2: Introduction to the incentivized section



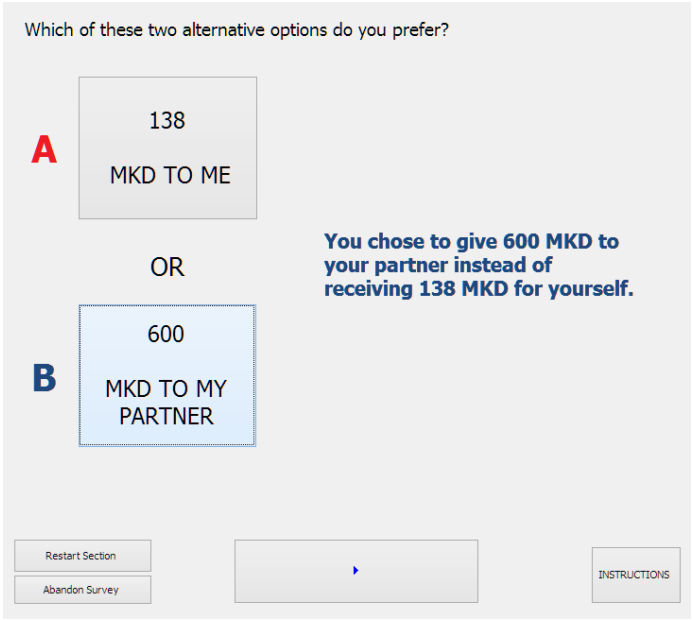
Note. This screenshot was presented to the respondents at the beginning of the session and was read together with the interviewer.

Figure A3: Experiment setting for the incentivized section

A. Choice to keep the money



B. Choice to give the money to the partner



Note. These screenshots present the setting faced by the respondent in the experiment. The top panel shows the screen when the respondent choose to keep the amount when choosing between 550 MKD for herself and 600 MKD for the partner. The bottom panel show the screen when the respondent choose to give the amount to the partner when choosing between 138 MKD for herself and 600 MKD for the partner.

A.2 Full survey questionnaire

The following table presents the text and the coding of all questions in the survey. Questions indicated as CES-D10 are part of the 10 questions composing the Center for Epidemiologic Studies Short Depression Scale.

ID	Questions	Coding
CES-D10-1	For each of the following statements, please select the answer that best describes how often you felt or behaved this way during the past week: I was bothered by things that usually don't bother me.	1 Rarely or none of the time 2 Some or a little of the time 3 Occasionally or a moderate amount of the time 4 Most or all of the time .a Not applicable .b Dont know
CES-D10-2	For each of the following statements, please select the answer that best describes how often you felt or behaved this way during the past week: I had trouble keeping my mind on what I was doing.	1 Rarely or none of the time 2 Some or a little of the time 3 Occasionally or a moderate amount of the time 4 Most or all of the time .a Not applicable .b Dont know
CES-D10-3	For each of the following statements, please select the answer that best describes how often you felt or behaved this way during the past week: I felt depressed.	1 Rarely or none of the time 2 Some or a little of the time 3 Occasionally or a moderate amount of the time 4 Most or all of the time .a Not applicable .b Dont know
CES-D10-4	For each of the following statements, please select the answer that best describes how often you felt or behaved this way during the past week: I felt that everything I did was an effort.	1 Rarely or none of the time 2 Some or a little of the time 3 Occasionally or a moderate amount of the time 4 Most or all of the time .a Not applicable .b Dont know
CES-D10-5	For each of the following statements, please select the answer that best describes how often you felt or behaved this way during the past week: I felt hopeful about the future.	1 Rarely or none of the time 2 Some or a little of the time 3 Occasionally or a moderate amount of the time 4 Most or all of the time .a Not applicable .b Dont know
CES-D10-6	For each of the following statements, please select the answer that best describes how often you felt or behaved this way during the past week: I felt fearful.	1 Rarely or none of the time 2 Some or a little of the time 3 Occasionally or a moderate amount of the time 4 Most or all of the time .a Not applicable .b Dont know
CES-D10-7	For each of the following statements, please select the answer that best describes how often you felt or behaved this way during the past week: My sleep was restless.	1 Rarely or none of the time 2 Some or a little of the time 3 Occasionally or a moderate amount of the time 4 Most or all of the time .a Not applicable .b Dont know
CES-D10-8	For each of the following statements, please select the answer that best describes how often you felt or behaved this way during the past week: I was happy.	1 Rarely or none of the time 2 Some or a little of the time 3 Occasionally or a moderate amount of the time 4 Most or all of the time .a Not applicable .b Dont know
CES-D10-9	For each of the following statements, please select the answer that best describes how often you felt or behaved this way during the past week: I felt lonely.	1 Rarely or none of the time 2 Some or a little of the time 3 Occasionally or a moderate amount of the time 4 Most or all of the time .a Not applicable .b Dont know

CES-D10-10	For each of the following statements, please select the answer that best describes how often you felt or behaved this way during the past week: I could not get going.	1 Rarely or none of the time 2 Some or a little of the time 3 Occasionally or a moderate amount of the time 4 Most or all of the time .a Not applicable .b Dont know
11	In your neighbourhood, how likely is it that a married woman would divorce?	1 Very likely 2 Somewhat likely 3 Could happen 4 Unlikely 5 Very unlikely .a Not applicable .b Dont know
12	In the last 2 weeks, did you and your spouse argue about ...MANAGING MONEY?	1 Yes 2 No .a Not applicable .b Dont know
13	In the last 2 weeks, did you and your spouse argue about ...DISCIPLINE OF THE CHILDREN?	1 Yes 2 No .a Not applicable .b Dont know
14	Sometimes a husband is annoyed or angered by things that his wife does. In your opinion, is a husband justified in hitting or beating his wife if SHE ARGUES WITH HIM?	1 Yes 2 No .a Not applicable .b Dont know
15	Sometimes a husband is annoyed or angered by things that his wife does. In your opinion, is a husband justified in hitting or beating his wife if SHE GOES OUT WITHOUT TELLING HIM?	1 Yes 2 No .a Not applicable .b Dont know
16	Sometimes a husband is annoyed or angered by things that his wife does. In your opinion, is a husband justified in hitting or beating his wife if SHE NEGLECTS THE CHILDREN?	1 Yes 2 No .a Not applicable .b Dont know
17	Sometimes a husband is annoyed or angered by things that his wife does. In your opinion, is a husband justified in hitting or beating his wife if SHE BURNS THE FOOD?	1 Yes 2 No .a Not applicable .b Dont know
18	In your neighbourhood, is it usual for husbands to beat the wives if THEY ARGUE WITH HIM?	1 Yes 2 No .a Not applicable .b Dont know
19	In your neighbourhood, is it usual for husbands to beat the wives if THEY GO OUT WITHOUT TELLING HIM?	1 Yes 2 No .a Not applicable .b Dont know
20	In your neighbourhood, is it usual for husbands to beat the wives if THEY NEGLECT THE CHILDREN?	1 Yes 2 No .a Not applicable .b Dont know
21	In your neighbourhood, is it usual for husbands to beat the wives if THEY BURN THE FOOD?	1 Yes 2 No .a Not applicable .b Dont know
22	If your child doesn't want to go to school, who in the household usually decides whether he/she should go?	1 Wife 2 Husband 3 Together .a Not applicable .b Dont know
23	Who in the household usually decides how much money to be spent on food?	1 Wife 2 Husband 3 Together .a Not applicable .b Dont know
24	Who in the household usually decides about the financial administration?	1 Wife 2 Husband 3 Together .a Not applicable .b Dont know

25	Imagine the following household composed by a wife, a husband and three children. The wife is 40 years old and her husband is 43 years old. The three children are aged 5, 10 and 14. Both wife and husband have been unemployed in the last 2 years and have been receiving SFA. Today, the wife receives X MKD from her parents to help the family. Who do you think should decide what to do with that amount?	1 Wife 2 Husband 3 Together .a Not applicable .b Dont know
26	In 3 years time, how likely is it that you will have worked at least once for A SALARIED JOB?	1 Very likely 2 Somewhat likely 3 Could happen 4 Unlikely 5 Very unlikely .a Not applicable .b Dont know
27	In 3 years time, how likely is it that you will have worked at least once for AN OCCASIONAL JOB?	1 Very likely 2 Somewhat likely 3 Could happen 4 Unlikely 5 Very unlikely .a Not applicable .b Dont know
28	If your household is in need of financial help, think whether you would ask for help to the following people. Can you ask for financial help to your MOTHER?	1 Yes 2 No .a Not applicable .b Dont know
29	If your household is in need of financial help, think whether you would ask for help to the following people. Can you ask for financial help to your FATHER?	1 Yes 2 No .a Not applicable .b Dont know
30	If your household is in need of financial help, think whether you would ask for help to the following people. How many SIBLINGS can you contact for asking financial help? (Report the total number, write 0 if none)	-
31	If your household is in need of financial help, think whether you would ask for help to the following people. How many OTHER RELATIVES can you contact for asking financial help? (Report the total number, write 0 if none)	-
32	If your household is in need of financial help, think whether you would ask for help to the following people. How many FRIENDS can you contact for asking financial help? (Report the total number, write 0 if none)	-
34	Does your partner own a cell-phone?	1 Yes 2 No .a Not applicable .b Dont know
35	How much do you believe he spends on paying the phone bill/buying pay-as-you-go cards in a typical month?	-
36	Do you have your own cell-phone (you own the phone and you are not sharing the use of it with nobody else in the household)?	1 Yes 2 No .a Not applicable .b Dont know
37	How much do you spend on paying the phone bill/buying pay-as-you-go cards in a typical month?	-
38	Do any of your children have a cell-phone?	1 Yes 2 No .a Not applicable .b Dont know

39	Do you and your partner pay for the expenses?	1 Yes 2 No .a Not applicable .b Dont know
40	How much do you think that they spend on the phone bill/buying pay-as-you-go cards in a typical month?	-
41	How much does your household spend on food in a typical week?	-
42	How much of what your household spend on food typically goes to your children?	-
43	How much does your household spend on cigarettes in a typical week?	-
44	How many cigarettes do you smoke in a typical day? (write 0 if None, indicate the brand or type of tobacco in the additional information field)	-
45	How many cigarettes does your partner smoke in a typical day? (write 0 if None, indicate the brand or type of tobacco in the additional information field)	-
46	How much does your household spend on alcohol in a typical week?	-
47	Do you drink alcohol?	1 Yes 2 No .a Not applicable .b Dont know
48	Does your partner drink alcohol?	1 Yes 2 No .a Not applicable .b Dont know

B Parametric distribution fit for willingness to pay

To correct for censoring at the extremes of the distribution of the willingness to pay, we need to make distributional assumptions. To this end, we estimate a parametric distribution fit using maximum likelihood assuming a mixture of three Gaussian distributions.[2] The probability density function of the willingness to pay, s_i, is defined by:

$$f_i(s_i) = \sum_{j=1}^{3} w_j \phi_j(s_i) \tag{15}$$

where $\phi(s_i)$ is the p.d.f. of a normal distribution with mean μ_j and standard deviation σ_j, and w_j are the weights associated with each p.d.f. such that $w_j \geq 0$ and $\sum w_j = 1$. We rely on maximum likelihood to estimate the parameters $\mathbf{w} = (w_1, w_2, w_3)$, $\mu = (\mu_1, \mu_2, \mu_3)$ and $\sigma = (\sigma_1, \sigma_2, \sigma_3)$.[3] The cumulative distribution function is defined by:

$$F_i(s_i) = \sum_{j=1}^{3} w_j \Phi_j(s_i) \tag{16}$$

where $\Phi_j(s_i)$ is the c.d.f. of a normal distribution with mean μ_j and standard deviation σ_j.

Since we don't allow s_i to vary continuously beyond pre-defined thresholds, we face multiple censoring points when the respondents report to always wanting to keep the offered money or when they report to always wanting to give the money to the partner. These points are different depending on the stakes. For example, when the initial stake is 600 MKD and the respondent always keep the money, the willingness to pay is right censored at 0.9375 (i.e.$(600 - 37.5)/600$). If the respondent always give the money to partner the answer is instead left censored at -0.083 (i.e.$(600 - 650)/600$). Table B2 presents censoring points for each stake both in terms of last amount offered to the respondents and in terms of the corresponding willingness to pay.

This means that the underlying willingness to pay, s_i^* is not observed beyond these bounds that are determined by the initial stake, E_i, and by the rules of the experiment. Assuming that $s_i^* \sim f_i(\mathbf{w}, \mu, \sigma)$, the observed willingness to pay, s_i, is described by the following rule:

$$s_i = \begin{cases} s_i^* & \text{if } lb_i(E_i) > s_i^* > ub_i(E_i) \\ lb_i(E_i) & \text{if } s_i^* \leq lb_i(E_i) \\ ub_i(E_i) & \text{if } s_i^* \geq ub_i(E_i) \end{cases} \tag{17}$$

[2] The results are consistent when using different mixture of distributions. For example, assuming a mixture of two Gaussian distributions or a mixture of a Gaussian and Weibull distributions leads to the same conclusions.

[3] w_3 is not estimated via maximum likelihood, but is identified by $w_3 = 1 - w_1 - w_2$.

where $lb_i(E_i)$ and $ub_i(E_i)$ are the lower and the upper censoring points for participant i that was offered a stake E_i (for simplicity we will refer to lb_i for $lb_i(E_i)$ and ub_i for $ub_i(E_i)$). Let $\{s_i = 1, ..., N\}$ be a random sample of data from the model. The log-likelihood function is therefore defined by:

$$\begin{aligned} ln\, l_i(s_i; \mathbf{w}, \mu, \sigma) &= \mathbf{1}(s_i = lb_i) ln\left[F_i(s_i)\right] + \mathbf{1}\left(lb_i > s_i > ub_i\right) ln\left[f_i(s_i)\right] + \\ &\quad + \mathbf{1}(s_i = ub_i) ln\left[1 - F_i(s_i)\right] \end{aligned} \tag{18}$$

Using the sample likelihood function and substituting for (15) and (16), we can derive $(\mathbf{w}, \mu, \sigma)$ by maximizing the following log-likelihood function [4]:

$$\begin{aligned} argmax_{\{w,\mu,\sigma\}}\, ln\, L_N(s_i; .) &= \sum_{n=1}^{N} \{\mathbf{1}\left(s_i = lb_i\right) ln \left[\sum_{j=1}^{3} w_j \Phi_j(s_i)\right] + \\ &\quad + \mathbf{1}\left(lb_i > s_i > ub_i\right) ln \left[\sum_{j=1}^{3} w_j \phi_j(s_i)\right] \\ &\quad + \mathbf{1}\left(s_i = ub_i\right) ln \left[1 - \sum_{j=1}^{3} w_j \Phi_j(s_i)\right]\} \end{aligned} \tag{19}$$

Up to this point we have assumed that the willingness to pay, s_i, is observed when the distribution is not upper or lower censored. However, the exact realization s_i is never observed as the software is designed to stop when two consecutive offered amounts with different decisions (either to keep the amount or to give it to the partner) are separated by an amount lower than 20 MKD. In the paper, we therefore assume that s_i is not observed, but we assume that s_i is within the two bounds, s_i^U and s_i^L. We can then express the log-likelihood function by:

$$ln\, l_i(s_i; \mathbf{w}, \mu, \sigma) = ln\left[F_i(s_i^U) - F_i(s_i^L)\right] \tag{20}$$

where s_i^U and s_i^L are defined according to the stopping rule at each choice situation.

In order to analyse the distribution and compare the estimated mean for different groups we need to compute the mean of the distribution and its variance. The distribution mean of a mixture of three Gaussian distribution can be computed using parameter estimates derived from maximum likelihood estimation and is defined by:

$$\mu = w_1\mu_1 + w_2\mu_2 + (1 - w_1 - w_2)\mu_3 \tag{21}$$

[4] We extend the estimation by considering a conditional version of the probability function and allowing k controls. In this case the argument of the p.d.f. and the c.d.f. is $(s_i - X'\beta)$, where X is a $k \times N$ matrix of individual controls and β is a $k \times 1$ vector of coefficients. Results for the conditional version are comparable to the unconditional version.

The variance of the mean is instead equal to

$$\begin{aligned}\sigma_{\mu}^{2} &= Var\left[w_1\mu_1 + w_2\mu_2 + (1 - w_1 - w_2)\mu_3\right] \\ &= Var\left[w_1\mu_1\right] + Var\left[w_2\mu_2\right] + Var\left[(1 - w_1 - w_2)\mu_3\right] + \\ &\quad + 2Cov\left[w_1\mu_1, w_2\mu_2\right] + 2Cov\left[w_1\mu_1, (1 - w_1 - w_2)\mu_3\right] + \\ &\quad + 2Cov[w_2\mu_2, (1 - w_1 - w_2)\mu_3] \end{aligned} \tag{22}$$

Since different components of σ_{μ}^{2} are not directly observed, we use the Delta Method to compute the standard error of the mean. The variance of μ is therefore defined by:

$$\hat{Var}[\mu] = \left[\frac{d\mu}{d\theta}\right]' \hat{Var}[\theta] \left[\frac{d\mu}{d\theta}\right] \tag{23}$$

where $\theta = [w_1, w_2, w_3, \mu_1, \mu_2, \mu_3]$ is the vector of parameters composing the mean of the distribution and $\frac{d\mu}{d\theta} = [\mu_1, \mu_2, \mu_3, w_1, w_2, w_3]$ is the vector of first derivatives of μ with respect to each of the parameters in θ.

Table B2: Lower and Upper Censoring points for different Stakes

Stakes offered to partner E_i	**Lower Censoring**		**Upper Censoring**	
	Last amount offered	$lb_i(E_i)$	Last amount offered	$ub_i(E_i)$
800	850	-0.0625	12	0.9850
750	800	-0.0667	11	0.9853
700	750	-0.0714	10	0.9857
650	700	-0.0769	10	0.9846
600	650	-0.0833	34	0.9433
550	600	-0.0909	31	0.9436
500	550	-0.1000	28	0.9440
450	500	-0.1111	25	0.9444
400	450	-0.1250	22	0.9450

Note. Values are reported in Macedonian Denars (MKD). $lb_i(E_i)$ and $ub_i(E_i)$ are defined as the share the person is willing to pay when the experiment stops as a share of the stake. For lower censoring the willingness to pay is negative. The experiments stops when the difference between two consecutive offered amounts is smaller than 20 MKD for upper censoring and is larger than the stake plus 50 MKD for lower censoring.

C Sample selection

In this section, we present an analysis of response rate. Table C3 presents probit regressions of participation in the lab interview on the policy instrument and other individual and household controls. The dependent variable is equal to one if the selected participant responded to the lab interview and zero if the selected participant was not present during the days of the interview or rejected to participate. We can observe that on average women living in municipalities where the CCT payments were targeted to women have a slightly lower probability to participate in the lab interview. However, this effect is not statistically significant in three of four specifications and only weakly statistical significant in one (the probit-specification that leaves out controls for ethnicity).

Table C3: Response rate in the lab interview and the CCT policy experiment

	Dep.var.: Participated in the lab interview			
	(1)	(2)	(3)	(4)
	OLS	OLS	Probit	Probit
Payment to mother (d)	-0.045	-0.041	-0.046*	-0.042
	(0.028)	(0.027)	(0.027)	(0.026)
Demographic controls	Yes	Yes	Yes	Yes
Ethnicity controls	No	Yes	No	Yes
pseudo-R^2			0.049	0.062
Observations	906	906	906	906

Note: In columns 3 and 4, marginal effects are presented. Standard errors in parenthesis are clustered at municipality level. Dependent variable is a dummy variable equal to one if the respondent participated in the lab interview after being selected and zero otherwise. Controls include respondent's and partner's age and education, gender of the household head, household size, religion and regional dummies and ethnicity of the family.

D Additional data analysis

D.1 Household decision making and domestic violence indexes

In this section we look at how the gender-targeted payments affected other measures of women's empowerment than the one proposed in the paper. We build two indexes: a *Domestic Violence Index* and a *Household Decision Making Index*.[5]

The *Domestic Violence Index* aims at capturing respondent's attitudes towards domestic violence and perceptions of domestic violence in the neighbourhood of residence. We focus on whether the respondent believes that domestic violence is acceptable if a woman argues with the partner, if a woman goes out without informing her partner, if a woman neglects her children and if a woman burns the food while cooking. In addition, we use information on whether the respondent believes that these types of domestic violence are common in her neighbourhood.

The *Household Decision Making Index* is instead looking at who within the household is participating in decisions about children's schooling, food expenses, household financial administration and about an extra income. These variables are coded as 0 if the man is deciding, 1 if the two partners are deciding together and 2 if the woman is deciding.

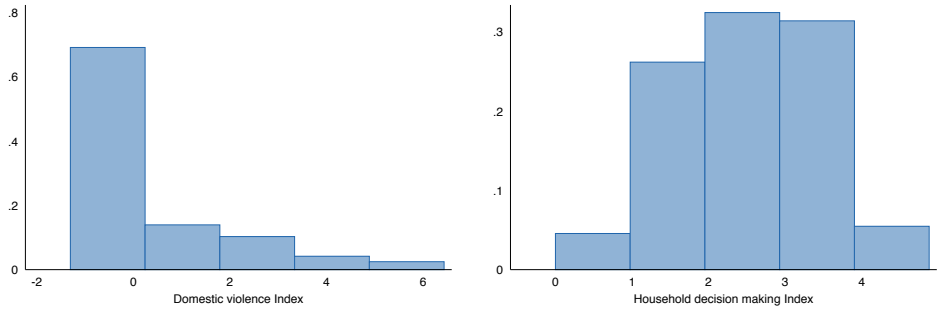
For the DV Index we use Principal Component Analysis (PCA) on the selected dummy variables and we construct the index using the first component only. For the HDM Index, since the variables are ordinal, we perform Factor Analysis (FA) using a polychoric correlation matrix. Table D5 presents the factor loadings for the domestic violence index and the household decision making index. Figure D4 presents the distribution of the household decision making index by ethnic groups.

In order to test whether the effect of targeting payments to mothers is captured by these alternative measures, we estimated the effect of gender-targeted transfers on the HDM and the DV index and we compare these with the effect on the willingness to pay from the experiment (Table D6).

First, in columns 1, 4 and 7, we focus on intent-to-treat estimates (equation 13) on whether a respondent is residing in a municipality where CCT payments were transferred to women. Second, we look at IV estimates (equation 14) of the effect of wife's income share (columns 2, 5 and 8), defined as the share attributable to the wife of total household income, and third, we look at the effect of total CCT transfer to the woman (columns 3, 6 and 9) on willingness to pay. We observe that the effect of targeting payments to women on the HDM index and the DV index, respectively, is not significant. However, the direction of the effect is in line with

[5]Table D4 presents descriptive statistics about the variables we consider for the construction of the two indexes.

Figure D4: Distribution of domestic violence and household decision making indexes



Note. The graph presents the distribution of an index of attitudes toward domestic violence (left panel) and an index of household decision making (right panel. Indexes are built using principal component analysis and using the first component only. See Table D5 for factor loadings.

the results obtained for the willingness to pay obtained from the lab experiment.

Table D4: Descriptive statistics: household decision making

	(1) Mean	(2) Median	(3) St.Dev.	(4) Min	(5) Max
Argued about managing money	0.35	0.00	0.48	0	1
Argued about children's discipline	0.30	0.00	0.46	0	1
Violence justified for argument	0.10	0.00	0.29	0	1
Violence justified for going out	0.16	0.00	0.37	0	1
Violence justified for neglecting children	0.33	0.00	0.47	0	1
Violence justified for burning food	0.05	0.00	0.22	0	1
Violence common for argument	0.28	0.00	0.45	0	1
Violence common for going out	0.21	0.00	0.41	0	1
Violence common for neglecting children	0.20	0.00	0.40	0	1
Violence common for burning food	0.10	0.00	0.30	0	1
Wife decides about school	0.94	1.00	0.24	0	1
Wife decides about food	0.81	1.00	0.39	0	1
Wife decides about finance	0.70	1.00	0.46	0	1
Wife decides about extra amount	0.96	1.00	0.21	0	1
Husband decides about school	0.88	1.00	0.33	0	1
Husband decides about food	0.76	1.00	0.42	0	1
Husband decides about finance	0.73	1.00	0.44	0	1
Husband decides about extra amount	0.92	1.00	0.27	0	1
Depression Index	13.01	13.00	6.34	0	30
Presence of depression symptoms	0.70	1.00	0.46	0	1
High likelihood of divorce in the neighborhood	0.22	0.00	0.41	0	1
High likelihood of salaried job	0.24	0.00	0.42	0	1
High likelihood of occasional job	0.40	0.00	0.49	0	1

Note: Depression index is based on CES-D10 test. Presence of depression symptoms is a dummy variable equal to one if the CES-D10 depression value is equal or larger to 10. For variables concerning likelihood, we refer to "high likelihood" the answers "Very likely" and "Somewhat likely", while the excluded answers are "Could happen", "Unlikely" and "Very unlikely". For variables concerning decisions, we refer to "wife (husband) decides" if the respondent (partner) decides alone or together with the partner.

Table D5: Principal component analysis for domestic violence and household decision making

	Factor loadings	
	Domestic violence (DV)	Household decision making (HDM)
	(1)	(2)
Violence justified for:		
argument	0.280	
going out	0.289	
neglecting children	0.299	
burning food	0.234	
Violence common for:		
argument	0.380	
going out	0.447	
neglecting children	0.450	
burning food	0.386	
Participation in the decision about:		
school		0.510
food expenses		0.714
financial administration		0.701
managing an extra amount		0.516
Share of total variance explained	0.401	.
Observations	768	768

Note. For the DV index, the table presents the Principal Component Analysis (PCA) factor loadings of the first component. "Violence justified for" refers to the question "Sometimes a husband is annoyed or angered by things that his wife does. In your opinion, is a husband justified in hitting or beating his wife if...". "Violence common for" refers to the question "In your neighbourhood, is it usual for husbands to beat the wives if...". For the HDM Index, index weights are computed performing Factor Analysis (FA) using a polychoric correlation matrix. Variables about household decision making are coded as 0 if the man is deciding, 1 if the two partners are deciding together and 2 if the woman is deciding.

Table D6: Effect of targeting payments to women on different measure of women's empowerment

Dep.var.:	Willingness to pay			HDM index			DV index		
	(1) OLS	(2) IV	(3) IV	(4) OLS	(5) IV	(6) IV	(7) OLS	(8) IV	(9) IV
Payment to mother	-0.053**			0.112			-0.202		
	(0.024)			(0.089)			(0.171)		
Wife's income share		-0.271**			0.573			-1.030	
		(0.109)			(0.445)			(0.852)	
Wifes's CCT income			-0.005**			0.011			-0.019
			(0.002)			(0.008)			(0.015)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	768	768	768	768	768	768	768	768	768

Note: Standard errors in parenthesis are clustered at municipality level (*** p<0.01, ** p<0.05, * p<0.1). In columns 1 and 4, the table presents estimates using equation 13 for the effect of targeting payments to mothers on the willingness to pay. In columns 2-3 and 5-6, the table presents estimates for equation 14 on the effect of wife's income share, defined as the share attributable to the wife of total household income, and on total CCT transfer to the woman on willingness to pay. Willingness to pay is defined as the share of transfer the respondent is willing to give away to receive the money instead of the partner receiving the money. Household Decision Making (HDM) Index is built using information on who within the household is participating in decisions about school, food expenditures, financial administration and about what to do with extra income, and performing Factor Analysis (FA) using a polychoric correlation matrix. Domestic Violence (DV) Index is built using information on respondent's attitudes towards domestic violence and perceptions of domestic violence in the neighbourhood of residence and performing Principal Component Analysis (PCA). Controls include age and education of partner's, the gender of the household head, religion and ethnicity of the household, regional dummies, indicator variables for the type of settlement and indicator variables for the stake.

D.2 Incentivized and non incentivized willingness to pay

In this section we compare willingness to pay reported by the respondent in the incentivized version and in the non-incentivized version (with larger stakes).

Willingness to pay in the incentivized version appears to be strongly correlated with the willingness to pay in the non-incentivized versions. Table D7 presents OLS regression of incentivized willingness to pay on non-incentivized willingness to pay, controlling for different sets of regressors. The coefficient on non-incentivized willingness to pay is around 58 percent and is not affected by adding individual and ethnic controls and controlling for stake dummies.

Initial stakes seems not to be related to incentivized willingness to pay. Table D8 shows estimates of an OLS regression of willingness to pay on a set of dummy variables for different starting points[6]. Columns (1) and (2) show that willingness to pay in the incentivized version is not correlated with the offered stake. A joint test cannot reject the equality of the coefficients to zero. Figure D5 presents the distribution of willingness to pay by stake. If we turn our attention to the non-incentivized version (columns (3) and (4)), we can observe instead that, while not following a precise pattern, the largest stakes have a significant effect on willingness to pay. However, using controls we cannot reject joint equality to zero.

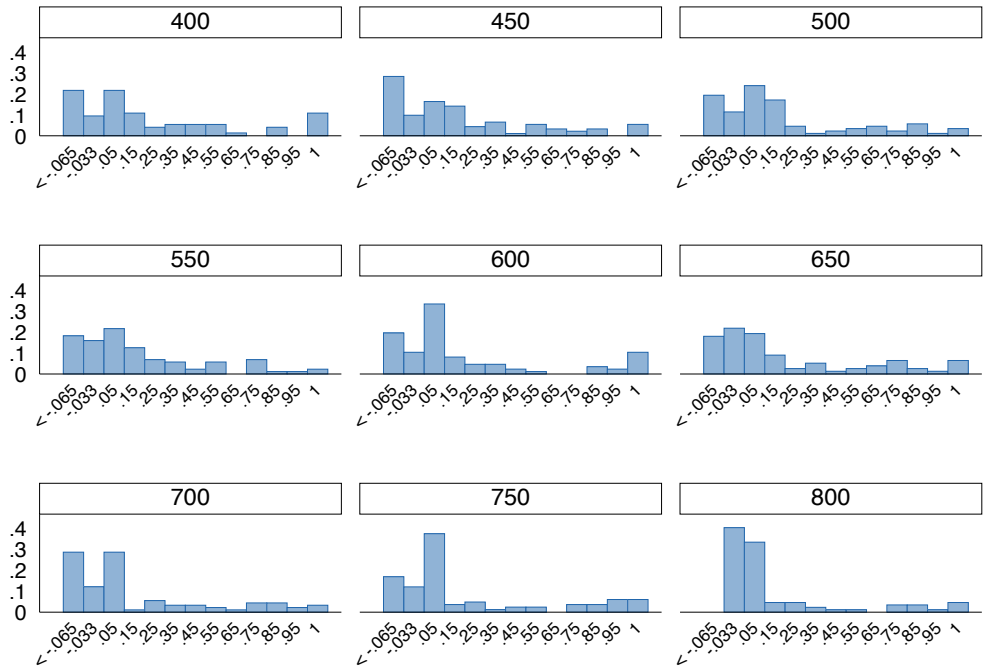
Table D7: Correlation between incentivized and non-incentivized willingness to pay

	Dep.var.: Willingness to pay			
	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
WTP (non incentivized)	0.594***	0.585***	0.578***	0.580***
	(0.036)	(0.036)	(0.037)	(0.037)
Individual controls	No	Yes	Yes	Yes
Ethnic controls	No	No	Yes	Yes
Stake dummies	No	No	No	Yes
Observations	768	768	768	768
R^2	0.386	0.404	0.412	0.413

Note: Standard errors in parenthesis are clustered at municipality level (*** p<0.01, ** p<0.05, * p<0.1). Dependent variable is willingness to pay (in the incentivized version) defined as the share of transfer the respondent is willing to give away to receive the money instead of the partner receiving the money. Controls include age and education of partner's, the gender of the household head, religion and ethnicity of the household, regional dummies, indicator variables for the type of settlement and indicator variables for the stake.

[6]We aggregate starting points in the following groups: 400-500 MKD, 550-650 MKD, 700-800 MKD.

Figure D5: Willingness to pay by stake



Note. The graph presents the distribution of respondents by the share the respondent is willing to pay in order to receive the payment for each of the stakes. The left bar is representing all responses smaller or equal to -0.065, which is the largest value of censored share and is defined as - 50 MKD divided by the maximum stake, 800 MKD.

Table D8: Correlation of willingness to pay to stakes

	Incentivized		Non incentivized	
	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
Stake equal to 550-650 MKD	-0.000	0.003	-0.036	-0.036
	(0.028)	(0.027)	(0.033)	(0.029)
Stake equal to 700-800 MKD	-0.017	-0.008	-0.057	-0.052*
	(0.028)	(0.027)	(0.034)	(0.030)
Stake equal to 5500-6500 MKD			0.017	0.018
			(0.031)	(0.031)
Stake equal to 7000-8000 MKD			0.060**	0.058**
			(0.026)	(0.026)
Controls	No	Yes	No	Yes
Observations	768	768	768	768
R^2	0.001	0.048	0.009	0.057
F test of joint equality to zero of corresponding stakes (p-value)	0.780	0.922	0.060	0.084

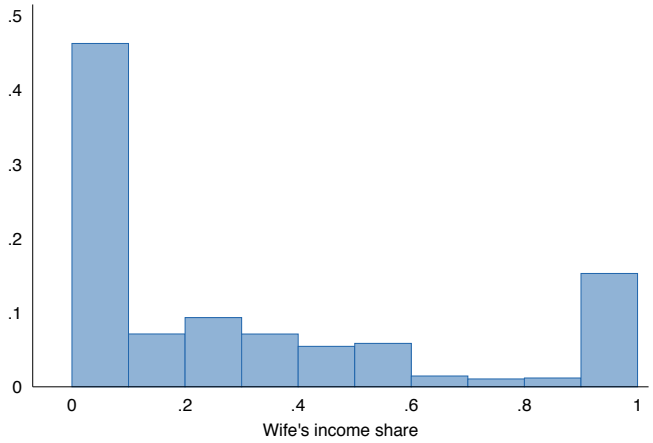
Note. Standard errors in parenthesis are clustered at municipality level (*** p<0.01, ** p<0.05, * p<0.1). Dependent variable is willingness to pay (in the incentivized and non-incentivized versions) defined as the share of transfer the respondent is willing to give away to receive the money instead of the partner receiving the money. Excluded controls include a dummy variable for the stake 400-500 MKD for the incentivized willingness to pay and a dummy for the stake 4000-5000 MKD for the non incentivized. Controls include age and education of partner's, the gender of the household head, religion and ethnicity of the household, regional dummies, indicator variables for the type of settlement and indicator variables for the stake. F test of joint equality is carried out on the stakes corresponding to the reported willingness to pay.

D.3 The definition of income share

Throughout the paper, we defined respondent's income share as her share of the sum of income for her and her spouse. Income share is built using information about assignable income from labour income, income from financial assistance (including the CCT transfer) and assistance from family and friends. If available, we sum income from up to two rounds of data collection. Figure D6 presents the distribution of wife's income share using all available information on attributable income.

In order to validate our measure, we focus on the panel sample, i.e. respondents of the lab interview that were interviewed at baseline in 2010, and we compare the wife's income share at baseline and at the time of the second follow up in 2013 in municipalities where the CCT transfer was targeted to mothers and where it was targeted to household heads. Table D9 shows that, while at baseline (columns (1) and (2)), there is no significant difference among these two groups, at follow-up respondents that are residing in a municipality where the CCT transfer targeted mothers have a significantly larger income share (columns (3) and (4)). We also observe a significant effect of the payment modality on willingness to pay (columns (5) and (6)).

Figure D6: Distribution of wife's income share



Note. The graph presents the distribution of wife's income share, define as the share total parental income that is assignable to the women in the household.

In this section we perform a series of robustness checks to show that results are robust to the definition used to compute income shares.

First, the main source of income for SFA recipients is the social benefit paid by the state. In this case the official recipient of the income is the household head, which is the person entitled to receive the payment. In the main definition, we

attribute income from financial assistance to the household head. In order to test whether the results are sensitive to this, we define the income share taking into account only income different from SFA.

Second, in our main definition we consider income assignable to a member the financial assistance received from its family and friends. It might well be that such assistance is provided to the household and not assignable to a specific member. Because of this we present the results by excluding not only the assistance from SFA, but also the income derived from assistance from family and friends.

Third, in order to use additional information about income, we summed income using each wave of household survey post-baseline. In order to check the robustness of this measure, we present the results by looking at income shares computed using only the latest source of information, the 2013 data collection wave.

Table D10 shows the relation between willingness to pay and the respondent's income share using different definition to account for individual income and presenting IV estimates (equation 14) where income share is instrumented by the payment modality introduced by the CCT.

While the interpretation of the coefficient is slightly different as income share is defined differently, we can observe that the results are robust to the definition of income share: in all cases, we can identify a significant effect of the respondent's income share on its willingness to pay.

Table D9: Income shares and willingness to pay in the panel sample

Dependent var.:	Baseline wife's income share		Follow-up wife's income share		Willigness to pay	
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	OLS	OLS
Payment to mother	-0.017	-0.015	0.138***	0.137***	-0.094**	-0.100**
	(0.022)	(0.022)	(0.034)	(0.034)	(0.043)	(0.038)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic controls	No	Yes	No	Yes	No	Yes
Observations	249	249	249	249	249	249
R^2	0.747	0.751	0.394	0.396	0.080	0.121

Note: Standard errors in parenthesis are clustered at municipality level (*** p<0.01, ** p<0.05, * p<0.1). The table presents OLS estimates on the effect of living in a "Payment to mother" municipality on different outcomes. In Columns (1) and (2), the dependent variable is wife's income share computed at baseline (pre-programme). In Columns (3) and (4), the dependent variable is wife's income share computed at follow-up. In Columns (5) and (6), the dependent variable is willingness to pay to receive a transfer rather than having the partner receiving it. Controls include age and education of partner's, the gender of the household head, religion and ethnicity of the household, regional dummies, indicator variables for the type of settlement and indicator variables for the stake.

Table D10: Willingness to pay and different definitions of income shares

	Dep.var.: Willingness to pay					
Subsample:	Include all observations			Exclude always keep and always give		
	(1)	(2)	(3)	(4)	(5)	(6)
	IV	IV	IV	IV	IV	IV
Wife's income share (exclude SFA income)	-0.122**			-0.125***		
	(0.054)			(0.046)		
Wife's income share (exclude all assistance)		-0.104**			-0.107***	
		(0.047)			(0.039)	
Wife's income share (consider only latest survey)			-0.336**			-0.386**
			(0.140)			(0.158)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	768	768	768	576	576	576
First stage results:						
Payment to mother	0.437***	0.510***	0.158***	0.444***	0.521***	0.144***
	0.026	0.029	0.024	0.032	0.035	0.029
R^2	0.363	0.409	0.409	0.358	0.404	0.393
F test of excluded instrument	275.379	310.162	43.169	188.906	216.496	24.191

Note: Standard errors in parenthesis are clustered at municipality level (*** p<0.01, ** p<0.05, * p<0.1). The table presents estimates for equation 14 on the effect of wife's income share, defined as the share attributable to the wife of total household income, and on total CCT transfer to the woman on willingness to pay. Dependent variable is willingness to pay defined as the share of transfer the respondent is willing to give away to receive the money instead of the partner receiving the money. Endogenous variables are instrumented using the dummy variable Payment to mother which is equal to one if the household resides in a municipality where the CCT transferred the money to mothers.In Columns (3)-(4) we restrict the sample by excluding the respondents who decided to always keeping the money offered or always giving it to their partner. Controls include age and education of partner's, the gender of the household head, religion and ethnicity of the household, regional dummies, indicator variables for the type of settlement and indicator variables for the stake.

D.4 Alternative measures of empowerment

In this section, we focus on alternative measures of empowerment that can point out the effect of payments targeting man versus woman. Since the randomization of the payment modality in the CCT program didn't include a pure control, in municipalities where the transfer targeted household heads, the transfer could have empowered men even further.

We therefore look at two measures that can distinguish transfers towards men to transfers towards women. First, we focus on the number of years in which a woman has been recipient of the CCT transfer versus the number of years in which a man has been a recipient. This number ranges from 0 to 3 and is dependent on the payment modality assigned by the CCT to the municipality of residence of the household. Second, we look at the actual CCT transfer to the woman versus the actual CCT transfer to the man. In both cases, we estimate the effect on willingness to pay using equation 14 and instrumenting the endogenous variable using the dummy variable "Payment to Mother", which is equal to 1 if the respondent resides in a municipality where the CCT transfer targeted women.

Table D11 presents estimates for these indicators of endogenous program participation. A higher number of years in which a woman has been the recipient of the CCT transfer and a higher amount received by a woman are linked to a lower willingness to pay. On the contrary, a higher number of years in which a man has been recipient of the CCT transfer and a higher amount received by a man are linked to a higher willingness to pay.

Table D11: Effect of the number of years of gender-targeted recipiency and amount received on willingness to pay

	Dep.var.: Willingness to pay							
Subsample:	Include all observations				Exclude always keep and always give			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	IV	IV	IV	IV	IV	IV	IV	IV
N. of years with mother recipient	-0.056**				-0.059***			
	(0.025)				(0.020)			
N. of years with father recipient		0.048**				0.049***		
		(0.021)				(0.017)		
Wifes's CCT income			-0.005**				-0.005***	
			(0.002)				(0.002)	
Husband's CCT income				0.004**				0.004***
				(0.002)				(0.001)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	768	768	768	768	576	576	576	576
Uncentered R^2	0.302	0.301	0.297	0.302	0.393	0.390	0.385	0.391
First stage results:								
Payment to mother	0.942***	-1.107***	10.663***	-12.982***	0.945***	-1.133***	10.672***	-13.679***
	0.059	0.046	0.786	0.751	0.066	0.058	0.903	0.833
R^2	0.390	0.495	0.321	0.371	0.379	0.514	0.315	0.397
F test of excluded instrument	253.325	575.486	183.897	299.156	202.726	381.525	139.577	269.593

Note: Standard errors in parenthesis are clustered at municipality level (*** p<0.01, ** p<0.05, * p<0.1). Table presents estimates for equation 14 on the effect of the number of years of gender-targeted recipiency and of total CCT transfer to the woman on willingness to pay. Dependent variable is willingness to pay defined as the share of transfer the respondent is willing to give away to receive the money instead of the partner receiving the money. Payment to mother is a dummy variable equal to one if the household resides in a municipality where the CCT transfers the money to mothers. In Columns (5)-(8) we restrict the sample by excluding the respondents who decided to always keeping the money offered or always giving it to their partner. Controls include age and education of partner's, the gender of the household head, religion and ethnicity of the household, regional dummies, indicator variables for the type of settlement and indicator variables for the stake.

E Identifying the empowerment effect

Consider preferences as specified in the Linear Expenditure System (LES):

$$u^S(Q, q_A, q_B) = a^S \log(q_S - c_S) + A^S \log(Q - C) \quad (S = A, B) \tag{24}$$

so that individual S only cares about the consumption of his own private good and the public good.

The household then solves the following:

$$\begin{aligned} \max \left(\mu(a^A \log(q^A - c^A) + A^A \log(Q - C)) + (1 - \mu)(a^B \log(q^B - c^B) + A^B \log(Q - C))\right. \\ \text{s.t. } p^A q^A + p^B q^B + PQ = x, \end{aligned} \tag{25}$$

Using the FOCs and the budget constraint, we get the following demands for the private and public goods:[7]

$$p^A q^A = p^A c^A + a^A \mu X \tag{26}$$

$$p^B q^B = p^B c^B + a^B (1 - \mu) X \tag{27}$$

$$PQ = PC + (A^A \mu + A^B (1 - \mu)) X \tag{28}$$

where $X = x - p^B c^B - p^A c^A - PC$.

We find that the collective indirect utility of individual A is, up to an additive constant:

$$v^A(p, P, x, f) = \log X - a^A \log p^A - A^A \log P + a^A \log(\mu a^A) + A^A \log(\mu A^A + (1-\mu) A^B). \tag{29}$$

Setting all prices to 1, we can simplify this to:

$$v^A(x, f) = k_0 + \log(x - k) + a^A \log(\mu a^A) + A^A \log(\mu A^A + (1 - \mu) A^B). \tag{30}$$

Consider the Pareto weights to be additive separable function of f, x and $\mathbf{z}$:

$$\mu = g(x) + h(f) + k(\mathbf{z}). \tag{31}$$

[7] When solving for this is to solve in the standard way, remember that $a^A + A^A = 1$ and $a^B + A^B = 1$.

Using 30 and 12, we then arrive at:

$$s = \frac{\frac{a^A}{\mu}\frac{\partial \mu}{\partial f} + \frac{A^A(A^A - A^B)\frac{\partial \mu}{\partial f}}{\mu A^A + (1-\mu)A^B}}{\frac{x}{x-k} + x\left(\frac{a^A}{\mu}\frac{\partial \mu}{\partial x} + \frac{A^A(A^A - A^B)\frac{\partial \mu}{\partial x}}{\mu A^A + (1-\mu)A^B}\right)} \tag{32}$$

Using the notation $\Omega = \frac{a^A}{\mu} + \frac{A^A(A^A - A^B)}{\mu A^A + (1-\mu)A^B}$ we can write:

$$s = \frac{\Omega \frac{\partial \mu}{\partial f}}{\frac{x}{x-k} + x\Omega\frac{\partial \mu}{\partial x}}, \tag{33}$$

and:

$$\frac{\partial s}{\partial f} = \frac{\left(\frac{\partial \Omega}{\partial f}\frac{\partial \mu}{\partial f} + \Omega\frac{\partial^2 \mu}{\partial f^2}\right)\left(\frac{x}{x-k} + x\Omega\frac{\partial \mu}{\partial x}\right) - x\Omega\frac{\partial \mu}{\partial x}\frac{\partial \Omega}{\partial f}\frac{\partial \mu}{\partial f}}{\left(\frac{x}{x-k} + x\Omega\frac{\partial \mu}{\partial x}\right)^2}. \tag{34}$$

Which can be simplified to:

$$\frac{\partial s}{\partial f} = \frac{\frac{\partial \Omega}{\partial f}\frac{\partial \mu}{\partial f}\frac{x}{x-k} + \Omega\frac{\partial^2 \mu}{\partial f^2}\left(\frac{x}{x-k} + x\Omega\frac{\partial \mu}{\partial x}\right)}{\left(\frac{x}{x-k} + x\Omega\frac{\partial \mu}{\partial x}\right)^2}. \tag{35}$$

As:

$$\frac{\partial \Omega}{\partial f} = -\frac{a^A}{\mu}\frac{\partial \mu}{\partial f} - \frac{A^A(A^A - A^B)\left(A^A\frac{\partial \mu}{\partial f} - A^B\frac{\partial \mu}{\partial f}\right)}{(\mu A^A + (1-\mu)A^B)^2} \tag{36}$$

is negative, we can see that as long as $\frac{\partial^2 \mu}{\partial f^2} \leq 0$, $\frac{\partial s}{\partial f}$ is negative. However, if $\frac{\partial^2 \mu}{\partial f^2} > 0$, $\frac{\partial s}{\partial f}$ may or may not be negative.