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Abstract

This study investigates the impact of participatory intrahousehold decision-making, introduced through a randomly encouraged intensive coaching package and less intensive awareness raising couple seminars, in agricultural households in Uganda on intrahousehold cooperation and sharing behaviour measured in a lab-in-the-field experiment.

Both the intensive and less intensive treatment, as compared to not having exposure to any of the interventions introducing participatory household decision-making, increased the likelihood of equilibrium behaviour as measured by the accuracy of wives' expectations about their husbands' contributions, respectively husbands' expectations about their wives' contributions, in voluntary contribution mechanism (VCM) games, on condition of allowing communication before the game, which mimicked intrahousehold communication stimulated in the intensive treatment. Husbands' expectations about their wives' offers in a dictator game, simultaneously played by husband and wife used to measure sharing behaviour, become more accurate as well.

An analysis of treatment effects across the distribution of husbands' and wives' contributions in the games confirmed trends that emerged in the analyses of average treatment effects and effects on the likelihood of opting for the most cooperative or most generous strategy. The impact of the treatments is largely positive in a second VCM game both among husbands and wives, but negative in a first VCM game - which is explained by cautious initial strategies by spouses, except by intensively treated cooperative types of husbands. The treatments generally makes women less generous in the sharing game but men more generous.

The analysis of distributional treatment effects revealed that different types of husbands and wives respond differently to treatments, which calls for well targeted approaches that can induce virtuous circles of increasing cooperation and equitable sharing. More particularly, the intensive versus the less intensive treatment in combination with communication stimulates cooperation in the second VCM game and generous sharing among cooperative - generous - types of men and women. Among less generous types of women the impact on generosity is negative. However, the intensive versus the less intensive treatment makes men of the less cooperative type more cooperative, in the absence of communication, which is the only positive impact observed among the less cooperatively-minded, and an important achievement of the intervention.

The intensive and less intensive treatment versus no exposure, in combination with communication, have positive treatment effects on generosity among generous types of men; the intensive treatment on cooperation among cooperative types of women. In contrast, among the less cooperative/generous type of men the treatments reduce cooperation and generosity; and among the less generous type of women generosity.

1. Introduction

There is ample evidence, including experimental evidence, that households in developing contexts like rural sub-Saharan Africa are not cooperative, thus leaving scope for efficiency gains if cooperation could be stimulated. At the same time, there is evidence of unequal sharing of costs and benefits of providing in a livelihood for the household; where women often pull the short straw. Not only are such gender inequalities undesirable from a human rights perspective, they may also encumber efficiency. On the one hand, women's capabilities may be restricted - think of gender gaps in productive resources (Doss, 2014) or gender productivity gaps (e.g. Ayalew, Bowen, Deininger, & Duponchel, 2015) – on the other hand, an unequal division of costs and benefits can be a disincentive for collective action (Ostrom, 1990).

Focusing attention on households, more specifically agricultural households, is justified as they are the most significant decision-makers in rural societies in developing contexts. A focus on the household as a group is necessary as it is now well established that one cannot assume that the household decides as a unit, nor can one make inference about household choices by 'aggregating' individual decisions (Munro, 2017). Both Munro (2017) and Doss and Meinzen-Dick (2015) suggest that some of the reasons why households do not realise the gains from cooperation relate to collective action dilemmas; as they emerge in common pool resource settings (Doss & Meinzen-Dick, 2015) and in trust and public good games played among strangers (Munro, 2017). The relatively weak bargaining power of women in these rural societies marked by patriarchy is a contributing factor to an unequal division of costs and benefits (Agarwal, 2001; Doss & Meinzen-Dick, 2015; Lecoutere & Wuyts, 2017).

Cooperation and more equity in agricultural households is expected to be beneficial for their wellbeing. McCarthy and Kilic (2017) demonstrated for Malawi that cooperation in agricultural households can positively impact total household income, consumption expenditures per capita, and the share of household consumption devoted to public goods. They find that strengthening women's bargaining power can positively impact total household income, but to a lesser extent.

Hence, understanding why, where and in which households cooperation fails is a key issue that needs further study (Munro, 2017). Additionally, the potential of social or government institutions and development programs that promote intrahousehold cooperation and/or women empowerment to support household members reaching more cooperative and equitable outcomes needs to be explored (Doss & Meinzen-Dick, 2015; McCarthy & Kilic, 2017). Combining randomised control trials of household interventions and experiments is said to be a promising avenue of research (Munro, 2017). Because of the parallels with collective action problems and the influence of power imbalances on sharing in common pool resource settings, Doss and Meinzen-Dick (2015) point out that it is worth investigating whether more participatory household decision-making could contribute to greater cooperation and equitable sharing of resources and benefits in agricultural households. Promoting participatory household decision-making could reduce information asymmetries between household members and strengthen women's voice in rule- and decision-making, all of which may be beneficial for cooperation and equity.

This study responds to the challenge of investigating the impact of introducing participatory household decision-making in agricultural households on experimentally measured intrahousehold cooperation and sharing behaviour. With an assessment of the impact of introducing participatory intrahousehold decision-making on spouses' behaviour in lab-in-the-field experiments the following hypotheses will be tested:

I) The likelihood of equilibrium behaviour by spouses is not increased by the introduction of participatory intrahousehold decision-making;

II) Allowing communication in the game, which mimics the promotion of intrahousehold communication implied in the treatment(s) introducing participatory intrahousehold decision-making, in combination with the treatment(s) does not increase the likelihood of equilibrium behaviour;

III) The introduction of participatory intrahousehold decision-making does not increase cooperation by spouses in agricultural households;

IV) The introduction of participatory intrahousehold decision-making does not increase the generosity by which spouses share resources;

V) Allowing communication in the game, in combination with the treatment(s) does not increase cooperation (respectively generosity) by spouses.

We focus on couples from rural coffee farming households in the area of Masaka in central Uganda.

2. Literature

2.1. Experimental studies of cooperation in households

Experimental studies of cooperation in households in developing contexts have focused on determining the extent to which a unitary, collective, cooperative or non-cooperative intrahousehold model is followed (e.g. Fiala & He, 2017); on establishing the level of cooperation in households (e.g. Iversen, Jackson, Kebede, Munro & Verschoor, 2011); on evaluating the effect of treatments within the experiments - such as communication, asymmetric information, allocation rules, initial endowment among others - on the level of cooperation (e.g. Iversen et al., 2011; Ashraf, 2009; Mani, 2011; Kebede, Tarazona, Munro & Verschoor, 2014); or on examining the influence of exogenous characteristics on the level of cooperation in households such as the composition of the group (e.g. polygamous versus monogamous households), prevalent gender roles (e.g. North India with limited versus South India with more female autonomy), or individual predispositions (e.g. to react opportunistically to asymmetric information or not) (Munro, Kebede, Tarazona-Gomez & Verschoor, 2010; Munro, Kebede, Tarazona-Gomez & Verschoor, 2014; Hoel, 2015).

Munro (2017) recapitulates the main findings of the recent experimental work on intrahousehold decision-making. The experimental evidence on cooperation in households, measured by the extent to which household members participating in the game maximise the household payoff (efficiency), is mostly based on variations of public good type games, such as the voluntary contribution mechanism (VCM) game, or trust and dictator games. We refer to Munro's article for a detailed overview of the recent findings but highlight that generally few individuals play the cooperative strategy and that efficiency levels vary (measured by the sum of income received by a household as a fraction of the potential income). Efficiency levels are generally around 75 %, but equal to or lower than 50 % in several cases. There is no evidence that the likelihood of cooperation is linked to the context, to the potential gains from cooperation, to the degree of transparency in the experiment, or to the type of game played and whether it is repeated or not.

The work by Iversen et al. (2011) in Uganda and the work by Hoel (2015) in Kenya, a setting relatively similar to Uganda, are of particular interest for this study focusing on agricul-

tural households in Uganda. Iversen et al. (2011) used different alternatives of a game varying the relative endowments of husband and wife and varying the level of control over the allocation of the pool by husband and wife. They played these games with two different communities in Uganda. Their findings reject the hypothesis that spouses maximise efficiency. There are significant differences in the realisation of the cooperative potential between the two communities, which are linked to the different farming systems with a different gender division of labour. Whether the pool was to be distributed on a 50/50 basis or one of the spouses was to decide on the allocation did not affect spouses' contribution levels. When women controlled the distribution of the common pool, both men and women contributed more than when men were in control of allocating the pool. There is no evidence that women contribute more than men, neither in case the allocation rule was fixed nor in case one of the spouses controlled the allocation. Finally, participants were found to routinely keep back some of their endowments, even if they controlled the allocation.

In her study in rural south western Kenya, Hoel (2015) focused on asymmetric information as a cause of inefficiency in household decision-making. The lab-in-the-field experiments with spouses showed that about half of the participants gave similar amounts in the public game (a dictator game where the receiving spouse may be informed about the decision by the spouse making the offer) and in the secret game (a dictator game where decisions are hidden), hence do not respond opportunistically to asymmetric information. Somewhat more than one third of the participants took advantage of asymmetric information and gave more in the public game than in the secret game. And unexpectedly, about one sixth gave more in secret than in public despite the fact this generosity would not be revealed. Additionally, based on survey data, an indicator of being better informed about the income streams and expenditures in the household was constructed. Hoel (2015) found a positive but insignificant relation between better information between spouses and being generous in the games among the participants who gave the same in public as in secret. She found that among those who gave more in the public game than in the secret game, the difference between those amounts was larger if there is better information between spouses. She concluded that for non-cooperative couples, better information in fact reflects more monitoring.

Lenjiso, Smits, and Ruben (2016) measured the impact of smallholder milk market participation using a quasi-experimental design on the experimentally measured women`s relative intrahousehold bargaining position in Ethiopian households. They used an experiment that starts from the assumption that players with a better bargaining position would expect higher offers from their spouse and that those spouses would expect lower offers. In the coordination game they conducted with spouses, the couple won the payoffs if offers in a dictator game and spouses' expectations about the offer by their husband/wife matched (as in Kebede et al. 2014). They found that women`s relative intrahousehold bargaining position was positively affected by participation in the milk market despite the fact that the control over income earned from milk had shifted from women to men. Women's control over milk production and the household's livelihood apparently consolidated their bargaining position. Apart from this study, to our knowledge there is no evidence of the impact of a change in intrahousehold decision-making on experimentally measured levels of cooperation in agricultural households based on a randomised control trial or quasi-experiment.

2.2. Studies of the impact of changing intrahousehold decision-making on cooperation

Apart from experimental evidence of cooperation and sharing behaviour in agricultural households, evidence of the impact of changing decision-making within households on spouses' relative bargaining power and cooperation within the household provide an interesting background. We present a non-exhaustive review of recent evidence from sub-Saharan Africa. As there is no direct measure of intrahousehold cooperation, joint decision-making by husband and wife or increased involvement of women in intrahousehold decision-making (as compared to the default of little women's involvement in patriarchal societies) are taken as indicators of increased cooperation with households.

Lecoutere and Wuyts (2017) showed that introducing participatory intrahousehold decision-making, by way of the same intervention as studied here, in the same sample of smallholder coffee farming households in Uganda, advanced the involvement of women in decision-making about strategic household expenditures and business investments and increased women's control over income earned from coffee produced in the household farm. The limited transparency between spouses over coffee income, however, did not increase. The combination of women's greater involvement in decision-making and increased shared control over financial resources may have contributed to resolving some of the collective action problems that these agricultural households face, more specifically information asymmetry and opportunistic behaviour. This is reflected in positive treatment effects on economic development of the households. Whether the mixed results on women's involvement in decisions on sustainable intensification of cash crops indicate better cooperation with regard to household agricultural production is inconclusive.

In Zambia, the transfer of livestock to women, in combination with training on intrahousehold decision-making, was found to have a positive impact on joint decision-making in the household, at the expense of individual decision-making, in spheres relating to livestock keeping and marketing, children's education, household finances and crop management (Kafle, Michelson, & Winter-Nelson, 2016). In Côte d'Ivoire, a quasi-experimental evaluation of the impact of a program facilitating intrahousehold and intracommunity communication about gender equity showed a positive impact on the regularity of intrahousehold communication, on the involvement of women in decision-making and on joint decision-making across three different spheres which include domestic work, livestock and household issues to do with children, expenditures and health. There was no impact on decision-making about farming (Nordhagen, Bastardes Tort, Kes & Winograd, 2017). A qualitative evaluation of the household level activities of the Gender Action Learning System (GALS) implemented in Uganda among coffee value chain stakeholders found that men and women participants in GALS report an increase in joint decision-making over household income and expenditure, an increase in men taking up reproductive tasks, and a decrease of domestic violence. A rise in joint investments such as businesses and joint land titles was reported as well (Farnworth et al. 2013).

Other studies demonstrate the external validity of experimentally observed intrahousehold decision-making processes. Hoel (2015) showed that lab-in-the-field experiments with spouses can be useful for identifying different types of households, who may respond differently to an intervention, on the basis of their responses to asymmetric information in the experiment. Lecoutere and Jassogne (2017) show that experimentally measured intrahousehold decision-making that supports cooperation and equitable sharing between spouses is associ-

ated with greater investment by the household in the intensification of cash and food crop production, more equitable access and control over income within the household, and improved household food security among smallholder coffee farming households in Kasese in Uganda.

3. The intervention

This study concentrates on smallholder coffee farming households spread across Masaka and Kalungu districts in central Uganda. Agricultural production on the household farm typically includes the production of food crops for household consumption, of which excess harvests are sold, as well as some cash crops - mostly coffee in this case - for marketing. The household farm system comprises of productive resources such as land, labour, financial and other assets, from which agricultural produce and income are derived.

The smallholder coffee farming households included in this study are members of producer organisations (POs) linked to the Hanns R. Neumann Stiftung (HRNS), a German non-profit foundation working with coffee farmers across the world. Standard interventions by HRNS include training in applying sustainable agronomic intensification practices, farmer field schools, training on climate change mitigation, and good post-harvest practice for coffee. In addition, member farmers are encouraged to jointly market their coffee through the POs to increase their competitiveness. All farming households, including those in the control groups, have been exposed to these standard interventions.

Of particular interest for this study is the Gender Household Approach (GHA) implemented by HRNS in selected areas. With the GHA, HRNS aims to address gender inequity within households and challenges to collective action at the intrahousehold level – challenges which are pertinent in this patriarchal context - to ensure its member farming households are managed more efficiently and equitably. The GHA promotes farm and coffee production as a family business where all members contribute and benefit equally (HRNS, 2016).

The first stage of the GHA consists of couple seminars - referred to as the less intensive treatment – in which the HRNS gender officer guides couples through a self-assessment of the current division of roles and responsibilities in their household and who has control over which household resources in a half-day session. The enhanced awareness of the current gender imbalances motivates couples to introduce changes, and one suggested way is to better cooperate as a couple and share benefits and costs related to household and farm more equally. In the areas where the GHA is implemented, HRNS invites couples who are member of the POs to couple seminars organised for one or two POs in a convenient proximate location with the aid of the PO leaders who received an introduction to the GHA.

A selection of couples pursues the intensive coaching package introducing participatory intrahousehold decision-making in their households; which we will refer to as the intensive treatment. This is the intervention that has been encouraged for this study among a random selection of monogamous couples who participated in the couple seminars (see section 4.1.). The intensive coaching package starts with a one day seminar where a group of couples are coached on how to make their intrahousehold decision-making more participatory. A household farm plan and budget where each couple lists their planned investments, expected income and necessary expenditures for both their farm and household together is an essential communication tool. The seminar is followed by a home visit by the gender officer of HRNS. In this private session, the gender officer continues to coach the couples in applying a participatory way of intrahousehold decision-making and follows up on the household plan and budget. women are invited to attend a women leadership training. The women in the couples go through a women

leadership training to strengthen their leadership skills in groups, but also within the households, and to stimulate their participation and representation in farmer groups. The fourth and final activity is a follow-up workshop in which couples share experiences and self-evaluate the intensive coaching program.

As a final element of the GHA, the couples in the intensive coaching program are stimulated to promote participatory intrahousehold decision-making and gender equity within their communities in order to create a positive spillover and widen the program's reach. For that purpose, HRNS also organises drama shows in the communities; although these have not taken place before endline data collection for this study.

4. Method

4.1. Introducing participatory intrahousehold decision-making: A randomised control trial

To evaluate the impact of the two components of the HRNS Gender Household Approach - the couple seminars and the subsequent intensive coaching program, through which participatory intrahousehold decision-making is introduced in smallholder coffee farming households, we set up a randomised control trial (RCT) using an encouragement design with three different groups. The RCT started in November 2015 and endline data was collected from January to April 2017. The RCT includes couples from 77 POs spread across the Masaka and Kalungu districts.

Out of the 20 to 25 couples who participated in the couples seminars[1], we randomly selected up to six couples to be encouraged for the intensive coaching package.[2] These are 166 couples with 96% compliers (see Table 1 for the composition of the sample).[3] We call them the *Treatment group (T).* The encouragement consisted of an invitation and a personal phone call by the HRNS gender officer, and, if they were not able to attend, a second chance to participate in the activities that are part of the intensive coaching package.

Another random selection of up to six monogamous participant couples of each couple seminar were assigned to the first control group, *Control-A (CA)*, who were non-encouraged for the intensive intervention package. These are 159 couples with 94% compliers.

The impact of the intensive coaching program within a group of couples who attended a couple seminar can be estimated based on a comparison of the treatment and control-A groups.

Table 1: Composition of the sample

Number of couples	Treatment	Non-compliers in Treatment	Control-A	Non-compliers in Control-A	Control-C	Final sample	Attritors	Original sample
Masaka-Kalungu sub-sample	166	6	159	9	37	362	12	374

[1] In total 29 couple seminars have been conducted.

[2] Note that, at this stage, we blocked couples of which we knew they were polygamous. There are still six per cent of households that call themselves polygamous in the final sample. Polygamous households in this context are mostly organised as separate homesteads per wife and we only retained polygamous couples of which the same wife consistently attended the interventions and participated in the lab-in-the-field experiment. Hence, we expect that differences in the impact of treatment on behaviour in the experiment with that of monogamous couples remain limited and unsystematic.

[3] There was attrition of 12 couples who were interviewed at baseline either because either of the spouses did not consent to be further involved in the study (82.6% of attrited households), divorce (8.7%), or death of the husband (8.7%). The attrition was random.

A second control group, *Control-C (CC)*, is composed of 37 monogamous couples randomly selected among HRNS member farming households across the Masaka and Kalungu districts where HRNS does not implement its GHA but conducts its standard agronomic trainings; as it does in the areas where the GHA runs. The districts from which control-C households were selected are close enough to the districts in which the GHA runs to safely assume there is little chance households are fundamentally different or live in other circumstances; and far enough to avoid substantial spillovers from the GHA (See map in Figure A in Annex).[4]

A comparison of the treatment and Control-C groups tells us the impact of the combination of having received the intensive coaching program and the couple seminars versus no exposure to the Gender Household Approach. Comparing the Control-A and Control-C groups allows us to evaluate the impact of the couple seminars versus no exposure to the GHA.

Note that the - intended – spillovers to couple seminar (control-A) couples by the community engagement of the intensively coached (treatment) couples may result in an underestimation of the effect of the intensive coaching program versus the couple seminars. Another reason for a potential underestimation of the effect of the intensive coaching program (versus control-A and control-C) is linked to a delayed implementation of the home visits in 26 % of the (complying) treatment couples which reduced the time for this part of the intervention to take effect before the endline interview.

We take into account potential non-compliance with the randomly assigned encouragement status (in Treatment and Control-A groups) by ways of a two-stage regression, where the random encouragement status is used as an exogenous instrumental variable (IV) for the endogenous treatment status. Hence, we estimate local average treatment effects and the external validity of the results is limited to the couples complying with their encouragement status.[5] We use a two-stage IV regression for estimating local average treatment effects based on a comparison of the treatment and control-C groups as well, even if, by default, all Control-C respondents complied with their encouragement status (as there were no GHA interventions in their areas). We estimated robust standard errors corrected for potential clustering of observations within lab-in-the-field experiment sessions.

To account for the fact that the Control-C group was not chosen from a group which self-selected to participate in a couple seminar, we control for the initial self-selection of Treatment and Control-A couples into a couple seminar by including control variables in the regression (see further).[6] We use a single regression including control variables for the comparison of the (complying) control-A and control-C couples.[7]

[4] Table A in Annex presents Uganda Bureau of Statistics 2009 statistics aggregated and representative at the sub-county level in the sub-counties in which control-C, control-A and treatment couples were selected to further substantiate this. In general the population in the sub-counties have rather similar characteristics, apart from a relatively low likelihood that households own land in Bukulula (Control-C) (probably because they use land under the Mailo system, a quasi-freehold tenure system established under colonial rule for the Buganda), and a higher likelihood of growing sweet potato, matooke banana and maize in Bukulula and Kyanamukaaka (Control-C).

[5] The outcomes are either binary outcomes or count variables truncated to the left at zero and to the right at 10. Mainly at the left side of the distribution the assumption of normality is violated see Figure B-F and table B in Annex). Semi-parametric models are more appropriate in these cases. Hence, we opted for IV regression using GMM (General Method of Moments) (partialling out covariates), in which case robust consistent estimates of the (local) average treatment effect on the treated are possible and potential bias remains acceptable (Nichols 2011; Klungel et al. 2015).

[6] We rely on assumptions that unobservable differences are absorbed by controlling for observable factors and do not bias results.

[7] While it is possible that a particular selection of couples in the Control-A group sneaked into the intensive coaching program, in this case, we are only interested in the effect of couple seminars. Therefore, we will ignore non-complying Control-A couples who followed the intensive coaching program as these had an additional treatment on top of the couple seminar and use simple regression analysis to estimate the impact of couple seminars versus no

To investigate to what extent treatment and communication in the game have mutually reinforcing effects, we entered a dummy variable being in the sequence of games with or without communication and an interaction term for (randomly encouraged) treatment status and the communication dummy (as an instrument for the interaction of the endogenous treatment and the communication dummy) for estimating local average treatment effects on behaviour of husbands and wives in the different games. We additionally control for the fraction contributed by the couple in the previous game(s).[8]

Finally, we use the instrumental-variable estimator for unconditional quantile treatment effects proposed by Frölich and Melly (2010) to estimate distributional treatment effects when comparing the treatment and control A groups.[9] We additionally control for covariates to deal with potential selection bias when we compare the treatment and control C groups.[10] To estimate distributional treatment effects based on a comparison between the Control A and Control C groups, we use the estimator for unconditional quantile treatment effects with exogenous treatment proposed by Firpo (2007: in Frölich & Melly, 2010), thereby including covariates to control for selection on observables. While we include a dummy to estimate interaction effects of treatment status and communication in the game when estimating average treatment effects, we estimate separate models for distributional treatment effects for the second VCM game with communication and the second VCM game without communication and subsequent sharing games.[11]

We will estimate (local) treatment effects on the likelihood of equilibrium behaviour, on the likelihood of opting for the most cooperative/most generous strategy, on the likelihood of improving upon cooperation across games, and on contributions/offers by husbands and wives in the various games. We will estimate quantile treatment effects on contributions/offers by husbands and wives in the various games.

Table C in Annex, which compares baseline household and individual characteristics of (spouses in) the couples in the treatment (T), control-A (CA) and control-C (CC) groups, shows that the randomization was effective at creating balance between the groups, at least for these observed characteristics, with the exception of proportions of wives and husbands with a relatively high education level (i.e. secondary education or higher), and the proportion of wives

GHA exposure. Controlling for potential selection bias with the inclusion of control variables deals with the fact that couple seminars whom the Control-A couples attended were not randomised and the control-C group did not self-select into a couple seminar.

[8] The fraction is the sum of the contributions by the husband and the wife as a fraction of the maximum contributions by the couple (Hoel, 2015).

[9] Using stata command IVQTE as discussed in Frölich & Melly (2010).

Quantile treatment effects estimators using IVQTE rely on a nonparametric estimation of weights, for which local linear and local logit estimators are implemented (Frölich & Melly 2010:450). The fact that the dependent variable is truncated is less of an issue (the outcome variable (wage) in the examples in Frölich & Melly 2010 is truncated). The dependent variables are discrete while the IVQTE estimators are better fit for continuous variables. The IVQTE estimators are still useful as our main interest is formally estimating shifts across the distribution as a result of treatments, and not the magnitude of the effects per quantile.

[10] Unconditional quantile treatment effects allow controlling for selection bias using covariates and increasing efficiency of estimates, while avoiding that the definition of the effects is a function of the covariates. In contrast, including covariates, even if independent from treatment, while estimating conditional quantile treatment effects can change the limit of the estimated quantile treatment effects. We are neither interested in quantile treatment effects for particular values of covariates (Frölich & Melly 2010).

[11] We did not estimate models in which we interact communication in the game with treatment as estimating IVQTE with an interaction term with the treatment dummy would violate the "crucial assumption for identification [in the case of estimating quantile treatment effects with endogenous treatment] of rank invariance or rank similarity, i.e. we require that the individual's rank in the potential outcome distribution, conditional on exogenous covariates, is not systematically affected by the treatment." (Fort, 2012:5).

and husbands who individually earned off-farm income in the course of three months prior to the interview, for which controlled for with the inclusion of dummy variables for the wife and husband in the couple having secondary education level and having earned off-farm income. We included age difference between husband and wife and land size as reported by the husband[12] as additional control variables even if there was balance between treatment groups. We included the age difference as in Lecoutere and Jassogne (2016) because more assortative matching of spouses possibly is associated with more cooperative behaviour, and land size as a proxy for exogenous wealth.

4.2. The lab-in-the-field experiments

We conducted lab-in-the-field experiments as part of the endline data collection from 23rd of February until 5th of April 2017. The purpose of conducting lab-in-the-field experiments was not testing theory or the level of intrahousehold cooperation, but rather to measure differences in cooperative and sharing behaviour in smallholder coffee farming households as a result of the introducing participatory intrahousehold decision-making through the intensive coaching program and/or the couple seminars in the Gender Household Approach implemented by HRNS.

The lab-in-the-field experiments we conducted with couples in the Treatment, Control-A, and Control-C groups consisted of a sequence of three games in two tracks, one with and one without communication (see Table 2, and Annex for the experiment protocol).

All couples first played a Voluntary Contribution Mechanism Game (VCM) without communication (VCM1), similar to the investment baseline in Kebede et al. (2014). All participants were informed that the number of tokens given as endowment may differ but is between zero and ten tokens (in reality everybody received ten tokens). The endowments remained private as they were given to each husband and wife in a closed box. [13] It was common knowledge that tokens represented a value of 500 Ugandan Shilling (UGX), that their value remained 500 UGX when personally kept, that their value increased to 750 UGX if contributed to the common pot; and that there would be a 50/50 allocation of the value of the tokens in the common pot to the husband and wife.[14] People understood that the payoff of this first VCM game would be the sum of the value of the tokens individually kept plus the value of half of the tokens that husband and wife together invested in the common pot. It was understood that we would randomly select which game to pay out at the end, that this could be a different game for husband and wife from the same couple.

[12] With outliers winsorised at 20 acres.

[13] Iversen et al. (2011) explain that the imposition of asymmetric information about endowment is necessary for investment decisions to be truly private. This also contributes to deniability.

[14] At the time of the experiment, one US Dollar was equivalent to 3581 UGX.

Table 2: The lab-in-the-field experiment

Framing as decisions about investing in the common household farm and sharing resources
Participants are informed that we will randomly select one exercise to pay out

Game 1 – VCM1

Voluntary Contribution Mechanism (VCM)
Husband and wife individually decide on contribution to common pool (household farm) from an individual endowment

Without communication about contribution
Endowment **private** (Information: between 0 and 10 tokens; but all receive 10 tokens)
Contributions **multiplied by 1.5** (Tokens worth 500 UGX if kept; 750 UGX if contributed)
50/50 allocation between husband and wife (Common knowledge; known prior to decision)

After decision but before feedback, participants are asked about the **expected contribution** by their wife, resp. husband

Feedback about common pool generated by couple to each spouse in each couple

Game 2 – VCM2

A random selection of couples (1/3) plays	A random selection of couples (2/3) plays
VCM without communication	**VCM with** communication
Without communication about contribution	**With** free and costless communication about contribution after explaining a similar VCM game as the first will be played and prior to handing out endowment
Endowment **private** Contributions **multiplied by 1.5** **50/50 allocation** (prior common knowledge)	Endowment **private** Contributions **multiplied by 1.5** **50/50 allocation** (prior common knowledge)
After decision but before feedback, participants are asked about the **expected contribution** by their wife, resp. husband	After decision but before feedback, participants are asked about the **expected contribution** by their wife, resp. husband
Feedback about common pool generated by couple to each spouse in each couple	**Feedback** about common pool generated by couple to each spouse in each couple

Game 3 - Sharing game

Simultaneous dictator games after VCM2 **without** communication	**Simultaneous dictator games** after VCM2 with communication
Husband=proposer / wife=recipient Wife=proposer / husband=recipient	Husband=proposer / wife=recipient Wife=proposer / husband=recipient
Endowment **private** (Info: between 0 and 10 tokens; but all receive 10 tokens) Offers **multiplied by 1.5** (Tokens worth 500 UGX if kept; 750 UGX if offered)	Endowment **private** Offers **multiplied by 1.5**
Participants are asked about the **expected offer** by their wife, resp. husband	Participants are asked about the **expected offer** by their wife, resp. husband

Post-experiment questions

Payoff of one randomly selected exercise is paid at the end to each individual (in private)

After a short introduction in which we framed the decisions in the experiment as decisions people take about investment in agricultural production in their household farms, an example was played by the two experimenters and control questions were asked to check people's understanding. Then, participants were instructed to leave the tokens they decided to invest in the common farm in the box, that contained their initial endowment of tokens, and put the tokens they wanted to keep for themselves in a purse provided to them. The experimenters made sure decisions remained private by ensuring spouses faced different directions during the decision-making and by forbidding people to talk. After collecting the boxes and purses for recording the decisions, all respondents were asked to indicate on an 'expectation card' handed out to each individual the expected contribution by their wife, respectively husband.[15] Then feedback about the common pool they generated as a couple was given to each spouse in each couple by means of a folded 'feedback card' privately handed out to each participant.[16]

Thereafter, a second VCM game followed, which avoids to some extent that efficiency would not be reached because of imperfect learning (Lopez, Munro, & Tarazona-Gomez, 2015: In Munro, 2017). We randomly assigned the experiment sessions to be in the track with or without communication in such a way that one third of the sample of Treatment, Control-A and Control-C couples would have followed the track without communication; and two thirds the track with communication.[17] The second VCM game with communication mimics what the treatment group learns in the intensive coaching intervention, more particularly to discuss and plan their investments together reflecting on the allocation of returns earned through their common farm. If the experiment session was in the communication track, we allowed three minutes of free and costless communication between spouses about their future contributions to the pool, after explaining that a similar VCM game as the previous would be played; and prior to handing out endowments for this second VCM game. As such, the endowment remained private. Otherwise we followed the same procedures as in the first VCM game, including inquiry about expectations and feedback.

If the experiment session was in the track without communication, we repeated the same procedures as in the first VCM game without communication.

After the second VCM game – with or without communication – simultaneous dictator games followed. More particularly, dictator games with the husband as the proposer and the wife as the recipient and dictator games with the wife as the proposer and the husband the recipient were played simultaneously (We labelled it a sharing game in this article). The dictator games are similar as the secret spouse games played in Hoel (2015) with contributions multiplied by 1.5 if offered, thus setting the price of giving at less than one to test for efficiency between spouses.[18] As before, all participants were informed that the endowment, which remained private, could be between zero and ten tokens (and in reality amounted to ten tokens for everyone). Prior to making an individual decision of how much to offer to his/her spouse, participants were informed that tokens in the endowment represented a value of 500 UGX, that their value remained 500 UGX when personally kept, and that their value increased to 750 UGX if they of-

[15] We used a similar question as in Kebede et al. (2014): "Suppose your spouse has received 10 tokens, how much do you think s/he will put into the common pot?".

If people had challenges reading or writing, one of the experimenters was providing assistance in a discrete manner.

[16] This avoids that spouses have to discuss this when they get the chance to communicate in the subsequent VCM game with communication.

[17] We can reasonably assume that the learning from the first VCM brought into second VCM is similar, regardless of whether second VCM is without or with communication.

[18] In Hoel (2015) each game was played over three increasing stakes. We did not do that.

fered them to their wife, respectively husband. The tokens offered to the spouse were left in the box, the tokens personally kept were put in the purse. After making the decisions, participants were asked about the expected offer by their wife, respectively husband, using the 'expectation cards'. After the sharing game we did not disclose offers by the other spouse to ensure deniability; which is additionally guarded by the random decision about which game to pay the payoff from and by not disclosing to participants from which game they are actually paid out.[19]

The average payoffs per individual amounted to 6879 (658) UGX for men and 6802 (697) UGX for women.[20] During the individual post-experiment questions, about 94% of men and women responded that the first and second game reminded them to a high extent of decisions that they make in reality about using their [own] resources for investment in their common household farm, with insignificant differences by treatment status (see Table D in annex for details).

Since the participants are part of the RCT and had been interviewed at baseline one year prior to the endline, there was limited attrition between being invited and participation in the lab-in-the-field-experiment.[21] We facilitated the presence of mothers by allowing small children to be present. Otherwise selection bias is dealt with by the random encouragement design of the program and IV-regression analysis, in addition to controlling for possible selection bias with observable covariates (for comparisons with Control-C).

To address the 'undoing problem' to the extent possible, we masked endowments and randomly selected one of the three games for pay-out, which was not necessarily the same for both spouses (Munro, 2017). Additionally, the VCM games with private endowments have the property that decisions by each of the spouses untraceably changes the possible payoffs, which complicates full undoing. But, we could not avoid that spouses discussed their payoffs after the experiment ended and some extent of undoing took place. All couples, however, had a similar chance to do so and because of random selection any bias can be assumed limited.

Similarly, an influence on decisions because of scrutiny by the experimenters and by each participant's spouse is likely but scrutiny effects should be randomly distributed over couples of different treatment status. There is a slight chance though that spouses in the Treatment group may have experienced a weaker scrutiny effect than those in Control-A or Control-C if the intensive coaching intervention taught them to refrain from hiding decisions from their spouse. Conversely, treatment spouses may also have experienced stronger scrutiny effects if they became more used to collaborate; hence felt more pressure from their spouse. But it is difficult to apprehend to what extent treatment spouses could have been more or less subject to scrutiny effects than spouses in the Control-A or Control-C groups.

5. Results

Overall, efficiency levels, defined by the percent of income received as a fraction of the potential income, among husbands, wives, and couples in the first VCM game are between 67 % and 68 %; in the second VCM game with communication between 68 % and 71 % and in the subsequent sharing game between 67 % and 68 %. In the second VCM game without communication between 67 % and 68 %, and in the subsequent sharing game between 66 % and 67 % (see Table E in Annex for details). These are in a comparable range of efficiency levels in studies cited by Munro (2017). The proportions of participants opting for full efficiency never exceeds 2

[19] Hoel (2015) did not disclose information on decisions nor the amounts of money each spouse took home in the secret spouse games.

[20] Standard deviation between brackets.

[21] One treatment couple did not consent, three control-C couples could not be reached within the time available for data collection.

% among husbands and ranges between 0% and 3.8 % among wives (see Table F in Annex for details).

5.1. Equilibrium behaviour by treatment status across games

Hypothesis I) *The likelihood of equilibrium behaviour by spouses is not increased by the introduction of participatory intrahousehold decision-making.*

Hypothesis II) *Allowing communication in the game in combination with the treatment(s) introducing participatory intrahousehold decision-making does not increase the likelihood of equilibrium behaviour.*

Comparing the contribution each of the spouses expects from the other spouse with the actual contribution by the other spouse, gives us an indication of whether the spouses' behaviour exhibits equilibrium characteristic as in a game theoretic framework (Kebede et al., 2014).[22] Indicators based on this comparison allow testing whether expectations are more accurate among spouses who were introduced to participatory intrahousehold decision-making.

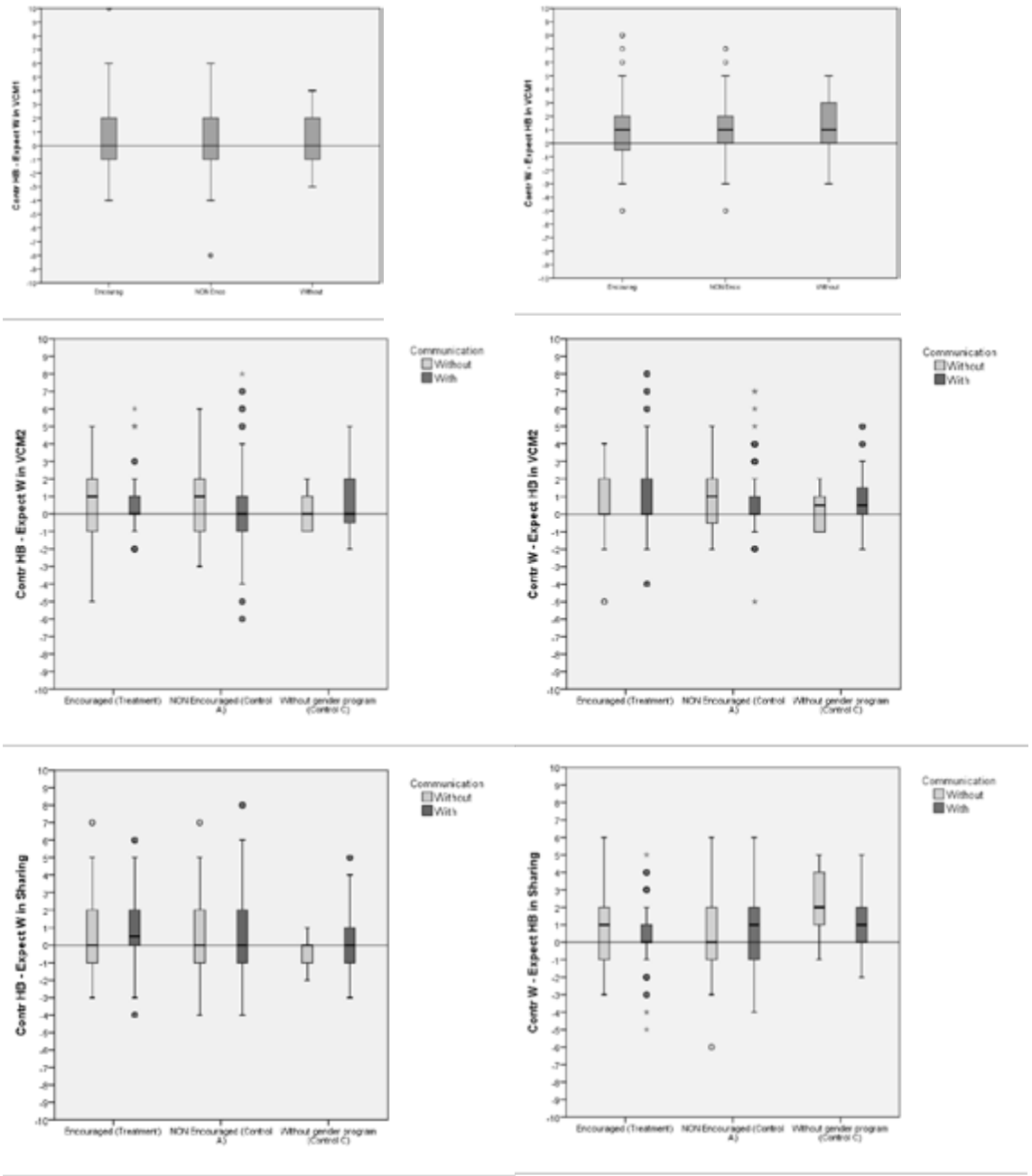
First, the likelihood that the actual contributions by husbands (respectively wives) and the expectations by their wives (respectively husband) exactly match, in different treatment groups and across the different games, is relatively small; yet the gap between expectations and contributions is not extremely large either. This is visualised in Figure 1, which for the sake of simplicity only considers compliers.[23] From the descriptive statistics of the difference between spouses' contributions and expectations between in Table G in Annex we can infer that, on average, husbands and wives tend to underestimate the contributions of their spouses in the VCM and sharing games.

[22] Kebede et al. (2014) state that, in equilibrium, spouses would not be surprised by what the other spouse does, hence, what they expect from their spouse should be an accurate reflection of the actual behaviour of their spouse.

[23] For the case of treatment and control-A couples, this implies the figure shows decisions of couples who actually received the treatment (intensive coaching program) and couples who did not receive it (control-A) but who's treatment status may be endogenous.

Figure 1 - Exploring equilibrium behaviour by spouses by treatment status across games

Treatment T = Encouraged; Control-A = NON Encouraged; Control-C = Without gender program ; Contr HB – Expect W=Contribution by husband minus his contribution expected by his wife; Contr W – Expect HB=Contribution by wife minus contribution expected by her husband; VCM1 = first VCM game; VCM2 = second VCM game; Sharing game.



Secondly, we formally test if treatments – the intensive coaching package, respectively the less intensive couple seminars – have an effect on the likelihood that spouses' behaviour exhibits equilibrium characteristics (i.e. that the difference between actual contributions by husbands, respectively wives, and the expectations by their wives, respectively husband, is equal to zero). The results are presented in Tables 3, 4 and 5. In addition, we estimate (local) average treatment effects on the absolute value of the difference between the actual contributions and the expectations by the other spouse (Tables 6, 7, and 8).

Table 3: Treatment effects on the likelihood of equilibrium behaviour in the 1st VCM game

	Husband's VCM1 contribution matches wife's expectation					Wife's VCM1 contribution matches husband's expectation				
	T_CA	T_CC	T_CC°	CA_CC	CA_CC°	T_CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	CntHB=ExpW_VCM1	CntHB=ExpW_VCM1	CntHB=ExpW_VCM1	CntHB=ExpW_VCM1	CntHB=ExpW_VCM1	CntW=ExpHB_VCM1	CntW=ExpHB_VCM1	CntW=ExpHB_VCM1	CntW=ExpHB_VCM1	CntW=ExpHB_VCM1
Treatment	0.044	0.096*	0.081	0.066	0.059	-0.074	0.063	0.110***	0.117**	0.148***
	(0.050)	(0.055)	(0.054)	(0.056)	(0.055)	(0.045)	(0.045)	(0.043)	(0.051)	(0.050)
	0.387	0.083	0.131	0.243	0.286	0.102	0.162	0.010	0.025	0.004
Treatment*Communication										
Communication										
[Contr. In previous game(s)]^										
[Covariates]^					[ ]					[ ]
Constant	0.213***	0.162***		0.162***	0.169***	0.264***	0.132***		0.132***	0.215***
	(0.037)	(0.041)		(0.042)	(0.060)	(0.036)	(0.034)		(0.035)	(0.063)
	0.000	0.000		0.000	0.007	0.000	0.000		0.000	0.001
N	319	198	198	186	186	319	199	197	187	185
R2 (IV)	-0.003	-0.002	-0.004			0.003	-0.001	0.002		
Fdf2	54.00	58.00	58.00			54.00	58.00	58.00		
F	0.73	2.93	2.16			2.62	1.91	6.33		
Adj. R2 (IV)	-0.01	-0.01	-0.05			-0.00	-0.01	-0.04		
Kleibergen-Paap rk LM $\chi 2$	47.24	8.18	9.05			47.24	8.04	9.16		
Kleibergen-Paap Wald F	1	4	2			1	4	2		
Hansen J stat	217.99	312.63	848.90			217.99	312.74	922.70		
Hansen J p-value	0.00	0.00	0.00			0.00	0.00	0.00		
R2				0.004	0.027				0.013	0.088
Residual DF				59.00	59.00				59.00	59.00
Root MSE				0.41	0.41				0.42	0.40
Adj. R2				-0.00	-0.01				0.01	0.05

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC.
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table H in Annex.

Table 4: Treatment effects on the likelihood of equilibrium behaviour in the 2nd VCM game

	Husband's VCM2 contribution matches wife's expectation					Wife's VCM2 contribution matches husband's expectation				
	T_CA	T_CC	T_CC°	CA_CC	CA_CC°	T_CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	CntHB=ExpW_VCM2	CntHB=ExpW_VCM2	CntHB=ExpW_VCM2	CntHB=ExpW_VCM2	CntHB=ExpW_VCM2	CntW=ExpHB_VCM2	CntW=ExpHB_VCM2	CntW=ExpHB_VCM2	CntW=ExpHB_VCM2	CntW=ExpHB_VCM2
Treatment	0.058	-0.087	-0.152**	-0.145**	-0.095	0.136	0.169***	0.219***	-0.024	-0.061
	(0.064)	(0.056)	(0.059)	(0.060)	(0.074)	(0.096)	(0.059)	(0.069)	(0.060)	(0.077)
	0.367	0.118	0.010	0.018	0.205	0.156	0.004	0.001	0.687	0.429
Treatment*Communication	-0.035	0.278***	0.351***	0.294***	0.279***	-0.133	-0.075	-0.116	0.095	0.077
	(0.091)	(0.103)	(0.110)	(0.099)	(0.105)	(0.121)	(0.148)	(0.151)	(0.141)	(0.143)
	0.697	0.007	0.001	0.004	0.010	0.273	0.613	0.442	0.504	0.591
Communication	0.234***	-0.069	-0.137*	-0.067	-0.053	0.253***	0.186	0.228*	0.168	0.189*
	(0.073)	(0.068)	(0.078)	(0.070)	(0.069)	(0.080)	(0.121)	(0.126)	(0.118)	(0.113)
	0.001	0.315	0.080	0.341	0.449	0.002	0.125	0.071	0.160	0.098
[Contr. In previous game(s)]^	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
[Covariates]^					[ ]					[ ]
Constant				0.073	-0.052				0.461*	0.504*
				(0.251)	(0.252)				(0.249)	(0.268)
				0.773	0.837				0.069	0.065
N	319	198	198	186	186	319	199	197	187	185
R_2 (IV)	0.049	0.051	0.054			0.042	0.024	0.028		
Fdf_2	54.00	58.00	58.00			54.00	58.00	58.00		
F	4.61	3.02	3.67			4.33	8.41	8.01		
Adj. R_2 (IV)	0.03	0.03	-0.00			0.03	-0.00	-0.03		
Kleibergen-Paap rk LM $\chi 2$	23.65	1.25	1.32			23.65	1.25	1.32		
Kleibergen-Paap Wald F	419.22	660.18	945.88			419.22	660.34	944.61		
Hansen J stat	0.00	0.00	0.00			0.00	0.00	0.00		
Hansen J p-value										
R_2				0.051	0.083				0.063	0.083
Residual DF	.			59.00	59.00	.			59.00	59.00
Root MSE				0.46	0.46				0.46	0.47
Adj. R_2				0.03	0.03				0.04	0.03

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC; controlling for the fraction contributed by the couple in the previous game(s).
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table H in Annex.

Table 5: Treatment effects on the likelihood of equilibrium behaviour in the sharing game

	Husband's offer in sharing game matches wife's expectation					Wife's offer in sharing game matches husband's expectation				
	T_CA	T_CC	T_CC°	CA_CC	CA_CC°	T_CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	CntHB=ExpW_SH	CntHB=ExpW_SH	CntHB=ExpW_SH	CntHB=ExpW_SH	CntHB=ExpW_SH	CntW=ExpHB_SH	CntW=ExpHB_SH	CntW=ExpHB_SH	CntW=ExpHB_SH	CntW=ExpHB_SH
Treatment	-0.053	-0.279***	-0.343***	-0.274***	-0.290***	-0.193*	0.177***	0.130**	0.273***	0.285***
	(0.104)	(0.053)	(0.063)	(0.083)	(0.092)	(0.101)	(0.058)	(0.057)	(0.072)	(0.074)
	0.612	0.000	0.000	0.002	0.003	0.055	0.002	0.024	0.000	0.000
Treatment*Communication	0.061	0.283***	0.347***	0.270**	0.277**	0.305***	-0.077	-0.015	-0.257**	-0.315***
	(0.123)	(0.076)	(0.088)	(0.105)	(0.111)	(0.113)	(0.094)	(0.091)	(0.110)	(0.108)
	0.620	0.000	0.000	0.012	0.016	0.007	0.417	0.873	0.023	0.005
Communication	0.005	-0.205***	-0.253***	-0.257***	-0.268***	-0.093	0.264***	0.218***	0.186**	0.260***
	(0.088)	(0.041)	(0.053)	(0.043)	(0.058)	(0.081)	(0.070)	(0.069)	(0.076)	(0.075)
	0.958	0.000	0.000	0.000	0.000	0.254	0.000	0.002	0.018	0.001
[Contr. In previous game(s)]^	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
[Covariates]^					[ ]					[ ]
Constant				0.779***	0.856***				-0.002	0.008
				(0.276)	(0.281)				(0.263)	(0.268)
				0.006	0.003				0.994	0.977
N	319	198	198	186	186	319	199	197	187	185
R2 (IV)	0.002	0.010	0.015			0.023	0.057	0.062		
Fdf2	54.00	58.00	58.00			54.00	58.00	58.00		
F	0.39	15.40	14.05			3.37	15.84	14.11		
Adj. R2 (IV)	-0.02	-0.02	-0.05			0.00	0.03	0.00		
Kleibergen-Paap rk LM **χ2**	26.44	1.27	1.34			26.44	1.27	1.34		
Kleibergen-Paap Wald F	465.50	732.43	1			465.50	732.54	1		
Hansen J stat	0.00	0.00	010.00			0.00	0.00	006.97		
Hansen J p-value			0.00					0.00		
R2				0.027	0.038				0.023	0.061
Residual DF	.			59.00	59.00	.			59.00	59.00
Root MSE				0.45	0.46				0.42	0.42
Adj. R2				-0.00	-0.02				-0.00	0.00

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC; controlling for the fraction contributed by the couple in the previous game(s).
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table H in annex y

Table 6: Treatment effects on the extent to which spouses' contributions and expectations match in the 1st VCM game

	Absolute value of the difference between husband's VCM1 contribution and wife's expectation					Absolute value of the difference between wife's VCM1 contribution and husband's expectation				
	T_CA	T_CC	T_CC°	CA_CC	CA_CC°	T_CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	|CntHB-ExpW_VCM1|	|CntHB-ExpW_VCM1|	|CntHB-ExpW_VCM1|	|CntHB-ExpW_VCM1|	|CntHB-ExpW_VCM1|	|CntW-ExpHB_VCM1|	|CntW-ExpHB_VCM1|	|CntW-ExpHB_VCM1|	|CntW-ExpHB_VCM1|	|CntW-ExpHB_VCM1|
Treatment	-0.130	-0.069	0.005	0.036	0.050	0.132	-0.160	-0.283	-0.238	-0.383
	(0.196)	(0.171)	(0.186)	(0.192)	(0.192)	(0.180)	(0.234)	(0.289)	(0.242)	(0.248)
	0.508	0.686	0.978	0.851	0.795	0.464	0.493	0.328	0.331	0.128
Treatment*Communication										
Communication										
[Contr. In previous game(s)]^										
[Covariates]^					[ ]					[ ]
Constant	1.653***	1.595***		1.595***	1.391***	1.587***	1.868***		1.868***	1.465***
	(0.144)	(0.127)		(0.129)	(0.238)	(0.139)	(0.194)		(0.196)	(0.308)
	0.000	0.000		0.000	0.000	0.000	0.000		0.000	0.000
N	319	198	198	186	186	319	199	197	187	185
R2 (IV)	-0.001	-0.001	0.000			-0.003	0.006	0.011		
Fdf2	54.00	58.00	58.00			54.00	58.00	58.00		
F	0.43	0.16	0.00			0.53	0.46	0.91		
Adj. R2 (IV)	-0.00	-0.01	-0.04			-0.01	0.00	-0.03		
Kleibergen-Paap rk LM $\chi 2$	47.24	8.18	9.05			47.24	8.04	9.16		
Kleibergen-Paap Wald F	1	4	2			1	4	2		
Hansen J stat	217.99	312.63	848.90			217.99	312.74	922.70		
Hansen J p-value	0.00	0.00	0.00			0.00	0.00	0.00		
R2				0.000	0.015				0.004	0.046
Residual DF				59.00	59.00				59.00	59.00
Root MSE				1.48	1.50				1.50	1.49
Adj. R2				-0.01	-0.02				-0.00	0.01

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC.
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table I in Annex.

Table 7: Treatment effects on the extent to which spouses' contributions and expectations match in the 2nd VCM game

	Absolute value of the difference between husband's VCM2 contribution and wife's expectation					Absolute value of the difference between wife's VCM2 contribution and husband's expectation				
	T_CA	T_CC	T_CC°	CA_CC	CA_CC°	T_CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	|CntHB-ExpW_ VCM2|	|CntHB-ExpW_ VCM2|	|CntHB-ExpW_ VCM2|	|CntHB-ExpW_ VCM2|	|CntHB-ExpW_ VCM2|	|CntW-ExpHB_ VCM2|	|CntW-ExpHB_ VCM2|	|CntW-ExpHB_ VCM2|	|CntW-ExpHB_ VCM2|	|CntW-ExpHB_ VCM2|
Treatment	-0.018	0.838***	0.843***	0.935***	1.085***	-0.221	0.420***	0.224	0.741***	0.938***
	(0.311)	(0.189)	(0.177)	(0.270)	(0.327)	(0.305)	(0.153)	(0.194)	(0.150)	(0.186)
	0.953	0.000	0.000	0.001	0.002	0.468	0.006	0.249	0.000	0.000
Treatment*Communication	-0.364	-1.156***	-1.156***	-0.792**	-0.867**	0.409	-0.257	-0.110	-0.753**	-0.859**
	(0.356)	(0.285)	(0.263)	(0.341)	(0.363)	(0.355)	(0.353)	(0.406)	(0.320)	(0.339)
	0.307	0.000	0.000	0.024	0.020	0.250	0.466	0.786	0.022	0.014
Communication	-0.287	0.484***	0.515***	0.511***	0.511**	-0.536**	0.117	0.008	0.161	0.258
	(0.283)	(0.172)	(0.138)	(0.188)	(0.200)	(0.220)	(0.255)	(0.314)	(0.244)	(0.277)
	0.311	0.005	0.000	0.009	0.013	0.015	0.646	0.979	0.512	0.356
[Contr. In previous game(s)]^	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
[Covariates]^					[ ]					[ ]
Constant				0.107	-0.117				0.859	0.580
				(1.083)	(1.167)				(0.653)	(0.696)
				0.921	0.921				0.193	0.408
N	319	198	198	186	186	319	199	197	187	185
R2 (IV)	0.041	0.057	0.056			0.015	-0.008	-0.005		
Fdf2	54.00	58.00	58.00			54.00	58.00	58.00		
F	4.30	10.02	10.41			2.41	2.71	0.48		
Adj. R2 (IV)	0.03	0.03	0.00			-0.00	-0.03	-0.06		
Kleibergen-Paap rk LM $\chi 2$	23.65	1.25	1.32			23.65	1.25	1.32		
Kleibergen-Paap Wald F	419.22	660.18	945.88			419.22	660.34	944.61		
Hansen J stat	0.00	0.00	0.00			0.00	0.00	0.00		
Hansen J p-value		.	.				.	.		
R2				0.015	0.054				0.035	0.061
Residual DF				59.00	59.00				59.00	59.00
Root MSE				1.66	1.65				1.39	1.40
Adj. R2				-0.01	-0.00				0.01	0.01

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC; controlling for the fraction contributed by the couple in the previous game(s).
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table I in Annex.

Table 8: Treatment effects on the extent to which spouses' offers and expectations match in the sharing game

	Absolute value of the difference between husband's offer in the sharing game and wife's expectation					Absolute value of the difference between wife's offer in the sharing game and husband's expectation				
	T_CA	T_CC	T_CC°	CA_CC	CA_CC°	T_CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	|CntHB-ExpW_SH|	|CntHB-ExpW_SH|	|CntHB-ExpW_SH|	|CntHB-ExpW_SH|	|CntHB-ExpW_SH|	|CntW-ExpHB_SH|	|CntW-ExpHB_SH|	|CntW-ExpHB_SH|	|CntW-ExpHB_SH|	|CntW-ExpHB_SH|
Treatment	-0.040	0.696***	0.754***	1.085***	1.089***	0.383	-0.811***	-0.736***	-0.829***	-0.892***
	(0.274)	(0.182)	(0.222)	(0.251)	(0.267)	(0.333)	(0.189)	(0.203)	(0.221)	(0.223)
	0.883	0.000	0.001	0.000	0.000	0.249	0.000	0.000	0.000	0.000
Treatment*Communication	0.099	-0.409	-0.454	-0.921**	-0.978**	-0.479	0.638**	0.544*	0.690**	0.825**
	(0.350)	(0.297)	(0.344)	(0.366)	(0.371)	(0.378)	(0.285)	(0.314)	(0.319)	(0.321)
	0.777	0.168	0.187	0.015	0.011	0.205	0.025	0.083	0.035	0.013
Communication	0.027	0.519***	0.540***	0.890***	0.979***	-0.097	-1.128***	-1.052***	-0.897***	-1.063***
	(0.265)	(0.169)	(0.202)	(0.244)	(0.297)	(0.267)	(0.167)	(0.218)	(0.205)	(0.199)
	0.918	0.002	0.007	0.001	0.002	0.717	0.000	0.000	0.000	0.000
[Contr. In previous game(s)]^	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
[Covariates]^					[ ]					[ ]
Constant				-0.940	-1.157				2.426***	2.701***
				(1.116)	(1.078)				(0.874)	(0.914)
				0.403	0.287				0.007	0.004
N	319	198	198	186	186	319	199	197	187	185
R2 (IV)	-0.000	0.005	0.008			0.008	0.067	0.069		
Fdf2	54.00	58.00	58.00			54.00	58.00	58.00		
F	0.11	17.60	9.11			1.62	33.48	23.36		
Adj. R2 (IV)	-0.02	-0.03	-0.06			-0.01	0.04	0.01		
Kleibergen-Paap rk LM χ2	26.44	1.27	1.34			26.44	1.27	1.34		
Kleibergen-Paap Wald F	465.50	732.43	1			465.50	732.54	1		
Hansen J stat	0.00	0.00	010.00			0.00	0.00	006.97		
Hansen J p-value		.	0.00				.	0.00		
R2				0.030	0.057				0.022	0.042
Residual DF				59.00	59.00				59.00	59.00
Root MSE				1.56	1.57				1.42	1.44
Adj. R2				0.00	-0.00				-0.00	-0.02

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC; controlling for the fraction contributed by the couple in the previous game(s).
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table I in Annex.

There is no evidence of treatment effects on the likelihood of an exact match of wives' expectations and husbands' contributions (Panel 1-5 Table 3), nor on the gap between wives' expectations and husbands' contributions (Panel 1-5 Table 6) in the first VCM game. As compared to no exposure to the Gender Household Approach (GHA), the likelihood of a match between husbands' expectations and their wives' contributions increases as a result of both the intensive coaching package and the less intensive couple seminars (Panel 8 and 10 Table 3). These findings reject hypothesis (H) I) of negative treatment effects on equilibrium behaviour. But there are no treatment effects on the gap between husbands' expectations and their wives' contributions (Panel 6-10 Table 6).

With regard to the accuracy of wives' expectations about their husbands' contributions in the second VCM game, we observe that, as compared to no exposure to the Gender Household Approach (GHA), the intensive coaching (and indicatively also the couple seminars[24]) reduces the likelihood of an exact match and widens the gap in the absence of communication in the game (Panel 3 and 5 Table 4, resp. Table 7). This means for these cases we cannot reject H I). Communication in the game, however, makes a difference for the treatment effect (the interaction effect is significantly positive). More particularly, if communication is allowed, both the intensive coaching and the couple seminars increase the likelihood of an exact match and reduce the gap between wives' expectations and their husbands' contributions as compared to no GHA exposure (Panel 3 and 5 Table 4, resp. Table 7). Thus, we can reject H II) and conclude that the combined effect of (intensive and less intensive) treatment and communication in the game makes wives' expectations about husbands' contributions to the common pool in more accurate, i.e. more in line with equilibrium behaviour.

In the sharing game, however, as compared to no GHA exposure, both the intensive coaching and the couple seminar make an exact match between the wives' expectations and their husbands' offers less likely and the gap larger, regardless of whether communication is allowed (Panel 3 and 5 Table 5, resp. Table 8). So, H I) of negative treatment effects on the accuracy of expectations about husbands' sharing behaviour cannot be rejected. But the negative effect on the likelihood of an exact match is smaller with communication, which is in support of rejecting H II). Yet, when considering the gap by the intensive coached versus no GHA exposure, it is generally communication in the game that widens the gap while communication does not make a difference for the treatment effect (insignificant interaction effect) (Panel 3 Table 8). Net, it results in the intensive coaching (vis-à-vis no GHA exposure) widening the gap more if there is communication than if there is none.

With regard to the husbands' expectations about their wives' contributions in the second VCM game, the intensive coaching increases the likelihood of an exact match versus no GHA exposure (Panel 8 Table 4); which is in support of rejecting H I) of negative treatment effects. Because communication in the game has a positive effect, net, the positive treatment effect on the likelihood of an exact match is stronger for the treated in the games with communication. When we compare couple seminar couples with those without GHA exposure, the gap between husbands' expectations and their wives' contributions becomes wider (Panel 10 Table 7)– hence, we cannot reject H I) for this case - although it widens less with communication in the game, which is in support of rejecting H II).

In the sharing game, the intensive coaching reduces the likelihood of an exact match between what the husband expects and what his wife offers as compared to the less

[24] We report indications of impact if it is significant at 15 % and along the same line of significant trends of impact.

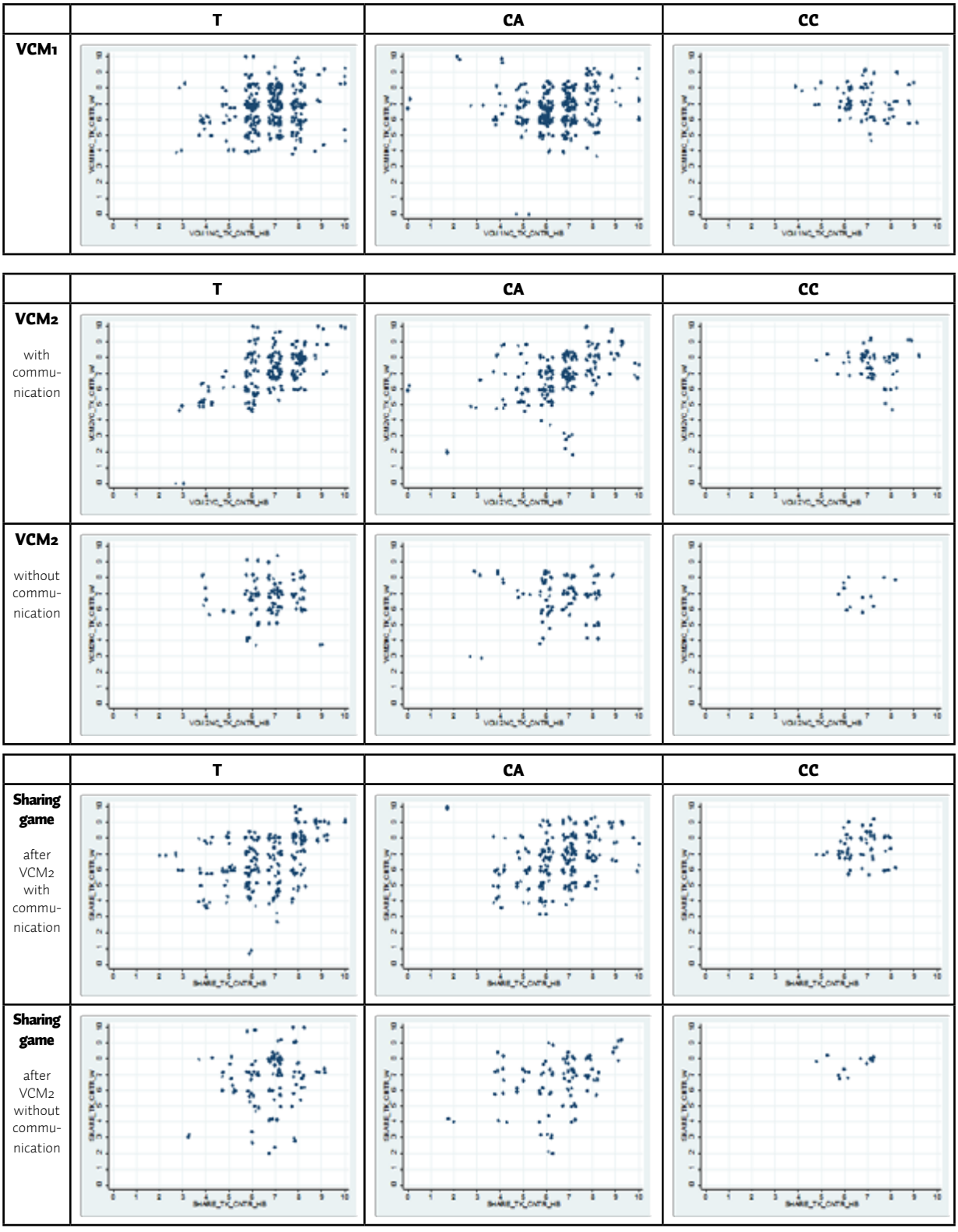
intensive couple seminars (Panel 6 Table 5). Thus, H I) of negative treatment effects cannot be rejected for that case. But here, communication in the game reverses the treatment effect to positive – thus, makes husbands' expectations about their wife's offers more likely to be accurate. This means H II) can be rejected as treatment combined with communication does result in positive effects. As compared to no GHA exposure, both the intensive coaching and the less intensive couple seminars make it more likely that husbands' expectations about their wife's offers are accurate (Panel 8 and 10 Table 5) (reject H I); in case of the intensive coaching even more likely with communication (Panel 8 Table 5) (reject H II); in case of the couple seminars communication makes the positive treatment effect somewhat smaller (Panel 10 Table 5) (no rejection of H II). The gap reduces as a result of both the intensive and the less intensive treatment vis-à-vis no GHA exposure (Panel 8 and 10 Table 8) (reject H I); even more so with communication in the game (reject H II).

5.2. Exploring spouses' behaviour in the games by treatment status

First, we visualise the decisions of husbands and wives by treatment status in the first VCM game, the second VCM game and the sharing game; in the sequences with and without communication in Figure 2. For the sake of simplicity we consider compliers only in Figure 2 (see footnote 23). The scatterplots show that husbands and wives do not always opt to contribute the same amount of tokens from their endowment of ten tokens. Husbands and wives behave differently and respond differently to the treatments and to the introduction of communication in the second VCM game.

Figure 2 – Contributions by husbands and wives in couples by treatment status across games

Husbands' contributions on the x-axis; wives' on the Y-axis. Contributions of 7 out of 10 tokens endowment by husbands marked by vertical line, by wives marked by horizontal line. VCM1 = first VCM game; VCM2 = second VCM game; Sharing game.

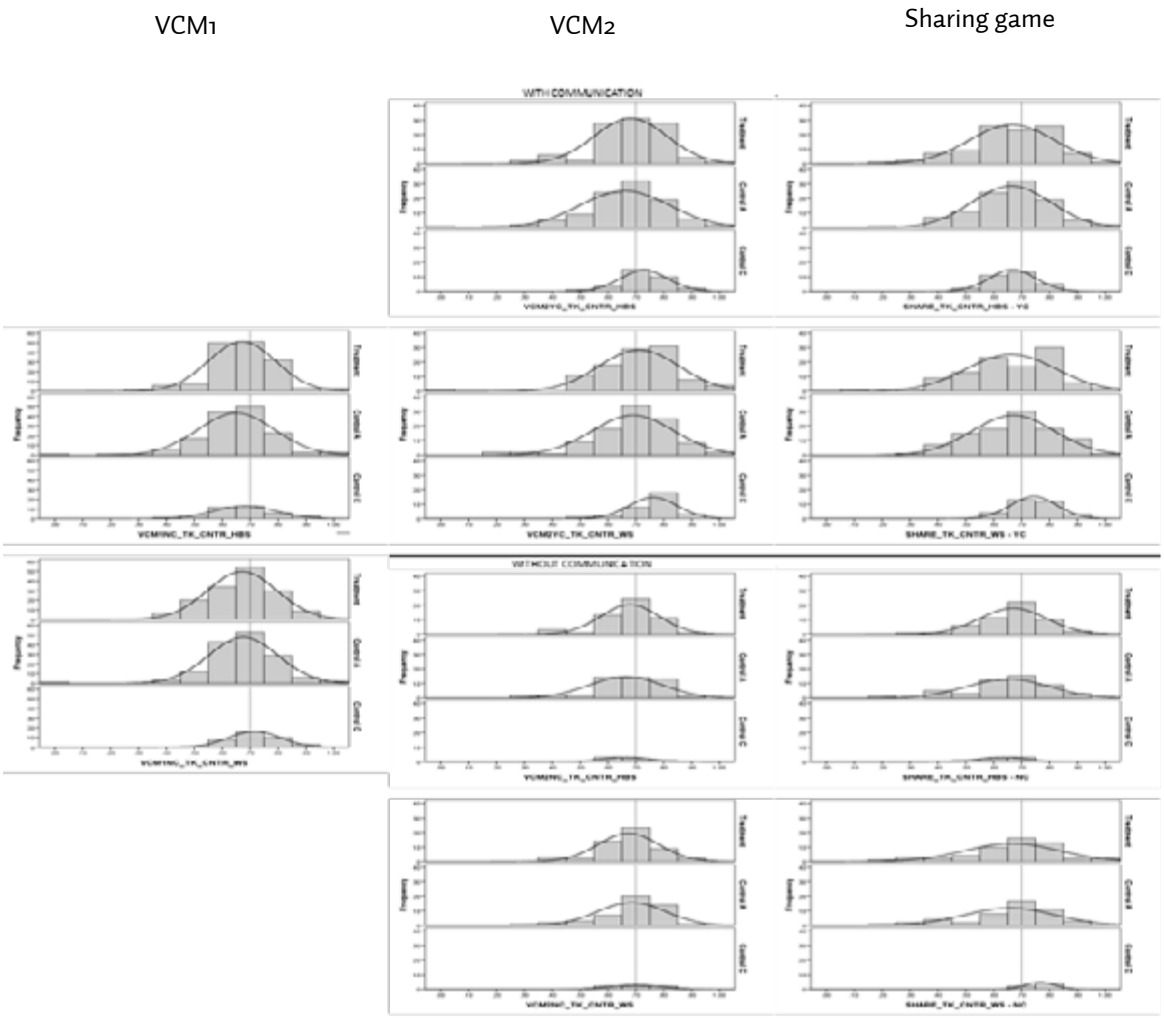


The scatterplots reveal a concentration of contributions of seven out of the ten tokens available as endowment, both by husbands and wives across different treatments. But, in the first VCM game the distribution weighs heavier in the lower left corner - below the line indicating contributions of seven tokens - for the group with couple seminars as treatment (Control-A) as compared to the intensively treated (Treatment) group. The distribution weighs heavier in the upper right corner - above the line of seven tokens - for the intensively treated group in the second VCM game especially when communication is allowed. This patterns emerges for the sharing game following the second VCM game with communication as well.

With histograms shown in Figure 3, in which, for simplicity, we only consider compliers only (see footnote 23), we explore the distribution, mean, median and mode of contributed shares by husbands and wives, in the first and second VCM game and the sharing game; in the sequences with and without communication.[25]

Figure 3: Distribution of contributed shares by husbands and wives by treatment status across games

The vertical line is the contribution of 7/10 tokens, the mode in most situations. The curve is what the normal distribution would look like. VCM1 = first VCM game; VCM2 = second VCM game; Sharing game.



[25] Contributed shares are the number of tokens contributed out of the total endowment of 10 tokens. Table E in Annex presents median, mode, mean, and standard deviation of the contributed shares by husbands, wives and couples by treatment status (compliers only).

For the first VCM game, there is a higher proportion with contributed shares of 0.7 and 0.8 among intensively treated husbands than among husbands who received couple seminars (Control-A) and those without GHA exposure (Control-C). For the second VCM game with communication, the mode among intensively treated husbands is a contributed share of 0.7, as is the case among husbands with couple seminar and without GHA exposure, but there is a higher proportion with a contributed share of 0.8. Among intensively treated wives the mode is 0.8 rather than 0.7 as among wives who received couple seminars. For the sharing game following the second VCM game with communication, the mode among intensively treated wives and husbands is 0.8 while the mode is 0.7 for husbands with couple seminars and without GHA exposure and for wives with couple seminars. For the second VCM game without communication and the subsequent sharing game, there is a higher proportion of intensively treated husbands with contributed shares of 0.7 and 0.8 than among husbands with couple seminars and without GHA exposure; and a similar difference among wives for the second VCM game without communication.

5.3. Treatment effects on the likelihood of cooperation

Hypothesis III) and IV) *The introduction of participatory intrahousehold decision-making does not increase cooperation by spouses, respectively the generosity by which spouses share resources*

Hypothesis V) *Allowing communication in the game, in combination with the treatment(s) does not increase cooperation (respectively generosity) by spouses*

As a first formal test of our hypotheses about the impact of introducing participatory intrahousehold decision-making on cooperation and generosity in agricultural households, and the combined effect of treatment and communication, estimated treatment effects on the likelihood of choosing the most cooperative strategy in the first VCM (VCM1) and second VCM game (VCM2), respectively the most generous strategy in the sharing game, defined as contributing more than six out of the initial endowment of 10 tokens, conditional on the outcome of the preceding game(s), the treatment status, communication and the interaction of treatment and communication in the game. Results are presented in Tables 9, 10, and 11. We also assess the impact on the likelihood of increasing cooperation from the first VCM game to the second VCM game, of which present results in Table 12.

Table 9: Treatment effects on the likelihood of opting for the most cooperative strategy in the 1st VCM game

	Husband's VCM1 contribution larger than 60 percent of endowment					Wife's VCM1 contribution larger than 60 percent of endowment				
	T-CA	T_CC	T_CC°	CA_CC	CA_CC°	T-CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	VCM1_CNTR_HBCOOP	VCM1_CNTR_HBCOOP	VCM1_CNTR_HBCOOP	VCM1_CNTR_HBCOOP	VCM1_CNTR_HBCOOP	VCM1_CNTR_WCOOP	VCM1_CNTR_WCOOP	VCM1_CNTR_WCOOP	VCM1_CNTR_WCOOP	VCM1_CNTR_WCOOP
Treatment	0.044	-0.024	-0.045	-0.064	-0.074	0.001	-0.154***	-0.142***	-0.159***	-0.208***
	(0.064)	(0.096)	(0.096)	(0.096)	(0.089)	(0.054)	(0.041)	(0.051)	(0.050)	(0.057)
	0.489	0.803	0.641	0.504	0.408	0.984	0.000	0.005	0.002	0.001
Treatment*Communication										
Communication										
[Contr. In previous game(s)]^										
[Covariates]^					[ ]					[ ]
Constant	0.529***	0.595***		0.595***	0.676***	0.614***	0.763***		0.763***	0.744***
	(0.042)	(0.085)		(0.086)	(0.124)	(0.048)	(0.019)		(0.019)	(0.085)
	0.000	0.000		0.000	0.000	0.000	0.000		0.000	0.000
N	319	198	198	186	186	319	199	197	187	185
R2 (IV)	0.002	-0.000	-0.000			0.000	0.021	0.017		
Fdf2	54.00	58.00	58.00			54.00	58.00	58.00		
F	0.47	0.06	0.21			0.00	13.86	7.47		
Adj. R2 (IV)	-0.00	-0.01	-0.04			-0.00	0.02	-0.02		
Kleibergen-Paap rk LM $\chi 2$	47.24	8.18	9.05			47.24	8.04	9.16		
Kleibergen-Paap Wald F	1	4	2			1	4	2		
Hansen J stat	217.99	312.63	848.90			217.99	312.74	922.70		
Hansen J p-value	0.00	0.00	0.00			0.00	0.00	0.00		
R2				0.003	0.040				0.018	0.064
Residual DF				59.00	59.00				59.00	59.00
Root MSE				0.50	0.50				0.48	0.48
Adj. R2				-0.00	0.00				0.01	0.03

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC.
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table J in Annex.

Table 10: Treatment effects on the likelihood of opting for the most cooperative strategy in the 2nd VCM game

	Husband's VCM2 contribution larger than 60 percent of endowment					Wife's VCM2 contribution larger than 60 percent of endowment				
	T-CA	T_CC	T_CC°	CA_CC	CA_CC°	T-CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	VCM2_CNTR_HBCOOP	VCM2_CNTR_HBCOOP	VCM2_CNTR_HBCOOP	VCM2_CNTR_HBCOOP	VCM2_CNTR_HBCOOP	VCM2_CNTR_WCOOP	VCM2_CNTR_WCOOP	VCM2_CNTR_WCOOP	VCM2_CNTR_WCOOP	VCM2_CNTR_WCOOP
Treatment	0.088	0.311***	0.315***	0.198***	0.217***	-0.105	0.121*	0.162***	0.172***	0.132*
	(0.078)	(0.051)	(0.055)	(0.057)	(0.062)	(0.099)	(0.063)	(0.061)	(0.059)	(0.069)
	0.257	0.000	0.000	0.001	0.001	0.285	0.055	0.008	0.005	0.063
Treatment*Communication	-0.071	-0.514***	-0.510***	-0.428***	-0.416***	0.104	-0.279***	-0.287***	-0.344***	-0.278***
	(0.103)	(0.124)	(0.123)	(0.127)	(0.133)	(0.108)	(0.094)	(0.095)	(0.096)	(0.089)
	0.492	0.000	0.000	0.001	0.003	0.338	0.003	0.003	0.001	0.003
Communication	-0.016	0.412***	0.409***	0.412***	0.399***	-0.072	0.292***	0.295***	0.282***	0.204***
	(0.073)	(0.102)	(0.109)	(0.104)	(0.111)	(0.073)	(0.060)	(0.069)	(0.060)	(0.047)
	0.824	0.000	0.000	0.000	0.001	0.322	0.000	0.000	0.000	0.000
[Contr. In previous game(s)]^	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
[Covariates]^					[ ]					[ ]
Constant				-0.884***	-0.873***				-0.657***	-0.571**
				(0.255)	(0.263)				(0.245)	(0.274)
				0.001	0.002				0.010	0.042
N	319	198	198	186	186	319	199	197	187	185
R2 (IV)	0.007	0.029	0.024			0.005	0.025	0.013		
Fdf2	54.00	58.00	58.00			54.00	58.00	58.00		
F	0.84	22.98	14.64			0.45	17.19	11.98		
Adj. R2 (IV)	-0.01	0.00	-0.03			-0.01	0.00	-0.05		
Kleibergen-Paap rk LM $\chi 2$	23.65	1.25	1.32			23.65	1.25	1.32		
Kleibergen-Paap Wald F	419.22	660.18	945.88			419.22	660.34	944.61		
Hansen J stat	0.00	0.00	0.00			0.00	0.00	0.00		
Hansen J p-value	.	.	.			.	.	.		
R2				0.184	0.213				0.178	0.231
Residual DF				59.00	59.00				59.00	59.00
Root MSE				0.44	0.44				0.41	0.40
Adj. R2				0.17	0.17				0.16	0.19

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC; controlling for the fraction contributed by the couple in the previous game(s).
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table J in Annex.

Table 11: Treatment effects on the likelihood of opting for the most cooperative strategy in the sharing game

	Husband's offer in sharing game larger than 60 percent of endowment					Wife's offer in sharing game larger than 60 percent of endowment				
	T-CA	T_CC	T_CC°	CA_CC	CA_CC°	T-CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	SH_CNTR_HBCOOP	SH_CNTR_HBCOOP	SH_CNTR_HBCOOP	SH_CNTR_HBCOOP	SH_CNTR_HBCOOP	SH_CNTR_WCOOP	SH_CNTR_WCOOP	SH_CNTR_WCOOP	SH_CNTR_WCOOP	SH_CNTR_WCOOP
Treatment	0.098	0.180***	0.094	0.081	0.113	-0.010	-0.345***	-0.393***	-0.328***	-0.464***
	(0.106)	(0.066)	(0.071)	(0.082)	(0.084)	(0.079)	(0.049)	(0.055)	(0.078)	(0.086)
	0.356	0.006	0.185	0.326	0.187	0.900	0.000	0.000	0.000	0.000
Treatment*Communication	-0.107	-0.125	-0.053	-0.016	-0.025	-0.073	0.066	0.145	0.110	0.237*
	(0.135)	(0.117)	(0.126)	(0.125)	(0.124)	(0.112)	(0.106)	(0.096)	(0.129)	(0.129)
	0.425	0.285	0.676	0.899	0.842	0.516	0.537	0.132	0.397	0.070
Communication	0.015	0.025	-0.032	0.026	0.009	-0.018	-0.148**	-0.214***	-0.165*	-0.275***
	(0.097)	(0.084)	(0.093)	(0.077)	(0.084)	(0.093)	(0.075)	(0.067)	(0.083)	(0.083)
	0.880	0.770	0.733	0.739	0.918	0.848	0.048	0.001	0.052	0.002
[Contr. In previous game(s)]^	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
[Covariates]^					[ ]					[ ]
Constant				-0.266	-0.230				0.229	0.278
				(0.273)	(0.283)				(0.258)	(0.265)
				0.333	0.420				0.379	0.300
N	319	198	198	186	186	319	199	197	187	185
R2 (IV)	0.003	0.011	0.009			0.008	0.058	0.048		
Fdf2	54.00	58.00	58.00			54.00	58.00	58.00		
F	0.52	2.86	0.78			0.54	26.34	28.26		
Adj. R2 (IV)	-0.02	-0.02	-0.06			-0.01	0.03	-0.01		
Kleibergen-Paap rk LM χ2	26.44	1.27	1.34			26.44	1.27	1.34		
Kleibergen-Paap Wald F	465.50	732.43	1			465.50	732.54	1		
Hansen J stat	0.00	0.00	010.00			0.00	0.00	006.97		
Hansen J p-value	.	.	0.00			.	.	0.00		
R2				0.052	0.080				0.113	0.199
Residual DF				59.00	59.00				59.00	59.00
Root MSE				0.49	0.49				0.45	0.44
Adj. R2				0.03	0.02				0.09	0.15

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC; controlling for the fraction contributed by the couple in the previous game(s).
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table J in Annex

Table 12: Treatment effects on the likelihood of improving on cooperation in the 2nd VCM game vis-à-vis the 1st VCM game

	Husband's contribution in VCM2 is larger than in VCM1					Wife's contribution in VCM2 is larger than in VCM1				
	T_CA	T_CC	T_CC°	CA_CC	CA_CC°	T_CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	HB_VCM2>VCM1	HB_VCM2>VCM1	HB_VCM2>VCM1	HB_VCM2>VCM1	HB_VCM2>VCM1	W_VCM2>VCM1	W_VCM2>VCM1	W_VCM2>VCM1	W_VCM2>VCM1	W_VCM2>VCM1
Treatment	0.040	0.299***	0.309***	0.252***	0.285***	-0.053	0.197***	0.196***	0.232***	0.181***
	(0.111)	(0.057)	(0.055)	(0.070)	(0.076)	(0.068)	(0.056)	(0.064)	(0.046)	(0.054)
	0.717	0.000	0.000	0.001	0.000	0.432	0.000	0.002	0.000	0.001
Treatment*Communication	-0.036	-0.464***	-0.474***	-0.437***	-0.438**	0.101	-0.239***	-0.244**	-0.312***	-0.280***
	(0.127)	(0.148)	(0.152)	(0.158)	(0.167)	(0.087)	(0.089)	(0.115)	(0.082)	(0.091)
	0.777	0.002	0.002	0.008	0.011	0.246	0.007	0.034	0.000	0.003
Communication	0.008	0.425***	0.438***	0.430***	0.423***	0.096	0.420***	0.422***	0.423***	0.376***
	(0.090)	(0.127)	(0.135)	(0.132)	(0.144)	(0.064)	(0.054)	(0.077)	(0.054)	(0.065)
	0.932	0.001	0.001	0.002	0.005	0.130	0.000	0.000	0.000	0.000
[Contr. In previous game(s)]^	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
[Covariates]^					[ ]					[ ]
Constant				0.725***	0.702***				0.466*	0.600**
				(0.261)	(0.253)				(0.244)	(0.265)
				0.007	0.007				0.060	0.027
N	319	198	198	186	186	319	199	197	187	185
R2 (IV)	-0.001	-0.002	-0.004			0.022	0.056	0.056		
Fdf2	54.00	58.00	58.00			54.00	58.00	58.00		
F	0.07	26.97	20.98			2.82	40.58	32.92		
Adj. R2 (IV)	-0.02	-0.03	-0.06			0.01	0.03	0.00		
Kleibergen-Paap rk LM $\chi 2$	23.65	1.25	1.32			23.65	1.25	1.32		
Kleibergen-Paap Wald F	419.22	660.18	945.88			419.22	660.34	944.61		
Hansen J stat	0.00	0.00	0.00			0.00	0.00	0.00		
Hansen J p-value	.	.	.			.	.	.		
R2				0.069	0.088				0.047	0.116
Residual DF				59.00	59.00				59.00	59.00
Root MSE				0.46	0.46				0.47	0.46
Adj. R2				0.05	0.04				0.03	0.06

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC; controlling for the fraction contributed by the couple in the previous game.
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table K in Annex.

There is no evidence of treatment effects by the most intensive coaching package as compared to the less intensive couple seminars, nor of the interaction of communication and treatment, on the likelihood of husbands and wives choosing the most cooperative strategy in the different VCM games and the sharing game (Panel 1 and 6 Table 9, 10 and 11). Hence, we cannot reject the hypothesis III) and IV) that the intensive vis-à-vis the less intensive treatment reduces cooperation and generosity. Hypothesis V) can neither be rejected as the combination of intensive coaching and communication vis-à-vis the less intensive treatment shows no impact.

Among husbands, both the intensive coaching and the less intensive couple seminars, as compared to no GHA exposure, have a positive effect on the likelihood of opting for the most cooperative strategy in the VCM2 game (Panel 3 and 5 Table 10), which makes us reject H III). Yet, while communication increases the likelihood, the treatment effect is smaller with communication. Thus H V) cannot be rejected in this case. Along the same line, both the intensive and the less intensive treatment versus no GHA exposure make it more likely that husbands improve on cooperation from the VCM1 to the VCM2 game (Panel 3 and 5 Table 12); but the effect is smaller in combination with communication in the game. We do not observe treatment effects on offers by husbands in the sharing game.

The negative effects on the likelihood that wives opt for the most cooperative strategy in the first VCM game as a result of both the intensive and the less intensive treatment vis-à-vis no GHA exposure do not support a rejection of H III) (Panel 8 and 10 Table 9). Neither do the negative effects of the intensive and less intensive treatment versus no GHA exposure on the likelihood that wives' opt for the most generous offers in the sharing game support a rejection of H IV) (Panel 8 and 10 Table 11). And while communication ensures a different treatment effect, the larger negative effect of communication results in a stronger negative effect of the intensive and less intensive treatment in the presence of communication; which makes we cannot reject H V) either. Both the likelihood that wives opt for the most cooperative strategy in the second VCM game, and the likelihood that they improve on cooperation from VCM1 to VCM2 are positively affected by the intensive and less intensive treatment versus no GHA exposure – thus we can reject H III) for these cases (Panel 8 and 10 Table 10 and Table 12). But H V) cannot be convincingly rejected as the interaction effect points a smaller treatment effect in the presence of communication while communication in itself has a positive effect. Net, the impact of the treatment in combination with communication on the likelihood that wives opt for the most cooperative strategy is not much different than without communication; the net impact on the likelihood of improving on cooperation from VCM1 to VCM2 is larger.

5.4. Average treatment effects on contributed shares across games

Hypothesis III) and IV) *The introduction of participatory intrahousehold decision-making does not increase cooperation by spouses, respectively the generosity by which spouses share resources*

Hypothesis V) *Allowing communication in the game, in combination with the treatment(s) does not increase cooperation (respectively generosity) by spouses*

In this section, to test the hypotheses III), IV) and V), we explore (local) average treatment effects on contributions in the different games, conditional on contributions in the preceding games, the treatment status, communication and the interaction of treatment and communication in the game (and control variables to deal with self-selection into couple seminars). Results are presented in Table 13, 14, and 15.

Table 13: Average treatment effects on contributions in the 1st VCM game

	Husband's contribution in VCM1					Wife's contribution in VCM1				
	T_CA	T_CC	T_CC°	CA_CC	CA_CC°	T_CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	VCM1_CNTR_HB	VCM1_CNTR_HB	VCM1_CNTR_HB	VCM1_CNTR_HB	VCM1_CNTR_HB	VCM1_CNTR_W	VCM1_CNTR_W	VCM1_CNTR_W	VCM1_CNTR_W	VCM1_CNTR_W
Treatment	0.174	-0.120	-0.151	-0.307*	-0.278	-0.112	-0.480***	-0.486***	-0.400**	-0.570***
	(0.142)	(0.163)	(0.189)	(0.164)	(0.176)	(0.134)	(0.161)	(0.181)	(0.170)	(0.185)
	0.220	0.462	0.423	0.066	0.121	0.402	0.003	0.007	0.022	0.003
Treatment*Communication										
Communication										
[Contr. In previous game(s)]^										
[Covariates]^					[ ]					[ ]
Constant	6.528***	6.811***		6.811***	6.619***	6.804***	7.158***		7.158***	7.021***
	(0.105)	(0.127)		(0.128)	(0.259)	(0.126)	(0.118)		(0.120)	(0.197)
	0.000	0.000		0.000	0.000	0.000	0.000		0.000	0.000
N	319	198	198	186	186	319	199	197	187	185
R2 (IV)	0.008	-0.001	-0.001			-0.003	0.007	0.006		
Fdf2	54.00	58.00	58.00			54.00	58.00	58.00		
F	1.47	0.53	0.61			0.69	8.66	6.84		
Adj. R2 (IV)	0.00	-0.01	-0.04			-0.01	0.00	-0.04		
Kleibergen-Paap rk LM χ2	47.24	8.18	9.05			47.24	8.04	9.16		
Kleibergen-Paap Wald F	1	4	2			1	4	2		
Hansen J stat	217.99	312.63	848.90			217.99	312.74	922.70		
Hansen J p-value	0.00	0.00	0.00			0.00	0.00	0.00		
R2				0.008	0.031				0.018	0.072
Residual DF				59.00	59.00				59.00	59.00
Root MSE				1.33	1.34				1.19	1.18
Adj. R2				0.00	-0.01				0.01	0.04

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC.
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table L in Annex.

Table 14: Average treatment effects on contributions in the 2nd VCM game

	Husband's contribution in VCM2					Wife's contribution in VCM2				
	T_CA	T_CC	T_CC°	CA_CC	CA_CC°	T_CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	VCM2_CNTR_HB	VCM2_CNTR_HB	VCM2_CNTR_HB	VCM2_CNTR_HB	VCM2_CNTR_HB	VCM2_CNTR_W	VCM2_CNTR_W	VCM2_CNTR_W	VCM2_CNTR_W	VCM2_CNTR_W
Treatment	0.164	0.553***	0.547***	0.364**	0.463**	-0.233	0.184	0.208	0.284*	0.227
	(0.221)	(0.141)	(0.148)	(0.175)	(0.208)	(0.212)	(0.142)	(0.149)	(0.161)	(0.201)
	0.458	0.000	0.000	0.042	0.030	0.273	0.195	0.164	0.082	0.264
Treatment*Communication	-0.068	-0.907***	-0.859**	-0.860**	-0.820*	0.371	-0.535**	-0.515**	-0.806***	-0.773***
	(0.284)	(0.310)	(0.339)	(0.366)	(0.412)	(0.270)	(0.213)	(0.243)	(0.230)	(0.240)
	0.812	0.003	0.011	0.022	0.051	0.168	0.012	0.034	0.001	0.002
Communication	-0.055	0.761***	0.734**	0.763***	0.693**	-0.034	0.826***	0.814***	0.791***	0.741***
	(0.250)	(0.256)	(0.294)	(0.262)	(0.324)	(0.204)	(0.109)	(0.150)	(0.106)	(0.118)
	0.824	0.003	0.013	0.005	0.036	0.866	0.000	0.000	0.000	0.000
[Contr. In previous game(s)]^	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
[Covariates]^					[ ]					[ ]
Constant				2.026*	2.156*				1.811**	2.021**
				(1.068)	(1.085)				(0.726)	(0.812)
				0.063	0.052				0.015	0.016
N	319	198	198	186	186	319	199	197	187	185
R2 (IV)	0.004	0.005	0.001			0.005	0.049	0.046		
Fdf2	54.00	58.00	58.00			54.00	58.00	58.00		
F	0.35	11.29	6.71			1.28	27.65	17.84		
Adj. R2 (IV)	-0.01	-0.02	-0.06			-0.01	0.02	-0.01		
Kleibergen-Paap rk LM χ2	23.65	1.25	1.32			23.65	1.25	1.32		
Kleibergen-Paap Wald F	419.22	660.18	945.88			419.22	660.34	944.61		
Hansen J stat	0.00	0.00	0.00			0.00	0.00	0.00		
Hansen J p-value	.	.	.			.	.	.		
R2				0.204	0.260				0.289	0.324
Residual DF				59.00	59.00				59.00	59.00
Root MSE				1.29	1.26				1.14	1.13
Adj. R2				0.19	0.22				0.27	0.29

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC; controlling for the fraction contributed by the couple in the previous game(s).
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table L in Annex.

Table 15: Average treatment effects on contributions in the sharing game

	Husband's offer in the sharing game					Wife's offer in the sharing game				
	T_CA	T_CC	T_CC°	CA_CC	CA_CC°	T_CA	T_CC	T_CC°	CA_CC	CA_CC°
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	SHARE_CNTR_HB	SHARE_CNTR_HB	SHARE_CNTR_HB	SHARE_CNTR_HB	SHARE_CNTR_HB	SHARE_CNTR_W	SHARE_CNTR_W	SHARE_CNTR_W	SHARE_CNTR_W	SHARE_CNTR_W
Treatment	0.233	0.531***	0.357**	0.251	0.253	0.054	-0.902***	-1.075***	-0.925***	-1.296***
	(0.247)	(0.182)	(0.176)	(0.207)	(0.238)	(0.277)	(0.224)	(0.204)	(0.292)	(0.308)
	0.345	0.003	0.042	0.230	0.293	0.846	0.000	0.000	0.002	0.000
Treatment*Communication	-0.212	-0.349	-0.201	0.038	0.074	-0.214	0.345	0.581*	0.339	0.574
	(0.328)	(0.287)	(0.314)	(0.285)	(0.278)	(0.363)	(0.379)	(0.346)	(0.403)	(0.411)
	0.519	0.224	0.521	0.894	0.790	0.555	0.363	0.093	0.403	0.168
Communication	0.100	0.235	0.127	0.070	-0.009	0.234	-0.322	-0.525**	-0.241	-0.435*
	(0.266)	(0.170)	(0.187)	(0.140)	(0.145)	(0.313)	(0.249)	(0.222)	(0.247)	(0.242)
	0.705	0.168	0.500	0.620	0.951	0.455	0.196	0.018	0.333	0.077
[Contr. In previous game(s)]^	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
[Covariates]^					[ ]					[ ]
Constant				2.966***	2.991***				5.099***	5.268***
				(0.992)	(1.041)				(0.717)	(0.729)
				0.004	0.006				0.000	0.000
N	319	198	198	186	186	319	199	197	187	185
R2 (IV)	-0.001	0.000	0.000			0.003	0.006	0.000		
Fdf2	54.00	58.00	58.00			54.00	58.00	58.00		
F	0.31	3.71	1.73			0.25	9.73	14.69		
Adj. R2 (IV)	-0.02	-0.03	-0.06			-0.02	-0.03	-0.06		
Kleibergen-Paap rk LM χ2	26.44	1.27	1.34			26.44	1.27	1.34		
Kleibergen-Paap Wald F	465.50	732.43	1			465.50	732.54	1		
Hansen J stat	0.00	0.00	010.00			0.00	0.00	006.97		
Hansen J p-value	.	.	0.00			.	.	0.00		
R2				0.153	0.167				0.101	0.168
Residual DF				59.00	59.00				59.00	59.00
Root MSE				1.24	1.25				1.39	1.36
Adj. R2				0.13	0.11				0.08	0.12

IV estimations of average treatment effects for T vs CA and T vs CC (GMM, covariates partialled out), linear regression for CA vs CC; controlling for the fraction contributed by the couple in the previous game(s).
Per variable: Coefficient on 1st line, robust standard errors corrected for clustering per session on 2nd line, p-value on 3rd line.
° Estimations controlling for selection bias with covariates
^ Coefficients of fractions contributed by the couple in previous game(s), and coefficients of covariates in Table L in Annex.

There is unconvincing evidence of average treatment effects on husbands' contribution in the first VCM game (Panel 1, 3 and 5 Table 13).

In the second VCM game, both the intensive treatment and less intensive treatment versus no GHA exposure increase husbands' contributions (Panel 3 and 5 Table 14); in the sharing game, the intensive treatment versus no GHA exposure increases their offers (Panel 3 Table 15). Hence, we can reject H III) and H IV) for these cases. The effect of the intensive treatment in combination with communication on offers in the sharing game are not different than without communication - hence we cannot reject H V) for offers by husbands. The impact on husbands' VCM2 contributions of the intensive treatment and less intensive treatment in combination with communication is smaller than without communication, which does not support a rejection of H V).

In line with the observed treatment effects on the likelihood of opting for the most cooperative, respectively most generous strategy, women who received the intensive or the less intensive treatment, versus women without GHA exposure, reduce their contribution to the pool in the first VCM game and their offer in the sharing game (Panel 8 and 10 Table 13 and 15). Hence, we cannot reject H III) and H V) for these cases. But the combination of intensive or less intensive treatment with communication in the game makes the reduction of their offer as a result of treatment smaller – which supports a rejection of H V).

In the case of wives' contributions in the second VCM game, treatments in themselves have no effect but the combination of communication and intensive or less intensive treatment versus no GHA exposure has a net positive effect, but it is driven by a generally positive effect of communication (Panel 8 and 10 Table 14).

5.5. Distributional differences as a result of treatment and communication

Hypothesis III) and IV) *The introduction of participatory intrahousehold decision-making does not increase cooperation by spouses, respectively the generosity by which spouses share resources*

Hypothesis V) *Allowing communication in the game, in combination with the treatment(s) does not increase cooperation (respectively generosity) by spouses*

The histograms presented in Figure 3 in section 5.2. point to a shift in the distribution of contributions by husbands and wives as a result of the introduction of participatory intrahousehold decision-making and communication in the game. The estimation of average treatment effects may not capture these shifts in the distribution well. That is why in this section we explore the effects of treatment across the distribution of contributions by husbands and wives in the first VCM game, the second VCM game with communication and without communication and subsequent sharing games. Tables 16, 17, 18, 19, and 20 present the estimated quantile treatment effects. We marked negative effects in bold grey (red in online versions) and positive effects in bold black (green in online versions).[26]

[26] Note that the sample size became problematic for estimations of quantile treatment effects comparing intensively and less intensively treated with husbands and wives without GHA exposure in the VCM2 and sharing game in the sequence without communication. Therefore, it was impossible to control for selection bias with covariates or to use bootstrapping to estimate robust standard errors corrected for clustering per session. While the estimations are included in the Tables 19 and 20, they are not reliable enough to be reported.

Table 16: Unconditional quantile treatment effects on husbands' and wives' contributions in the 1st VCM game

		Husband's contribution in VCM1					Wife's contribution in VCM1				
		T_CA	T_CC	T_CC°	CA_CC	CA_CC°°	T_CA	T_CC	T_CC°	CA_CC	CA_CC°
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES		VCM1_CNTR_HB	VCM1_CNTR_HB	VCM1_CNTR_HB	VCM1_CNTR_HB	VCM1_CNTR_HB	VCM1_CNTR_W	VCM1_CNTR_W	VCM1_CNTR_W	VCM1_CNTR_W	VCM1_CNTR_W
Quantile_1	QTE	0	-1	-1	-1	-1*	0	-1***	-1***	-1**	-1*
	S.E.	(0.523)	(0.656)	(0.640)	(0.618)	(0.524)	(0.503)	(0.161)	(0.143)	(0.498)	(0.548)
	p	1.000	0.127	0.118	0.106	0.056	1.000	0.000	0.000	0.045	0.068
Quantile_2	QTE	0	0	0	0	0	0	-1	0	0	0
	S.E.	(0.377)	(0.170)	(0.241)	(0.468)	(0.417)	(0.470)	(0.648)	(0.651)	(0.248)	(0.453)
	p	1.000	1.000	1.000	1.000	1.000	1.000	0.123	1.000	1.000	1.000
Quantile_3	QTE	0	0	0	0	0	0	-1***	-1***	-1***	-1***
	S.E.	(0.000)	(0.371)	(0.441)	(0.355)	(0.279)	(0.223)	(0.095)	(0.297)	(0.122)	(0.377)
	p	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.001	0.000	0.008
Quantile_4	QTE	0	-1	-1	0	0	-1	0	0	0	-1**
	S.E.	(0.379)	(0.661)	(0.649)	(0.552)	(0.530)	(0.624)	(0.506)	(0.514)	(0.505)	(0.506)
	p	1.000	0.130	0.123	1.000	1.000	0.109	1.000	1.000	1.000	0.048
Quantile_5	QTE	0	0	0	0	0	0	0	0	0	0
	S.E.	(0.514)	(0.321)	(0.359)	(0.558)	(0.604)	(0.160)	(0.293)	(0.314)	(0.290)	(0.313)
	p	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Quantile_6	QTE	0	0	0	0	0	0	0	0	0	0
	S.E.	(0.032)	(0.122)	(0.188)	(0.212)	(0.310)	(0.000)	(0.481)	(0.488)	(0.462)	(0.428)
	p	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Quantile_7	QTE	0	0	0	0	0	0	-1**	-1**	-1*	-1*
	S.E.	(0.248)	(0.399)	(0.524)	(0.400)	(0.483)	(0.455)	(0.504)	(0.508)	(0.515)	(0.533)
	p	1.000	1.000	1.000	1.000	1.000	1.000	0.047	0.049	0.052	0.061
Quantile_8	QTE	1*	0	0	-1	-1	0	0	0	0	0
	S.E.	(0.587)	(0.562)	(0.597)	(0.685)	(0.668)	(0.349)	(0.211)	(0.310)	(0.325)	(0.481)
	p	0.088	1.000	1.000	0.144	0.135	1.000	1.000	1.000	1.000	1.000
Quantile_9	QTE	0	0	0	0	0	0	0	0	0	0
	S.E.	(0.045)	(0.521)	(0.528)	(0.518)	(0.525)	(0.293)	(0.486)	(0.504)	(0.462)	(0.371)
	p	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
N		319	198	198	186	186	319	199	197	187	185

Unconditional quantile treatment effects with endogenous treatment for T vs CA and T vs CC, with exogenous treatment for CA vs CC.
S.E. = Robust standard errors corrected for clustering per session through bootstrapping (1000 replications)
° Estimations controlling for selection bias with covariates °° Dummy variables for wife and husband having secondary education dropped as covariates.

Table 17: Unconditional quantile treatment effects on husbands' and wives' contributions in the 2nd VCM game in the sequence with communication

		Sequence with communication									
		Husband's contribution in VCM2					Wife's contribution in VCM2				
		T_CA	T_CC	T_CC°	CA_CC	CA_CC°	T_CA	T_CC	T_CC°°	CA_CC	CA_CC°°
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES		VCM2_CNTR_HB	VCM2_CNTR_HB	VCM2_CNTR_HB	VCM2_CNTR_HB	VCM2_CNTR_HB	VCM2_CNTR_W	VCM2_CNTR_W	VCM2_CNTR_W	VCM2_CNTR_W	VCM2_CNTR_W
Quantile_1	QTE	-1	0	-1	-1	-1	0	-2***	-1	-1	-1
	S.E.	(0.833)	(0.915)	(0.875)	(0.840)	(0.782)	(0.530)	(0.703)	(0.703)	(0.669)	(0.064)
	p	0.230	1.000	0.253	0.234	0.201	1.000	0.004	0.155	0.135	0.120
Quantile_2	QTE	0	-1**	-1**	-1*	-1**	0	-1***	-1***	-1***	-1**
	S.E.	(0.459)	(0.457)	(0.412)	(0.604)	(0.472)	(0.255)	(0.294)	(0.365)	(0.361)	(0.040)
	p	1.000	0.029	0.015	0.098	0.034	1.000	0.001	0.006	0.006	0.013
Quantile_3	QTE	0	-1**	-1**	-1***	-1***	0	0	0	0	0
	S.E.	(0.189)	(0.419)	(0.506)	(0.302)	(0.337)	(0.576)	(0.601)	(0.655)	(0.596)	(0.064)
	p	1.000	0.017	0.048	0.001	0.003	1.000	1.000	1.000	1.000	1.000
Quantile_4	QTE	0	0	0	-1*	0	0	-1**	-1***	-1**	-1**
	S.E.	(0.629)	(0.474)	(0.528)	(0.534)	(0.542)	(0.197)	(0.445)	(0.364)	(0.484)	(0.045)
	p	1.000	1.000	1.000	0.061	1.000	1.000	0.025	0.006	0.039	0.026
Quantile_5	QTE	0	0	0	0	0	0	-1***	-1***	-1***	-1***
	S.E.	(0.279)	(0.257)	(0.458)	(0.258)	(0.448)	(0.100)	(0.305)	(0.368)	(0.216)	(0.023)
	p	1.000	1.000	1.000	1.000	1.000	1.000	0.001	0.007	0.000	0.000
Quantile_6	QTE	0	0	-1	0	-1	0	0	0	-1**	-1**
	S.E.	(0.200)	(0.566)	(0.664)	(0.517)	(0.626)	(0.570)	(0.407)	(0.377)	(0.447)	(0.048)
	p	1.000	1.000	0.132	1.000	0.110	1.000	1.000	1.000	0.025	0.037
Quantile_7	QTE	1*	0	0	-1	0	0	0	0	0	0
	S.E.	(0.588)	(0.626)	(0.619)	(0.648)	(0.707)	(0.329)	(0.032)	(0.090)	(0.230)	(0.032)
	p	0.089	1.000	1.000	0.123	1.000	1.000	1.000	1.000	1.000	1.000
Quantile_8	QTE	0	0	0	0	0	0	0	0	0	0
	S.E.	(0.338)	(0.275)	(0.373)	(0.316)	(0.441)	(0.032)	(0.144)	(0.224)	(0.063)	(0.038)
	p	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Quantile_9	QTE	0	0	0	0	0	1	1*	1	1	0
	S.E.	(0.389)	(0.487)	(0.582)	(0.656)	(0.747)	(0.628)	(0.584)	(0.655)	(0.622)	(0.070)
	p	1.000	1.000	1.000	1.000	1.000	0.111	0.087	0.127	0.108	1.000
N		213	136	136	132	132	213	137	135	133	131

Unconditional quantile treatment effects with endogenous treatment for T vs CA and T vs CC, with exogenous treatment for CA vs CC; controlling for the fraction contributed by the couple in the previous game.
S.E. = Robust standard errors corrected for clustering per session through bootstrapping (1000 replications)
° Estimations controlling for selection bias with covariates; °° Dummy variables for wife having secondary education and for wife having off-farm income dropped as covariates.

Table 18: Unconditional quantile treatment effects on husbands' and wives' offers in the sharing game in the sequence with communication

		Sequence with communication									
		Husband's offer in the sharing game					Wife's offer in the sharing game				
		T_CA	T_CC	T_CC°	CA_CC	CA_CC°	T_CA	T_CC	T_CC°°	CA_CC	CA_CC°°
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES		SHARE_CNTR_HB	SHARE_CNTR_HB	SHARE_CNTR_HB	SHARE_CNTR_HB	SHARE_CNTR_HB	SHARE_CNTR_W	SHARE_CNTR_W	SHARE_CNTR_W	SHARE_CNTR_W	SHARE_CNTR_W
Quantile_1	QTE	0	-1	-1	-1**	-1*	-1	-1	-1	-1	-1
	S.E.	(0.678)	(0.695)	(0.730)	(0.468)	(0.593)	(0.636)	(0.702)	(0.706)	(0.668)	(0.642)
	p	1.000	0.150	0.170	0.033	0.092	0.116	0.154	0.157	0.135	0.119
Quantile_2	QTE	0	0	0	0	0	0	-2***	-2***	-2***	-2***
	S.E.	(0.665)	(0.449)	(0.504)	(0.474)	(0.540)	(0.528)	(0.648)	(0.625)	(0.602)	(0.632)
	p	1.000	1.000	1.000	1.000	1.000	1.000	0.002	0.001	0.001	0.002
Quantile_3	QTE	0	0	0	0	0	0	-1**	-1**	-1*	-1*
	S.E.	(0.164)	(0.205)	(0.283)	(0.346)	(0.425)	(0.537)	(0.417)	(0.397)	(0.512)	(0.527)
	p	1.000	1.000	1.000	1.000	1.000	1.000	0.017	0.012	0.051	0.058
Quantile_4	QTE	0	0	0	0	0	0	-1*	-1	0	0
	S.E.	(0.595)	(0.638)	(0.631)	(0.729)	(0.715)	(0.557)	(0.600)	(0.616)	(0.639)	(0.685)
	p	1.000	1.000	1.000	1.000	1.000	1.000	0.095	0.105	1.000	1.000
Quantile_5	QTE	0	0	0	0	0	0	0	0	0	0
	S.E.	(0.482)	(0.568)	(0.656)	(0.383)	(0.486)	(0.555)	(0.720)	(0.688)	(0.572)	(0.579)
	p	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Quantile_6	QTE	0	0	0	0	0	0	-1	-1*	-1*	-1**
	S.E.	(0.343)	(0.422)	(0.516)	(0.134)	(0.294)	(0.463)	(0.712)	(0.601)	(0.549)	(0.448)
	p	1.000	1.000	1.000	1.000	1.000	1.000	0.160	0.096	0.068	0.026
Quantile_7	QTE	1*	1**	1*	0	0	1*	0	0	0	0
	S.E.	(0.595)	(0.457)	(0.518)	(0.509)	(0.567)	(0.601)	(0.414)	(0.329)	(0.607)	(0.575)
	p	0.093	0.029	0.053	1.000	1.000	0.096	1.000	1.000	1.000	1.000
Quantile_8	QTE	0	1**	1**	1***	1**	0	0	0	0	0
	S.E.	(0.273)	(0.432)	(0.456)	(0.304)	(0.398)	(0.203)	(0.386)	(0.375)	(0.504)	(0.532)
	p	1.000	0.021	0.028	0.001	0.012	1.000	1.000	1.000	1.000	1.000
Quantile_9	QTE	0	0	0	0	0	-1*	0	0	0	0
	S.E.	(0.534)	(0.486)	(0.546)	(0.610)	(0.551)	(0.574)	(0.692)	(0.687)	(0.659)	(0.666)
	p	1.000	1.000	1.000	1.000	1.000	0.082	1.000	1.000	1.000	1.000
N		213	136	136	132	132	213	137	135	133	131

Unconditional quantile treatment effects with endogenous treatment for T vs CA and T vs CC, with exogenous treatment for CA vs CC; controlling for the fraction contributed by the couple in the previous games.
S.E. = Robust standard errors corrected for clustering per session through bootstrapping (1000 replications)
° Estimations controlling for selection bias with covariates. °° Dummy variables for wife and husband having secondary education and for wife having off-farm income dropped as covariates (additionally husband having off-farm income, in case of CA vs CC).

Table 19: Unconditional quantile treatment effects on husbands' and wives' contributions in the 2nd VCM game in the sequence without communication

		Sequence without communication					
		Husband's contribution in VCM2			Wife's contribution in VCM2		
		T_CA	T_CC°°	CA_CC°°	T_CA	T_CC°°	CA_CC°°
		(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES		VCM2_CNTR_HB	VCM2_CNTR_HB	VCM2_CNTR_HB	VCM2_CNTR_W	VCM2_CNTR_W	VCM2_CNTR_W
Quantile_1	QTE	1	0	-1	0	0	-1
	S.E.	(1.151)	(0.546)	(0.811)	(0.768)	(0.857)	(0.715)
	p	0.385	1.000	0.218	1.000	1.000	0.162
Quantile_2	QTE	0	0	0	0	0	0
	S.E.	(0.423)	(0.253)	(0.251)	(0.480)	(0.493)	(0.654)
	p	1.000	1.000	1.000	1.000	1.000	1.000
Quantile_3	QTE	0	0	0	-1**	-1	1
	S.E.	(0.512)	(0.524)	(0.374)	(0.462)	(0.659)	(0.652)
	p	1.000	1.000	1.000	0.030	0.129	0.125
Quantile_4	QTE	1*	1**	1*	0	0	0
	S.E.	(0.522)	(0.405)	(0.570)	(0.421)	(0.688)	(0.556)
	p	0.055	0.014	0.080	1.000	1.000	1.000
Quantile_5	QTE	0	1**	1**	0	0	0
	S.E.	(0.329)	(0.412)	(0.489)	(0.210)	(0.571)	(0.551)
	p	1.000	0.015	0.041	1.000	1.000	1.000
Quantile_6	QTE	0	1**	1*	0	0	0
	S.E.	(0.262)	(0.491)	(0.556)	(0.416)	(0.582)	(0.640)
	p	1.000	0.042	0.072	1.000	1.000	1.000
Quantile_7	QTE	0	0	1	-1**	-1	1
	S.E.	(0.510)	(0.585)	(0.673)	(0.489)	(0.644)	(0.723)
	p	1.000	1.000	0.137	0.041	0.120	0.167
Quantile_8	QTE	0	1*	1**	-1*	0	0
	S.E.	(0.538)	(0.575)	(0.468)	(0.520)	(0.742)	(0.603)
	p	1.000	0.082	0.033	0.054	1.000	1.000
Quantile_9	QTE	0	1**	1*	0	0	0
	S.E.	(0.174)	(0.415)	(0.534)	(0.370)	(0.445)	(0.529)
	p	1.000	0.016	0.061	1.000	1.000	1.000
N		106	62	54	106	62	54

Unconditional quantile treatment effects with endogenous treatment for T vs CA and T vs CC, with exogenous treatment for CA vs CC; controlling for the fraction contributed by the couple in the previous game.
S.E. = Robust standard errors corrected for clustering per session through bootstrapping (1000 replications) (except in case of VCM2 and Sharing game T vs CC and CA vs CC in sequence without communication)
°° Estimations without controlling for selection bias with covariates in this case of T vs CC and CA vs CC in VCM2 game in the sequence without communication.

Table 20: Unconditional quantile treatment effects on husbands' and wives' offers in the sharing game in the sequence without communication

		Sequence without communication					
		Husband's offer in the sharing game			Wife's offer in the sharing game		
		T_CA	T_CC°°	CA_CC°°	T_CA	T_CC°°	CA_CC°°
		(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES		SHARE_CNTR_HB	SHARE_CNTR_HB	SHARE_CNTR_HB	SHARE_CNTR_W	SHARE_CNTR_W	SHARE_CNTR_W
Quantile_1	QTE	1	-1	-2**	0	-3*	-3***
	S.E.	(0.813)	(0.700)	(0.868)	(1.020)	(1.568)	(0.636)
	p	0.219	0.153	0.021	1.000	0.056	0.000
Quantile_2	QTE	0	0	0	0	-1	-1
	S.E.	(0.717)	(0.589)	(0.772)	(0.712)	(0.717)	(0.743)
	p	1.000	1.000	1.000	1.000	0.163	0.179
Quantile_3	QTE	0	0	0	0	-2***	-1*
	S.E.	(0.504)	(0.599)	(0.475)	(0.620)	(0.600)	(0.589)
	p	1.000	1.000	1.000	1.000	0.001	0.089
Quantile_4	QTE	1*	1	0	0	-1	0
	S.E.	(0.578)	(0.629)	(0.640)	(0.494)	(0.668)	(0.634)
	p	0.084	0.112	1.000	1.000	0.134	1.000
Quantile_5	QTE	0	1*	1	0	-1**	-1*
	S.E.	(0.452)	(0.532)	(0.622)	(0.190)	(0.437)	(0.532)
	p	1.000	0.060	0.108	1.000	0.022	0.060
Quantile_6	QTE	0	0	0	0	-1**	-1*
	S.E.	(0.232)	(0.514)	(0.531)	(0.549)	(0.474)	(0.530)
	p	1.000	1.000	1.000	1.000	0.035	0.059
Quantile_7	QTE	0	0	0	0	0	-1
	S.E.	(0.524)	(0.578)	(0.603)	(0.631)	(0.626)	(0.638)
	p	1.000	1.000	1.000	1.000	1.000	0.117
Quantile_8	QTE	0	1*	1*	0	0	0
	S.E.	(0.595)	(0.574)	(0.557)	(0.198)	(0.512)	(0.420)
	p	1.000	0.082	0.073	1.000	1.000	1.000
Quantile_9	QTE	0	1***	1**	0	-1	0
	S.E.	(0.423)	(0.293)	(0.399)	(0.693)	(0.733)	(0.441)
	p	1.000	0.001	0.012	1.000	0.173	1.000
N		106	62	54	106	62	54

Unconditional quantile treatment effects with endogenous treatment for T vs CA and T vs CC, with exogenous treatment for CA vs CC; controlling for the fraction contributed by the couple in the previous games.
S.E. = Robust standard errors corrected for clustering per session through bootstrapping (1000 replications) (except in case of VCM2 and Sharing game T vs CC and CA vs CC in sequence without communication)
°° Estimations without controlling for selection bias with covariates in this case of T vs CC and CA vs CC in Sharing game in the sequence without communication.

What emerged as a trend in the analysis of average treatment effects on contributions and on the likelihood of opting for the most cooperative strategy, becomes clear in an analysis of distributional treatment effects. The impact of the treatments is different in the first VCM game than in the second VCM game both among husbands and wives; the treatment effects on women's behaviour in the sharing game differs from those on men's. Furthermore, the assessment of distributional treatment effects shows there are different types of husbands and wives who respond differently to treatment.

Focusing first on husbands' contributions in the second VCM game in the sequence with communication, we observe that at the higher end of the distribution – i.e. when men contribute a lot (7 tokens or more), in other words, among the cooperative type of men – the intensive treatment has a positive effect when compared to the less intensive treatment (Panel 1 Table 17).[27] Among the less cooperative types of husbands – i.e. at the lower end of the distribution – both the intensive and the less intensive treatment versus no GHA exposure have a negative effect on contributions (Panel 3 and 5 Table 17). Yet, in the sequence without communication, the less cooperative types of husbands increase their contributions as a result of the intensive vis-à-vis the less intensive treatment (Panel 1 Table 19).

The effects on husbands' offers in the sharing game are somewhat similar to the effects on contributions in the second VCM game. Among the more cooperative – more generous - types of husbands, the intensive versus less intensive treatment increases their offers (Panel 1 Table 18); but in this case we see such positive effects also when comparing the intensive and the less intensive treatment with no GHA exposure (Panel 3 and 5 Table 18). Among the less generous types of husbands the less intensive treatment (and indicatively the intensive treatment) versus no GHA exposure has a negative effect on husbands' offers. However, in the sequence without communication, the intensive vis-à-vis the less intensive treatment has a positive effect on offers among the less generous types of husbands (Panel 1 Table 20).

Hence, we can reject H III) and IV) for cooperative/generous types of husbands, but when it comes to cooperation in the second VCM game only for the intensive versus less intensive treatment. And as these effects are only present with communication, this supports a rejection of H V). For less cooperative/generous types of husbands and for the effect of the intensive versus less intensive treatment, we can reject H III) and H IV); but not H V) as the positive impact only emerges in the sequence without communication.

Secondly, among the cooperative types of wives, the intensive treatment versus the less intensive treatment and versus no GHA exposure has a positive impact on wives' contributions in the second VCM game in the sequence with communication (Panel 6 and 8 Table 17). Among the generous types of wives, the intensive treatment versus the less intensive treatment increases wives' offers in the sharing games with communication in the 7th quantile, reduces offers in the 9th quantile (Panel 6 Table 18). Among the less cooperative/generous types of wives, the impact of the intensive treatment and the less intensive treatment versus no GHA exposure is negative on contributions in the second VCM game and on offers in the sharing game in the sequence with communication (and indications that the intensive treatment versus less intensive treatment negatively impacts offers) (Panel 8 and 10 Tables 17 and 18). In the sequence without communication both cooperative and less cooperative types of wives respond with lower contributions in the second VCM game to the intensive treatment versus the less intensive treatment (Panel 4 Table 19).

[27] We use contributions of 7 out of 10 tokens, which is the mode in most situations, as the cut-off point for labelling husbands and wives as being of the cooperative or less cooperative type.

Thus, H III) can only be rejected for cooperative types of women, H IV) as well but only as a result of the intensive treatment versus the less intensive treatment, and with the note that the most cooperative types of women (9th quantile) reduce their offer. For less cooperative/ generous types of wives, the impact of the intensive treatment and the less intensive treatment versus no GHA exposure on VCM contributions and on offers in the sharing game is negative and does not support a rejection of H III) and H IV). We can reject H V) as positive effects on VCM contributions and offers in the sharing game that emerge among cooperative types of wives are only realised with communication in the game. In fact without communication, the impact on cooperation is negative, zero on generosity.

Thirdly, in the first VCM game the responses to treatment are different than in other games. The intensive and less intensive treatment versus no GHA exposure have a negative impact on contributions in the first VCM game of less cooperative types of husbands (Panel 3 and 5 Table 16), of cooperative types of wives, and of less cooperative types of wives (Panel 8 and 10 Table 16) (for the latter case there are indications that the intensive versus less intensive treatment also has a negative effect (Panel 6 Table 16)). This does not support a rejection of H III) for these cases. Husbands of the cooperative type, however, increase their offer in the first VCM game as a result of the intensive versus the less intensive treatment (Panel 1 Table 16); which allows a rejection of H III).

6. Discussion

In an effort to address the limited levels of cooperation between spouses and the presence of (gender-related) inequalities in agricultural households, which are the most significant decision-makers in rural societies in developing contexts, Doss and Meinzen-Dick (2015) suggested participatory intrahousehold decision-making could reduce information asymmetries between household members and strengthen women's voice in rule- and decision-making, all of which may be beneficial for cooperation and equity. This study, focusing on couples in rural coffee farming households in central Uganda, responds to the challenge of investigating the impact of introducing participatory household decision-making in agricultural households on experimentally measured intrahousehold cooperation and sharing behaviour. It tests the extent to which the introduction of participatory intrahousehold decision-making, through the Gender Household Approach (GHA) implemented by the Hanns R. Neumann Stiftung which entails an intensive coaching program and less intensive awareness raising couple seminars, has an impact on I) the likelihood of equilibrium behaviour by spouses; III) cooperative behaviour by spouses; and IV) generosity by which spouses share resources. Additionally, it tests whether allowing communication in the game, which mimics the promotion of intrahousehold communication implied in participatory intrahousehold decision-making, in combination with the treatment(s) results in a stronger (positive) impact of participatory intrahousehold decision-making on II) the likelihood of equilibrium behaviour; and on V) cooperation, respectively generosity, by spouses.

We found that behaviour is more likely to exhibit equilibrium characteristics as measured by women's expectations about their husbands' contributions in a voluntary contribution mechanism (VCM) game as a result of the intensive coaching and the couple seminars, but only with communication in the game. In the absence of communication, as well as for the VCM game played first, there are negative treatment effects instead. Regardless of communication or not, both the intensive coaching and the couple seminars versus no exposure to the GHA made women's expectation about their husbands' offers in the sharing game less accurate.

In case of husbands' expectations about their wives' contributions, there are posi-

tive effects, which are strengthened by communication, in the second VCM game as well as in the sharing game and first VCM game. But the less intensive couple seminars versus no GHA exposure have a negative effect on the accuracy of husbands' expectations about their wives' contributions in the second VCM game. The intensive coaching versus the less intensive treatment increased the accuracy of husbands' expectations about their wives' offers in the sharing game with communication; without communication it reduced it.

These findings demonstrate that, clearly, communication is beneficial for the accuracy of expectations about the other spouse's contributions or offers. It also means that spouses tend to stick to what they agreed during their discussion prior to making a decision in the game. In some cases, the treatments reduced information asymmetry between spouses but in fewer instances when it concerns the accuracy of women's expectations about their husbands' behaviour than when it concerns the accuracy of men's expectations about their wives' behaviour. Still, the fact that the intensive and less intensive treatment made their husbands' contributions to the common pool more transparent or predictable for women is an important achievement in this context of patriarchal role models that favour information asymmetry – mostly towards women - within households.

Next, we examined the impact of the treatments on the likelihood of choosing the most cooperative, respectively the most generous, strategy and on the likelihood of increasing cooperation from the first to the second VCM game. There is no evidence of treatment effects by the most intensive coaching package as compared to the less intensive couple seminars. But as compared to no GHA exposure, husbands and wives who went through the intensive and less intensive treatment are more likely to opt for the most cooperative strategy in the second VCM game and more likely to increase cooperation from the first to the second VCM game. Along the same line, we found positive average treatment effects on husbands' contributions in the second VCM game. Communication, however, makes these positive treatment effects among husbands smaller. The likelihood of highly generous offers by husbands in the sharing game is not affected by treatments. There are, however, positive average treatment effects their offers in the sharing game but only as a result of the intensive treatment versus no GHA exposure. Communication did not make a difference in the latter case.

The likelihood that wives opt for the most generous offers in the sharing game is negatively affected by both the intensive and less intensive treatment versus no GHA exposure, as is the likelihood of opting for the most cooperative strategy in the first VCM game. Communication makes negative treatment effects on wives' offers stronger. Along the same line, women on average reduced their contribution to the pool in the first VCM game and their offer in the sharing game; but in the latter case communication made the negative effect on their offer smaller. There is no evidence of average treatment effects on wives' contributions in the second VCM game but, in combination with communication the intensive and less intensive treatment versus no GHA exposure have a net positive effect.

In a related study of the same intervention in the same area, some of the experimental findings are reflected in a positive impact on joint management of the main food and cash crop production, as a survey-based measure of cooperation, as a result of the intensive versus the less intensive treatment (Lecoutere, 2018). That study also found indications that, as compared to no GHA exposure, both the intensive and less intensive treatment made joint management of cash crop production more likely.

In this article, we additionally analysed distributional treatment effects, which

confirmed what emerged as trends in previous analyses: The impact of the treatments is largely negative in the first VCM game and positive in the second VCM game both among husbands and wives; the treatments generally makes women less generous in the sharing game but men more generous. The main contribution of the assessment of distributional treatment effects is the demonstration that there are different types of husbands and wives who respond differently to treatments, which was masked in the previous analyses.

The assessment of distributional treatment effects showed that the intensive versus less the intensive treatment in combination with communication stimulates cooperation in the second VCM game and generous sharing among cooperative types of men and women. Among less cooperative types of women the impact on generosity, however, is negative; and in the absence of communication the intensive versus less the intensive treatment reduces cooperation among both women of the cooperative and less cooperative type. Yet, the intensive versus the less intensive treatment makes men of the less cooperative type more cooperative, but only in the absence of communication, which is the only positive impact observed among the less cooperatively-minded.

The latter can be considered a crucial change, also in the view of women, as in a related mixed methods study women explained that cooperation in their household is only feasible if their husband is 'flexible' (Lecoutere & Wuyts, 2017). By flexible women mean a husband is ready to be cooperative, rather than merely optimizing what is in his interest and not necessarily the optimum from a household perspective.

When comparing with husbands and wives who did not get any GHA treatment, the intensive and less intensive treatment in combination with communication are found to have positive treatment effects on generosity among cooperative types of men; and the intensive treatment on cooperation in the second VCM game among cooperative types of women. In contrast, among the less cooperative type of men the treatments reduce cooperation and generosity; and among the less cooperative type of women generosity.

The negative impact of the treatments among less cooperative types of spouses can mean different things. It could be that the treatments drive a wedge between couples in which spouses are of a less cooperative mind-set and do the opposite of what they were intended for, namely increasing intrahousehold cooperation and equitable sharing. But it might be more likely that men and women of a less cooperative mind-set fear un-cooperative behaviour from their spouse and - not trusting a high contribution to the pool by their spouse - have taken the opportunity to get a certain and individual return in the game by keeping the endowment to themselves. Or they value bargaining power over individually kept income more than greater income through the common pool, try to hide winnings or value the nominal ownership of the payoffs from the game (Munro, 2017). Building trust among spouses by demonstrated cooperation is a solution, which however is at the core of the problem and possibly not easy to accomplish by outsiders. Similarly, the negative treatment effect on generosity among the less cooperative type of women (and the lack of effect among the cooperative type) could mean these women took an opportunity of a certain and individual return, not trusting to receive a large offer by their husband, or value that more. Alternatively, these results could indicate that the treatments taught women to claim their share; and the negative effects are actually showing some form of women's empowerment.

The positive treatment effects, on the other hand, that mainly occur among husbands and wives who are already cooperative or generous could point to a kind of threshold

level of cooperation before participatory intrahousehold decision-making can stimulate cooperation and generous sharing. This resonates with the mixed methods study findings of different pathways of empowerment of women in their households that depend on whether cooperation between spouses is actually possible or out of the question as the husband resists it (Lecoutere & Wuyts, 2017). A recommendation that follows from these findings about an apparent threshold level of cooperation would be to introduce participatory intrahousehold decision-making in a fast track mode focusing on couples who show some level of cooperation; and in a slow track mode inspiring spouses into more cooperative mind-sets.

As indicated, in the first VCM game different things are at play. We observed that generally cooperation is negatively affected by the intensive and less intensive treatment; except among men of the cooperative type who received the intensive coaching treatment as compared to the less intensive couple seminar. And while the intensive and less intensive treatment, as compared to no GHA exposure, made cooperative and less cooperative types of husbands and wives more opportunistic in the first VCM game, especially the cooperative types learned fast and turned to cooperation and generosity in the subsequent games. This also showed from positive effects on the likelihood of improving on cooperation from the first to the second VCM game. Vis-à-vis the less intensively treated, the intensively treated cooperative type of men, however, went for cooperation straight away.

The generally negative treatment effects in the first VCM game may point to the fact that spouses may initially value bargaining power over individual returns more than potentially higher income through the common pool (Munro, 2017). This initial hesitation for cooperation, even among the treated, also resonates with women's observations that only with the experience of cooperation by the other spouse, one can safely be cooperative (Lecoutere & Wuyts, 2017); which points more to a trust issue. It also hints at the positive feedback loops of experiencing of less opportunistic behaviour for cooperation (Baland & Platteau 1998). For similar interventions, it may be important to make sure couples experience a positive first experience from better cooperation and equitable sharing – and are also aware that cooperation and sharing are the reason - as this is essential to be confident about cooperation in the future. If this can be realised, there could be a virtuous circle of increasing intrahousehold cooperation and equitable sharing. Methodologically, the evidence of spouses updating their behaviour in a second game not only validates the importance of a second game to avoid imperfect learning (Lopez, Munro, & Tarazona-Gomez, 2015: In Munro, 2017), but demonstrates it may also be needed to capture both the initial cautious and updated strategies as they are exercised in real life.

Finally, the findings have shown that communication is likely to reinforce positive effects of participatory intrahousehold decision-making on cooperation. Hence, encouraging communication and mutual consultation between spouses when introducing participatory intrahousehold decision-making is essential. In that sense, the household plans and budgets that are part of the intensive coaching program are a key tool as they aid to reduce information asymmetry about work input, production, income and expenditures and to learn spouses how to come to compromises. Additionally, diminishing information asymmetry between spouses about income earned through marketing coffee could be accomplished through payment systems by coffee buyers that are transparent and easily accessible and consultable by both spouses.

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FIGURES

TABLES

ANNEX

IOB
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