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Transforming Gender Relations through the Market: Smallholder Milk Market Participation and Women`s Intra-household Bargaining Power in Ethiopia

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ABSTRACT *We study the relationship between smallholder milk market participation and women`s intra-household bargaining position in Ethiopia, using a quasi-experiment and propensity score matching. In market participant households, milk income is higher and its control has shifted from women to men. Our data also indicate that men transfer this income partly to their wives. Qualitative findings indicate that men see this as recognition for their wife's household maintenance responsibility. Women argue however that transferring income is also men`s tactic for reducing intra-household conflict. Overall, dependency between husbands and wives seems higher and a woman's bargaining position stronger in participant households.*

1. Introduction

> Bargaining within the household is often hidden, involving emotional manipulations and unspoken power games that may not be readily detectable or fundamentally threatening. (Locke & Okali, 1999, p. 275)

In response to the problems posed by a unitary conceptualisation of the household, economists have proposed alternative household models. These models, especially those embodying the bargaining approach, provide a useful framework for analysing gender relations (Agarwal, 1997). Research based on these models indicates that increased resources (earnings) in the hands of women may generate egalitarian shifts in gender relations, by enhancing women`s intra-household bargaining power (for example Adato, De La Bénédicte Mindek, & Quisumbing, 2000; Mahmud, Shah, & Becker, 2012; Naved, 2000; Sen, 1990). Foa and Foa (2012) argue that any trait or behaviour that is valued by household members can be used to influence household decisions and intra-household gender relations.

According to Sultana (2013), household bargaining is not only a matter of intra-household relations, but is also influenced by institutionalised forms of gendered relations. As long as gender disparity is in operation, changes in earnings alone would do little to improve women`s intra-household bargaining.

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Whether changes in gender dynamics due to the introduction of a market system have the potential to transform existing gender imbalances, as has been suggested by some scholars (Agarwal, 1997; Goyal, 2007), remains however to be seen. There are indications that market developments, especially in Africa, do not benefit women and sometimes even worsen their intra-household positions (Abbas, 1997, Naved, 2000; Njuki, Kaaria, Chamunorwa, & Chiuri, 2011; Okali, 2011, Sahan & Fischer-Mackey, 2011).

In Ethiopia, the government has been implementing the Growth and Transformation Plan (GTP) since 2010, which is meant to change the country from a semi-subsistence agrarian economy to a more diversified and food secure economy. Smallholder market integration is one of the crucial features of the plan and the dairy sector is the target of the commercialisation policy in the country. In Ethiopia, dairy has traditionally been a women`s business. Women were responsible for milking cows and for processing milk into butter, cottage cheese and yoghurt, for household consumption as well as for the local market. The dairy market surplus has been an important source of income for Ethiopian rural women. However, with the integration of smallholder milk production into the formal market system this may have changed. The experience of other African countries indicates that cash crops and their benefits tend to be controlled by males (see Abbas, 1997; Endeley, 2001; Fischer & Qaim, 2012; Njuki, Kaaria, Chamunorwa, & Chiuri, 2011). Given that in market participant households dairy is considered more as a cash commodity, the shift towards a market-oriented system may involve a shift of the control over milk income from women to men.

Previous studies (Tangka, Emerson, & Jabbar, 2002) have shown that while women in the central highland of Ethiopia received the total dairy income from the sale of butter in the local market, their earning share was reduced to 59 per cent of the total milk income in market-oriented dairying. Similarly, Tangka, Ouma, Staal, and Shapiro (1999) found that women`s dairy income from selling butter in the local market increased four times in market-oriented systems, thus indicating that marketing is favorable for women. However, these authors also found that at the same time men`s income increased 14 times. Hence, with market integration of the dairy sector, the income of men grew more than three times as strong as that of women. To what extent market integration and the related income changes affect women's intra-household bargaining position remains to be seen. Until now, no empirical evidence is available regarding this important issue.

The current study aims to contribute to the literature on intra-household gender relations by assessing the relationship between household milk market participation and women`s intra-household bargaining position in Ethiopia. Using the information obtained in quasi-experimental games, a household survey and qualitative information collected from key informants and post-game interviews, we aim to answer the following research question: *What is the relationship between milk market participation of dairy farm households and women's intra-household bargaining power in Ethiopia?*

In this study, we define women's intra-household bargaining power as the ability of wives to control a fair share of household income. To gain insight into the strength of women's bargaining power in dairy farming households, our experimental game focuses on two major outcome parameters: the share of household income that husbands and wives think should go to the wife and the degree to which husbands and wives agree about the size of this share.

The remainder of the paper is structured as follows: Section 2 provides the theoretical model and a description of the quasi-experimental design. Section 3 is devoted to data collection, sampling and analytical procedures. Section 4 presents empirical results and in Section 5 the findings are summarised and discussed.

2. Theoretical Models and the Quasi-Experimental Design

2.1. Theoretical Models

In the unitary household model, the household is considered as the unit of study. Household members are assumed to have homogeneous preferences and resources to be allocated equally by the altruistic household head. As the resources of spouses are pooled, it is irrelevant by which spouse the resources

are controlled (Pollak, 1994). In most households, however, resources are neither pooled nor jointly allocated (Njuki et al., 2011,). This is problematic for the unitary household model as it considers the household as a black box (Geisler, 1993; Katz, 1995). More recent research models address this issue by an explicit recognition that individual preferences and bargaining power within the household may affect the outcomes of household decisions (Agarwal, 1997; Himmelweit, Santos, Sevilla, & Sofer, 2013; Njuki et al., 2011). These studies also revert to early family models (for example Blood & Wolfe, 1960; Rodman, 1972, Sen, 1990) that consider households as a place for conflict as well as cooperation. These models focus on the interaction between varying, if not conflicting, preferences and power distributions among household members.

In bargaining models, intra-household resource sharing is assumed to be the result of bargaining between household members, whether the bargaining is explicit or implicit (Himmelweit et al., 2013). Bargaining models of marriage presuppose that marriage generates substantial surpluses, the distribution of which is determined by bargaining within marriage rather than by prior agreements (Pollak, 1994). Bargaining power is supposed to influence the distribution of these surpluses by affecting the sharing rules. The basic hypothesis underlying these models is that there is a positive relationship between an individual's bargaining power, his/her influence on family decision-making, and his/her share of family resources (Seth, 1997). According to Katz (1995) it is possible to peek into the 'black box' of the household and to observe the complex intra-household dynamics that characterises the domestic economy. Mojirayo (2013) argues that individuals with a higher financial status in the household have more power and agency in household decision-making. This power and agency increases their confidence in making decisions that benefit them.

To measure women`s intra-household bargaining power, a wide range of indicators have been used; like income, participation in labor market, asset ownership, education, bride price, whether the woman has given birth to a son, women's role in household decision-making, and women`s autonomy to travel (Agarwal, 1997; Dito, 2011; Doss, 2013). Sultana, Mohd Hed, and Che Leh (2013) argue that women`s intra-household position does not only depend on what women earn and how much they participate in decisions, but also on the spouses` perception of what they earn and their role in decision-making. The mutual expectation of spouses should be an accurate reflection of their actual behaviour (Kebedea, Tarazona, Munro, & Verschoora, 2014). Gaining insight into these perceptions and expectations, therefore, would provide us with information about the actual intra-household position of women.

In this paper, we capture spouses' perceptions of their and their partners' bargaining power by performing an incentivised resource sharing game. A basic assumption underlying this approach is that the resource sharing rules in the game reflects the intra-household bargaining position of the spouses well. By comparing the outcomes of this game between milk market participants and non-participant farm households, we intend to understand the consequences of market participation for the bargaining position of Ethiopian farmwomen. The central hypothesis tested in this way is that household milk market participation is negatively related to women`s intra-household bargaining power, because it shifts milk income control from women to men.

2.2. The Experimental Design

According to Orsini and Spadaro (2005) the relative bargaining power of spouses can determine each spouse's share of the available resources. Individuals exercise agency in order to maximise their benefits. This agency is necessarily bounded by the social institution that determines resource sharing (Slootmaker, 2013). In our experiment, this social institution is a resource sharing game in which husbands and wives are asked to divide an amount of money between themselves and their partners, whereby agreement between husbands and wives regarding the amount given to the other determines whether they win the game. The amount to be divided is 100 Ethiopian birr (ETB), which is equivalent to the daily milk income in market participant households. In our game there are two roles, (1) proposing how to share the amount between themselves and their spouse, and (2) indicating how much one expects to receive from the spouse. It is only when the proposals and the expectation of the

spouses coincide, that the couple wins the game and receives the amount indicated in the game (plus the show up fee of 50 ETB), otherwise they get only the show up fee.

The assumption behind this game is that the amounts proposed or expected depend on the perception of the players regarding their own and their partner's bargaining power. This is because the spouses expectations of each other's behaviour in an experiment can be an important indicator of their actual positions (Kebedea et al., 2014). This will be especially so, if the partners agree with each other regarding each other's behaviour. The incentive of winning the game is supposed to control for other potential factors that influence sharing behaviours, like generosity, fairness, or togetherness and force the player to critically predict the bargaining position of the other party. Kebedea et al. (2014) indicated that spouses who have better remarriage potential transfer less to their partner in Ethiopia, implying that individuals with better bargaining power transfer less money to their spouses in the game. Hence, we assume compared to players with a weak bargaining position, the players with a better bargaining position will expect that their partners offer them more money and that those partners expect to receive less money. By doing this game with couples in milk market participant and non-participant households we aim to increase our understanding of how household milk market participation might influence the intra-household bargaining position of women versus their husbands.

The game was played in two rounds to enable the spouses to play both roles. The spouses were located in different rooms to avoid communication between them. Husbands and wives were assigned to the rooms through a lottery method. In the first round, players in room-A were proposers and players in room-B indicated their expectations. In the second round the roles were reversed and players in room-A indicated their expectation, while player in room-B played the proposer role.

After entering the room, participants were informed that they play the proposer or receiver role. Each player was given an envelope containing a smaller coded envelope, a form with possible expectation options, and 100ETB divided into five 20 birr voucher notes. First they were asked to decide how to share the 100ETB between themselves and their husbands. The amount they wanted to send to their partner (the proposal) had to be placed in the smaller envelope. The proposal could be zero or a multiple of 20 (20, 40, 60, 80 or 100). It was not possible to share the money equally, so the proposers were forced to either benefit themselves or their spouses. We believe this decision to benefit self or the spouse, in order to win the game, is determined by the relative position of oneself in relation to their spouse. After all participants made their decisions, the smaller envelopes were collected and the amounts contained in each envelope (proposal) was recorded alongside the household code.

Participants playing the receiver role were asked to indicate their expectations regarding the amount their partner would send them. They received a form with possible proposal options (0, 20, 40, 60, 80, and 100) ETB and were asked to indicate the option that best represented their expectation. They were informed that there was no option of sharing the money equally, so that they had to benefit either themselves or their partners. Subsequently, all expectation decisions were collected and recorded alongside the household code. In the second round participants switched roles. The outcomes of the two rounds were recorded in four columns of excel sheet: the wife's proposal, the husband`s expectations, the husband`s proposal and the wife's expectations. Partners whose proposals and expectations coincided won the game and got the amount(s) they indicated in the game plus the 50ETB show up fee. Participants whose proposals and the expectations of their spouse didn't coincide lost the game and got only the show up fee.

The results of the game were changed into bargaining indexes in the following way, women`s bargaining index in the game was calculated as:

$$\mathrm{WBI} = \frac{((WiExMo - WiPro) + WiEx)}{WiExmo + HuExmo} \tag{1}$$

where

- WBI – Wife`s bargaining index in the game
- WiExMo – Wife's experimental money
- WiPro – Wife's proposal
- WiEx – Wife's expectation

Men`s bargaining index in the game was calculated as

$$\mathrm{HBI} = \frac{((HuExMo - HuPro) + HuEx)}{WiExmo + HuExmo} \tag{2}$$

where

- HBI – Husband`s bargaining index in the game
- HuExMo – Husband's experimental money
- HuPro – Husband's proposal
- HuEx – Husband's expectation

Subsequently, women`s relative intra-household bargaining position (women`s bargaining position in relation to her partner) was calculated by dividing women`s bargaining index in the game by the men`s bargaining index in the game:

$$\mathrm{WRIHHBP} = \frac{\mathrm{WBP}(1)}{HBP(2)} \tag{3}$$

The basic assumption underlying the experiment is that the ratios indicated by the husbands' and wives' bargaining indexes in the game mimic their actual role in household financial decision-making. These ratios range from 0 to 1. Three situations are most relevant from a theoretical perspective. First, the case where the wives and the husbands retain all their endowments and expect that their partners would return all their endowment to them. In this case, the bargaining index would equal 1 and the husband or the wife is the household's dictator financial decision-maker. This is consistent with the assumption of the unitary household model, where resources are pooled and the altruistic head of the household makes resource allocation decisions.

Second, the case where the husband and the wife`s bargaining index equals 0.5. This option is based on equal sharing of the resources and the household is considered egalitarian. This would be in line with the collective household model, where each household member has a well-defined objective function, and interact to generate household level decisions. In this case husband and wife are supposed to make financial decisions on the basis of consensus. However, in the current study this option was not possible because we forced the players to either benefit themselves or their spouse with the aim to rule out perfect fairness.

The third situation is mostly in line with many bargaining models. Husband and wife use their bargaining power in sharing the experimental endowments and any ratio that ranges between 0 and 0.5 indicates lower individual bargaining power while a ratio between 0.5 and 1 indicates better individual bargaining power.

The ratio of the women`s bargaining index to the men`s bargaining index can be seen as a summary index for women`s relative intra-household bargaining position. The higher this ratio, the higher the bargaining power of the women compared to their husbands.

3. Methodology

3.1. Description of the Study Area

The study was conducted in the Oromia state, the largest of the nine regional states in Ethiopia. With 354 thousand sq km, Oromia covers one-third of the total area of the country. It has 36 per cent of the country's population (CSA, 2008). The climate of the region is favourable for farming and animal rearing. The region is classified into 18 zones and 190 weredas (districts). The study area, Selale, is one of the 18 zones in Oromia, known for its tradition and high potential for dairying. About 85 per cent of the population in Selale is engaged in agriculture and local livelihoods depend mainly on livestock raising and dairy production. Major crops grown include oats, teff, barley, wheat, horse beans and field peas. The climate and topography of the region favoured the introduction of improved dairy cows, which has led to a further expansion of milk market in the area.

3.2. Sampling and Data Collection Procedure

Selale was selected for this study because of its tradition of and potential for dairy production, its milk market coverage and its dairy supply to the Addis Ababa market. The Selale dairy cooperative union (SDCU) is the major formal milk buyer in the area. From the list of 22 dairy cooperatives that are active members of SDCU, we randomly selected four primary dairy cooperatives. The four *kebeles* (the smallest administrative unit) where these sample dairy cooperatives are located were taken as sample *kebele* for the study. By employing stratified sampling techniques, 300 farm households were selected from the four *kebeles*, proportionately to their population size.

We administered a structured questionnaire with both closed and open-ended questions regarding the socio-economic and demographic background of the dairy farm households. Based on the results of this survey, the households were stratified into market participant and non-participant households. We randomly selected 168 households (couples), 84 from market participant and 84 from non-participant households for participating in the resource sharing game (discussed in Section 2 above).

Post-game interviews and interviews with a key informant were employed to get qualitative insights into the effect of household milk market participation on women`s intra-household bargaining position. Our key informant was the former head of the livestock marketing agency officer in the area. The post-game interviews were held with 12 respondents who participated in the game. Six men and six women, three from market participant and three from non-participant households participated in the interview. We selected participants with higher and lower proposals and expectations on the basis of the experimental results. The information was discussed as direct quotes and fake names were used to keep the privacy of informants.

3.3. The Analytical Approach

This study examines the relationships between household market participation and women`s intra-household bargaining power by determining the average effect of milk market participation on women`s bargaining positions. Households who sell raw milk to cooperatives; private collectors, processing companies, hotels and cafeterias are considered as participants (treated). Households located in the same *kebele* as the treated households, which did not sell raw milk, were selected as non-participants (control). We used propensity scores (Heinrich, Maffioli, & Vázquez, 2010; Austin, 2011) to match these households on their baseline characteristics to ascertain as much as possible that the effect on the outcome variable was the result of difference in milk market participation (treatment).

3.3.1. Propensity score matching. Random control trials (RTCs) are the most appropriate method for estimating the effect of a treatment on an outcome. This is because random treatment allocation can ensure that treatment effects are not cofounded by measured or unmeasured baseline characteristics (Austin, 2011). Recently, there has been growing interest in using observational studies to estimate the effect of interventions on outcomes. Heinrich et al. (2010) argue that the main challenge of a credible

impact evaluation is the construction of the counterfactual outcome, that is, what would have happened to the participants in absence of the treatment. Although using a control group is the ideal way to solve this challenge, assignment of the participants into treatment and control group is often not random. Hence, treatment selection can be cofounded by observable and unobservable characteristics of the participants. Recently, there was a growing interest in using propensity score matching (PSM) as a technique to reduce this selection bias. PSM uses information from a pool of units that do not participate in the intervention, to identify what would have happened to the participating units in the absence of the intervention (Heinrich et al., 2010).

Propensity score matching has two main assumptions; *the conditional independence assumption and the common support assumption* (Heinrich et al., 2010). 'Conditional independence' means that there is a set of X covariates and that controlling for these covariates makes the potential outcomes independent of the treatment status. 'Common support' implies that for each value of X, there is a positive probability of being both treated and untreated (to be on common support). To carry out the matching procedure with these assumptions, three types of variables are required. These are: (1) a dummy variable that groups participants into treatment and control, (2) predicted probability scores, indicating the probability that a unit in the combined sample of treated and untreated units receives the treatment given their observed characteristics and (3) the outcome variable(s) with which the average treatment effect on the treated will be evaluated. Based on these assumptions and variables the average treatment effect on the treated (ATT) is given as follows (Heinrich et al., 2010)

$$\mathcal{J}\mathrm{ATT} = \mathrm{E}(\mathcal{J}|D = 1) = \mathrm{E}[Y(1)|\mathrm{D} = 1] - \mathrm{E}[\mathrm{Y}(0)|\mathrm{D} = 1]$$

$$\mathcal{J}\mathrm{ATT} = \mathrm{E}(\mathcal{J}|D = 1) = \mathrm{E}[Y(1)|\mathrm{D} = 1] - \mathrm{E}[\mathrm{Y}(0)|\mathrm{D} = 1]$$

Where

Y_0 = the outcome in control group

Y_1 = the outcome in treatment group.

3.3.2. Propensity score estimation and matching algorism. To assess the mean differences between milk market participant and non-participant households on the covariates, we ran t-tests. After that, we matched the households based on their baseline characteristics. There were households from the participant as well as the non-participant group on the common support region. The distribution of the estimated propensity scores is presented in Figure 1.

To estimate ATT, the mean difference in outcomes for market participant and non-participant households after matching, two matching algorism were used; nearest neighbour (NN) matching 'with replacement' and kernel matching. In NN matching, the treated individual is matched to a control person who is closest in terms of propensity score (Caliendo & Kopeinig, 2005). Matching with replacement' allows an untreated individual to be used more than once as a control. We followed this technique considering our restricted sample size.

Kernel matching is a non-parametric matching technique that uses weighted averages of all individuals in the control group to construct the counterfactual outcome (Caliendo & Kopeinig, 2005). Each individual in the treated household is thus matched with the entire sample of persons in the control households. This technique uses more information from the control households and can lower variance. However, it might include observations that are bad matches. We have imposed the common support condition to minimise this drawback and to improve the robustness of the results. The standard errors have been computed using 100 bootstrap replications. According to De Hoop (2012), using both nearest neighbour matching with replacement and kernel matching provides a natural robustness check to guard against the disadvantages of the two matching algorism.

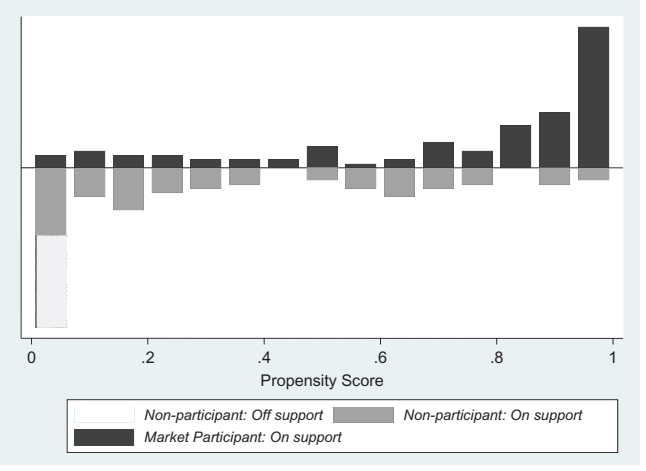

Figure 1. Distribution of the propensity scores from market participant and non-participant households.

Table 1. Covariate comparison for milk market participant and non-participant households

	Market Participant		Non-Participant		
Covariates	Mean	Std Error	Mean	Std Error	T-Stat
Husband age	47	912	45	932	1,26
Wife age	41	841	37	753	3,68***
Household distance from MCC	2,9	208	5,7	287	−7.90***
Household distance from weekly market	5,0	187	4,0	256	−3,00***
Total household size	7,8	242	6,6	186	4,05***
Total household females size	4,2	180	3,1	123	5,22***
Total household male size	3,6	114	3,5	118	−,624
Number of children under five	51	071	.45	.064	.558
Total household land Size	5,1	270	3,7	159	4,34***
Land used for crop cultivation	2,8	151	2.20	.107	3.26***
Land used for grazing	1,8	130	1,3	067	3,74***
Total household cows	5,0	172	4,0	146	3.85***
Total household lactating cows	2,94	120	2.1	.076	5.75***
Households Indigenous cows	2,4	159	3,0	166	−2.71***
Household crossbreed cows	2,4	178	94	119	6,71***
Years of experience in dairying	21,1	971	16,5	557	3,38***
Total household milk Production (per day)	12,6	875	5,0	210	8,51***
Milk processed into Butter (per day)	47	124	4,2	210	−10,7***
Milk consumed at household level (per day)	1,3	161	74	081	2,93**
Household milk income (per day)	101	7,00	48,8	9,11	4,55***
Income from processed milk (women`s income)	4,0	992	34	1,68	−15,3***
Income from raw milk sale (Men`s income)	93	7,23	0,0	0,00	12,9***

Notes: Number of obs = 167 (83 market participant and 84 non-participant). *** P < 0.01, ** P < 0.05.

4. Empirical Results

4.1. Household Characteristics

To assess the mean differences between milk market participant (treated) and non-participant (control) households on observable covariates we ran t-tests (Table 1). We found statistically significant differences between milk market participant and non-participant households on 19 variables.

Women in milk market participant households are on average older (mean 41) than women in non-participant households (mean 37). Market participant households are located closer to milk collection centers (2.9 km) and farther away from weekly markets (5 km) compared to non-participant households (5.7 km and 4 km respectively). Market participant households are significantly larger (7.8 persons) compared to non-participants households (6.6 persons). The number of female members is also significantly larger in market participant households (4.2) than in non-participant households (3.1).

Market participant households have significantly larger land size (5.1 hectare) compared to non-participant households (3.7 hectare) and use significantly more land for animal grazing and crop production (2.8 hectare) compared to non-participant households (1.3 and 2.3 hectare). Market participant households have significantly more cows (5) and crossbreed cows (2.4) compared to non-participants (4 and 0.9). Dairy experience is significantly higher among market participant households (21.1 years) compared to non-participant households (16.5 years). Total household milk production per day is also significantly higher for milk market participant households (12.6 liter) than for non-participant households (5.0 liter).

Household daily milk production is used for three different purposes. It can be sold raw, used for own consumption or processed into cottage butter and cheese. Market participant households consume significantly more milk (1.3 liter) per day compared to non-participant households (0.7 liter). The average volume of milk processed into butter per day is significantly lower among market participant households (0.47 liters) than among non-participant households (4.2 liters).

Household milk income per day is significantly higher for market participant households (101 birr) compared to non-participant households (49 birr). In milk market participant households, the husband generally receives the milk income, as it is the registered household head that signs the contract with the milk company. Milk processed into butter and cheese is sold at the local market and the women who do the processing work control the income. Given that in market participant household women process less milk themselves, the women in those households earn only 4.0 birr per day, whereas women in non-participant households earn 34 birr per day. On the other hand, men earn, on average, 93 birr per day in market participant households while they don't earn from milk on a daily basis in non-participant households.

Inline with this, our key informant interview participant mentioned the challenges of milk marketing in the area as follows:

> . . .the idea of selling raw milk was debated and challenged in the community and among household members. Traditionally, dairy income was the domain of women and men`s involvement was considered a taboo. However, households have to sign contract and receive milk income twice a month through a registered head of the households (mostly men) in the formal milk market. This has generated intense conflicts in the households. (Tesfaye, male, key informant)

According to the informant, the conflicts were not only the result of shifting milk income control from women to men, but also because sometimes men did not share the income fairly with their wives. There were even cases where men spent the whole milk income on their own personal needs. In these cases, the women`s responses were sometimes systematic and subtle, for instance by reducing the daily milk production. This could be done by leaving milk for calves or giving it to children, by hiding milk in the house, or by using unclean utensils to reduce milk quality so that the collectors will reject it. Women also chose to process extra milk into butter and cottage cheese to sell in the local market and in this way generate income for themselves.

These interplays between intra-household gender relations and milk market participation also were brought to courts and elders in the community. Hence, although milk income control shifted from women to men, there were dynamic interplays within the households that resulted in redistribution of part of the income from men to women and might lead to new resource-sharing norms in the local communities.

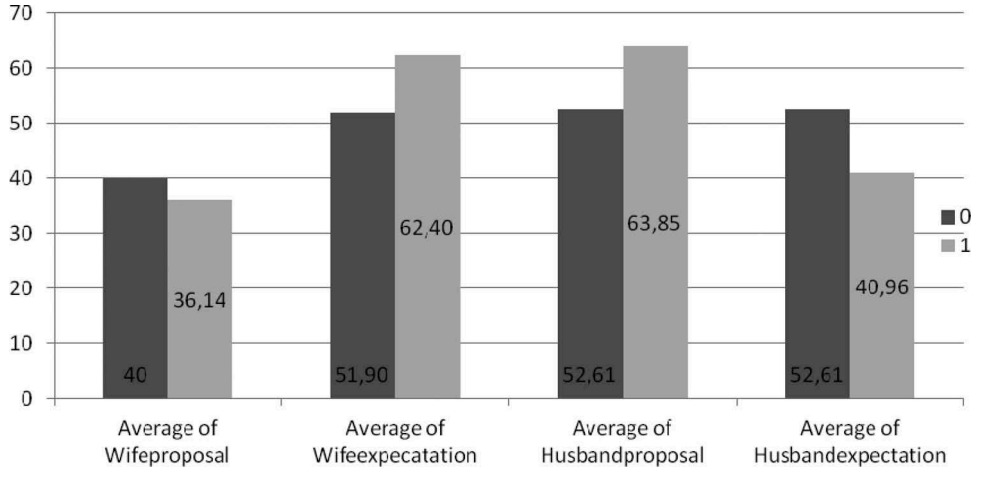

Figure 2. Husband's and Wife's Proposal and Expectation in the resource sharing games.

4.2. Resource Sharing between Husband and Wife

To study the differences in the way income is distributed between spouses in market participant and non-participant households, a resource sharing game was conducted. In this game, husbands and wives were asked to propose an amount of money to be transferred to their partner and to mention their expectation regarding the amount their partner would transfer to them. The outcomes of this game are presented in Figure 2.

There are substantial difference in the amounts proposed and expected by husbands and wives in participant and non-participant households. Women in milk market participant households made somewhat lower proposals (36 birr) compared to women in non-participant households (40 birr), however this difference is not statistically significant. Regarding the amount they expected to receive from their husbands, women in market participant households expected to receive a significantly larger share of their husband`s endowment (62 birr) compared to women in non-participant households (52 birr). In line with women`s expectation, men in market participant households made significantly larger proposals (64 birr) compared to men in non-participant households (53 birr). Men in market participant households expected to receive a significantly lower share of their wives` endowment (41 birr) compared to men in non-participant households (52.6 birr). The average amounts proposed by the men were almost completely in line with the amounts expected by the women in both participant and non-participant households. In the participant households also the average amounts proposed by the women were in line with the amounts expected by the men. So in these situations it seems that there is agreement between women and men regarding the share of income that should go to the wives. Only in non-participant households there seems to be some disagreement regarding this, as the average amounts proposed by the women were significantly lower (40 birr) than was expected by the men (52.6 birr).

Men and women`s intra-household bargaining indexes differed significantly between market participant and non-participant households (see Figure 3). The bargaining index is significantly higher (0.63) for women in market participant households compared to men in participant households (0.38) and to women in non-participant households (0.55). On the other hand, the bargaining index for men in market participant households (0.38) is significantly lower compared to women in market participant households (0.63) and to men in non-participant households (0.50).

In the post-game interview, we focused on how participants allocated their endowments and the potential reasons that underlie their sharing behaviours/rules. In line with the game results, participants unanimously agreed that men in participating households make higher proposal and expect to receive less compared to women. The major explanation given for this was that women need more money

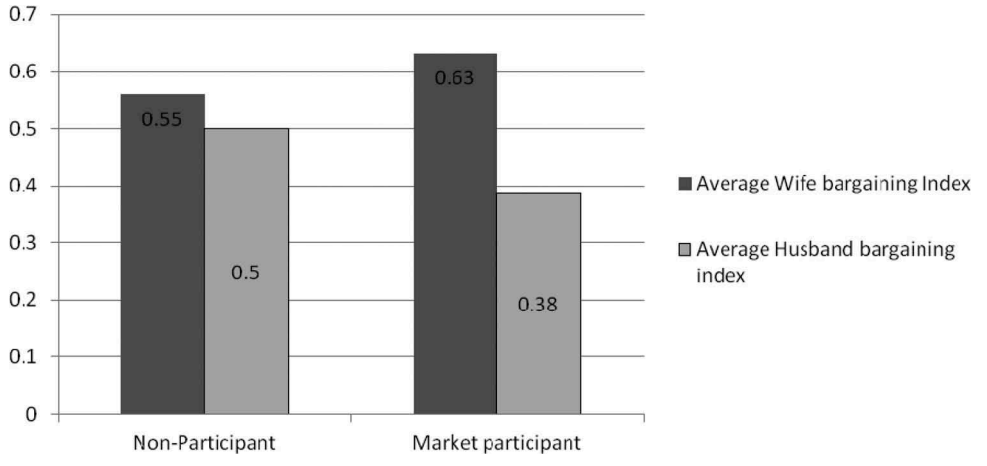

Figure 3. Husband's and Wife's Bargaining Index in the resource sharing game.

because they are charged with the household maintenance responsibilities. We also posed a question whether there is a relationship between household milk market participation and intra-household resource allocation behaviour. In this regard, men also argued that returning resources to their wives is a recognition for the women`s household maintenance responsibility and has nothing to do with the status of the household in the milk market. They mentioned that women are the centre of the household, especially for those who depend on cash income; women manage the household income with care. According to one interviewee:

> ….When the households produced crops and ate from their store, men used to spend the money on alcohol. But now crop production is declining in the area due to declining farm size and soil fertility. Thus income management is a critical matter for household maintenance and women do this better than men. (Chamada, male, from market participant household)

On the other hand, women argued that the intra-household dynamics related to milk market integration have influenced men`s decision to return income to their wives.

> ….men`s decision to return resources to their wife, at least in part can be a strategy to shift the household maintenance responsibility completely to women and to reduce potential conflicts

Table 2. Average effect of market participation on spouse's proposals and expectations

	NN Matching			Kernel Matching		
Outcome variable	Mean Difference	S.E.	T-stat	Mean Difference	S.E.	T-stat
Women Proposal	−18,8	6,4	−2,9***	−18,4	7,5	−2,4**
Women Expectation	18	7,8	2,3**	17,4	7,3	2,4**
Men proposal	21,7	6,8	3,2***	19,3	5,5	3,5***
Men Expectation	−16,8	9,2	−1.8	−16,2	7,8	−2.05**
Women bargaining Index	0,18	0,06	2,8***	0,18	0,06	2,9***
Men Bargaining Index	−0,19	0,07	−2,6***	0,18	0,07	−2,6***
Women`s relative Bargaining power	0,93	0,21	4,5***	0,89	0,26	3,5***

Notes: Total Number of Obs = 167, Number of common support = 145, *** P < 0.01, ** P < 0.05, *P < 0.1.

related to resource sharing in the household. (Hawine, female, from market participant households)

4.3. The Effect of Milk Market Participation

The results of the propensity score matching are presented in Table 2. Women in market participant households proposed significantly less (18%) and expected to receive significantly more (17–18%) of their husband`s endowments compared to women in non-participant households. Men in market-participant households proposed significantly more (19–22%) and expected to receive significantly less (16–17%) of their wife`s endowment compared to men in non-participant households. Hence men`s proposals and expectations were rather consistent with women`s expectations and proposals.

Based on these figures, we have calculated the relative bargaining indices for husbands and wives. This index is also significantly higher (18%) for women in market participant households compared to women in non-participant households. On the other hand, men in market participant households showed a significantly lower bargaining index (17–19%) compared to men in non-participant households. Women`s relative intra-household bargaining power (compared to their husband's) based on these figures also differed significantly between market participant and non-participant households. The ratio of the women`s bargaining index to their husbands bargaining index show that women in market participant have a 89–93 per cent better bargaining position compared to women in non-participant households. This figure can suggest a positive relationship between household milk market participation and women`s relative intra-household bargaining position.

Information gained through the post-game interview indicates that the difference in resource sharing behaviour between market participant and non-participant households can be related to the shift of milk income control from women to men. In non-participant households, women still generate income from the sale of dairy products, whereas in participant households dairy income is received through the head of the household. Since the husbands know that their wives have no earning, they return the milk income in part to their wife for household maintenance. The pressure from women to get a fair share of milk income might also be high in these households. Given that the women still to a large extent control the milk production in the household, they may have a relatively strong position in the bargaining process about this income.

Participants also mentioned from time to time that divorce is expanding in the area and that a major reason underlying many divorce cases is resource-sharing issues. Reducing intra-household conflict and divorce risk might therefore have been a major reason for sharing the milk income with their wives. Another reason might be more tactical. By transferring income to their wives the husbands to a certain extent freed themselves from providing for the family. This might mean that in milk market participating households women`s burden has increased, because more household provision responsibilities have come on their shoulders. In sum, market participation involves various intra-household dynamics that put men and women into dialogue, conflict and bargaining, which could potentially influence women`s bargaining position.

5. Discussion and Conclusion

In this paper, we studied the relationship between the milk market participation of smallholder households and women`s intra-household bargaining power in Ethiopia. The main objective of integrating Ethiopian farmers into the market was to increase household income. Our data show that household income is indeed substantially higher in milk market participating households (101 versus 49 birr daily). This higher income of participating households is almost completely earned by selling raw milk to the market. The other way of receiving milk income – processing raw milk into butter and cottage cheese for sale at the local market – is much less important in market participant households than in non-participant households.

This difference has important consequences for the distribution of income within the household. Milk income from the formal market is received and controlled by men (who sign the contract with the milk company), whereas income from the local market is received and controlled by women. The consequences for the intra-household distribution of income are clearly reflected in our data. In milk market participant households, men`s milk income is on average 93 birr per day, whereas in non-participant households men do not earn income from milk on a daily basis. Women tend to earn and control the entire dairy income in non-participant households (34 birr per day), but earn no more than 4 birr milk income per day in market participant households.

The central goal of the current study was to find out what the consequences of this change are for the bargaining position of women in Ethiopian smallholder households. This is an important issue, as previous research (Adato et al., 2000; Mahmud et al., 2012) suggests that women`s share in household income determines their participation in household decision-making and their intra-household bargaining power. Moreover, Agarwal (1997), Quisumbing and Maluccio (2000) and Njuki et al. (2011) indicated that income in the hands of women enhances the welfare of household members more than income in the hands of men. Hence, the income shift from women to men in market participant households can negatively affect the women`s intra-housheold bargaining power, as well as the other household member`s welfare.

To study the difference in women's bargaining power between spouses from milk market participant and non-participant households, a resource sharing game was conducted. In this game, husbands and wives were asked to propose an amount of money to be transferred to their partner and to indicate their expectation regarding the amount their partner would transfer to them. They could only win the game if the amounts they proposed to give to their partner coincided with the amounts their partners expected to receive from them. It therefore is a coordination game that provides information on the division of income between husbands and wives as well as insight into the agreement between husbands and wives regarding this division.

This game revealed substantial differences in the amounts proposed and expected between milk market participant and non-participant households. Women`s expectations and the amounts actually proposed by their husbands were significantly higher in market participant compared to non-participant households Hence, whereas the income earned by selling milk to the market is controlled by the husband, the wives in the milk market participating households were expecting and receiving a larger share of the experimental money than the wives in non-participating households. The share of the money expected by the wives and proposed by the husbands in participant households was over 60 per cent of the total amount that could be distributed. This indicates a stronger bargaining position of the wives in these households than in the non-participant households, where this share was significantly less (about 50%).

We also computed bargaining indices on the basis of the outcomes of the game and compared them between participant and non-participant households using propensity score matching. The results indicate that for women in participant households the average index is 0.18 higher than for women in non-participant households, whereas for men it is 0.18 to 0.19 lower in participant compared to non-participant households. Hence, while we expected women in market participating households to have a weaker bargaining position – as the control of milk income has shifted from women to men – the outcomes of our experimental game point in the other direction. These women in fact expect and receive significantly more money from their husband than women in non-participating households. How is this possible?

There are (at least) two possible explanations for this. First, the loss of their personal milk income, and hence their financial independence, may have brought the women out of the traditional framework of separate female and male domains and into a situation where they have to bargain with their husband to get a fair share of the milk income. Although they do not receive the milk income themselves any more, these women are not without power. They still to a large extent control the milk production, which is the basis of the increased household income. As the interview with the livestock marketing agency officer indicates, they have subtle ways to influence the amount and quality of the milk that is produced and in this way may be able to 'convince' their partner that it is

wise to share the milk income. The intra-household conflicts related to milk income sharing might have also influenced the bargaining power of the women in market participant households. As Agarwal (1997) mentioned, the present bargaining power of an individual woman with regard to any particular issue is related to her own successful bargaining and that of other women on the same issues in the past.

Second, producing for the milk market involves important changes in the organisation of the household, which might also involve other changes in responsibilities and dependencies than those directly related to milk production. Most smallholder households in the study area used to consume most of what they produced. However, with the introduction of the milk market, they start to produce a commodity of which they consume only a small amount; that is they produce with a marketing target and start to rely on cash to buy food. This new livelihood system requires new skills, like longer-term planning and income management, as our informant called it, a skill that becomes the responsibility of the women. Men may agree with women`s control over household cash income, because they believe that women manage the cash income better and use it more wisely and mainly for household maintenance purposes. But they may also agree in order to reduce intra-household conflict related to expenditure.

Our findings contradict with Kebedea et al.'s (2014) study of Ethiopian couples that found actual and expected contribution rates of spouses to be systematically different, whereby husbands` expected their wives to contribute more than they actually contributed and wives expected their husbands to contribute less than they actually contributed. This difference might be due to the fact that Kebeda et al.'s study was not a coordination game. In our experiment, husbands and wives were forced to think about the relative position of their partner, as they could only gain money by mentioning the same amounts as those partners. In Kebeda et al.'s game there was no such restriction on the amounts chosen, which means that their outcomes are probably much more influenced by situational factors, like social expectations.

The indications found in our experimental study that women in market participant households might have a better intra-household bargaining position, suggest that the changing base of the livelihood system in the study area has unintended by-effects. The requirements of the new system may have increased the area for consultation and negotiation between husbands and wives as well as their interdependency. Findings also indicate that although the husband receives milk income, the wives' access to and control over this income in fact has increased. The husband may in name receive this income but this does not prevent his wife from having a strong say in the decisions about its expenditure. In general, the result of our study indicate that men are more willing to share income with their wives in milk market participant compared to non-participant households. Given that there is broad agreement in the bargaining literature (for example Adato et al., 2000; Himmelweit et al., 2013; Mahmud et al., 2012; Naved, 2000; Orsini & Spadaro, 2005; Seth, 1997) that women's bargaining and decision making power is related to their share in household income, we feel confident to conclude that women in market participant households have better bargaining power compared to women in non-participant households.

An important limitation of this study is that there is no full control of all confounding factors that could influence bargaining power of individual players. Although propensity score matching helps to use the available information as well as possible, it does not control for unmeasured factors that might offer alternative explanations for the relationships that were found. This implies that although important new information on the differences between milk market participation and non-participation households and on the willingness of spouses to transfer money to their partners is presented, no strict conclusions in terms of causal relations can be drawn.

Another potential problem is that in our experiment intra-household bargaining power of husbands and wives is measured rather indirectly. Our conclusions are based on the assumption that the amounts proposed and expected in the experiment reflect the way income is distributed within the household. If this assumption does not hold, our conclusions might be wrong. However, we feel rather confident that it is correct. In the experiment the participants can gain (for them) a substantial amount of money if they come up with proposals/expectations that coincide with their partner's proposals/expectations.

However, after they have entered the experimental situation and obtained information about the game, they have no possibilities to communicate with their husband. This means that they have little other information to base their choice on than the way they usually distribute money within the household. If a husband does not share money in daily life, his wife will not expect him to be particularly generous in the experiment. Of course, we cannot completely exclude the possibility that the husbands are more generous in the experimental situation than in daily life, and that their wives are able to correctly guess this. However, even in that unlikely case the question remains why the husbands in the market participant households would be more generous in the game than those in the non-participant households.

Our confidence is further strengthened by the information obtained in the post-game interviews and by the fact that the average amounts the wives expected to receive were very similar to the proposals done by the husbands. The only discrepancy between expectations and proposals was for the males in the non-participating households, who received on average less money from their wives than they expected. However, even in these households, the average amounts expected by the wives were almost exactly the same as the average amounts proposed by their husbands.

A final critical issue regarding our findings is whether the husbands in market participant households willingness to share more money with their wives would be the result of the fact that these husbands control more cash. We don't think this to be the case. First, the amount to be won is quiet substantial in comparison to the husbands' usual income, so we expect them to be motivated to play the experiment well. Second, winning the game is not based on how much money they want to give to their wives, but on whether they can predict how much their wives expect them to propose. Simply being generous and sending much money does not help to win, if they normally keep most money for themselves. As discussed above, the only clue the partners have about what to propose and expect is the way they share income in their daily situation. It therefore seems likely that the amounts proposed/expected in the experiment paint a reasonable picture of that daily situation.

For policy makers it is important to realise that while on the one hand gender insensitive development planning can end up in upsetting the existing gender relations, this on the other hand does not always need to worsen the existing gender relations, as is often argued. Such plans may sometimes break the silence and open up new re-negotiation opportunities that improve women's bargaining position and bring the gender relations on the right track. In this regard, we recommend reassessing the existing gender analytical tools to capture important social processes that can potentially affect the existing relationships. Gender relations are social relations; they change over time and take time to be realised. Our qualitative findings indicate that the shift of milk income from women to men in the Selale area and the related intra-household conflicts may have led to a transformation of the within household gender relations and may, according to our key informant, even to a certain extent have influenced the legal practices in favour of women. Hence, understanding the processes involved and the perceptions of people of their own situation and of their relations with important others may provide a better guideline for developing scenarios than the information on what they earn and who receives the income.

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No potential conflict of interest was reported by the authors.

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