Gender, Smallholder Market Participation and Parental Investment on Child Education in Ethiopia

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Abstract

We examine the links between smallholder milk market participation, socio-demographic characteristics of the parent, spousal information and communication, about income received in an experimental setting and parental investment on child education in Ethiopia. In the bivariate analysis, we found that parental willingness to invest on child education significantly differ between mothers and fathers, between parents from milk market participant and non-participant households and between experimental groups with and without information about other parent`s income and experimental outcomes. In the multivariate analysis, we found gender and age of the parent, village of origin of the parents, number of school age children in the household, household status in milk market and information about other parent's income and experimental outcomes are significantly related to parental investment on child education.

Key Words: Ethiopia, parental investment, gender, market, spouse information and communication, experiment

1. Introduction

Fathers are biological necessities, but social accidents ~ Margaret Mead

The dynamic give-and-take relationships between parents and offspring have been explained in parental investment theory (see Trivers, 1972,Webster, 2009). According to this theory, parents are forced to make a difficult choice between investing in themselves and investing in their offspring. Although both parents have a shared interest in the survival of their offspring, males in most species invest substantially less in their offspring compared to females (Bjorklund & Shackelford, 1999, Webster, 2009, Shenk, 2011). This theory has important implications for the study of human parenting, the processes that supports the physically, social, emotional and intellectual development of children (Triver, 1972). Parenting plays a critical role in human capital development, because outcomes that affect this development depend on the decisions made by parents who may not always agree with each other (Ashraf, 2009). Given the potential differences in parent's preferences and the scarcity of resources, understanding the patterns of parental investment remains pertinent for understanding the status of child welfare in low income countries.

Women`s empowerment and earnings have been justified among others for the positive spillover effect on child welfare. There are indications that income in the hands of women is more likely invested in children`s educational, nutritional and health welfare compared to income in the hands of men (see Agarwal, 1997; Ashraf, 2009; Fischer-Mackey & Sahan, 2011; Goyal, 2007; Kabeer, 1999; Naved, 2000; Njuki, Kaaria, Chamunorwa, & Chiuri, 2011; Quisumbing & Maluccio, 1999; Seebens, 2010; Tangka, Emerson, & Jabbar, 2002).

There are two main explanations for this asymmetric parental investment on children. The first asserts that women invest more on child welfare because they are more altruistic compared to men. In line with this Ong, Ho & Ho (2012) document the existence of mutual altruism between mothers and children but not between fathers and children. Vyrastekova et, al. (2014) argue that paternity uncertainty makes the expected return of childcare smaller for fathers compared to mothers. Hence, mothers invest more in children, because they are more certain

about their parenthood compared to fathers. The second group argues that women contribute more to child welfare because they have been given a responsibility to do so by the existing social norms. According to Haddad (1999) women`s care and provision for children is the result of their closer emotional ties due to birth, raising and caring for children or their treatment of healthy and educated children as an insurance against old age poverty. Ashraf (2009) noted that husbands and wives respond strategically to changes in information and observability and that difference in responses are more driven by the underlying household control structure than by gender identities. Guyer (1988) argued that it does matter who gains control of output in the household, because women and men have different spending preferences, not necessarily because they hold different values but because they are in structurally different situations.

Other studies questioned the empirical content, reliability and the generality of the above conclusion. Women's control over income and decision-making at household level can negatively affects child nutrition, education and health (Dito, 2011; Rathnayake & Weerahewa, 2011). Dito (2011) noted for Ethiopia that an unbalanced power relation in the household adversely affects child welfare, regardless of the gender identity of who is powerful in the household. Aromolaran (2004) found a negative effect of women`s income share on calorie intake in Nigeria and rejected the hypothesis that increase in women`s share of income increase calorie intake in the household. These conflicting results could imply that various individual, child and contextual factors might influence parental investment. There are for instance indications that the age and education level of the parents can affect parental investment on children (Davis-Kean, 2005; Hagen, 1999). Child factors such as sex of the child, number of children in the household and birth order can also potentially influence parental investment. In environments where fathers are absent, or there is marital discord, the resulting stress may produce harsh and inconsistent child care and insecure attachment (Bjorklund & Shackelford, 1999). Contextual variables like household income, maternal employment and the quality of parental employment may be important too. Policy makers in developing countries are therefore working towards increasing household income as a prerequisite for improving development outcomes at household level.

In the same way, Ethiopia has planned to achieve economic transformation. The growth and transformation plan of the country (MoFED, 2010) state the need to transform the agrarian structure from subsistence to market oriented production system. This is believed to increase household income and in the long run improve families' investment in human capital such education, health, and nutrition. In the context of dairy, this transformation has indeed increase household milk income and also shifted control over milk income from women to men (B. Lenjiso, Smits, & Ruben, 2014). If men`s and women`s response to investment decisions are driven by the underlying household control structure, this shifting income control from women to men in milk market participant households may affect parent`s investment decision on children`s education welfare. However, there is no study so far that explores the patterns of parental investment on child welfare and its determinants in Ethiopian context. We believe understanding this is a relevant policy issue in Ethiopia, where scarcity of resources hamper child development. Recently, there are efforts to target children with interventions and understanding parental investment decisions and what factors affect this decisions will help policy makers to choose useful channels to inject resources into the household in order to address child welfare challenges effectively.

In this chapter, we study the pattern of parental investment on child education and factors that affect this investment decisions by using incentivized parental choice experiments in rural Ethiopia. To test if parental investment in child education differs by the gender of the parent, observability over income received by other parent, household status in milk market and other individual and household characteristics, we designed an experiment where mother and father from both market participant and non-participant households decide how to allocate resources between their own personal need and their children`s educational expenses.

The remainder of the chapter is structured as follows: Section 2 discusses the major determinants of parental investment on children and provides description of the experimental design. Section 3 is devoted to data collection, sampling and analytical procedures. Section 4 present empirical results and in section 5 we conclude the study.

2. Determinants of Parental Investment

Parental investment includes any investment by the parent in an individual offspring that increases the offspring's chances of survival, at the cost of the parent's ability to invest in other offspring (Travier, 1972). Since investing on themselves is as noble as investing on their children, parents make a difficult choice between caring for a child and acquiring the resources needed to insure their own productive and reproductive successes (Turner & McAndrew, 2006). This choice can be influenced by the social, cultural and economic factors at household level, and by socio-demographic factors at individual level. These factors may vary from culture to culture and overtime. However, the following variables are the most frequently cited determinants of parental investment on children.

i) Gender; the gender of the parent has been the most widely reported determinant of parent`s willingness to invest on children. This is mentioned across disciplines, from biology through social anthropology, with similar conclusions but different explanations. There is consensus that the gender identity of the parent through which income is received determines how the resources are invested on child welfare. Studies (Agarwal, 1997; Kabeer, 2000) indicated that income injected into the household through the mother do more justice to the welfare of children compared to resources injected through the father. Similarly, an exogenous increase in mothers income has a larger effect on children`s outcomes than the same amount of increase in fathers income (Njuki, Kaaria, Chamunorwa, & Chiuri, 2011; Ong et al., 2012). In this study we will test the hypothesis that mothers invest more in children compared to fathers in the Ethiopian context.

ii) Age of the parent: the age of the parent is another important determinant of parental investment. Hagen (1999) in his defection hypothesis argues mother's age is a critical determining factor of her investment on her children. Specifically, younger mothers who have plenty of future reproductive opportunities can afford to be choosier when it comes to deciding which child will be worth investing in compared to older ones who have fewer alternatives. The author also argued that the age of the mother is one of the best predictors of child abuse and infanticide and the risk is even greater when these young mothers are unmarried, poor and lacking social support.

iii) Education of the parents: According to Davis-Kean (2005) parents` years of schooling is an important socioeconomic factor that needs to be taken in to consideration in both policy and research on school age children. On one hand, parent`s increasing education can positively influence child welfare by increasing their awareness. On the other hand, as indicated by parent child care time investments studies, education increase parent's involvement in labor market increase and that negatively affect childcare time.

iv) Child *factors*: The number, sex and birth order of the child are also among factors that could affect parental investment on children. First and last born children have better access to their parent and their resources compared to children born somewhere in the middle. In Ethiopian context first-born child, especially first-born male child receive better treatment from his parents because he is expected to inherit the families homestead and generation (principle of primogeniture). Children raised up with grandparents also receive better investment compared to those raised-up with their families, especially young families.

v) Contextual factors: In developing countries the welfare satisfaction of children is directly influenced by the income and welfare satisfaction of their parents. When income increases at the household level, intuitively that improves the welfare of household members, especially children. Lenjiso, Smits and Ruben (2014) found that household milk market participation has increased household income in rural Ethiopia. Household income and maternal employment status are the two contextual factors that have frequently been associated with parental involvement (Corwyn & Bradley, 1999). Hence, we hypothesize that parents from milk market participant households invest more on child education compared to parents from non-participant households.

On the other hand, some argue that the relationship between parents and children is much more complex and does not only depend on parents demographic, social and economic variables. Evolutionary psychologists argue that parental investment decisions are largely unconscious and that the proximate forces guiding responses are emotional states such as feeling of love (see Turner & McAndrew, 2006). Familial altruism engages the member of the family into voluntary and unconditional transfer of the resources within the family. Therefore, parental investment

decisions may not involve logical calculations such as information about other parent's capacity to invest and how much they invest.

To study the links between household milk market participation, gender of parents who receive income and parental willingness to invest on child education, we adapted parent choice experiment from Ashraf (2009). In this experiment, we had three groups of players, where we varied the information about other parent`s income, experimental choices and outcomes, to study whether parental investment is the result of inherent altruism and unconditional emotional attachment with the children or that it can be influenced by the situation of other parent`s income, communication between parents and other socioeconomic factors. Figure 1: provides the conceptual link between contextual and parental factors, treatment in the experimental settings and parental investment.

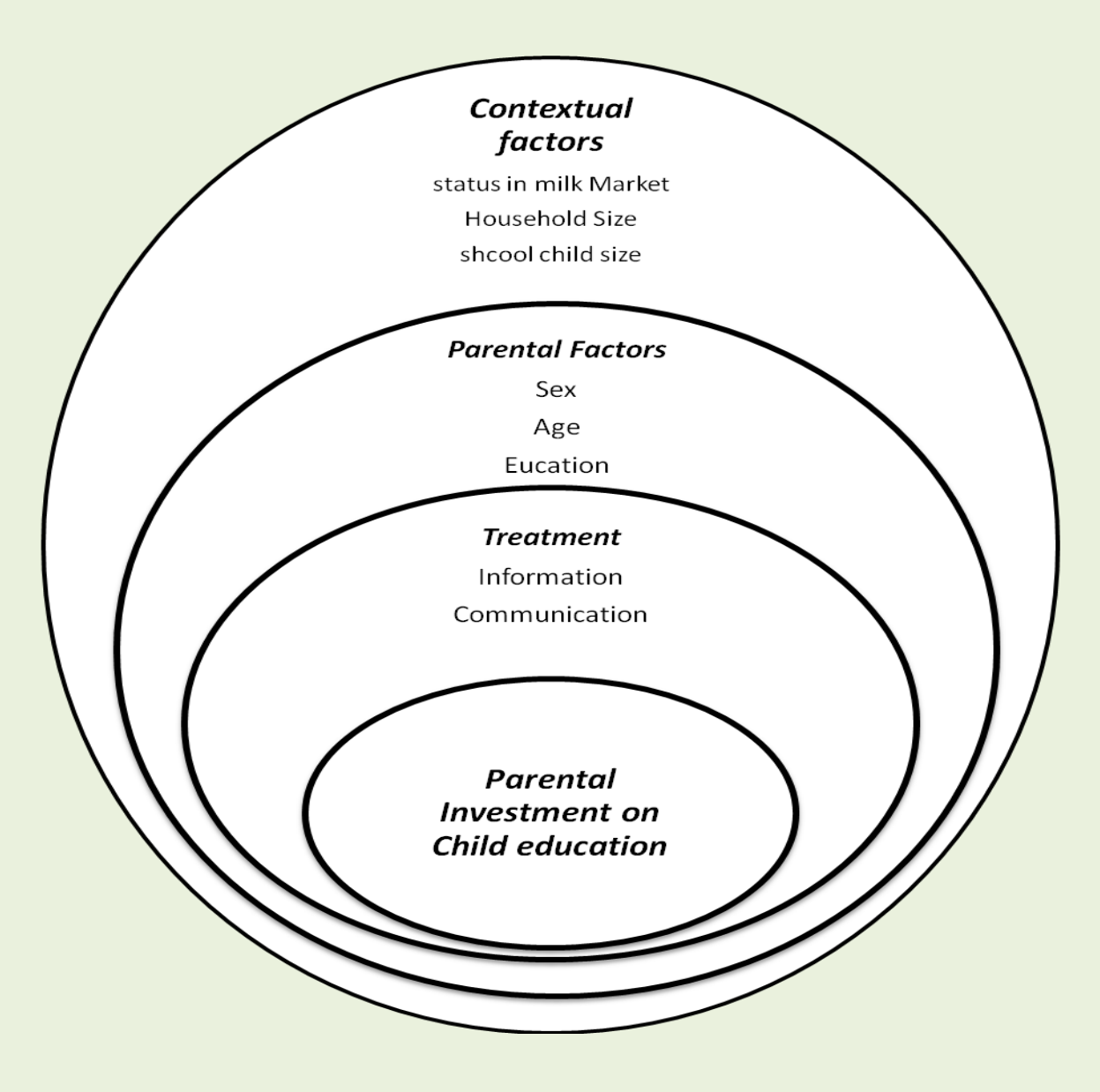

Figure 5. 1. Determinants of parental investment: conceptual framework

3. The Experimental Design and processes

Whether investment in children is the result of parent's altruistic behavior or a form of instilling guilty in the children to pay back as old age insurance, investing in children`s human capital formation, can presumably reap returns in the form of increased earnings later in life. To study parental investment on child education in rural Ethiopia, we invited parents (mothers and fathers)

who already participated in a household survey to make a decision on how to share their show-up fee (50ETB approximately equal the daily wage of farmers and a one term educational expense of one child) between using for own personal needs and investing it on their children`s education expenses. We varied the levels of information about others spouse`s income, choices and payoffs and the communication between them to see how these affects parental investment decision on child education based on Ashraf (2009). At the end of the experiment, we tripled the amount of money invested on child education and parents received a voucher to get educational materials of their choice from our pre-arranged shops.

Upon arrival, participants were randomly assigned, along with their spouses, to one of the three settings that had different limitations placed on the privacy of information and communication. The experimental groups were named as; private, public and negotiation group based on the level of information spouses get and communication they have with each other. We conducted the experiment in four different rooms.

In the first (***Private)*** group participants were separated from their spouses and play the game in different rooms. After they registered and received their show up fee (50ETB) for participating in this game, participants were given a detailed instruction about the experiment. Then they were asked either to keep the money for their own personal use or to invest it on child educational materials. The money invested on child educational material was tripled and the voucher was provided to get the materials at the end of the game. The participants were told explicitly that their spouses do not know whether they received any income or what choices they made (that their choices will be kept private) and they will get the vouchers based on their choices before reuniting with their spouses. According to Ashraf (2009) this mimic a situation in which spouses might receive temporary shocks to income and choose about what to do with that income that their spouse may not find out about, We believed, if parental investment on children is influenced by unconditional altruism and emotional attachments parents invest this income on their children and there will not be significantly differ in parental investment decision among experimental groups with varying information and communication between spouses. And if certain parents are more altruistic than the other their investment decisions will be less affected by the limitations on information and communication with other parent. Therefore, decisions

made in this group can help us to understand whether parents consider information about other parent's income and decisions as important predictor of their investment decision or not.

In the second (***Public)*** group the mother and father played in the same room. After they registered and received their show up fee (50ETB) they took a seat in different rows and learn about their own and each other's payoffs and choice sets and detailed experimental instructions. Then they were asked to make decisions on how to allocate the money between their own needs and their child educational material expenses simultaneously. But they do not communicate or see the decision of one another. The money invested on child education was tripled and they received voucher to get educational materials at the end of the experimental sessions. We believed moving from private to public group can tells us what effect obscuring information about spouse's income and choices can have on parental investment on child educational welfare. This condition according to Ashraf (2009) mimic the real world situation where spouses receive extra income and can put it aside or spend it but with the foreknowledge that their spouse will find out what they did with it. In our context, we assume if investment on child education is a responsibility of one parent, the other parent is less likely responds to information about others income and outcomes.

In the third (***Negotiation)*** group participants follow the same decision as public but this time they can communicate before making a decision. Their decision is observable to each other. They discuss what decisions are best to follow and then finally they decided individually. This is analogous to a cooperative household model where couples have full information about everything and decide together what is the best for their household. In this group we aimed to understand how bargaining between parents affect allocation for child educational outcomes and whether it differ between market participant and non-participant households.

5.3.1. The Experimental Settings and Conditions

The experiments were conducted in local farmers training centers (FTC) in four different *kebeles*. The participants were invited through letters produced from Ambo University. The local development agents approached the participants in person and the participants signed a form to arrive on the stated time and to participate in the experiment. Up on arriving in the training centers participants were randomly assigned to one of the three groups through the lottery method. Only the wife drew the lottery and then both husband and wife play in the same group. Figure 2. Provides a schematic diagram of the experimental design.

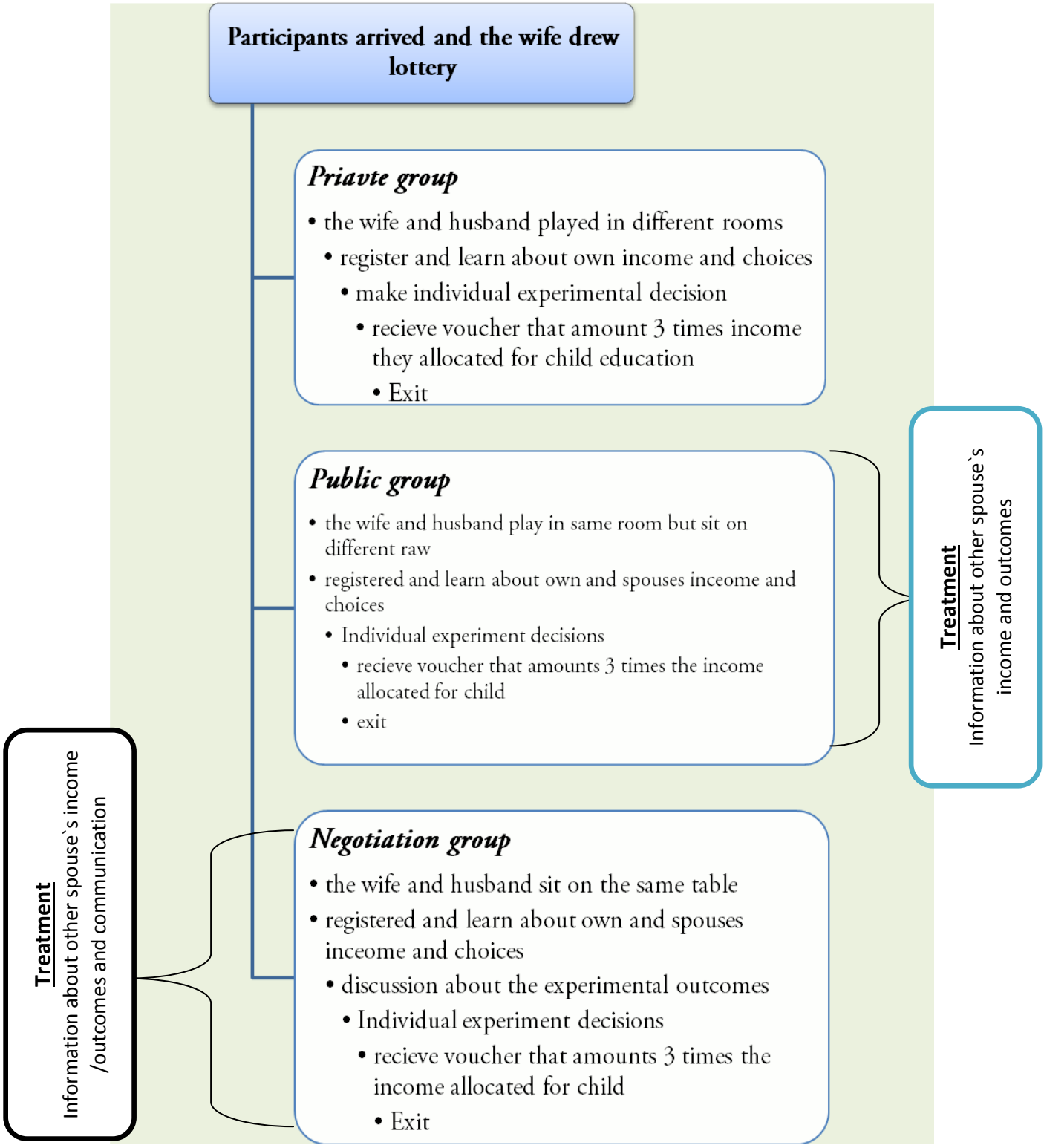

Figure 2:Schematic diagram of the experimental design

3. Methodology

3.1. Study area, sampling and data collection

This study was conducted in Selale area located in Oromia national regional state of Ethiopia. Selale is known for its tradition and high potential for dairying. It was purposely selected for this study based on its actual and potential dairy production, its dairy supply to the Addis Ababa market, and its milk market coverage. Selale dairy cooperative union (SDCU) is the major formal milk buyer in Selale and the entry point for this study. A samples of four primary dairy cooperatives have been randomly selected from the list of 22 dairy cooperatives who are active members of SDCU. The four *kebeles* (the smallest administrative unit) where the sample dairy cooperatives are located have been 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 and a questionnaire was distributed to sample households to collect information on socio-economic and demographic backgrounds of the dairy farm households. After further stratifying the households into milk market participant and non-participant based on the survey results, 167 households (couples) were selected to participate in the experiment (*see section 2 above*).

Immediately after the experiment, we have identified 12 participants for a qualitative study. The sample consists of 6 mother and 6 fathers, 2 each from experimental groups. Half of the participants are from milk market participant households while the remaining half are from non-participant households. We have briefly checked the experimental results and included individuals with higher and lower investment to get insights about what behaviors underlie their decisions in the experiment and what do they think about other people's investment pattern.

3.2. *Data Analysis*

We used descriptive statistics to report background of participants (at household and individual level) and to see the pattern of parental investment in different groups. We ran t-test to compare parental investment by gender of the parent and among different experimental groups. We employed propensity score matching techniques to measure the effect of household milk market participation on parental investment decision. Finally, we used multivariate analysis to

assess the relationship between selected independent variables and parental investment on child education. The dependent variable was parental investment on child education. Independent variables were gender of the parent (male=1, female=0), age of the parent, parents village of origin (1=same as village of study, 0=from different village), total household size, number of school age children, parent education (1=literate, 0=illiterate), parents milk income per day, household status in milk market (1=participant, 0= non-participant), information about spouses income and experimental outcomes (1=have information, 0=have no information), communication between spouses before decision in the experiment (1=with communication, 0=without communication) and the interaction between some variables.

Qualitative information is discussed separately in the result section. In the discussion section we combine the quantitative findings with the in-depth interviews to explain behaviors that underlie the experimental decisions. We used only information that relates to the quantitative finding and that help us to explain the result in more detail.

5. Empirical Findings

5.1. Socio-Economic Background

We observed the demographic variables for fathers and mothers and other contextual factors that can potentially affect parental investment on child education. Accordingly, the average age of the parent is 42, mean household size is 7.2, mean household school age child is 2.5 and parent's milk income per day is 23 birr. About 88% of the participants in the study can read and write while 12% are illiterate. In terms of the gender, males and females make 50;50%. About 50% of the participants are from milk market participant households and the remaining 50% are from non-participant households. About 33% of the participants participated in private group (with no information about other spouse income and communication), 35% participated in public group (where they can get information about their spouse`s endowment but cannot communicate) and the remaining 32% played in negotiation group (where they get full information about spouses income and communicate before making decisions).

Table 1: Descriptive statistics

Variables	
Age, Mean (SD)	42.3 (8.7)
Household size, Mean (SD)	7.2 (2.1)
Household school age children Mean (SD)	2.5 (0.94)
Parents milk income per day, Mean (SD)	23 (52.7)
Educational status	
• Literate	88%
• Illiterate	12%
Sex	
• Female	50%
• Male	50%
Status in Milk market	
• Milk market participant	49.7%
• Non-participant	50.3%
Participant in experimental group	
• Private	33%
• Public	35%
• Negotiation	32%
Parental investment on child education, Mean (SD)	24.7 (10.5)

The mean for parental investment on child educational material is 24.7birr which is about 50% of the total single parents endowment or quarter of the household endowment in the experiment.

5.2. Patterns of Parental Investment

As we move from private to public group (increased information about other parents income), parental investment on child education increased, especially for parents from non-milk market participant households and for both mother and father. However, it declined with communication between spouses again more for parents from non-participant households. In market participant household it continue to increase for fathers while it slightly decline for mothers. On average, the increase in parental investment as we move from one group to the other is almost the same for father and mother.

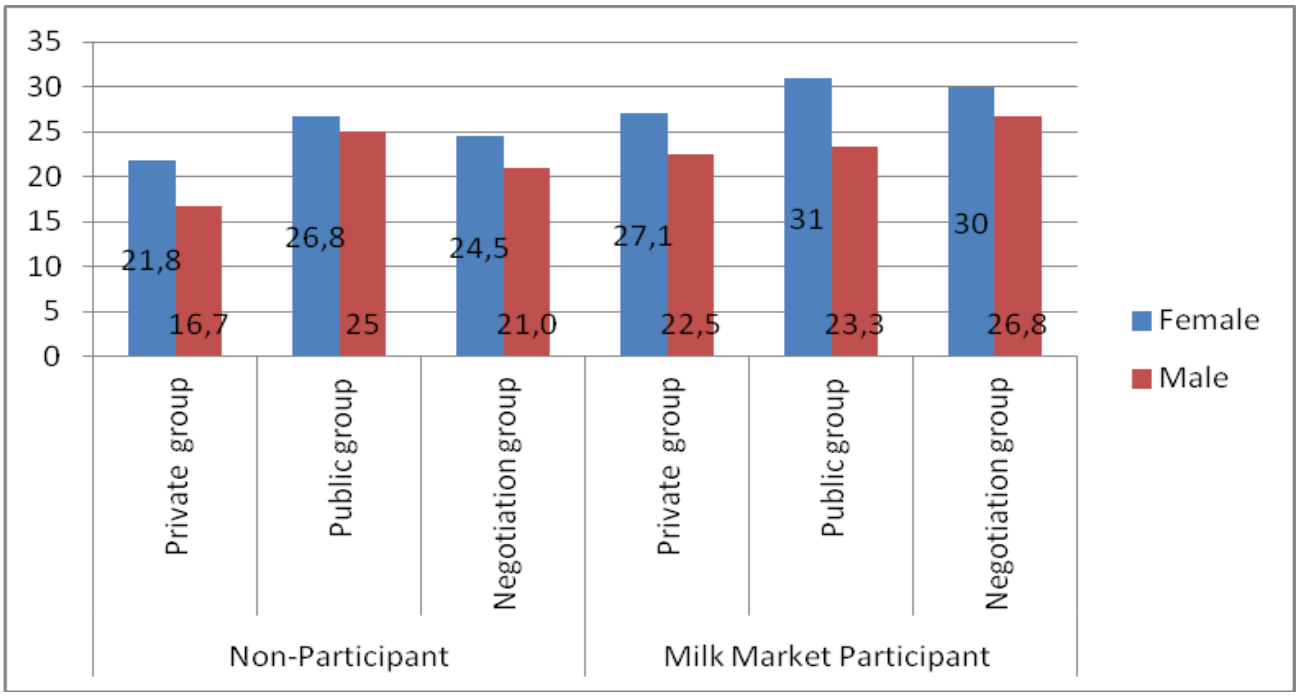

Figure 3: patterns of parental investment decisions

5.3 Comparison of Parental Investment

Table 2: Parental investments mean comparison by gender

Covariates	Mothers		Fathers		T-Test
	Mean	Std Error	Mean	Std Error	t-Value
Parental Investment	26.88	,787	22.5	,804	-3.88***

Number of observation 334 (166 milk market participant and 168 non-participant households)
*** P<0.01, ** P<0.05, *P<0.1

We run bivariate analysis to see if there is difference in parental investment between fathers and mothers. We found that mothers invested significantly higher on child education (27birr) compared to fathers (22.5birr).

Table 3: Parental investments mean comparison between private and public experimental group

Covariates	Private Group		Public group		T-Test
	Mean	Std Error	Mean	Std Error	t-Value
Parental Investment	22,09	1,08	26,6	,85	-3,26***

Number of observation 226 (110 in private and 116 in public group) *** P<0.01, ** P<0.05, *P<0.1

We also ran the bivariate analysis to study whether there is significant difference in parental investment in different experimental settings. We observed significant difference in parental investment by varying information about other parent's endowment, choices and outcomes. In private experimental group where the parental endowment, experimental choices and outcome sets are private (secrete) parental investment is significantly lower than the other groups where information is revealed to spouse and communications is permitted. The mean for parental allocation is 22.09 birr in private group and significantly lowers than 26,6birr in public group.

Table 4: Parental investments mean comparison between private and negotiation experimental group

Covariates	Private group		Negotiation group		T-Test
	Mean	Std Error	Mean	Std Error	t-Value
Parental Investment	22.09	1,08	25,4	,101	-2,21**

Number of observation 218 (110 in private and 108 in negotiation group) *** P<0.01, ** P<0.05, *P<0.1

The mean difference for parental investment is also significant between private and negotiation group. Parents in negotiation group invested significantly higher (25.4birr) than parents from private group (22birr).

Table 5: Parental investments mean comparison between public and negotiation experimental group

Covariates	Public group		Negotiation group		T-Test
	Mean	Std Error	Mean	Std Error	t-Value
Parental Investment	26,6	,85	25,4	,101	0,89

Number of observation 224 (116 in public and 108 in negotiation group), *** P<0.01, ** P<0.05, *P<0.1

Although information about other parent's income, experimental choice and outcomes affect parental investment on child education, communication between spouses on how to allocate this income has no effect on their decisions. There is no significant difference in parental investment by varying communication between parents.

5.4 Effect of milk market on parental investment

Table 6: Effect of milk market on parental investment decisions

Variable	NN Matching			Kernel Matching		
	Mean Difference	S.E.	T-stat	Mean Difference	S.E.	T-stat
Parental investment on child education	3.62	1.58	2.82***	3.77	1.17	3.22***

Number of observation 334, number on common support 323, *** P<0.01, ** P<0.05, *P<0.1

Our propensity score matching procedure result indicate that household milk market participation has a positive effect on parental investment on child education. Parents from milk market participant households invest significantly more on child education compared to parents from non-participant households. On average these household made 4birr more investment on child education compared to parents from non-participant households.

5.4. Determinants of Parental Investment

Table 7; Effect of selected independent variables on parental investment on child education

Parental Investment	Coef.	Std. Err.	t
Gender of the parent	-6.48	2.30	-2.81***
Age of the parent	.183	.068	2.65***
Parents` village of origin	3.27	1.38	2.37**
Total household size	-.123	.279	-0.44
Number of school age children	2.99	.59	5.05***
Parent education	.765	1.84	0.42
Milk income received per day	-.011	.016	-0.69
Household status in milk market	5.10	2.116	2.41**
Information about spouse income	6.66	2.19	3.04***
Communication between spouses	-3.87	2.14	-1.81*
Sex. Market	-.776	2.54	-0.31
Sex. Info	-.016	2.50	-0.01
Sex. Commu	1.63	2.50	0.65
Market. Info	-3.79	2.49	-1.53
Market. commu	3.96	2.52	1.57
_cons	5.42	4.15	1.31

Number of obs=334, F(15, 318) = 7.07, Prob>F=0.000, R-square=0.2500, Adj R-square=0.2147, Root MSF= 9.3059, *** P<0.01, ** P<0.05, *P<0.1

We ran multivariate analysis to see how the various independent variables are related to parental investment and to see whether the bivariate results also hold in the multivariate analysis. The result of the regression model shows that gender of the parent, age of the parent, parent's village of origin, number of school children in the housheold, household status in milk market and information about spouse`s income are directly related to parental investment on child

education. The age of the parent and the number of household school age children are positively and significantly related to parental investment on child education. On average, mothers invest 6birr more on child education compared to fathers. The age of the parent is also positively related to parental investment on child education. Older parents invest more on child education compared to younger parents. Parent's village of origin is also another factor that is significantly related to parental investment on child education. Parents who are original from the same village as the study village allocated more for child education than parents who come from different village of origin. Parents in milk market participant households and parents who have information about other parent's income do more investment on child education compared to parents in non-participant households and those who don't have information about the other parent's income. None of the interaction variables showed statistically significant influence on parental investment on child education.

4.5. Does parent's investments on children differ? Qualitative Information

The interviews began by asking participants to reflect on their game experience. Given that this is their second experiment in raw, participants mentioned that this experiment is simple and clear compared to previous experiment. They mentioned that they did not had any difficulty in making decisions and in understanding the outcomes.

…decisions like these are our daily life. It is not new, we don't have enough cash to spend and we have to make choices to make any payment. Most families know how much they need for their kids schooling. Since it is the right time to buy exercise books, pen and pencils now they can invest their allowance for this purpose easily (Tull A, male participant from market participant household).

Does a mother invest more on child education than fathers? The participants anonymously answered yes. However, some took the question farther and said even if the mother may not invest more in quantitative terms they are always there to listen and to respond to their children's need compared to futhers. This is partially because the children`s identify themselves more with their mothers more than fathers. When they need support of any sort the children tell their mothers. Rarely children take requests to their fathers before they inform their mothers.

This is not something related to paying their costs. Even when the children know that the mothers have no money to buy them what they need and it is only the father who can afford to do so, the children first discuss with their mothers and then ask the mothers to ask their fathers or to support their request. This goes as the Ethiopian proverb says "*Motherhood is a truth; fatherhood is a belief "*said Abera, male interview participant from non-participant households. Children believe that their mothers will consider their requests more than their fathers. And other male participants argued that it is of course the household (both father and mother) who provide for child education but the requests come often through mothers and this is because the children's identify themselves with mothers and they also acknowledge their mother for what they get.

Do you think household milk market participation improves investment on child education? Participant`s mentioned that the milk market and related technology adoption demands more labor at household level and children supply this labor. As the result the households get more income and the children also get their share from this. But there are also other possible ways for the negative effect of household milk market participation on child education as the result of the labor demand. But they don't believe that could be reflected in the experiment.

Why do you think some parents allocate more than others? The reason mentioned frequently for higher investment is the number of school children in the housheold. In households where the number of school children is large the parents tend to allocate more money to get as many educational materials as possible for cheap in order to save their own money. Those who allocated less, especially from non-participant households mentioned allocating the money on other things as option to generate income in the coming years than investing it on material this year and paying it from their pocket afterwards. This indicates that there are possibilities for investing the money on different aspect of child welfare.

5. Discussions and Conclusion

In this paper, we report a finding of our parental choice experiment and post-game interviews in Ethiopia. It has been widely reported that the gender of the parents can affect

parental investment on children. This view is held across disciplines from natural sciences (evolutionary biology) to social sciences (social anthropology) with different explanations as to why they do so. However, few studies combined the gender difference with other potential determining factors to see the consistency in this finding. In pursuit of this we have conducted choice experiment with parents and combined it with qualitative information to shed light on the patterns of parental investment and its determining factors.

In our experiment we varied information about other parent's income and experimental outcomes and communication between spouses to see how mother and father in milk market participant and non-participant households react to these situations. In the first (private) group, the parent has no information about what the other parent gets and do. Here we want to know if parents are investing on their children based on unconditional love, emotional ties and personal altruism than considering other contextual factors. In the second group (public), parents get information about the other parent's income and their outcomes sets and after that they make decisions on their allocation. This is to see whether there is difference between mother and father in terms of responsibilities in allocating for children by providing full information about the income received by spouse and potential outcomes. In the third (negotiation) group the parents know their own and their spouse`s income and outcome sets and they discuss about each and every outcome before they make decisions. And this helps to understand how much parents make trade-offs when they come together.

We found out that parental investment varies by gender of the parent, household status in milk market and information difference in experimental groups. Parents generally invested less (but fathers less than mothers) in private group. As we move from private to public group parental investment increased for both household types but more in non-participant than milk market participant households. As we move from public to negotiation group there is still increase for father's investment but slight decline in mother's investment. The qualitative studies show that husband and wife in non-participant households decided to take the remaining money with them but to invest on something that can generate income for their children for the next years. Most of them mentioned buying chicken by their kids' names.

We found that parental investment significantly differ by the gender of the parent. Mothers invested significantly more on child educational material compared to fathers. This finding is consistent with previous research that mothers invest on children more than fathers (Agarwal, 1997a; Njuki et al., 2011; Quisumbing & Maluccio, 1999). From our interviews, we found out that mothers invest more because the children usually indentify themselves with them and they are easy to ask. Even when the children know that the mothers have no money and it is only the father who can provide for their needs they tell their mothers and ask them to ask their fathers or to support their requests. The explanation for this close self-identification could be the result of how children are socialized and their frequent interaction with their mothers.

By varying information about the other parent's income and experimental outcomes, we have also observed a significant difference in parental investment on child education. Parents who have information about their partner's income invested more on children than participants without information about their spouse`s income and outcomes. This could be an explanation that provision for children is usually a familial issue and parents strategically respond to investing on their children considering their environment. There could be needs from respective parents that the other parent should provide for the children. However, from whom the children expect, what does the culture say, what does the other parent have can determine the response of one parent.

Our propensity score matching model shows that household milk market participation has positive effect on parent`s investment decision on child education. Parents from milk market participant households, with higher income at household level, invest significantly more on child education when compared to parents from non-participant households. Parents from these households invested, on average 4birr more on child education compared to parents from non-participant households. This could be either the result of income effect at household level or the result of the contribution of children in dairy business at household level in milk market participant households. As the policy logic goes, milk market participation can enhance household's investment on human capital development in the long run and pay-off the contribution of children in diary labor by increasing investment in their education.

Although findings are consistent with pervious literature in showing that gender of the parent can significantly influence parental investment on children (mothers allocate more for children than fathers) it is still difficult to ensure it is gender per se that produce this difference. The gendered culture can manifest itself in various ways. As the result many other factors can interact with gender and influence parental investment. To see how other variables influence parental investment we have included a list of variables including gender and ran a multivariate analysis. The result of our analysis shows that the age of the parent, number of children in school, parents village of origin, household participation in milk market and information about spouse`s income are significantly related with parental investment on child education in Ethiopian context. In line with many previous researches, gender and age of the parent has been found to influence parental investment decision on children. Mothers and older parents invest more on child education compared to fathers and younger parents. The number of school children in the household is one of the strong determinants of parental investment in this study. In general the result of our study shows that contextual factors, parental social and demographic variables and information treatment in the game explained parental investment on children to some extent in our model.

We need to acknowledge that our study might suffer from certain limitations. The first one is the likelihood that our participants are less likely does calculations behind the logic of our experimental design because our participants are less educated. Therefore, there is a possibility that the behaviors that underlie their decision could be a random decision or what they though we need than really calculative behavior on which game theories are based. The second potential limitation is that parents may allocate more money to get educational materials by considering its higher resale value than considering its educational value for their children. The third potential limitation is that parents who retain more money with themselves may invest the money on urgent child needs than what we asked them in the experiment. In that case not investing or investing less on education material does not mean parental investment on child welfare is less for those particular parents but took simply a different item.

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