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## **Household bargaining and spending on children**

Experimental evidence from Tanzania

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**Abstract:** This paper studies whether increasing the wife's bargaining power results in couples allocating more resources to their child, and, if so, what the underlying mechanisms for this are. We conduct a novel between-subject lab experiment in Tanzania, in which we vary the relative bargaining power between spouses. The paper provides two main insights. First, increasing the wife's bargaining power does not result in an increase in the allocation to the child, but it does lead to equal allocations to boys and girls. Second, time preferences are important; it is more beneficial for the child that the most patient spouse has most bargaining power.

**Keywords:** intra-household allocation, female bargaining power, Tanzania

**JEL classification:** C92, D13, J13, O12

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## 1 Introduction

Since the UN Millennium Development Goals (MDGs) were launched in 2000, there has been an increased focus on female empowerment in international development aid strategies. Female empowerment is undoubtedly a goal of great intrinsic importance, but the policy debate has also focused on instrumental reasons for empowering women. In particular, it has been argued that increasing the wife’s intra-household bargaining power increases the family’s budget share spent on factors such as food, health, and education, benefiting all household members.<sup>1</sup> The instrumental reasons for female empowerment are also reflected in implemented policies; for instance, most conditional cash transfer programs target women (Fiszbein and Schady 2009).

While policy-makers and aid programs frequently assume that female empowerment leads to increased spending on children, the empirical and theoretical evidence are mixed. We use a novel between-subject lab experiment to study the effect of female empowerment on spending on children. In the experiment, we exogenously vary the relative bargaining power between the husband and the wife. The design allows us to causally identify whether an increase in the wife’s bargaining power influences how much the couple allocates to their child. We also investigate whether time and risk preferences and the gender of the child might be underlying mechanisms that shed light on household decision-making.

The experiment was conducted with married couples in Dar es Salaam, Tanzania, July 2015. The main outcome of interest is how the couples distribute a fixed endowment among themselves, their spouse, and their child. The amount allocated to the child is an investment in the child’s education and is paid out in the form of tutoring. In the experiment, we change the wife’s bargaining power by exogenously increasing her control over the allocation of the endowment given to the household. The first treatment is a dictator game where the husband is the dictator and makes the allocation decision. The second and third treatments are Rubinstein shrinking-pie bargaining games where the husband makes the first proposal for the allocation decision in the second treatment, and the wife makes the first proposal in the third treatment (Rubinstein 1982). Finally, the fourth treatment is a dictator game where the wife is the dictator and makes the allocation decision. The treatments are designed to capture an increase in the wife’s experimental economic bargaining power. We think of the first treatment as a situation where the husband has complete bargaining power. The second and third treatments are considered as situations where the bargaining power is shared between the spouses, but where the first proposer has the upper hand through a first-mover advantage. Thus, the wife is thought to have more bargaining power in the third than in the second treatment. Finally, we think of the fourth treatment as a situation where the wife has complete bargaining power.

The paper offers two main insights. First, we find no evidence that increasing the wife’s bargaining power causes a larger allocation to the child. To the contrary, we observe a significant reduction in the allocation to the child in the bargaining treatment where the wife has the first-mover advantage compared to the treatment where the husband is the dictator. However, increasing the wife’s bargaining power is beneficial for gender equality among children; girls receive as least as much as boys when the wife has some bargaining

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<sup>1</sup>See, e.g., Attanasio and Lechene (2002), Brown (2003), Browning et al. (2014), Doss (2006), Duflo (2003), Duflo and Udry (2004), Gitter and Barham (2008), Khandker (2005), Phipps and Burton (1998), Rubalcava et al. (2009), Thomas (1990), and Thomas (1993).

power. Second, when considering mechanisms, we find that the time preferences of the spouse with relatively more bargaining power matter. When the wife is less patient than the husband is, going from a situation where the husband is the dictator to a situation where the wife is the dictator decreases the allocation to the child by 13.7 percentage points.

The main contribution of our paper is the striking finding that strengthening the wife's economic position in the household does not necessarily increase spending on children. This challenges the common assumption among policy-makers that targeting the wife is beneficial for the children. However, we do find one positive effect of increasing the wife's bargaining power: it yields more gender-equal outcomes for the children in the household. This finding suggests that increasing the wife's bargaining power, over time, may lead to a more gender-equal society, an important goal in itself. Another contribution of our paper is to show the importance of time preferences in the decision-making process in the household. We find that it is not the gender of the spouse with most bargaining power that is most important, but his or her time preferences. Theoretically, a more extensive analysis of the household is necessary in order to gain a deeper understanding of household decision-making.

Our study contributes to the growing literature on household decision-making in developing countries. Earlier studies such as Case and Deaton (1998), Kennedy and Peters (1992), Lundberg et al. (1997), Thomas (1990), and Thomas (1993) suggest that wives allocate more resources towards children's human capital (education, health, and child care) and children's clothing than men do. Two possible explanations for why our results do not support the earlier studies are that (i) by using randomization, we ensure that there are no systematic differences between couples in the different treatments, and our identification is cleaner than in these earlier studies which typically compare male headed households to female headed households, and (ii) the husband's preferences may have changed towards spending on children since the 1980s when these studies were conducted.

In the last two decades, a large strand of the household decision-making literature has focused on cash transfer programs. The social assistance program Oportunidades (formerly PROGRESA) in Mexico is a prominent example used to study how conditional cash transfer programs targeted towards women affect different outcome variables; Atanasio and Lechene (2002; 2010) and Rubalcava et al. (2009) find that cash transfers to women increase the family's budget share spent on food and children's clothing, and decrease the share spent on alcohol compared to households that did not receive a transfer. In Oportunidades, the women received the transfer conditional on their children attending school, their visiting health clinics regularly, and their spending the transfer to improve the family's wellbeing (Nigenda and Gonzalez-Robledo 2005). Because of the conditionality of the program, and the fact the transfers were given to women only, it is challenging to study the effect of the cash transfer itself and the importance of the gender of the receiver on children's education and health by studying Oportunidades. Yoong et al. (2012) review the results from more than 15 studies (two of them on Oportunidades) on conditional and unconditional cash transfer programs. They find that when transfers are unconditional, targeting women does not guarantee positive outcomes for the family's welfare (broadly defined). This last finding is also supported by more recent randomized controlled trials on both unconditional and conditional transfers (Akresh et al. 2016; Benhassine et al. 2015; Haushofer and Shapiro 2016). These studies randomize the gender of the recipient of a cash transfer, and have not been able to document differences in

the effects on household responses (consumption, production, and investment decisions) to the program between male and female recipients. Armand et al. (2016), however, find that female recipients spend significantly more on food (especially meat, fish, and dairy products) than male recipients. Even though our results are most in line with Akresh et al. (2016), Benhassine et al. (2015), and Haushofer and Shapiro (2016), our findings can also shed light on why the literature has not yet concluded on the effect of increasing the wife’s bargaining power on spending on children. We study the effect of a change in bargaining power in a controlled setting and shed light on potential underlying mechanisms (i.e., time preferences, risk preferences, and gender preferences) explaining household decision-making.

Another strand of the household decision-making literature uses lab experiments to test household models, including efficiency and cooperation within the household. This literature suggests that women do not always make choices that are in the best interest of the household. A pioneer study in this field is conducted by Ashraf (2009), who investigates the effect of information and communication on financial choices of couples in the Philippines. In an experiment, she studies how an individual allocates an endowment between a private account and an account joint with his or her spouse and varies whether this spouse is informed about the decisions the individual makes or not. The study shows that men deposit more money into their private account when their wives are not informed about their choice. This effect is not driven by gender, but rather by who makes the savings decisions in the household. If the wife makes the savings decisions, the husband responds more strongly to the treatments, and vice versa. Even though Ashraf’s study is very different from ours, one of our main results – that it is the characteristics of the decision-maker that matter and not the gender – is the same. Iversen et al. (2011), Kebede et al. (2014), and Munro et al. (2014) use public good games and find that the wife contributes less to the common pool than the husband does. In this context the wife’s decision reduces the household income more than the husband’s decision does. Similarly, Jakiela and Ozier (2016) find that women are willing to conceal their initial endowment, even though it reduces their potential earnings in the experiment. Finally, Castilla and Walker (2013) and Hoel (2015) find evidence of inefficiencies and hiding of income in their studies. We contribute to this literature on household decision-making by conducting a lab experiment that focuses on the effect on real-world outcomes (spending on children), rather than efficiency, cooperation, or testing of household models.

The paper unfolds as follows: Section 2 presents a conceptual framework. Section 3 describes the experimental design. Section 4 discusses the empirical strategy and Section 5 provides the results. Section 6 discusses the results and concludes.

## 2 Conceptual framework

This section presents a simple conceptual framework to guide our analysis. The framework is based on the collective household model, as developed by Chiappori (1992). We first address the question of bargaining power, and second the mechanisms.

Assume that each spouse cares about his or her own consumption and spending on their child. Spouse  $s = w, h$ ’s utility function can be expressed as:

$$u_s = \ln q_s + \alpha_s \ln Q \tag{1}$$

where  $q_s$  is private consumption,  $Q$  is spending on the child, and  $\alpha_s \geq 0$  is the weight assigned to the child by spouse  $s$ .

First, we consider intra-household bargaining power. In the collective framework, a spouse's bargaining power is defined as how much weight is assigned to his or her utility in the household utility function. The higher the bargaining power, the higher the gains for the spouse (Browning et al. 2014). We assume that the household maximizes:

$$\max_{q_w, q_h, Q} \mu u_w + (1 - \mu) u_h \quad (2)$$

where  $\mu \in (0, 1)$  denotes the wife's bargaining power. When prices are normalized to 1, and household income is denoted by  $Y = Q + q_w + q_h$ , we obtain the following relationship between spending on the child and the wife's bargaining power:

$$\frac{dQ}{d\mu} = \frac{\alpha_w - \alpha_h}{(\alpha_w \mu + \alpha_h (1 - \mu) + 1)^2} Y \quad (3)$$

From Equation (3), we see that if the husband and the wife assign the same weight to the child in their utility function, a change in bargaining power does not affect spending on children. If, however, the wife assigns a higher weight to the child than her husband ( $\alpha_w > \alpha_h$ ), an increase in the wife's bargaining power increases spending on children.

To address the underlying mechanisms, we consider which factors determine the weight assigned to the child by spouse  $s$ ,  $\alpha_s$ . Previous literature has mainly thought of  $\alpha_s$  as capturing how much the spouse cares about the child, where the common assumption is that the wife cares more about the child than the husband. This assumption has support in evolutionary biology theory through the fact that women's fertility is constrained, whereas men's fertility is not (Eswaran and Kotwal 2004). We argue that a broader set of factors may shape  $\alpha_s$ , including time preferences, risk preferences, and gender preferences.<sup>2</sup>

Time preferences may be important in determining the weight assigned to the child because spending on children, and on children's education in particular, requires a long-term perspective as it involves delayed benefits (such as higher wages for the child and security in old age for the parents). Thus, we hypothesize that spouses that are more patient assign a higher weight to the child in their utility function than less patient spouses.

The weight assigned to the child can also be affected by the risk preferences of the spouse. A priori, the effect of risk preferences is unclear. On one hand, as the future is uncertain (both in terms of survival, and in terms of children's ability and returns to education), a more risk-averse spouse may be more likely to have a lower weight attached to the child than a less risk-averse spouse. On the other hand, a child may represent an insurance mechanism and education can therefore be more valuable to a risk-averse spouse than to a less risk-averse spouse (Wölfel and Heineck 2012).

Finally, gender preferences may influence the weight assigned to the child. In Asia, there is a clear preference for sons (Guilmoto 2012; Qian 2008), but this is not common elsewhere (Norling 2016). Some studies from Africa and the US show that individuals favor children of their own gender (Dahl and Moretti 2008; Dizon-Ross and Jayachandran 2015; Raley and Bianchi 2006), whereas others do not find any gender-biasedness (Norling

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<sup>2</sup>In this paper we have chosen to focus on the spouse's preferences. Another important factor, however, is knowledge. The better knowledge the spouse has of the value of education, the more likely he or she is to assign a higher weight to the child. A proxy for knowledge is level of education, and it has been shown that children with parents with a high level of education are more likely to receive a high level of education themselves (Black et al. 2005).

2016). If the spouse is gender-biased, he or she will assign a higher weight to a child of one gender than to a child of the other gender.

To summarize, in our conceptual framework, bargaining power only matters if the husband and the wife assign different weights to their child in their utility function. The weight assigned to the child may depend on several factors, including caring preferences, time preferences, risk preferences, and gender preferences.

### 3 Experimental design and sample

#### 3.1 Sample and setting

The experiment was conducted with 287 couples in Dar es Salaam, Tanzania. The couples were recruited by distribution of invitation letters (see Appendix G) to pupils in four different primary schools in a relatively poor ward in the Kindiononi district in northern Dar es Salaam. The spouses signed up for participation in the study by returning a slip with their name and contact information to their child’s teacher. They were then called by one of the research assistants to schedule a session.

Each spouse received a TZS5,000 (approx. USD2.3) show-up fee, and had the opportunity to earn more during the experiment. All sessions took place in the afternoon between 1 pm and 5 pm, and consisted of between 15 and 30 couples. On average, each household earned TZS40,000 (approx. USD18.6), including the show-up fee. This corresponded to more than two days’ worth of wages for low-paying jobs in Tanzania at the time of the study.<sup>3</sup> In addition, we provided one child in each household with an average of 3.4 weeks of tutoring.

Table 1 provides background characteristics for participants by gender. The average participant is close to 39 years old, and men are on average eight years older than women. The couples cares for an average of 3.2 children of whom 1.4 are in primary school. The households in our sample are larger than the average household in urban areas in Tanzania (5.2 members vs. 4.3 members) (TNBS and ICF Macro 2016: 37). Most of the respondents have completed primary school or a higher level of education. Men are more educated than women, which reflects the gender gap in educational attainment in Tanzania (TNBS and ICF Macro 2016: 42–43). In addition, there are large gender differences in employment status. While 41% of women report being unemployed, only 5% of men do the same. This is in line with the Demographic Household Survey (DHS) when looking at those who have not been employed in the last 12 months (TNBS and ICF Macro 2016: 69–72).

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<sup>3</sup>The minimum daily wage for trade, communications, and domestic services was around TZS5,000, and for construction around TZS10,000 (<http://www.africapay.org/tanzania/home/salary/minimum-wages>).

Table 1: Background characteristics by gender

	Wife	Husband	Total	P-value, t-test
<i>A. Background</i>				
Age	34.95 (0.45)	42.66 (0.59)	38.80 (0.41)	0.000***
Number of children	-	-	3.17 (0.07)	
Children in primary	-	-	1.40 (0.03)	
<i>B. Education</i>				
No/some/completed primary	0.38 (0.03)	0.35 (0.03)	0.36 (0.02)	0.244
Some secondary	0.50 (0.03)	0.39 (0.03)	0.44 (0.02)	0.005***
Completed secondary or more	0.13 (0.02)	0.26 (0.03)	0.19 (0.02)	0.000***
<i>C. Employment status</i>				
Unemployed	0.41 (0.03)	0.05 (0.01)	0.23 (0.02)	0.000***
Self-employed	0.52 (0.03)	0.67 (0.03)	0.60 (0.02)	0.000***
Individuals	287	287	574	

Mean coefficients; standard error of mean in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* The table reports descriptive statistics for parents (age, education, employment status) and households (number of children, number of children in primary). Column (1) reports means for wives, Column (2) reports means for husbands, Column (3) reports means for the total sample, and Column (4) reports p-values for two-sided t-test of difference in means between husbands and wives. In panel A, we report background variables for the household. “Age”: participant’s reported age. “Number of children”: total number of children the couple cares for. “Children in primary”: total number of children the couple is caring for that are currently attending primary school in Dar es Salaam. In panel B, we report education variables. “No/some/completed primary”: share of participants who have no formal schooling, some primary school, or completed primary school as their highest obtained level of education. “Some secondary”: share of participants with some secondary school as their highest obtained level of education. “Secondary completed or more”: share of participants with completed secondary school or higher as their highest obtained level of education. In panel C, we report occupation variables. “Unemployed”: share of unemployed participants. “Self-employed”: share of self-employed participants. Remaining participants are employed in the formal sector (public or private).

*Source:* Authors’ computation based on the collected data.

### 3.2 Experimental set-up and conditions

The sequence of events is described in Figure 1. At arrival, we conduct a background survey with both spouses present. Couples are subsequently randomized to one of the four



treatments, and the husband and the wife are separated into different rooms according to their treatment. They then face three incentivized tasks and one unincentivized task. All the incentivized tasks are choices for how to allocate a monetary endowment. To illustrate their choice, the participants receive laminated pictures of TZS500 and TZS1,000 notes. They are asked to distribute the money between cups illustrating their choice and the research assistants record the answers. By simplifying the tasks in this manner, we ensure that literacy is not a requirement to be part of the study.

We elicit time and risk preferences using two separate tasks. In both, the participants are explicitly told that their spouse will not be informed about their decision.<sup>4</sup> Because of their simplicity, we base the time-preference task on Angerer et al. (2015), and the risk-preference task on Gneezy and Potters (1997).<sup>5</sup> In the time-preference task, the subjects are asked to allocate TZS3,000 between the day of the experiment and three weeks later. Any amount they choose to receive after three weeks is doubled. The participants indicate their choice by leaving the money they want to receive on the day of the experiment on the table, and placing the amount they want to receive after three weeks in a cup on the table. Earnings from the time-preference task are paid out as transfers to mobile phones through M-Pesa.<sup>6</sup> This makes the logistics of the payment easier. To ensure that allocations to the day of the experiment do not reflect a preference for cash over mobile money, both current and future earnings in the time-preference task are paid out using M-Pesa.

In the risk-preference task, the subjects decide how much of the TZS3,000 they want to keep and how much they want to invest in a risky option. The participants indicate their choice by placing the money they wanted to invest in a cup and leaving the rest on the table. After the decision has been made, the participants draw a card from a bag to determine whether the invested money is tripled (green card) or reduced to nothing (red card). The participants are informed that the probability of winning and losing are the same. Note that risk-neutral (and risk-seeking) individuals should invest the entire TZS3,000 endowment in the risky option. Thus, the item can be thought of as a measure of degree of risk aversion. Earnings from the risk-preference task are paid out in cash.<sup>7</sup>

In the third incentivized task, the participants allocate a TZS15,000 endowment among themselves, their spouse, and their child. If a couple has more than one child in primary school, one of them is randomly selected. The name of the chosen child is communicated to the parents before they make the allocation decision. For every TZS1,500 allocated to the child, the child receives one week of tutoring. The couples can allocate TZS0, TZS1,500, TZS3,000, ..., or TZS15,000 and the maximum possible amount of tutoring is ten weeks. The husband and wife's earnings from the distributive task are paid out in cash. The allocation to the child is paid out as a certificate for tuition. The certificate includes the child's name and the number of weeks of tuition earned. In Tanzania, children in primary school attend school in the morning for free. In the afternoon, parents can choose to pay for extra tuition. The tuition is conducted Monday through Friday from 3 pm to 5 pm. It includes tutoring, a speed test each day,

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<sup>4</sup>Instructions for the incentivized tasks are provided in Appendix H.

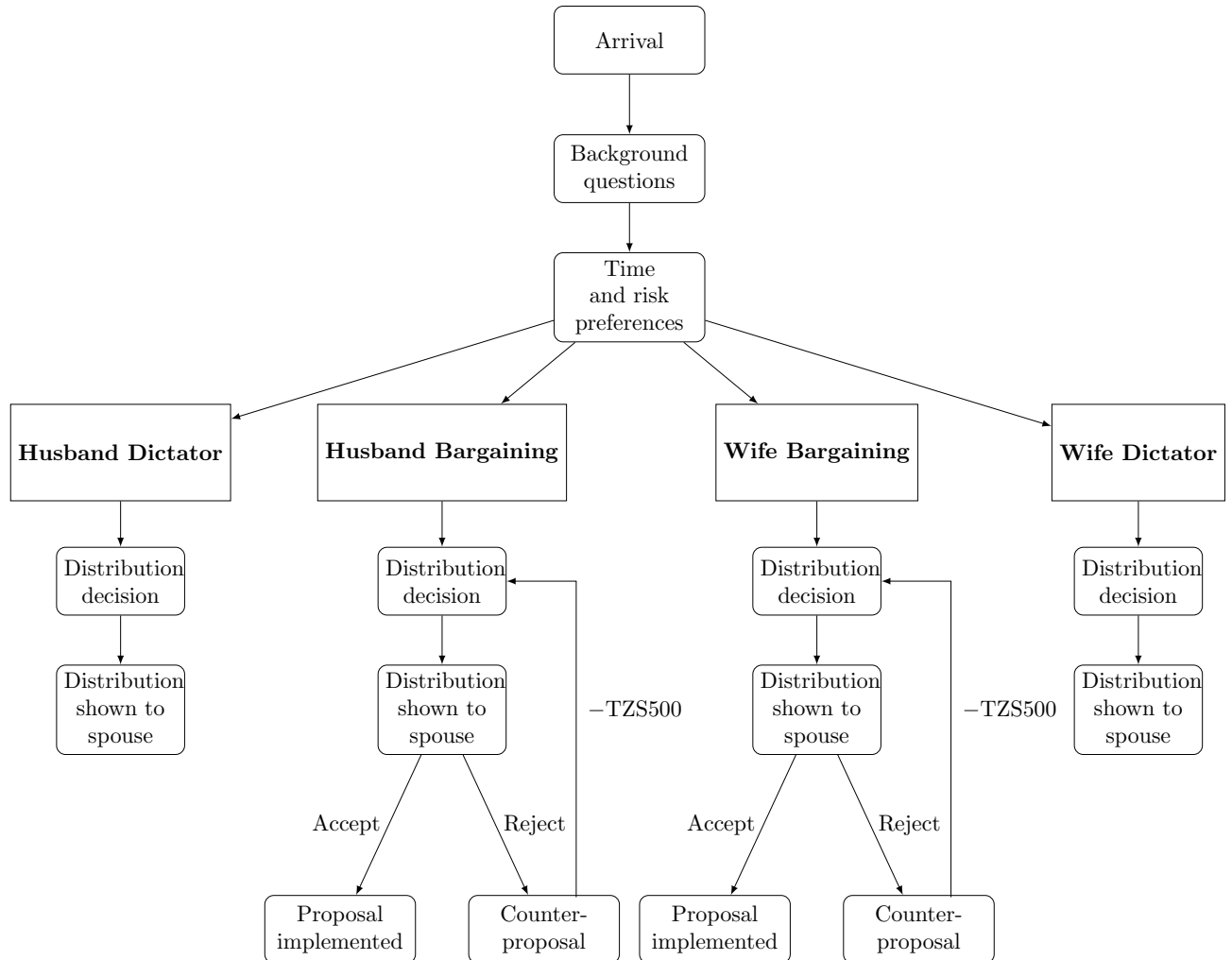
<sup>5</sup>The time-preference task is a simplification of the task used by Andreoni and Sprenger (2012).

<sup>6</sup>M-Pesa is an SMS-based money-transferring system allowing individuals to deposit, withdraw, and transfer money with their phone. The receiver could easily liquidate this money, or use it to pay bills such as phone and electricity bills.

<sup>7</sup>The outcome variables for both time and risk preferences have the possible outcomes  $0, \frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6}, \frac{5}{6}$ , and 1.

and a weekend test.<sup>8</sup> The regular price of tuition is TZS5,000 per week per child, and we provide the couples with the opportunity to pay only TZS1,500 per week.

Figure 1: Diagram of experimental design



Source: Authors' illustration.

The structure of the distributive task is determined by the treatment to which the couples were allocated:

**Husband Dictator:** dictator game with the husband as dictator

**Husband Bargaining:** Rubinstein shrinking-pie bargaining with the husband as first proposer

**Wife Bargaining:** Rubinstein shrinking-pie bargaining with the wife as first proposer

**Wife Dictator:** dictator game with the wife as dictator

<sup>8</sup>The children were taught in groups of 25–40 and the main focus of the teaching was mathematics, English, and science. We wrote contracts with the tutors teaching the children in each of the four schools.

In Husband Dictator, the husband decides how to distribute the endowment. The husband indicates his distribution by dividing the endowment among three cups: one with a picture of a woman, one with a picture of a man, and one with a picture of a child. He knows that his wife will be informed about his decision. In Husband Bargaining and Wife Bargaining, the first proposer makes a proposal for how to allocate the endowment. The proposal is then shown to the spouse, who can either agree or disagree. If the spouse agrees, the proposal is implemented. Otherwise, he or she makes a counter-proposal, but the amount to be allocated is reduced by TZS500. The couples can go back and forth until an agreement is reached or there is no money left. Wife Dictator is similar to Husband Dictator, but with the wife as the dictator.

The treatments are designed to exogenously vary the wife’s bargaining power. When the husband is the dictator, the wife has no bargaining power. In the two bargaining treatments, the bargaining power is shared between the spouses, but the first proposer has the upper hand through a first-mover advantage. Finally, in the fourth treatment, the wife has complete bargaining power. We will refer to the increase in the wife’s bargaining power as “small” when comparing Husband Dictator with Husband Bargaining, as “intermediate” when comparing Husband Dictator with Wife Bargaining, and as “large” when comparing Husband Dictator with Wife Dictator. Furthermore, the comparison of Husband Dictator with Wife Dictator yields information about whether the weights assigned to the child are different in the husband’s and in the wife’s utility function, respectively. The collection of additional data on patience and risk aversion is used to understand the underlying mechanisms behind the couple’s decision.

In the last task, we ask questions about household decision-making outside of the experiment. After completion of this task, the spouses are paid in private and can leave.

## 4 Empirical strategy

A pre-analysis plan was registered at the American Economic Association Randomized Controlled Trials Registry before we analyzed the data.<sup>9</sup> This plan specified the empirical strategy, including the hypothesis to be tested, the regression approach, and the dimensions to be studied in the heterogeneity analysis.

### 4.1 Main analysis

The first thing we investigate is whether an increase in the wife’s bargaining power increases the share allocated to the child. To test this hypothesis, we estimate the following regression:

$$y_c = \alpha + \beta_{HB}\text{Husband Bargaining}_c + \beta_{WB}\text{Wife Bargaining}_c + \beta_{WD}\text{Wife Dictator}_c + \delta X_c + \varepsilon_c \quad (4)$$

where  $y_c$  is the share of the endowment allocated to the child for couple  $c$ ,  $\alpha$  is a constant,  $\text{Husband Bargaining}_c$ ,  $\text{Wife Bargaining}_c$ , and  $\text{Wife Dictator}_c$  are treatment dummies taking the value 1 if couple  $c$  is in Husband Bargaining, Wife Bargaining, and Wife Dictator, respectively,  $X_c$  is a vector of background variables, and  $\varepsilon_c$  is the error-term.  $X_c$  consists of child and parent background variables as well as intra-household differences in education, and time and risk preferences (see Table 2 for definition of these variables). The

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<sup>9</sup><https://www.socialsciregistry.org/trials/770>.

inclusion of  $X_c$  allows us to control for initial (observable) differences between couples in the different treatments, and for any unbalance between treatments (see Table B.1 in Appendix B).

Husband Dictator is the reference category in Equation (4), and we interpret the estimated treatment effects relative to a situation where the husband has complete bargaining power. From Equation (4), we obtain estimates of the causal effect of increases in the wife’s bargaining power,  $\beta_{ij}$  with  $i$ =Husband, Wife, and  $j$ =Dictator, Bargaining.

We also estimate Equation (4) for  $y_{Hc}$ , share allocated to husband, and for  $y_{Wc}$ , share allocated to wife, respectively. As these regressions were not specified in the pre-analysis plan, they should be considered exploratory.

## 4.2 Heterogeneity and robustness analysis

To shed light on the underlying mechanisms determining allocation to the child, we study heterogeneity in the effect of an increase in female bargaining power using the elicited preferences and background data collected in the survey. We focus on time and risk preferences and gender of the child. In particular, we test whether the treatment effect is different for couples where the husband is more patient, less risk averse, and where the chosen child is a boy.<sup>10</sup>

We estimate the following regression for each of the three respective preference variables and the three treatments:

$$y_c = \alpha + \beta_T \text{Treatment}_c + \beta_{Var} \text{Var}_c + \theta_T \text{Treatment} * \text{Var}_c + \delta X_c + \varepsilon_c \quad (5)$$

where  $\text{Treatment}_c$  is an indicator variable for each of the three treatments, Husband Bargaining, Wife Bargaining, and Wife Dictator,  $\text{Var}_c$  is an indicator variable for couples where the husband is more patient or less risk averse, and couples where the chosen child is a boy, and  $\text{Treatment} * \text{Var}_c$  is an interaction term between the background indicator variables and the treatment indicator variables.<sup>11</sup>

On the basis of these regressions, we study whether there are significant differences in treatment effect between subgroups. The estimated subgroup difference in the causal effect of increasing female bargaining power is given by  $\theta_T$ . As an illustration, if  $\text{Var}_c$  is an indicator variable for the husband being more patient than the wife, then the estimate,  $\theta_T$ , shows whether the effect of an increase in female bargaining power is different for couples where the husband is more patient than the wife and for couples where he is not.

In accordance with the pre-analysis plan, we focus on the first proposal in the main analysis. This is because the receiver’s decision to accept or not may be influenced by the presence of other participants in the room, and it is therefore cleaner to consider the first proposal. Another reason to focus on the first proposal is that the endowment is reduced for each rejection. As we do not know if the share allocated to the child is constant with income, it may be problematic to use the final proposal. As a robustness check, we run Equation (4) with the final proposal in the two bargaining treatments. In addition, we run robustness checks for the heterogeneity with time and risk preferences where we exclude all couples where the spouses have the same time or risk preferences. The robustness checks are all reported in Appendixes D and E, and show that most of our results are robust.

<sup>10</sup>We deviate somewhat from the pre-analysis plan in the heterogeneity analysis. All pre-specified dimensions are reported in Appendix C.

<sup>11</sup>In this regression,  $X_c$  includes all background variables except the variable captured by  $\text{Var}_c$ .

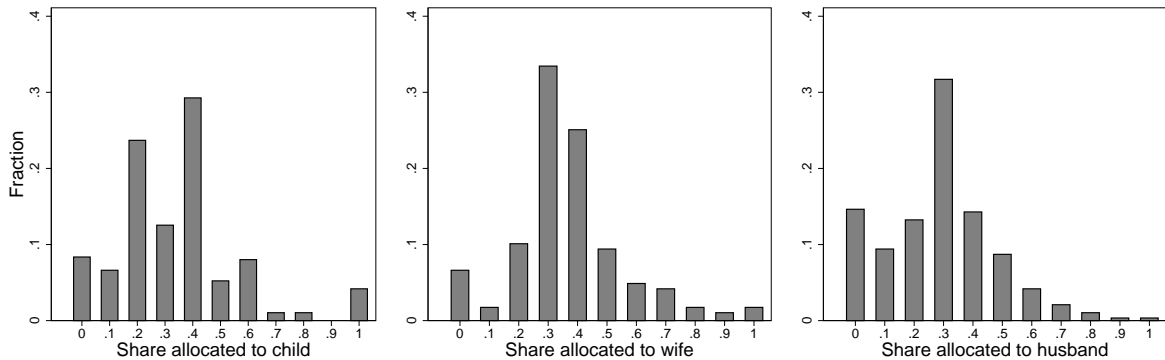
## 5 Results

We first provide an overview of the couples' allocation decisions in the experiment, as well as descriptive statistics about time and risk preferences. Then we turn to the main analysis of the treatment effects for the share allocated to the child, and the share allocated to the wife and the husband, respectively. In the last part, we discuss heterogeneous treatment effects.

### 5.1 Descriptive statistics

Figure 2 illustrates the distribution of the share allocated to the child, the wife, and the husband, for the whole sample. The majority of couples allocate shares between 0.20 and 0.40 of the endowment to their child (mean share allocated is 0.34), but there is significant heterogeneity in the distributive behavior. There is also substantial heterogeneity in shares allocated to the husband and the wife. The mean share allocated to the husband, 0.29, is significantly smaller than the mean share allocated to the wife, 0.37 ( $p = 0.000$ , two-sided t-test).

Figure 2: Share allocated to child, husband, and wife



*Note:* The figure displays the distribution of the shares allocated to the child, the wife, and the husband, respectively. “Share allocated to child” is the share allocated to the child in the dictator treatments (Husband Dictator and Wife Dictator) and the share proposed to the child in the first proposal in the bargaining treatments (Husband Bargaining and Wife Bargaining). “Share allocated to wife” is the share allocated to the wife by herself in Wife Dictator and by the husband in Husband Dictator, and the share proposed to herself in Wife Bargaining and the share proposed to be allocated to her by the husband in Husband Bargaining. “Share allocated to husband” is defined correspondingly.

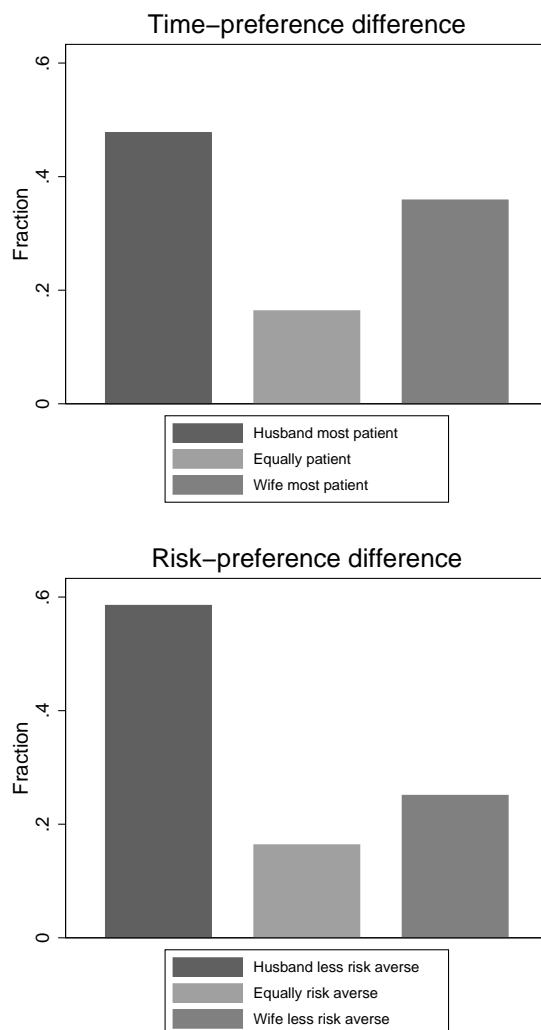
*Source:* Authors' computation based on the collected data.

Next, we consider time and risk preferences. We measure patience as the share of TZS3,000 allocated to the future (the higher the share allocated to the future, the more patient the spouse), and risk aversion as the share of TZS3,000 allocated to the risky option (the higher the share, the lower the risk aversion). On average, the husbands in our sample are found to be significantly less risk averse ( $p = 0.000$ , two-sided t-test) and significantly more patient ( $p = 0.094$ , two-sided t-test) than the wives.<sup>12</sup>

<sup>12</sup>See Figure A.1, Appendix A, for a graphical illustration of the distribution of time and risk preferences.

In Figure 3 we display intra-household differences in patience and risk aversion. Couples are sorted into three categories: husband most patient/least risk averse, husband and wife equally patient/risk averse, and wife most patient/least risk averse. The figure illustrates that there is a large variation in the differences in time and risk preferences between spouses. In about 16% of the couples, husband and wife have identical time preferences, and about 20% have the same risk preferences.

Figure 3: Time and risk preferences between husband and wife

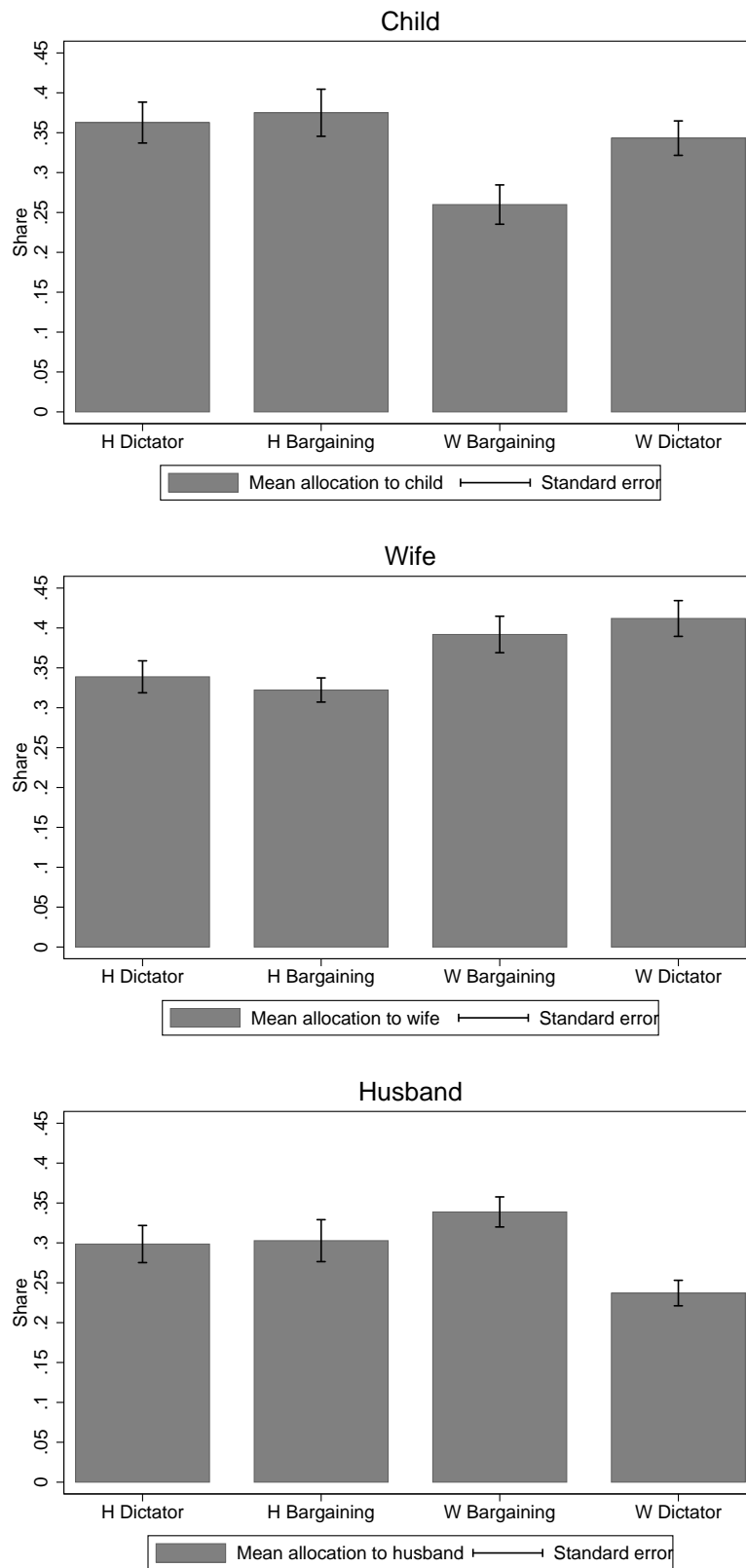


*Note:* The figure provides a simplified illustration of differences in time and risk preferences between husband and wife. Couples are divided into three categories: husband most patient/least risk averse, husband and wife equally patient/risk averse, and wife most patient/least risk averse. Time preferences are measured by the share allocated to the future and the fraction of couples in each of the three categories is illustrated in the upper panel. Risk preferences are measured by the share allocated to the risky option and the fraction of couples in each of the three categories is illustrated in the lower panel.

*Source:* Authors' computation based on the collected data.

Figure 4 reports the average share allocated to the child, the wife, and the husband in each of the four treatments. It shows that increasing the wife's bargaining power from Husband Dictator to Husband Bargaining does not cause significant changes in the

Figure 4: Share allocated to child, wife, and husband, by treatment



*Note:* The figure reports mean share allocated to child (upper panel), wife (middle panel), and husband (lower panel) and standard error for Husband Dictator, Husband Bargaining, Wife Bargaining, and Wife Dictator.

*Source:* Authors' computation based on the collected data.

allocation to the child. However, further increasing the wife’s bargaining power from Husband Bargaining to Wife Bargaining causes a significant reduction in the allocation to the child. Finally, increasing the wife’s bargaining power from Wife Bargaining to Wife Dictator increases the allocation significantly to a level that is not significantly different from the allocations in Husband Dictator and Husband Bargaining. To understand the reason for the decrease in the allocation to the child in Wife Bargaining, we investigate the allocation to the wife and the husband in the middle and lower panels of Figure 4. First we observe that the allocation to the wife is significantly larger when she has full bargaining power or is the first proposer. Second, the allocation to the husband is significantly smaller when the wife has full bargaining power, but is not affected by a small or intermediate increase. Third, in Wife Bargaining and Wife Dictator, the wife proposes/allocates the same allocation to herself. However, when the husband has the opportunity to reject her proposal in Wife Bargaining, she proposes a higher allocation to him and a smaller allocation to the child than when she has full bargaining power in Wife Dictator. The overall picture from Figure 4 is that a small increase in the wife’s bargaining power does not affect allocations to child, wife, or husband and the endowment is split approximately equally between the three. An intermediate increase in the wife’s bargaining power increases the allocation to the wife and reduces the share allocated to the child. A large increase in the wife’s bargaining power increases the share allocated to the wife and reduces the share allocated to the husband. It should also be noted that compared to Wife Bargaining, giving the wife complete bargaining power increases the share allocated to the child, and reduces the share allocated to the husband.

## 5.2 Main analysis

We now turn to a regression analysis of how the share allocated to the child depends on treatments. We also provide regressions for the share allocated to the wife and the husband, respectively.

Table 2 reports regressions for comparison of Husband Dictator with the three other treatments.<sup>13</sup> In Column (1) we only include the treatment indicator variables Husband Bargaining (taking the value 1 for couples in Husband Bargaining), Wife Bargaining (taking the value 1 for couples in Wife Bargaining), and Wife Dictator (taking the value 1 for couples in Wife Dictator). In Columns (2) to (5), we sequentially add session fixed effects and background variables.

We focus on the full specification in Column (5) and, consistent with the descriptive analysis, do not find a significant effect of a small or large increase in the wife’s bargaining power (Husband Dictator vs. Husband Bargaining and Husband Dictator vs. Wife Dictator). However, an intermediate increase in the wife’s bargaining power from Husband Dictator to Wife Bargaining significantly reduces the share allocated to the child.<sup>14</sup>

In terms of background variables, we find a positive effect of the husband’s age and a negative effect of the wife’s age. Furthermore, couples where the husband is less risk averse than the wife allocate less to the child. The last effect may be an indication that the husbands consider investment in children’s education a non-risky investment.

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<sup>13</sup>Please see Appendix F for extended regression tables.

<sup>14</sup>These results hold when we run the same regression with the final share allocated to the child in the two bargaining treatments. The regression is reported in Table E.1 in Appendix E. Note that only 8 of 97 couples rejected the first proposal. All counter-proposals were accepted.



Based on this regression, we formulate the following main result:

**Result 1:** Increasing the wife’s bargaining power does not increase the allocation to the child ( $\beta_{HB} = 0.022$ ,  $p = 0.576$ ,  $\beta_{WB} = -0.079$ ,  $p = 0.044$ ,  $\beta_{WD} = 0.003$ ,  $p = 0.933$ , see Column (5), Table 2). If anything, we find evidence of the opposite. An intermediate increase in the wife’s bargaining power from Husband Dictator to Wife Bargaining causally decreases the allocation to the child ( $\beta_{WB} = -0.079$ ,  $p = 0.044$ , see Column (5), Table 2).

Result 1 suggests that increasing the wife’s bargaining power does not causally increase the allocation to the child. In fact, increasing the wife’s bargaining power from Husband Dictator to Wife Bargaining causally *reduces* the allocation. As there is no significant difference between Husband Dictator and Wife Dictator, this is likely not a consequence of differences in the weight assigned to the child between the husband and the wife, but rather due to some other aspect of the bargaining situation (see Section 6 for a discussion).

Next, we consider the effect of increasing the wife’s bargaining power on the share allocated to the wife and the husband in Table 3. Both columns show the full specification where all background variables and the indicator variables are defined as in Table 2. As expected, a large increase in the wife’s bargaining power from Husband Dictator to Wife Dictator increases the share allocated to the wife and decreases the share allocated to the husband. The share allocated to the husband is not affected when the increase in bargaining power is small or intermediate. A small increase in the wife’s bargaining power increases the share allocated to her, but the effect is not robust to using the final share allocated to the wife (see Table E.2 in Appendix E).

Based on these regressions we formulate the following results for the allocation to husband and wife:

**Result 2:** A large increase in the wife’s bargaining power from Husband Dictator to Wife Dictator increases the allocation to her and reduces the allocation to the husband ( $\beta_{WD} = 0.091$ ,  $p = 0.001$ , see Column (1), Table 3, and  $\beta_{WD} = -0.102$ ,  $p = 0.001$ , see Column (2), Table 3).

Result 2 indicates that the wife has a stronger preference for allocations to herself than the husband does. Thus, the wife’s bargaining power matters for the allocations to the husband and the wife.

Table 2: Effect of increasing the wife’s bargaining power on the allocation to the child

	(1)	(2)	(3)	(4)	(5)
Husband Bargaining	0.012 (0.039)	0.016 (0.039)	0.021 (0.040)	0.026 (0.038)	0.022 (0.039)
Wife Bargaining	-0.103*** (0.036)	-0.100*** (0.035)	-0.096*** (0.035)	-0.080** (0.040)	-0.079** (0.039)
Wife Dictator	-0.019 (0.034)	-0.019 (0.033)	-0.015 (0.034)	0.001 (0.032)	0.003 (0.032)
Male child			0.020 (0.026)	0.038 (0.026)	0.037 (0.026)
Chosen child’s standard			0.001 (0.007)	0.006 (0.007)	0.005 (0.007)
Age husband				0.003** (0.002)	0.003** (0.002)
Age wife				-0.004* (0.002)	-0.004* (0.002)
H most patient					0.050 (0.045)
H least risk averse					-0.069* (0.042)
Session FE	No	Yes	Yes	Yes	Yes
Child background	No	No	Yes	Yes	Yes
Parent background	No	No	No	Yes	Yes
Parent difference	No	No	No	No	Yes
Couples	287	287	287	286	286
$R^2$	0.031	0.115	0.123	0.196	0.208

Robust standard errors in parentheses, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* The table reports regressions of the share allocated to the child (with possible discrete values of 0,0.1,0.2,...,0.9,1) on the treatment variables “Husband Bargaining” (indicator variable taking the value 1 for couples in Husband Bargaining), “Wife Bargaining” (indicator variable taking the value 1 for couples in Wife Bargaining), “Wife Dictator” (indicator variable taking the value 1 for couples in Wife Dictator), and a set of explanatory variables. “Session FE”: indicator variables for each of the 11 different sessions of the experiments. “Child background” is: “Male child”: indicator variable taking the value 1 if the couple’s chosen child is a boy, “Chosen child’s standard”: variable taking values corresponding to the chosen child’s school standard between 1 and 7 and “Children total”: indicator variable for couples with two or more children. We also include indicator variables for which of the four schools the child is attending. “Parent background” is: “Age $_i$ ” ( $i = H, W$ , H=husband, W=wife): count variable for individual  $i$ ’s reported age, “Self-employed $_i$ ”: indicator variable taking the value 1 if  $i$  is self-employed, “Highest level of education $_i$ ”: discrete variable taking the following values: 0 = No formal education, 1 = Some primary school, 2 = Primary school completed, 3 = Some primary school, 4 = Secondary school completed, 5 = More than secondary school, “Share allocated to future $_i$ ”: share allocated to the future by  $i$ , and “Share invested in risky option  $i$ ”: share allocated to the risky option by  $i$ . “Parent difference” variables are: “H most educated”: indicator variable taking the value 1 for couples where the husband is more educated than the wife, “H most patient”: indicator variable taking the value 1 for couples where the husband allocates more to the future than the wife, and “H least risk averse”: indicator variable taking the value 1 if the husband allocates more to the risky option than the wife.

*Source:* Authors’ computation based on the collected data.

Table 3: Effect of increasing the wife’s bargaining power on the allocation to the wife and the husband

	Allocation to wife	Allocation to husband
Husband Bargaining	−0.017 (0.031)	−0.007 (0.035)
Wife Bargaining	0.066** (0.032)	0.003 (0.035)
Wife Dictator	0.091*** (0.028)	−0.102*** (0.030)
Male child	0.004 (0.025)	−0.040* (0.023)
Chosen child’s standard	−0.004 (0.006)	−0.001 (0.006)
Age husband	−0.000 (0.001)	−0.003** (0.001)
Age wife	0.003 (0.002)	0.001 (0.002)
H most patient	0.038 (0.037)	−0.075* (0.039)
H least risk averse	0.035 (0.040)	0.038 (0.039)
Session FE	Yes	Yes
Child background	Yes	Yes
Parent background	Yes	Yes
Parent difference	Yes	Yes
Couples	286	286
$R^2$	0.226	0.186

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* The table reports a regression of the share allocated to the wife (with possible discrete values of 0,0.033,0.67,0.1,...,0.933,0.967,1) in Column (1), and a regression of the share allocated to the husband (with possible discrete values of 0,0.033,0.67,0.1,...,0.933,0.967,1) in Column (2) on the treatment variables “Husband Bargaining” (indicator variable taking the value 1 for couples in Husband Bargaining), “Wife Bargaining” (indicator variable taking the value 1 for couples in Wife Bargaining), “Wife Dictator” (indicator variable taking the value 1 for couples in Wife Dictator), and a set of explanatory variables. See Table 2 for definition of “Session FE”, “Child background”, “Parent background”, and “Parent difference”.

*Source:* Authors’ computation based on the collected data.

### 5.3 Heterogeneity analysis

In this subsection, we investigate whether subgroups of the sample are affected differently by an increase in the wife’s bargaining power. We focus on difference in time and risk preferences between the husband and the wife, and the gender of the child.<sup>15</sup>

Columns (1) to (3) in Table 4 consider whether the effect of increasing the wife’s bargaining power on the allocation to the child is different between couples where the husband is more patient than the wife and couples where the wife is at least as patient as the husband. Column (1) reports the difference in effect for a small increase in the wife’s bargaining power (Husband Bargaining), Column (2) reports the difference in effect for an intermediate increase in the wife’s bargaining power (Wife Bargaining), and Column (3) reports the difference in effect for a large increase in the wife’s bargaining power (Wife Dictator). We find that when the husband is more patient than the wife is, an intermediate or large increase in the wife’s bargaining power causally decreases the allocation to the child. Similarly, when the wife is at least as patient as the husband, a large increase in bargaining power increases the share allocated to the child.<sup>16</sup> Based on these regressions, we formulate the following result for differences in time preferences between the husband and the wife:

**Result 3:** The spouse’s time preferences matter to the effect of an increase in the wife’s bargaining power on the allocation to the child. When the husband is more patient than the wife, increasing the wife’s bargaining power *reduces* allocation to the child ( $\theta_{WB} + \beta_{WB} = -0.133$ ,  $p = 0.053$ , see Column (2), and  $\theta_{WD} + \beta_{WD} = -0.137$ ,  $p = 0.007$ , see Column (3), Table 4). We also find some evidence that when the wife is at least as patient as the husband a large increase in her bargaining power increases the allocation to the child ( $\beta_{WD} = 0.072$ ,  $p = 0.005$ , see Column (3), Table 4), but this finding is not robust to the stricter time-preference variable definition.

We next consider difference in risk preference between the husband and the wife in Columns (4) to (6). As above, Columns (4) to (6) respectively investigate a small, an intermediate, and a large increase in the wife’s bargaining power. We find that when the husband is less risk averse than the wife, a small increase in the wife’s bargaining power increases the share allocated to the child, but in general the difference in risk preference between the husband and the wife is found to be of little importance to the effect of an increase in the wife’s bargaining power.<sup>17</sup> The result on differences in risk preferences can be summed up as follows:

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<sup>15</sup>Table C.2 in Appendix C reports the heterogeneity analysis for education level differences and number of children in the household.

<sup>16</sup>In the above discussion, we have used a definition where “H most patient” is equal to 1 when the husband is more patient than the wife, and 0 otherwise. Thus, in 0, we include couples where the husband and the wife are equally patient. To check if these results are sensitive to the definition of the time-preference difference, we estimate regressions where we restrict the sample to couples where one of the spouses is more patient than the other in Table D.1 in Appendix D. We find that the negative effects of increasing the wife’s bargaining power when the husband is more patient than his wife are robust to the stricter definition, but that the positive effect when the wife is more patient is not.

<sup>17</sup>Table D.1 in Appendix D reports the results when we restrict the sample to couples where one spouse is less risk averse than the other and find that the positive effect of an increase in the wife’s bargaining power is not robust to the stricter definition of risk-preference difference. Table E.3 in Appendix E reports the results for the final share allocated to the child.

Table 4: Heterogeneity in time- and risk-preference difference and gender preference

	Var = H most patient			Var = H least risk averse			Var = Male child		
	HB	WB	WD	HB	WB	WD	HB	WB	WD
Treatment	0.060 (0.101)	-0.039 (0.053)	0.072* (0.043)	0.013 (0.063)	-0.024 (0.068)	-0.016 (0.053)	0.157*** (0.051)	0.006 (0.054)	0.032 (0.044)
Treatment X var	0.014 (0.113)	-0.094 (0.089)	-0.209*** (0.064)	0.084 (0.082)	-0.040 (0.079)	0.003 (0.067)	-0.240*** (0.083)	-0.126 (0.086)	-0.114* (0.062)
Var	0.102* (0.053)	0.095* (0.050)	0.104** (0.048)	-0.018 (0.057)	-0.005 (0.053)	-0.069 (0.053)	0.139*** (0.045)	0.119** (0.046)	0.124*** (0.047)
Treatment (var)	0.073 (0.049)	-0.133* (0.068)	-0.137*** (0.050)	0.097* (0.054)	-0.064 (0.055)	-0.013 (0.044)	-0.083 (0.067)	-0.120* (0.071)	-0.083 (0.051)
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child background	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent background	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent difference	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Couples	139	140	189	139	140	189	139	140	189
$R^2$	0.305	0.336	0.321	0.335	0.344	0.288	0.394	0.361	0.304

Standard errors in parentheses, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* Columns (1) to (3) in the table report regressions of the share allocated to the child (with possible discrete values of 0, 0.1, 0.2, ..., 0.9, 1) on the treatment variables “Husband Bargaining” (indicator variable taking the value 1 for couples in Husband Bargaining) in Column (1), “Wife Bargaining” (indicator variable taking the value 1 for couples in Wife Bargaining) in Column (2), and “Wife Dictator” (indicator variable taking the value 1 for couples in Wife Dictator) in Column (3), the indicator variable “Husband most patient” (indicator variable taking the value 1 for couples where the husband allocates more to the future than the wife), “Treatment X H most patient”, an interaction variable between the treatment indicator variables and “H most patient”, and a set of explanatory variables. Columns (4) to (6) in the table report regressions of the share allocated to the child on the treatment variables “Husband Bargaining”, “Wife Bargaining”, and “Wife Dictator”, respectively, the indicator variable “H least risk averse” (indicator variable taking the value 1 for couples where the husband allocates more to the risky option than the wife), interaction variables between the treatment indicator variable and “H least risk averse”, and a set of explanatory variables. Columns (7) to (9) in the table report regressions of the share allocated to the child on the treatment variables “Husband Bargaining”, “Wife Bargaining”, and “Wife Dictator”, respectively, the indicator variable “Male child” (indicator variable taking the value 1 if the couple’s chosen child is a boy), interaction terms between the treatment indicator variable and “Male child”, and a set of explanatory variables. “Treatment (H most patient)”: sum of estimated parameters for the treatment indicator variable and “Treatment X H most patient”. “Treatment (H least risk averse)”: sum of estimated parameters for the treatment indicator variable and “Treatment X H least risk averse”. “Treatment (Male child)”: sum of estimated parameters for the treatment indicator variable and “Treatment X Male Child”. See Table 2 for definition of “Session FE”, “Child background”, “Parent background”, and “Parent difference”.

*Source:* Authors’ computation based on the collected data.

**Result 4:** The spouse’s risk preferences do not matter to the effect of an intermediate or large increase in the wife’s bargaining power ( $\theta_{WB} + \beta_{WB} = -0.064$ ,  $p = 0.245$ , and  $\theta_{WD} + \beta_{WD} = -0.013$ ,  $p = 0.758$ , see Columns (5) and (6), Table 4). For a small increase in the wife’s bargaining power, the share allocated to the child increases if the husband is less risk averse than the wife ( $\theta_{HB} + \beta_{HB} = 0.097$ ,  $p = 0.075$ , see Column (4), Table 4). However, this finding is not robust to the use of final share allocated to the child.

Finally, we consider the gender of the child in Columns (7) to (9). First, we find that when the wife has no bargaining power, significantly more is allocated to boys than to girls. Second, in all situations where the wife has some bargaining power, at least as much is allocated to girls as to boys. This latter finding is also shown in Table C.1 in Appendix C, where we compare the situation where the husband has complete bargaining power to all three situations where the wife has some bargaining power. Based on these regressions, we formulate the following result about the spouses’ gender preferences:

**Result 5:** An increase in the wife’s bargaining power leads to more equal allocations to boys and girls. When the husband has complete bargaining power, he allocates significantly more to boys ( $\beta_{var} = 0.120$ ,  $p = 0.009$ , see Column (3), Table C.1). When the wife has some bargaining power, at least as much is allocated to girls as to boys ( $\beta_{HB} = 0.157$ ,  $p = 0.003$ , see Column (7),  $\beta_{WB} = 0.006$ ,  $p = 0.916$ , see Column (8), and  $\beta_{WD} = 0.032$ ,  $p = 0.470$ , see Column (9), Table 4).

Result 3 provides evidence that, even though the gender of the spouse making the allocation decision does not matter to the share allocated to the child (Result 1), his or her time preferences do. In other words, the attributes of the spouse with the upper hand in the bargaining situation are important, but not the gender itself. Result 4 shows that risk preferences are not an important attribute in determining the allocation to the child. Finally, Result 5 shows that increasing the wife’s bargaining power makes allocations to boys and girls more equal.

## 6 Discussion and conclusion

Our paper studies the effect of an increase in the wife’s bargaining power on couples’ spending on children. We do not find any evidence that such a change in relative bargaining power between the spouses increases the share allocated to the child. This finding challenges not only earlier studies such as Thomas (1990) and Thomas (1993), but also the general view among policy-makers that female empowerment leads to higher household spending on children. Our results further suggest that it is the attributes of the main decision-maker (time preferences and gender preferences), not the gender itself, that matter.

Result 1 suggests that increasing the wife’s bargaining power does not increase spending on children and might even reduce it: an intermediate increase in the wife’s bargaining power causally reduces the allocation to the child. The share allocated to the child is not significantly different between the two dictator treatments, suggesting that, on average, the husband and the wife assign the same weight to the child in their utility function. Thus, the effect of an intermediate increase in the wife’s bargaining power cannot be explained by a difference in weights assigned to the child in the utility function.

To further understand how the change in bargaining power affects household decisions,

we investigate the couples' allocations to the husband and the wife (Result 2). When one spouse has all the bargaining power, he or she receives a significantly larger share than when he or she has no bargaining power. This effect is driven by the wife: while the husband allocates about one third of the endowment each to himself, the child, and the wife when he has full bargaining power, the wife utilizes the situation where she has full bargaining power to allocate a larger share to herself (on average 0.4) and less to the husband (on average 0.24). As shown in the descriptive analysis, when the husband can reject the proposed allocation in Wife Bargaining, the wife proposes a higher allocation to herself (as in Wife Dictator), but instead of reducing the share to the husband, she reduces the share to the child. These findings indicate that wife's primary concern is to obtain a higher share of the allocation. When facing the possibility of a rejection from the husband, she proposes a larger share to the husband to make him happy and chooses to give a smaller share to the child rather than reducing her own in order to achieve this. This choice may reflect that the wife underestimates the husband's preferences about spending on children. Previous studies have shown that the wife tends to underestimate the husband's preference for a public good (Kebede et al. 2014). If the wife believes that her husband prefers allocating money to himself over allocating money to the child, she may reduce the allocation to the child, and instead increase the allocation to him.<sup>18</sup>

Result 3 suggests that time preferences play an important role in household decision-making. In particular, when one spouse has complete bargaining power, it is most beneficial for the child if this is the most patient spouse. This finding is in line with previous studies; Ahiakpor and Swaray (2015) find a positive association between male household head's patience and investments in children's education in rural Ghana, and Tanaka and Yamano (2015) find that the more patient spouses are, the higher the educational expenditures are in Uganda. In our sample, men tend to be more patient than women, implying that, on average, it is more beneficial for the child if the husband is the main decision-maker.<sup>19</sup>

Result 5 indicates that husbands have *stronger* preferences for allocating money to boys than to girls. Wives, on the other hand, do not display any gender preferences and allocate the same amount to boys and girls. The result is partly consistent with previous studies; Dizon-Ross and Jayachandran (2015) find that women favor girls and men favor boys in rural Uganda, and Raley and Bianchi (2006) find that, in the US, men spend more time with boys than with girls, whereas women spend equal time with boys and girls. Including women in the decision process by increasing their bargaining power gives a more gender-equal allocation to the children and, in the long run, female empowerment may lead to societies becoming more gender equal, an important goal in itself.

To summarize the result for the underlying mechanisms, our study suggests that the weight assigned to the child depends on the parents' time preferences, but not on their risk preferences. Furthermore, the husband's weight on the child also depends on the gender. In particular, the husband displays a stronger preference for boys. The wife's

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<sup>18</sup>We do not know how the spouses planned to spend the amount they allocated to themselves, and cannot rule out that either of them prefers to spend their money on other goods to their children such as clothing and food. Furthermore, we do not know what happens in the interaction between the spouses after the experiment. We do not have reason to believe that any behavior after the experiment is correlated with treatment, and thus this cannot explain any of the results discussed.

<sup>19</sup>Carlsson et al. (2012) and Yang and Carlsson (2012) find that women are more patient than men in China. Our finding is in line with the general finding in Falk et al. (2015), who study time preferences in 75 countries. Overall, they find that men are slightly more patient than women are, even though this gender difference is not found in Tanzania (mail correspondence with Armin Falk and Benjamin Enke).

weight does not appear to be influenced by the child's gender. Our study suggests that increased spending on children is not an instrumental reason for targeting women with cash transfers, but gender equality (among both children and adults) is. In other words, if the aim of a policy is to increase spending on children, targeted cash transfers to women are not necessarily the most efficient instrument. Future research should focus more on the relationship between parents' time preferences and spending on children. In particular, it would be interesting to test the external validity of our results by, e.g., conducting field experiments.

The results presented in this paper point to several avenues of new research. First, more generalized studies would be of interest. While random assignment of couples to different treatments ensures internal validity, the sample is not necessarily representative of the population in Dar es Salaam, or other parts of Tanzania. This is because we invited couples who already had a child in primary school (and thus had already made an investment), and because the couples that signed up for the study may be different from the couples that did not sign up. Second, considering other types of spending on children, such as nutrition and health, is important. Third, studying the spouses' preferences, such as time preferences and risk preferences, seems to be important in future research in order to understand the mechanisms behind household behavior.



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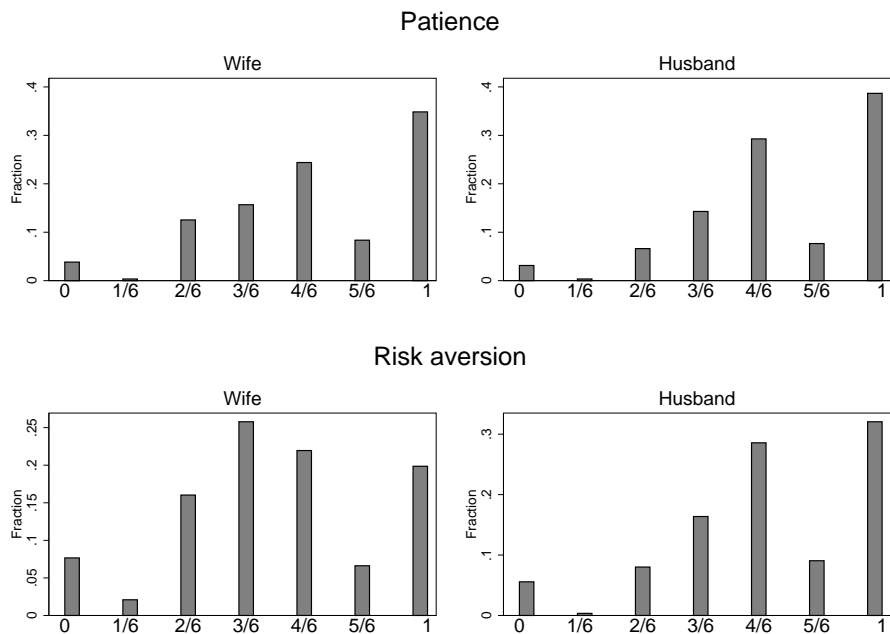
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## Appendix A Additional figures

Figure A.1: Distribution of time and risk preferences



*Note:* The upper panel illustrates the distribution of time preferences (measured as share of endowment, TZS3,000, allocated to the future) for wives (left) and husbands (right), respectively. The lower panel illustrates the distribution of risk preferences (measured as share of endowment, TZS3,000, allocated to the risky option) for wives (left) and husbands (right) respectively.

*Source:* Authors' computation based on the collected data.

## Appendix B Additional descriptive tables

Table B.1: Balance regressions

	Husband Dictator vs. Husband Bargaining	Husband Dictator vs. Wife Bargaining	Husband Dictator vs. Wife Dictator
Age husband	-0.551 (1.937)	-0.272 (1.551)	-0.451 (1.494)
Age wife	-0.026 (1.357)	-1.958 (1.254)	-0.860 (1.173)
Some secondary or more H	-0.069 (0.088)	0.145* (0.078)	0.029 (0.067)
Some secondary or more W	0.101 (0.084)	0.144* (0.077)	-0.010 (0.069)
Self-employed H	-0.014 (0.080)	-0.132 (0.084)	-0.060 (0.069)
Self-employed W	0.044 (0.085)	0.095 (0.087)	0.083 (0.073)
Children not in primary	-0.343 (0.236)	-0.158 (0.278)	-0.252 (0.218)
Children in primary	0.181* (0.108)	0.170 (0.108)	0.155* (0.088)
Male child	-0.157* (0.083)	0.033 (0.084)	-0.039 (0.072)
Standard chosen child	-0.092 (0.343)	-0.074 (0.344)	0.120 (0.287)
Chosen child attends A	0.085* (0.048)	0.042 (0.057)	-0.026 (0.041)
Chosen child attends B	-0.051 (0.080)	-0.105 (0.075)	-0.001 (0.067)
Chosen child attends C	-0.047 (0.033)	0.046 (0.050)	-0.005 (0.037)
Share invested in future H	0.013 (0.046)	-0.262*** (0.037)	-0.176*** (0.033)
Share invested in future W	0.008 (0.038)	0.136*** (0.052)	0.126*** (0.037)
Share invested in risky option H	-0.085* (0.049)	-0.094** (0.044)	-0.067* (0.039)
Share invested in risky option W	0.131*** (0.040)	0.032 (0.058)	0.104** (0.041)
H most patient	0.036 (0.082)	-0.388*** (0.080)	-0.403*** (0.066)
H least risk averse	-0.237*** (0.083)	0.140 (0.086)	-0.207*** (0.070)
H most educated	-0.018 (0.070)	0.005 (0.072)	0.091 (0.062)

Standard errors in parentheses, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Notes:* The table reports coefficients for regressions of each of the background characteristics as dependent variable on indicator variables for treatments (“Husband Bargaining” in Column (1), “Wife Bargaining” in Column (2), and “Wife Dictator” in Column (3)). “Age husband”: husband’s reported age. “Some secondary or more H”: indicator variable taking the value 1 if the husband has completed some secondary schooling or more. “Self-employed H”: indicator taking the value 1 if the husband is self-employed. “Children not in primary”: number of children currently not in primary school. “Children in primary”: number of children currently in primary school. “Male child”: indicator variable taking the value 1 if the child randomly chosen for tutoring was a boy. “Standard of chosen child”: Chosen child’s current standard in school. “Chosen child attends A”: indicator variable taking the value 1 for children in primary school A. “Chosen child attends B”: indicator variable taking the value 1 for children in primary school B. “Chosen child attends C”: indicator variable taking the value 1 for children in primary school C. “Share invested in future H”: share allocated by husband to the future. “Share invested in risky option H”: share allocated by the husband to the risky option. “Share invested in future W”: share allocated by the wife to the future. “Share invested in risky option W”: share allocated by the wife to the risky option. “H most patient”: indicator variable taking the value 1 for couples where the husband allocates more to the future than the wife. “H least risk averse”: indicator variable taking the value 1 for couples where the husband allocates more to the risky option than the wife. “H most educated”: indicator variable taking the value 1 for couples where the husband is more educated than the wife. The purpose of this is to check if participants in Husband Dictator and Husband Bargaining, Husband Dictator and Wife Bargaining, and Husband Dictator and Wife Dictator respectively, are different in terms of socioeconomic characteristics. All regressions include session fixed effects, indicator variables for each of the 11 different sessions of the experiment.

*Source:* Authors’ computation based on the collected data.

## Appendix C Additional heterogeneity tables

Table C.1: Heterogeneity in time- and risk-preference difference and gender preference, comparing Husband Dictator to Wife some power

	Var = H most patient	Var = H least risk averse	Var = Male child
Wife some power	0.027 (0.041)	-0.020 (0.045)	0.048 (0.035)
Wife some power X var	-0.074 (0.058)	0.022 (0.059)	-0.131** (0.056)
var	0.092* (0.048)	-0.064 (0.052)	0.120*** (0.046)
Wife some power (var)	-0.047 (0.040)	0.002 (0.037)	-0.084* (0.045)
Session FE	Yes	Yes	Yes
Child background	Yes	Yes	Yes
Parent background	Yes	Yes	Yes
Parent difference	Yes	Yes	Yes
Couples	286	286	286
$R^2$	0.163	0.186	0.209

Robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* The table reports a regression of the share allocated to the child (with possible discrete values of 0, 0.1, 0.2, ..., 0.9, 1) on the treatment variable “Wife some power” (indicator variable taking the value 1 for couples where the wife has some bargaining power, i.e. Husband Bargaining, Wife Bargaining, and Wife Dictator) and the indicator variable “Husband most patient” (indicator variable taking the value 1 for couples where the husband allocates more to the future than the wife), “Wife some power X H most patient”, an interaction variable between the treatment indicator variables and “H most patient”, and a set of explanatory variables in Column (1). In Column (2), the table reports a regression of the share allocated to the child on the treatment variable “Wife some power” and the indicator variable “H least risk averse” (indicator variable taking the value 1 for couples where the husband allocates more to the risky option than the wife), “Wife some power X H least risk averse”, an interaction term between the “Wife some power” variable and “H least risk averse”, and a set of explanatory variables. In Column (3) the table reports a regression of the share allocated to the child on the treatment variable “Wife some power” and the indicator variable “Male child” (indicator variable taking the value 1 if the couple’s chosen child is a boy), “Wife some power X Male child”, an interaction term between the treatment indicator variable and “Male child”, and a set of explanatory variables. “Wife some power (H most patient)”: sum of estimated parameters for “Wife some power” and “Wife some power X H most patient”. “Wife some power (H least risk averse)”: sum of estimated parameters for “Wife some power” and “Treatment X H least risk averse”. “Wife some power (Male child)”: sum of estimated parameters for “Wife some power” and “Wife some power X Male Child”. See Table 2 for definition of “Session FE”, “Child background”, “Parent background”, and “Parent difference”.

*Source:* Authors’ computation based on the collected data.



Table C.2: Heterogeneity in education level differences and number of children

	Var = H most educated			Var = Child total		
	HB	WB	WD	HB	WB	WD
Treatment	0.078 (0.048)	-0.048 (0.051)	-0.011 (0.038)	0.063 (0.064)	-0.058 (0.066)	0.021 (0.043)
Treatment X var	-0.031 (0.099)	-0.001 (0.088)	-0.041 (0.083)	0.015 (0.086)	0.016 (0.074)	-0.066 (0.061)
var	0.044 (0.077)	0.148* (0.081)	0.004 (0.083)	0.028 (0.045)	0.045 (0.044)	0.060 (0.042)
Treatment (var)	0.047 (0.091)	-0.049 (0.081)	-0.052 (0.078)	0.077 (0.059)	-0.042 (0.053)	-0.046 (0.049)
Session FE	Yes	Yes	Yes	Yes	Yes	Yes
Child background	Yes	Yes	Yes	Yes	Yes	Yes
Parent background	Yes	Yes	Yes	Yes	Yes	Yes
Parent difference (educ, pref)	Yes	Yes	Yes	Yes	Yes	Yes
Couples	139	140	189	139	140	189
$R^2$	0.349	0.346	0.272	0.348	0.346	0.295

Robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* Columns (1) to (3) in the table report regressions of the share allocated to the child (with possible discrete values of 0,0.1,0.2,...,0.9,1) on the treatment variables “Husband Bargaining” (indicator variable taking the value 1 for couples in Husband Bargaining) in Column (1), “Wife Bargaining” (indicator variable taking the value 1 for couples in Wife Bargaining) in Column (2), and “Wife Dictator” (indicator variable taking the value 1 for couples in Wife Dictator) in Column (3), the indicator variable “Husband most educated” (indicator variable taking the value 1 for couples where the husband has obtained a higher level of education than the wife), “Treatment X H most educated”, an interaction variable between the treatment indicator variables and “H most educated”, and a set of explanatory variables. Columns (4) to (6) in the table report regressions of the share allocated to the child on the treatment variables “Husband Bargaining”, “Wife Bargaining”, and “Wife Dictator”, respectively, the indicator variable “Child total” (indicator variable taking the value 1 for couples that currently care for two or more children), interaction variables between the treatment indicator variable and “Child total”, and a set of explanatory variables. “Treatment (H most educated)”: sum of estimated parameters for the treatment indicator variable and “Treatment X H most educated”. “Treatment (Child total)”: sum of estimated parameters for the treatment indicator variable and “Treatment X Child total”. See Table 2 for definition of “Session FE”, “Child background”, “Parent background”, and “Parent difference”.

*Source:* Authors’ computation based on the collected data.

## Appendix D Robustness check: time- and risk-preference difference

Table D.1: Heterogeneity in time- and risk-preference difference, strict definition

	Var = H most patient 2			Var = H least risk averse 2		
	HB	WB	WD	HB	WB	HD
Treatment	-0.114 (0.102)	-0.038 (0.064)	0.101 (0.061)	-0.040 (0.096)	0.029 (0.103)	0.047 (0.085)
Treatment X var	0.212* (0.113)	-0.096 (0.096)	-0.238*** (0.079)	0.122 (0.110)	-0.065 (0.113)	-0.049 (0.102)
var	0.075 (0.067)	0.091 (0.062)	0.114* (0.062)	-0.062 (0.084)	-0.029 (0.086)	-0.069 (0.086)
Treatment (var)	0.098*** (0.048)	-0.133* (0.067)	-0.138** (0.055)	0.082 (0.055)	-0.036 (0.059)	-0.002 (0.047)
Session FE	Yes	Yes	Yes	Yes	Yes	Yes
Child background	Yes	Yes	Yes	Yes	Yes	Yes
Parent background	Yes	Yes	Yes	Yes	Yes	Yes
Parent difference (educ, pref)	Yes	Yes	Yes	Yes	Yes	Yes
Couples	116	120	152	110	115	146
$R^2$	0.435	0.430	0.369	0.406	0.395	0.333

Robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* All couples where the husband and wife are equally patient and all couples where the husband and wife are equally risk averse are dropped. Columns (1) to (3) in the table report regressions of the share allocated to the child (with possible discrete values of 0,0.1,0.2,...,0.9,1) on the treatment variables “Husband Bargaining” (indicator variable taking the value 1 for couples in Husband Bargaining) in Column (1), “Wife Bargaining” (indicator variable taking the value 1 for couples in Wife Bargaining) in Column (2), and “Wife Dictator” (indicator variable taking the value 1 for couples in Wife Dictator) in Column (3), the indicator variable “Husband most patient 2” (indicator variable taking the value 1 for couples where the husband allocates more to the future than the wife, and 0 if the wife allocates more to the future than the husband), “Treatment X H most patient 2”, an interaction variable between the treatment indicator variables and “H most patient 2”, and a set of explanatory variables. Columns (4) to (6) in the table report regressions of the share allocated to the child on the treatment variables “Husband Bargaining”, “Wife Bargaining”, and “Wife Dictator”, respectively, the indicator variable “H least risk averse 2” (indicator variable taking the value 1 if the husband allocates more to the risky option than the wife and 0 if the wife allocates more to the risky option than the husband), interaction variables between the treatment indicator variable and “H least risk averse 2”, and a set of explanatory variables. “Treatment (H most patient 2)”: sum of estimated parameters for the treatment indicator variable and “Treatment X H most patient 2”. “Treatment (H least risk averse 2)”: sum of estimated parameters for the treatment indicator variable and “Treatment X H least risk averse 2”. See Table 2 for definition of “Session FE”, “Child background”, and “Parent difference”.

*Source:* Authors’ computation based on the collected data.

## Appendix E Robustness checks with final proposal

Table E.1: Effect of increasing the wife’s bargaining power on the allocation to the child, with final share

	(1)	(2)	(3)	(4)	(5)
Husband Bargaining	−0.001 (0.037)	0.003 (0.036)	0.009 (0.037)	0.013 (0.037)	0.009 (0.036)
Wife Bargaining	−0.088** (0.035)	−0.085** (0.035)	−0.081** (0.035)	−0.066* (0.039)	−0.065* (0.039)
Wife Dictator	−0.019 (0.034)	−0.019 (0.033)	−0.017 (0.033)	−0.004 (0.032)	−0.000 (0.032)
Male child			0.021 (0.026)	0.041 (0.026)	0.039 (0.025)
Chosen child’s standard			0.004 (0.006)	0.008 (0.007)	0.006 (0.007)
Age husband				0.003* (0.002)	0.003* (0.002)
Age wife				−0.003 (0.002)	−0.003 (0.002)
H most educated					0.030 (0.042)
H most patient					0.063 (0.044)
H least risk averse					−0.067 (0.040)
Session FE	No	Yes	Yes	Yes	Yes
Child background	No	No	Yes	Yes	Yes
Parent background	No	No	No	Yes	Yes
Parent difference (educ, pref)	No	No	No	No	Yes
Couples	287	287	287	286	286
$R^2$	0.021	0.104	0.114	0.188	0.201

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* The table reports regressions of the **final** share allocated to the child (share allocated to child divided by the final household endowment (TSZ15000 – TSZ500 for every time a proposal is rejected), with possible discrete values of 0, 0.1, 0.2, ..., 0.9, 1) on the treatment variables “Husband Bargaining” (indicator variable taking the value 1 for couples in Husband Bargaining), “Wife Bargaining” (indicator variable taking the value 1 for couples in Wife Bargaining), “Wife Dictator” (indicator variable taking the value 1 for couples in Wife Dictator), and a set of explanatory variables. See Table 2 for definition of “Session FE”, “Child background”, and “Parent background”.

*Source:* Authors’ computation based on the collected data.

Table E.2: Effect of increasing the wife’s bargaining power on the allocation to the wife and the husband, with final share

	Allocation to wife	Allocation to husband
Husband Bargaining	−0.010 (0.030)	−0.002 (0.034)
Wife Bargaining	0.045 (0.029)	0.011 (0.033)
Wife Dictator	0.092*** (0.028)	−0.100*** (0.030)
Male child	0.002 (0.024)	−0.039* (0.023)
Chosen child’s standard	−0.005 (0.006)	−0.001 (0.006)
Age husband	−0.000 (0.001)	−0.003** (0.001)
Age wife	0.003 (0.002)	0.001 (0.002)
H most educated	0.021 (0.036)	−0.041 (0.033)
H most patient	0.030 (0.036)	−0.080** (0.038)
H least risk averse	0.039 (0.039)	0.031 (0.038)
Session FE	Yes	Yes
Child background	Yes	Yes
Parent background	Yes	Yes
Parent difference (educ, pref)	Yes	Yes
Couples	286	286
$R^2$	0.218	0.201

Robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* The table reports regressions of the **final** share allocated to the wife and the husband (share allocated to the wife or the husband divided by the final household endowment (TSZ15000 – TSZ500 for every time a proposal is rejected), with possible discrete values of 0, 0.1, 0.2, ..., 0.9, 1) in Column (1) and a regression of the **final** share allocated to the husband (with possible discrete values of 0, 0.033, 0.67, 0.1, ..., 0.933, 0.967, 1) in Column (2) on the treatment variables “Husband Bargaining” (indicator variable taking the value 1 for couples in Husband Bargaining), “Wife Bargaining” (indicator variable taking the value 1 for couples in Wife Bargaining), “Wife Dictator” (indicator variable taking the value 1 for couples in Wife Dictator), and a set of explanatory variables. See Table 2 for definition of “Session FE”, “Child background”, “Parent background”, and “Parent difference (educ, pref)”.

*Source:* Authors’ computation based on the collected data.

Table E.3: Heterogeneity in time- and risk-preference difference and gender of child, with final share

	Var = H most patient			Var = H least risk averse			Var = Male child		
	HB	WB	WD	HB	WB	WD	HB	WB	WD
Treatment	-0.007 (0.074)	-0.018 (0.052)	0.072* (0.043)	-0.017 (0.054)	-0.006 (0.068)	-0.016 (0.053)	0.127*** (0.046)	0.023 (0.054)	0.032 (0.044)
Treatment X var	0.085 (0.087)	-0.113 (0.089)	-0.209*** (0.064)	0.119 (0.075)	-0.051 (0.078)	0.003 (0.067)	-0.206** (0.079)	-0.137 (0.085)	-0.114* (0.062)
var	0.092* (0.051)	0.098* (0.050)	0.104** (0.048)	-0.027 (0.055)	-0.004 (0.053)	-0.069 (0.053)	0.066** (0.045)	0.121*** (0.046)	0.124*** (0.047)
Treatment (var)	0.078* (0.047)	-0.131* (0.069)	-0.137*** (0.050)	0.102* (0.054)	-0.056 (0.055)	-0.013 (0.044)	-0.079 (0.067)	-0.114 (0.071)	-0.083 (0.051)
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child background	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent background	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent difference	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Couples	139	140	189	139	140	189	139	140	189
$R^2$	0.333	0.319	0.321	0.349	0.327	0.288	0.383	0.347	0.304

Robust standard errors in parentheses, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* Columns (1) to (3) in the table report regressions of the **final** share allocated to the child (share allocated to child divided by the final household endowment (TSZ15000 – TSZ500 for every time a proposal is rejected), with possible discrete values of 0,0.1,0.2,...,0.9,1) on the treatment variables “Husband Bargaining” (indicator variable taking the value 1 for couples in Husband Bargaining) in Column (1), “Wife Bargaining” (indicator variable taking the value 1 for couples in Wife Bargaining) in Column (2), and “Wife Dictator” (indicator variable taking the value 1 for couples in Wife Dictator) in Column (3), the indicator variable “Husband most patient” (indicator variable taking the value 1 for couples where the husband allocates more to the future than the wife), “Treatment X H most patient”, an interaction variable between the treatment indicator variables and “H most patient”, and a set of explanatory variables. Columns (4) to (6) in the table report regressions of the **final** share allocated to the child on the treatment variables “Husband Bargaining”, “Wife Bargaining”, and “Wife Dictator”, respectively, the indicator variable “H least risk averse” (indicator variable taking the value 1 for couples where the husband allocates more to the risky option than the wife), interaction variables between the treatment indicator variable and “H least risk averse”, and a set of explanatory variables. Columns (7) to (9) in the table report regressions of the **final** share allocated to the child on the treatment variables “Husband Bargaining”, “Wife Bargaining”, and “Wife Dictator”, respectively, the indicator variable “Male child” (indicator variable taking the value 1 if the couple’s chosen child is a boy), interaction terms between the treatment indicator variable and “Male child”, and a set of explanatory variables. “Treatment (H most patient)”: sum of estimated parameters for the treatment indicator variable and “Treatment X H most patient”. “Treatment (H least risk averse)”: sum of estimated parameters for the treatment indicator variable and “Treatment X H least risk averse”. “Treatment (Male child)”: sum of estimated parameters for the treatment indicator variable and “Treatment X Male Child”. See Table 2 for definition of “Session FE”, “Child background”, “Parent background”, and “Parent difference”.

*Source:* Authors’ computation based on the collected data.

## Appendix F Extended tables

Table F.1: Effect of increasing the wife's bargaining power on the allocation to the child, extended

	(1)	(2)	(3)	(4)	(5)
Husband Bargaining	0.012 (0.039)	0.016 (0.039)	0.021 (0.040)	0.026 (0.038)	0.022 (0.039)
Wife Bargaining	-0.103*** (0.036)	-0.100*** (0.035)	-0.096*** (0.035)	-0.080** (0.040)	-0.079** (0.039)
Wife Dictator	-0.019 (0.034)	-0.019 (0.033)	-0.015 (0.034)	0.001 (0.032)	0.003 (0.032)
Male child			0.020 (0.026)	0.038 (0.026)	0.037 (0.026)
Chosen child's standard			0.001 (0.007)	0.006 (0.007)	0.005 (0.007)
More than 2 children			0.022 (0.027)	0.028 (0.026)	0.031 (0.026)
School A			-0.003 (0.045)	-0.003 (0.043)	-0.004 (0.043)
School B			0.031 (0.032)	0.035 (0.031)	0.036 (0.031)
School C			0.000 (0.064)	-0.009 (0.064)	-0.011 (0.064)
Age husband				0.003** (0.002)	0.003** (0.002)
Age wife				-0.004* (0.002)	-0.004* (0.002)
Self-employed H				-0.004 (0.029)	0.002 (0.029)
Self-employed W				0.017 (0.026)	0.014 (0.026)
Highest level of H				0.015 (0.014)	0.005 (0.020)
Highest level of W				0.018 (0.018)	0.028 (0.021)
Share invested in future H				0.119* (0.066)	0.083 (0.079)
Share invested in future W				0.044 (0.048)	0.107 (0.072)
Share invested in risky option H				0.012 (0.058)	0.085 (0.066)
Share invested in risky option W				0.052 (0.048)	-0.026 (0.067)
H most educated					0.032 (0.043)
H most patient					0.050

					(0.045)
H least risk averse					-0.069*
					(0.042)
Constant	0.363***	0.387***	0.331***	0.018	0.016
	(0.026)	(0.083)	(0.097)	(0.127)	(0.127)
Session FE	Yes	Yes	Yes	Yes	Yes
Couples	287	287	287	286	286
$R^2$	0.031	0.115	0.123	0.196	0.208

Robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* The table reports regressions of the share allocated to the child (with possible discrete values of 0, 0.1, 0.2, ..., 0.9, 1) on the treatment variables “Husband Bargaining” (indicator variable taking the value 1 for couples in Husband Bargaining), “Wife Bargaining” (indicator variable taking the value 1 for couples in Wife Bargaining), “Wife Dictator” (indicator variable taking the value 1 for couples in Wife Dictator), and a set of explanatory variables. “Session FE”: indicator variables for each of the 11 different sessions of the experiments. See table notes of Table 2 for definition of variables.

*Source:* Authors’ computation based on the collected data.



Table F.2: Effect of increasing the wife's bargaining power on the allocation to the wife and the husband, extended

	Allocation to wife	Allocation to husband
Husband Bargaining	-0.017 (0.031)	-0.007 (0.035)
Wife Bargaining	0.066** (0.032)	0.003 (0.035)
Wife Dictator	0.091*** (0.028)	-0.102*** (0.030)
Male child	0.004 (0.025)	-0.040* (0.023)
Chosen child's standard	-0.004 (0.006)	-0.001 (0.006)
More than 2 children	-0.021 (0.026)	-0.006 (0.025)
School A	0.010 (0.047)	0.000 (0.041)
School B	-0.038 (0.024)	0.001 (0.025)
School C	-0.022 (0.046)	0.016 (0.038)
Age husband	-0.000 (0.001)	-0.003** (0.001)
Age wife	0.003 (0.002)	0.001 (0.002)
Self-employed H	-0.019 (0.024)	0.016 (0.023)
Self-employed W	-0.010 (0.023)	-0.005 (0.022)
Highest level of H	0.001 (0.018)	-0.016 (0.016)
Highest level of W	-0.007 (0.020)	-0.014 (0.018)
Share invested in future H	-0.025 (0.063)	-0.075 (0.062)
Share invested in future W	-0.019 (0.057)	-0.068 (0.062)
Share invested in risky option H	-0.005 (0.062)	-0.077 (0.061)
Share invested in risky option W	0.008 (0.063)	0.019 (0.060)
H most educated	0.006 (0.038)	-0.028 (0.033)
H most patient	0.038	-0.075*

	(0.037)	(0.039)
H least risk averse	0.035 (0.040)	0.038 (0.039)
Constant	0.274** (0.109)	0.724*** (0.120)
Session FE	Yes	Yes
Couples	286	286
$R^2$	0.226	0.186

Robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* The table reports a regression of the share allocated to the wife (with possible discrete values of 0, 0.033, 0.67, 0.1, ..., 0.933, 0.967, 1) in Column (1), and a regression of the share allocated to the husband (with possible discrete values of 0, 0.033, 0.67, 0.1, ..., 0.933, 0.967, 1) in Column (2), on the treatment variables “Husband Bargaining” (indicator variable taking the value 1 for couples in Husband Bargaining), “Wife Bargaining” (indicator variable taking the value 1 for couples in Wife Bargaining), and “Wife Dictator” (indicator variable taking the value 1 for couples in Wife Dictator), and a set of explanatory variables. See Table 2 for definition of “Session FE”, “Child background”, “Parent background”, and “Parent difference” as well as background variables.

*Source:* Authors’ computation based on the collected data.

Table F.3: Heterogeneity in time- and risk-preference difference and gender preference, extended

	Var = H most patient			Var = H least risk averse			Var = Male child		
	HB	WB	WD	HB	WB	WD	HB	WB	WD
Treatment	0.060 (0.101)	-0.039 (0.053)	0.072* (0.043)	0.013 (0.063)	-0.024 (0.068)	-0.016 (0.053)	0.157*** (0.051)	0.006 (0.054)	0.032 (0.044)
Treatment X var	0.014 (0.113)	-0.094 (0.089)	-0.209*** (0.064)	0.084 (0.082)	-0.040 (0.079)	0.003 (0.067)	-0.240*** (0.083)	-0.126 (0.086)	-0.114* (0.062)
H most patient	0.102* (0.053)	0.095* (0.050)	0.104** (0.048)	0.050 (0.067)	0.026 (0.065)	0.016 (0.055)	0.044 (0.067)	0.038 (0.061)	0.012 (0.058)
H least risk averse	-0.027 (0.060)	-0.022 (0.060)	-0.079 (0.048)	-0.018 (0.057)	-0.005 (0.053)	-0.069 (0.053)	-0.070 (0.061)	-0.038 (0.061)	-0.075 (0.051)
Male child	0.069 (0.042)	0.074* (0.040)	0.066** (0.031)	0.079* (0.040)	0.081** (0.041)	0.066** (0.031)	0.139*** (0.045)	0.119** (0.046)	0.124*** (0.047)
Share invested in future H				0.200* (0.111)	0.215* (0.109)	0.095 (0.099)	0.258** (0.120)	0.180 (0.110)	0.083 (0.124)
Share invested in future W				0.039 (0.119)	0.019 (0.099)	0.079 (0.089)	0.098 (0.114)	0.044 (0.099)	0.072 (0.098)
Chosen child's standard	0.001 (0.012)	0.006 (0.010)	0.018** (0.008)	0.004 (0.011)	0.005 (0.010)	0.018** (0.009)	0.001 (0.011)	0.006 (0.010)	0.019** (0.008)
More than 2 children	0.044 (0.039)	0.050 (0.038)	0.019 (0.030)	0.035 (0.038)	0.056 (0.037)	0.024 (0.029)	0.037 (0.038)	0.043 (0.037)	0.027 (0.029)
School A	-0.116 (0.077)	-0.035 (0.060)	-0.043 (0.053)	-0.115* (0.068)	-0.042 (0.056)	-0.036 (0.052)	-0.123* (0.071)	-0.051 (0.058)	-0.042 (0.054)
School B	-0.015 (0.045)	0.004 (0.042)	0.048 (0.039)	-0.008 (0.043)	0.008 (0.042)	0.054 (0.040)	-0.010 (0.044)	0.009 (0.042)	0.045 (0.039)
School C	0.074 (0.085)	-0.004 (0.074)	0.049 (0.075)	0.026 (0.086)	-0.011 (0.074)	0.016 (0.081)	0.034 (0.081)	-0.011 (0.072)	0.014 (0.082)

Age husband	0.006** (0.003)	0.004 (0.003)	0.004* (0.002)	0.005** (0.002)	0.004 (0.003)	0.004* (0.002)	0.005** (0.002)	0.004 (0.003)	0.004* (0.002)
Age wife	-0.006 (0.004)	-0.006* (0.004)	-0.006** (0.003)	-0.004 (0.003)	-0.006* (0.003)	-0.005* (0.003)	-0.004 (0.003)	-0.006* (0.003)	-0.005* (0.003)
Self-employed H	-0.024 (0.049)	-0.011 (0.044)	-0.024 (0.036)	-0.030 (0.048)	-0.012 (0.042)	-0.023 (0.037)	-0.006 (0.046)	-0.011 (0.043)	-0.018 (0.036)
Self-employed W	0.014 (0.043)	0.077** (0.039)	0.022 (0.030)	0.008 (0.041)	0.065 (0.039)	0.011 (0.032)	0.006 (0.040)	0.056 (0.043)	0.012 (0.031)
Highest level of H	0.044 (0.036)	-0.037 (0.033)	0.022 (0.026)	0.028 (0.033)	-0.038 (0.033)	0.021 (0.029)	0.039 (0.032)	-0.034 (0.033)	0.023 (0.028)
Highest level of W	-0.005 (0.032)	0.046 (0.030)	0.027 (0.027)	0.004 (0.032)	0.044 (0.031)	0.033 (0.028)	-0.011 (0.033)	0.043 (0.030)	0.027 (0.029)
Share invested in risky option H	0.090 (0.106)	0.123 (0.087)	0.099 (0.074)				0.106 (0.097)	0.046 (0.091)	0.034 (0.091)
Share invested in risky option W	-0.089 (0.103)	0.010 (0.075)	0.006 (0.073)				-0.256** (0.118)	-0.021 (0.085)	0.002 (0.085)
H most educated	0.004 (0.071)	0.148** (0.068)	-0.011 (0.059)	0.032 (0.070)	0.144** (0.069)	-0.013 (0.060)	0.035 (0.068)	0.145** (0.065)	-0.022 (0.058)
Constant	0.192 (0.203)	0.202 (0.200)	0.093 (0.151)	0.000 (0.205)	0.112 (0.195)	0.041 (0.158)	0.047 (0.188)	0.127 (0.191)	0.022 (0.155)
Treatment (var)	0.073 (0.049)	-0.133 (0.068)	-0.137 (0.050)	0.097 (0.054)	-0.064 (0.055)	-0.013 (0.044)	-0.083 (0.067)	-0.120 (0.071)	-0.083 (0.051)
Session FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Couples	139	140	189	139	140	189	139	140	189
$R^2$	0.305	0.336	0.321	0.335	0.344	0.288	0.394	0.361	0.304

Robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

*Note:* Columns (1) to (3) in the table report regressions of the share allocated to the child (with possible discrete values of 0,0.1,0.2,...,0.9,1) on the treatment variables “Husband Bargaining” (indicator variable taking the value 1 for couples in Husband Bargaining) in Column (1), “Wife Bargaining” (indicator variable taking the value 1 for couples in Wife Bargaining) in Column (2), and “Wife Dictator” (indicator variable taking the value 1 for couples in Wife Dictator) in Column (3), the indicator variable “Husband most patient” (indicator variable taking the value 1 for couples where the husband allocates more to the future than the wife), “Treatment X var”, an interaction variable between the treatment indicator variables and “var”, and a set of explanatory variables. Columns (4) to (6) in the table report regressions of the share allocated to the child on the treatment variables “Husband Bargaining”, “Wife Bargaining”, and “Wife Dictator”, respectively, the indicator variable “H least risk averse” (indicator variable taking the value 1 for couples where the husband allocates more to the risky option than the wife), interaction variables between the treatment indicator variable and “H least risk averse”, and a set of explanatory variables. Columns (7) to (9) in the table report regressions of the share allocated to the child on the treatment variables “Husband Bargaining”, “Wife Bargaining”, and “Wife Dictator”, respectively, the indicator variable “Male child” (indicator variable taking the value 1 if the couple’s chosen child is a boy), interaction terms between the treatment indicator variable and “Male child”, and a set of explanatory variables. “Treatment (H most patient)”: sum of estimated parameters for the treatment indicator variable and “Treatment X H most patient”. “Treatment (H least risk averse)”: sum of estimated parameters for the treatment indicator variable and “Treatment X H least risk averse”. “Treatment (Male child)”: sum of estimated parameters for the treatment indicator variable and “Treatment X Male Child”. See Table 2 for definition of “Session FE”.

*Source:* Authors’ computation based on the collected data.

## Appendix G Invitation letter

Economic and Social Research Foundation (ESRF)

P. O. Box 31226

Dar es salaam

**25<sup>th</sup> May 2015**

To parents of .....

**REF: INVITATION TO PARTICIPATE IN RESEARCH ON HOUSEHOLD DECISION-MAKING**

I have a pleasure to invite you both (father and mother) to participate in a research project about decision-making. Participation in the research project will take about three hours. Each of you will receive a show up fee and some refreshments. Depending on the decisions you make during the study, you may receive an additional amount. The research project will take place between July 8 and August 5. Precise date and venue will be communicated to you later.

Taking part in the study is entirely your decision. You do not have to participate in this study if you do not want to. If you decide to participate in the study, you can still withdraw at any time. All information you give will be completely confidential. We will not be able to trace your answers and decisions back to you.

We would highly appreciate your participation, it is very important to our research.

Coordinator

[Redacted signature]

If you would like to participate, please fill in your mobile phone numbers in the form provided below and return to us through your child in the next day so that we can call you back. For more details you can reach us through the following numbers:

[Redacted phone number]

[Redacted phone number]

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**CONTACT FORM**

Child's name.....

Father's name.....Phone numbers (1).....

(2).....

Mother's name.....Phone numbers (1).....

(2).....



## Appendix H Instructions

This section provides the instructions for elicitation of time and risk preferences as well as for the distributive decision for dictators and first proposers.

### H.1 Time preferences

*We will now hand out tokens that symbolize Tsh 3,000. Please use these to indicate your allocation. At the end of the study, you will be paid in mobile money.*

*You have received Tsh 3,000 and you are now asked to choose the amount you want to invest. The rest of the amount will be added to your payment that you receive today and will be paid in mobile money.*

*The amount you invest will be doubled and you will receive it in 3 weeks. For example, if you choose to invest nothing, you will receive Tsh 3,000 in mobile money today. If you choose to invest all of the Tsh 3,000, you will receive nothing today and Tsh 6,000 in mobile money in three weeks. If you choose to invest Tsh 1,000, you will receive Tsh 2,000 in mobile money today and Tsh 2,000 in mobile money in three weeks.*

*After three weeks, those of you who decide to invest some of the money will then get the mobile money. Those of you who do not invest, will not get anything after three weeks.*

*Please raise your hand if you have any questions*

*We will now come to each of you individually to verify that you have understood the task you have been given.*

*We now ask you to choose the amount of tokens you want to invest. The tokens you put in the cup with the picture of a calendar is the tokens you choose to invest. The invested amount will be doubled and received in mobile money in 3 weeks. The tokens you choose not to invest will be paid out to you in mobile money today after the session is completed.*

*Has anyone not made their choice?*

*My assistants will now come around to record your answers. We then move on to the next part of the session.*

### H.2 Risk preferences

*We will now hand out tokens that symbolize Tsh 3,000. Please use these to indicate your allocation. At the end of the study, you will be paid in real money, not mobile money. Your decision will be anonymous.*

*You have received Tsh 3,000 and you are now asked to choose the amount that you wish to invest in a risky option. The amount you choose not to invest, will be added to your payment.*

*In the lottery, there is an equal chance that the investment will fail or succeed. If the*

*investment fails, you lose the amount you invested. If the investment succeeds, you receive 3 times the amount invested.*

*After you have chosen how much you wish to invest, you will draw a card from a bucket to determine whether you win or lose. If the card is green, you win 3 times the amount you chose to invest. If the card is red, you lose the amount you chose to invest. It is equally likely that the card is green or red.*

*For example, if you choose to invest nothing, you will get the Tsh 3,000 for sure. That is, the draw of card will not affect your payment. If you choose to invest all of the Tsh 3,000, then if you draw a green card, you receive Tsh 9,000 in payment, and if you draw a red card you receive nothing in payment. If you chose to invest Tsh 1,500, then if you draw a green card, you receive 6,000 ( $1,500 + 3 \cdot 1,500$ ) in payment, and if you draw a red card, you receive 1,500 in payment*

*Please raise your hand if you have any questions.*

*We will now come to each of you individually to verify that you have understood the task you have been given.*

*We now ask you to choose the amount of tokens you want to invest. The tokens you put in the cup with the picture of a question mark is the tokens you choose to invest and which will triple if you draw a green card, and be reduced to zero if you draw a red card. The tokens you choose not to invest will be paid out to you for sure after the study is completed. The payment will be made in cash, not mobile money.*

*Has anyone not made their choice?*

*My assistants will now come around to record your answers and to draw the card. We then move on to the next part of the study.*

### **H.3 Distributive choice**

#### **H.3.1 Dictator treatments (Husband Dictator and Wife Dictator)**

*In this part of the study, you will be paired with your spouse. This means that the decisions you make will affect both your own and your spouse's payment.*

*Your household has received Tsh 15,000 and you have been chosen to decide how the money should be allocated between yourself, your child and your spouse.*

*We will now hand out tokens that symbolize Tsh 15,000. You will use these to show how you want to split the money between yourself, your child and your spouse. At the end of the study, you will be paid in real money according to the decision you made.*

*Your spouse will be informed about the task you have been given and the decision you make. However, he or she will not make any decision in this part of the session.*

*For each Tsh 1,500 you give to your child, this child will receive 1 week of tutoring. The*

*tutoring is conducted Monday through Friday from 15:00 to 17:00. It includes tuition, a speed test each day and a weekend test. Your child will be taught in groups of 25-40 children. The tutor teaches mathematics, English and Sayansi.*

*The RAs will now come and tell each of you which of your children has been randomly chosen to receive the tutoring.*

*Please raise your hand if you have any questions.*

*We will now come to each of you individually to verify that you have understood the task.*

*We now ask you to distribute the tokens between the three cups on your desk. Remember that the choice you make here will be implemented. The tokens you put in the cup with the picture of a woman will be paid out to your wife if you are a man and to yourself if you are a woman. The tokens you put in the cup with the picture of a child will be paid out as tutoring for your child. The tokens you put in the cup with the picture of a man will be paid out to yourself if you are a man and to your husband if you are a woman, after the completion of the session.*

*Has anyone not made their choice?*

*My assistants will now come and record your answers. They will take your decision to your spouse, so that she can see what you decided to do.*

*We now move on to the next part of the session.*

#### **H.4 Bargaining treatments (Husband Bargaining and Wife Bargaining)**

*In this part of the study, you will be paired with your spouse. This means that the decisions you make will affect both your own and your spouse's payment.*

*Your household has received Tsh 15,000 and you have been chosen to propose how the money should be allocated between yourself, your child and your spouse.*

*We will now hand out tokens that symbolize Tsh 15,000. You will use these to show your proposal for how to split the money between yourself, your child and your spouse. At the end of the study, you will be paid in real money.*

*When you have made your choice, we will reveal it to your spouse. He or she can either agree or disagree with your proposal. If he or she agrees, then your choice is implemented. If your spouse disagrees, he or she will get the opportunity to make a new proposal for the allocation of money and you can agree or disagree with the new proposal. You can do this as many times you like in order to get to an agreement for an allocation, but for each time you disagree the amount is reduced by Tsh 500. For example, if your spouse disagrees with your first proposal he or she will propose an allocation of Tsh 14,500. If*

*you then disagree with him or her, you will propose a new allocation of Tsh 14,000.*

*For each Tsh 1,500 you give to your child, this child will receive 1 week of tutoring. The tutoring is conducted Monday through Friday from 15:00 to 17:00. It includes tuition, a speed test each day and a weekend test. Your child will be taught in groups of 25-40 children. The tutor teaches mathematics, English and Sayansi.*

*The RAs will now come and tell each of you which of your children has been randomly chosen to receive the tutoring.*

*Please raise your hand if you have any questions.*

*We will now come to each of you individually to verify that you have understood the task you and your spouse have been given.*

*We now ask you to propose a distribution of the tokens between the three cups on your desk. The tokens you put in the cup with the picture of a woman is what you propose to give to yourself if you are a woman and to your wife if you are a man. The tokens you put in the cup with a picture of a child is what you propose to give to your child and which will be paid out as tutoring if proposal is accepted. The tokens you put in the cup with the picture of a man is what you propose to give to yourself if you are a man and to your husband if you are a woman.*

*Has anyone not made their choice?*

*My assistants will now come and record your answers. They will take your proposals to your spouses so that he or she can see what you propose to do and decide whether he or she agrees or disagrees with you. Please wait patiently while we wait for the response of your spouses.*