

Gender Bias in Parental Attitude: An Experimental Approach

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Abstract

Parental bias towards children of a particular gender has been widely observed in many societies. Such bias could be due to pure gender preference, differences in earning opportunities, or concern for the old-age supports. We conduct a lab-in-the-field experiment in rural Bangladesh to examine parental attitudes toward different-gendered children. Parents, either jointly or individually, allocate freely or restricted endowments for the benefit of anonymous girls or boys at a nearby school. The results suggest: 1) no systematic inherent gender bias; 2) no significant differences in individual and joint decisions; and 3) subjects reveal their true preferences.

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1.1 Introduction

Policymakers in developing countries are constantly struggling to address discrimination against girls and women. Sex-selective abortions and female infanticide are common in countries such as India, China and sub-Saharan Africa (Anderson and Ray 2010). Sen (1992) addressed this disturbing trend by identifying that millions of females are “missing” in these countries. A number of studies argue that there are deep-rooted structural and social factors that set the norms for boy-preference in developing countries. These include kinship, marriage payments, marriage norms, the agrarian economy, and rules and rituals associated with caste and religion (Pande and Astone, 2007; Anderson 2007).

If parents’ expectations of sons and daughters differ because, for example, sons bring benefits to their parents (e.g., old age insurance or better labour market prospects), while daughters impose costs (e.g., dowry), then differential treatment of sons and daughters is consistent with the efficient allocation of resources. However, this does not necessarily imply that parents show an inherent preference for sons. We define “inherent bias” as bias resulting from gender stereotyping or discriminatory beliefs about gender role, which are the product of socioeconomic factors, cultural norms, or religious teaching. Such taste or stereotyping may originate from persuasion or even from preadult influences (Fershtman and Gneezy 2001; Glaeser and Ma 2013) and may lead to taste-based discrimination (Becker 1957) if parental belief or prejudice toward gender affects parents’ utility functions.

In this paper, we attempt to understand parental attitudes toward different-gendered children using a very simple and novel experimental technique. We conduct a high-stakes artefactual field experiment in rural Bangladesh, where the subjects themselves are parents of school-age children. We examine whether there is any *systematic* inherent or preference-based gender bias among fathers and mothers, and whether such bias differs when they make the decision individually or jointly. We conduct a modified dictator game between two mutually exclusive groups that involves individual and joint decisions. The game is designed such that the outcome does not directly affect the subjects themselves or their own children.¹ This unique feature of the game, together with the anonymity of decision, minimizes any motivation for the subjects to hide their

¹ Given that the game outcome does not affect the subjects directly, it is more likely to capture the gender stereotyping or beliefs. However, this belief may turn into taste-based discrimination when parents make decisions about their own children, as the outcome affects their utility function.

true preferences. We also add a variation to our experiment to test whether subjects reveal true preferences by restricting the choice set of the players. We address the potential concern such as whether our experimental design is able to identify the bias due to pure parental preferences.

A growing experimental literature has focused on identifying the nature of discrimination (e.g., Fershtman and Gneezy 2001; List 2004). We contribute to this literature by adding to the understanding of parental preferences toward boys and girls. A large number of studies have established that in many parts of the world differentiating on the basis of gender has resulted in inequitable treatment of boys and girls. These studies have provided information on parental decisions confounded by other forces apart from parental attitude. We differ from the existing literature on gender bias in that our focus is on parental attitudes toward different-gendered children, rather than on the ultimate parental decision on allocation of resources among children.

Our findings can be summarized as follows. The experiment results indicate that there are a large number of parents who show a gender bias. However, there is no *systematic* gender bias by either parent. Among biased parents, neither fathers nor mothers are systematically gender biased. We also find that joint decisions elicit more biased choices than do individual decisions, but again we observe no systematic gender bias. Parental and household characteristics differ between unbiased and biased parents suggesting that they do play a role in explaining gender bias. Finally, the outcome from the restricted game suggests that the subjects revealed their true preferences in the experiment. Our results call for cautious interpretation of gender bias that exists in many developing countries. The results suggest that gender bias in these countries could be entirely due to the social security system (e.g., reliance on sons) or labour market discrimination faced by women. Hence, gender bias in developing countries could be addressed through affirmative action in the labour market or other policies such as addressing the old age security concern.

1.2 Background and Related Studies

Bangladesh poses an interesting case to study parental attitude toward gender because of its socioeconomic transformation in last few decades. In Bangladesh, Muslims constitute about 90 percent of the population, followed by Hindus with 8-9 percent and both communities are based

on traditional patriarchal norms including gender segregation, *purdah*² and seclusion of women. Local religious leaders and community elders exert significant influence by nurturing these norms (see, for example, Munshi and Myaux 2006). Anecdotal evidence strongly suggests a cultural preference for boys. Previous studies on Bangladesh find mixed evidence of gender bias in intrahousehold allocation (Chen et al. 1981; Pitt et al. 1990).

Bangladesh has made considerable improvements in female educational provision in recent years, particularly at primary level. However, very few girls participate in vocational, technical and higher education, and female participation in these areas tends to be highly sex segregated and stereotyped. This limits women's upward mobility in the labour market. Despite their growing role in agriculture, social practices and cultural norms effectively exclude women from direct access to land. It is customary for a woman not to claim her share of the family property unless it is willingly given. Violence against adolescent girls and women is still common. A 2010 report from United Nations Development Programme argues that there are an estimated 3.2 million missing women in Bangladesh, where the sex ratio at birth is 1.04.

A large body of literature suggests parental bias in favor of boys, particularly in South Asia and the Middle East (see Barcellos et al. 2014 for a review), while other studies have found no promale bias (see, for example, Bhalotra and Attfield 1998). A bias in favor of boys can partly be explained by labour market discrimination toward females. If market returns are higher for males, investing more in boys represents an efficient allocation of intrahousehold resources (Rosenzweig and Schultz 1982; Becker 1991). Alternatively, parents with a strong aversion to inequality among children might invest more in girls in this situation (Behrman et al 1982). Some researchers argue that poverty or resource constraint is the source of parental bias, and that parents may favor boys if they face bad times (see, for example, Rose 2000; Maccini and Yang 2009).

Das Gupta (1987) suggests that discrimination against girls (specifically in India) originates mainly from cultural factors; the widespread practice of dowry payments, kinship patterns, and the marriage system can lead to a preference for sons. Research shows that, even in developed countries where the differential returns due to economic or social factors do not exist or are minimal, parental sex preference is evident. Andersson et al. (2006) suggest that culturally rooted

² *Purdah* is a religious and social practice among Muslims (and Hindus, especially in Indian sub-continent) that involves the seclusion of women from public observation by means of concealing clothing (including the veil).

preferences for sons may prevail despite the acknowledged social, political and reproductive rights of women. Several studies have documented religion or caste-based gender differentials in mortality, sex ratio, or education (see, for example, Borooah and Iyer 2005; Bhalotra et al. 2010). The greater observed gender bias among Hindus than Muslims can partly be explained by the differences in the marriage and kinship system (Bhalotra et al. 2010). Cultural or religious teachings may lead to a belief that men are more valuable than women, to gender stereotyping, or to a psychological distaste for women's role in market activities. Delavande and Zafar (2013) find evidence of taste-based discriminatory behaviour against females among *Madrassa* (religious institution) students.

Preferences may differ between the two parents. The different preferences of fathers and mothers suggest that the ultimate resource allocation to boys and girls is an outcome achieved through intrafamily bargaining. Studies reject the "income-pooling" mechanism in the intrahousehold allocation process, implying that the differential preferences of spouses play an important role in the intrahousehold decision-making process (see, e.g., Bourguignon and Chiappori 1992; Thomas 1994). However, Ashraf (2009) finds that the ultimate household decision also depends on the relative influence of household members. Our study sheds light on the intrahousehold bargaining process between spouses by comparing two groups of couples, with one group making individual decisions and one group making a joint decision.

2. Design and Procedure of the Experiment

2.1. Study Sample

The experiment was conducted in 2012 in 66 villages in 2 districts (Khulna and Satkhira) in south-western Bangladesh.³ Nine hundred couples were randomly selected from households that had school-age children of both genders (6–18 years). Note that our sample is not restricted to families with children in school, but instead to all families with at least one boy child and one girl child of age 6-18 years. We choose families with school age children, as they are making actual human capital investment decisions for both boys and girls.⁴ Eighteen households, on average,

³ There are 64 districts in Bangladesh. These districts are typical of any Bangladeshi districts. They were chosen as the research teams have been working on other projects in those districts for a number of years.

⁴ A baseline survey for a different research project had been conducted by the third author. Eligible households (i.e., parents who had school-age children) were selected from a list of more than five thousand households from that

were selected from each village with a minimum of 4 and maximum of 34 households from each village. The final sample consists of a total of 882 couples (1 couple from each household) or 1,764 individuals.⁵ Each participant received a participation fee of 120 taka (120 taka \approx US\$1.70 at the time of the experiment); the average daily wage of an adult.⁶ Considering that most women are not wage earners, the total payment per couple (240 taka) would have been attractive to these households.

The experiment and surveys were administered by locally recruited enumerators fluent in the local dialect. Enumerators went to each of the selected households and invited parents to participate in the experiment.⁷ One common concern about running an experiment is that subjects might behave differently in an artificial experimental environment. We select subjects randomly from a list of a previous household level survey conducted for another project in the same villages. Both husband and wife were asked to be present at home on the day experiment was conducted. They were only informed that we will be running a general household survey and they will be paid for participation in the survey if both of them are at home on the particular day. The experiment was conducted during lean period when most people stay at home (as a lot of male work outside during rice cultivation and harvesting season) A related concern was that the subjects' behaviour might be influenced through the spread of gossip among neighboring households. To address this, all households in a village participated on the same day and all within the same *para* (neighborhood) participated at the same time. Furthermore, the typical village in our sample averaged more than 2,000 households and on average only 18 households in a village participated.

survey. The other project is a multiyear randomized controlled trial involving the school children in the locality; this study was undertaken independently from that project except that we used the basic household information.

⁵ Eighteen households were omitted as one parent or both parents were absent at the time. No household refused to participate in the experiment. The obvious reason for not refusing to participate is that the participation fee was high relative to the participants' opportunity cost. Also, the enumerators and the third author were local. Nonetheless, unanimous acceptance is not uncommon in other experiment studies of this type (e.g., Carlsson et al. 2012).

⁶ The average daily wage in the locality at the time of the experiment was about 150 taka for males and 100 taka for females.

⁷ Enumerators were supervised by trained research assistants with experience in conducting similar field experiments. The supervisor and all enumerators were trained by the authors and given guidelines for the experiment. The subjects were told that both husband and wife needed to be present to participate in the survey and that both would make some decision about a real-life scenario.

2.2. *Experimental Design*

In the experiment, parents divided a sum of money between an anonymous girl student and an anonymous boy student. The parents were informed that all money allocated to the girl (boy) would be donated to local schools to fund education-related gifts for girl (boy) students.⁸ Parents only knew the gender of the beneficiaries of their decisions.

The enumerators give a copy of written instructions to each individual, read them aloud, explain the procedures and instructions of the game, and answer all questions (see Appendix for instructions). After receiving and hearing the instructions, the parents may choose to participate or not, and may withdraw from the experiment at any time. The experiment starts once the parents understand the procedures of the game. The experiment procedure is typically completed within two hours. Subjects participated in one of four treatments. We detail the procedures for the Unrestricted Individual treatment (*UI*). The remaining three treatments followed the same basic procedures. Differences are discussed below.

In the UI treatment, each parent is given 120 taka in units of four 5-taka notes and ten 10 - taka notes, providing 25 alternative distribution possibilities. In private, each parent allocates the money between two envelopes – one marked “girl” with a stylized picture of a girl, the other marked “boy” with a stylized picture of a boy.⁹ There is no restriction on how they allocate their endowments.

The participants were assured about the anonymity of their decisions at the beginning of the experiment (see instructions for the game in the Appendix). To maintain the anonymity of the decisions, each parent is randomly assigned an ID number and the number is never associated with the individual’s name. Parents are also separated into two rooms or separate closed areas so that they cannot hear or communicate with each other.

The envelopes are marked with the parent’s ID number. The parent goes to a second room or separate closed area in the residence and divides the money between the two envelopes. When the parent returns to the main room, the envelopes are handed to the enumerator who places them in a sealed box. Individual and household level survey data are collected immediately after the experiment. Survey forms are marked with the parent’s ID number. Each parent separately and

⁸ At the time the parents made their decisions, they did not know exactly which school would receive their contribution. Parents included the full 240 taka in the envelopes and nobody stole money.

⁹ The envelopes are labeled with the drawings because some parents may be illiterate. Envelopes are marked with ID numbers to allow matching of allocation decisions and survey responses.

privately answers individual level attitudinal questions. Either individually or jointly parents provide the household level general information.

After collecting all the envelopes from all the households participating in the village, the enumerator submits the boxes, which are sealed and signed, to the experiment coordinator. We were aware of the possibility that parents might have concerns that the money would not be allocated according to their preferences. In order to maintain trust, the envelopes were opened the same day or the following day in front of a representative from the school receiving the money and a local leader.¹⁰ Participants in the game were informed about the time and venue of the ceremony and were invited to observe the whole process.¹¹ Before conducting the experiment in a village, we also informed the school teachers, village leaders and elders about the procedure for donating money from the experiment to the boy and girl children in schools. Parents were also informed about such arrangements. This helped to ensure that schools would divide the money between boys and girls as instructed.

Unrestricted Joint (UJ): In this treatment, the parents jointly decide how to allocate a common endowment of 240 taka (in units of eight 5-taka notes and twenty 10-taka notes, providing them with 49 alternative distribution possibilities) between the two envelopes. The objective of this treatment is to observe whether the individual distribution decisions differ from the joint distribution decisions.

Restricted Individual (RI): This treatment replicates UI, but with restrictions on the allocation of the endowment, forcing a parent to prefer either the boy or the girl. The 120 taka endowment was divided into one 80-taka bundle and one 40-taka bundle. Parents must either give 80 taka to the boy and 40 taka to the girl, or give 40 taka to the boy and 80 taka to the girl.

Restricted Joint (RJ): This treatment replicates UJ, but with restrictions on the allocation of endowment, forcing parents to prefer either the boy or the girl. The 240 taka endowment is bundled into one 160-taka bundle and one 80-taka bundle. Parents must either give 160 taka to the boy and 80 taka to the girl, or give 80 taka to the boy, and 160 taka to the girl.

The objective of incorporating treatments RI and RJ is to observe whether parents reveal their true preferences in treatments UI and UJ, where there is no restriction on the allocation of

¹⁰ The third author has a strong connection in these areas, and he has been conducting a multiyear intervention in the area with the same group of enumerators.

¹¹ Most of the participants attended the ceremony.

money. For example, if a person (couple) is biased, that person (couple) may not wish to reveal this for any number of reasons, and to avoid doing so may select an even or close to even split in UI and UJ. Hence, these treatments may or may not reveal the parents' true preferences. In RI and RJ, a biased person (couple) cannot hide the bias unless that person (couple) wants to act in a way that significantly goes against that bias. The parents have to either reveal their true biases or reveal the opposite preference.¹² It is reasonable in this case to assume that the person (couple) is more likely to choose the allocation consistent with the person's (couple's) true bias. The expectation then is that the percentage of choices biasing girls should be significantly different from 50%.

If instead, parents are not systematically biased, then, if forced in RI and RJ to choose between a boy biased and a girl biased allocation, they should choose randomly. Now the expectation is that the percentage of choices biasing girls should not differ significantly from 50%. If results from UI and RI or from UJ and RJ do not systematically differ, then this suggests that UI and UJ accurately measure bias. If these paired results are systematically dissimilar, then this suggests that UI and UJ provide inaccurate measures of bias.

The important feature of the experiment is that the parents' own children were not directly affected by their decisions. This feature separates out other factors that might typically influence a parent's resource allocation decision for his or her own children of different genders, leaving only the parent's attitude toward the gender of a child.

We did consider other alternative procedures. One included having a parent divide the money between her own son and daughter. We dismissed this procedure because the parent's decision might be driven by other factors (e.g., market forces). In addition, the parent would know how much each child received and, post-experiment, could demand that the child relinquish the money, thus rendering the allocation decision irrelevant. A second alternative was to have a

¹² Appendix Figure A1 shows the 25 choices available to subjects assigned to the "unrestricted individual" (UI) and the two choices available to subjects assigned to the "restricted individual" (RI). Let us take a parent whose actual preference is at point A. The parent might hide his/her preference by choosing an equal split at point C, which moves him/her from U_1 to U_3 . Limiting the choice set to just two options forces the parent to move to U_4 (point D) if he/she wants to hide the true preference. Instead, the other option (point B) is closer to actual preferences. As the graph illustrates, the manipulation forces the person to move to a much lower utility level if he/she wants to hide the true preferences. Given the restricted choice set, parents supposedly choose the option that gives them the highest utility. This restriction also forces parents to show bias even when they are not biased to any gender. However, this might be explained by extreme cases where parents need to choose investing in either a boy or a girl, for example, due to resource constraint. Nonetheless, our main objective of incorporating this restriction is to compare the average bias shown by the parents between treatments without and with restriction.

parent allocate money to another couple’s children. We dismissed this procedure because parents would have to provide consent for their children to participate. If both parents and children participated, parents, knowing the rules, might try to retrieve the money given to their children. Also, the parent might believe there was a high likelihood that the money would be confiscated by the child’s parents and not directly benefit the child. This might make the parent reluctant to allocate the money according to his or her preferences. By having the money benefit an anonymous child, parents were free to express their gender preferences.

3. Empirical Approach

To identify parental attitudes toward different-gendered children, we examine parental bias from two perspectives. First, we identify whether the parents individually or jointly reveal any bias by deviating from an even split of their endowments.¹³ Second, if bias is revealed, we test if there is any systematic girl bias using the sub-sample with unequal splits of the endowment.

We run the following regression to test whether parental attitude differs systematically by parent gender:

$$(1) \quad \text{bias}_{ij} = \alpha_0 + \alpha_1 \text{mother} + \alpha_2 X_{ij} + \alpha_3 H_j + \epsilon_j,$$

where bias_{ij} = attitude of parent i in household j , with $i=1, 2$.

We define “*bias*” in three ways:

(1) $\text{Girl}_{ij}/\text{Total}_{ij}$: proportion of the endowment allocated to girl;

(2) Unbiased: =1 if parent i in household j chooses an equal split;

(3) Girl-biased_{ij} : =1 if parent i in household j , conditional on being biased, allocated > 50%

of

the endowment to girl.

$\text{Mother}_i = 1$ for the female parent; X_{ij} is a vector of variables representing individual characteristics of parent i in household j ; and H_j is a vector of characteristics for household j . We

¹³ We choose to be conservative in what we considered unbiased. Any deviation from an even split was defined as biased.

are mainly interested in the coefficient α_1 —the differences in the attitudes of father and mother. We estimate standard errors by clustering at the village level.¹⁴

The allocation of resources between male and female children is a household decision. The joint household decision may predominantly reflect the preferences of one parent or may be a compromise. As such, the individual preferences revealed in UI may not reflect the joint preferences by the couple in the household. We test whether household behaviour differs systematically between individual and joint decisions by estimating the following regression:

$$(2) \quad bias_j = \beta_0 + \beta_1 C_j + \beta_2 H_j + \xi_j$$

where $C_j = 1$ if a joint decision. We compare joint decision in UJ with the individual decisions in UI by father, the mother, and their combined decisions.

We now test whether our subjects reveal their true preferences in the experiment. In UI and UJ, bias can be disguised by evenly dividing the endowment. RI and RJ force subjects to express a gender preference. If, for example, a parent is boy biased, disguising this bias in RI requires the parent to strongly prefer girls. We run the following regression with the sample consisting of participants in UI and RI in order to identify whether subjects reveal their true preferences in UI.

$$(3) \quad bias_{ij} = \lambda_0 + \lambda_1 mother_{ij} + \lambda_2 R_j + \lambda_3 X_{ij} + \lambda_4 H_j + \varphi_j$$

where, $bias_{ij}$, $mother_{ij}$, X_{ij} , and H_j are defined as above, and $R_j = 1$ for restricted decisions. Similarly, using participants in UJ and RJ we identify whether subjects revealed their true preferences when making the joint decision:

$$(4) \quad bias_j = \delta_0 + \delta_1 R_j + \delta_2 H_j + \eta_j$$

where, $bias_j$, R_j , and H_j are defined as above. We use Generalized Linear Model (GLM) estimation when the dependent variable is a proportion. For the dummy dependent variable, we use a linear probability model (LPM).¹⁵

¹⁴ We also cluster standard error at the household level to account for intrahousehold correlation, and the results remain robust.

Appendix Table A1 presents the descriptive statistics by treatment groups. The mean ages of the fathers and mothers are 43–44 years and 34–35 years, respectively. Fathers and mothers have, on average, a primary school education in all treatments. Around 70–80 percent of the households across the groups are Muslim. The mean yearly income of the households among the groups is 92–100 thousand taka. We deliberately kept the sample size in UI larger than other treatment groups, as considering our limited budget and that our focus was primarily on identifying the attitude of individual parents (UI). The results reported below are not affected by the differences in the sample sizes or characteristics across treatment groups. When we randomly draw samples from UI to keep the sample size similar to other treatments or balance all the observable characteristics, the results remain robust.

4. Results

4.1 Summary of the outcomes of the experiments

Table 1 summarizes the allocation decisions in the four treatments. Overall, the results suggest no systematic gender bias; on average, subjects in all treatments split the endowment equally between boys and girls. In the UI treatment, a majority of parents split the endowment equally (64% of the fathers and 70% of the mothers). Of the minority who reveal a bias, half are boy biased and half are girl biased. In the UJ treatment, we observe more evidence of bias; only 40% of the couples split the endowment equally. Again, however, among those couples revealing a bias, only slightly less than half (47%) preferred girls. Figure 1 shows the distributions of the proportion allocated to girls by fathers, mothers, and couples in the UI and UJ treatments. The figure suggests that parents who decide independently and those who decide jointly overwhelmingly chose the equal split. Even those who exhibit some bias, most of them do not deviate dramatically from the equal split. Finally, in both the RI and RJ treatments, marginally more than 50% of fathers, mothers, and couples revealed a girl bias.

¹⁵ We also use logit and probit regressions for binary outcomes, and a zero-one inflated beta distribution for when the outcome is a proportion. The results are similar and are available upon request.

4.2 UI and UJ, Nonparametric Tests

We test for evidence of systematic bias in the UI and UJ decisions by applying means tests. We cannot reject the null hypothesis that fathers, mothers, and couples allocate girls an equal share of the endowment (p-values > 0.10 in each case, two-tailed test).¹⁶ Furthermore, if we consider the subsample of parents and couples who exhibited bias, the mean percentage of the endowment allocated to boys does not differ significantly from that allocated to girls (p-values > 0.10 in each case, two-tailed test).¹⁷

If there is no systematic gender bias then the distributions of proportions allocated to girl should be symmetric. The distributions illustrated in Figure 1 appear roughly symmetric and normal. To get a clearer picture of how the actual distributions differ from a normal distribution, we graph the actual allocation distributions against the expected normal allocation distributions given the sample sizes, means and standard deviations (see Appendix Figure A2). The actual distributions largely track the expected distributions, especially for couples, given that the actual distributions are discrete rather than continuous and that each distribution has a relatively large mass at 50%. Where the father and mother distributions most differ from a normal distribution is in the tails, where small numbers of outliers give abnormally large amounts to either the boy or the girl.

We next test if fathers, mothers, and couples differ in gender bias. In the UI treatment, 64% of the fathers and 70% of the mothers individually choose an equal split. Table 2 reports for treatment UI the number of couples exhibiting the different possible patterns of bias. In 51% of the couples, both parents were unbiased. What else is evident in this table is the symmetry in parental bias (i.e., if a father is boy biased, the mother is equally likely to be boy biased as girl biased). A Wilcoxon Matched-Pairs Signed-Rank test cannot reject the null hypothesis that fathers and mothers distributed their endowments in the same way (p-value > 0.10). The Epps-Singleton test (see Goerg and Kaiser, 2009), on the other hand, suggests that the allocation distributions for fathers and mothers are significantly different (p-value < 0.05). However, as shown in Figure 1, the difference in the distributions is that mothers' giving is more concentrated

¹⁶ We checked whether parental allocation in the experiment is correlated with the gender of the firstborn child. The correlation coefficient is not significant in any of the treatments.

¹⁷ Furthermore, Wilcoxon Rank Sum tests cannot reject the null hypothesis that the allocations to boys by boy biased fathers, mothers, and couples are drawn from the same populations as the allocations to girls by girl biased fathers, mothers, and couples (p-value > 0.10 in both cases, two-tailed test).

at the even split than is fathers' giving, while both are still reasonably bell-shaped. Finally, Wilcoxon Rank Sum tests cannot reject the null hypothesis that the allocations of fathers and couples and mothers and couples are drawn from the same population (p -value > 0.10 in both cases).¹⁸

In the UJ treatment, 40% of the couples jointly choose an equal split; 51% in the UI treatment (Table 2). Comparing these two proportions of unbiased couples, we find that joint decisions significantly reduce the number of even allocation splits (p -value < 0.05 , two-tailed test).

4.3 UI versus UJ Decisions

One would *a priori* expect joint decisions to reduce (or at least not increase) biases if there is heterogeneity in preferences (and not perfect assortative matching according to this preference) and some form of joint-decision making. One possibility for our result is that individuals who are more gender-biased are also more likely to have a larger weight in the joint decision-making process (e.g., fathers who discriminate against girls make essentially decisions alone).

In our questionnaire, we ask parents, separately and privately, who makes the decision on the education of their children? The options are (a) father only, (b) mother only, (c) father and mother jointly, or (d) others – all family members jointly. In roughly half the households, fathers and mothers choose different options, generally giving themselves more self-importance.¹⁹ For example, in the survey response by the participants of the UI sample, 59 percent of fathers mention that the mother has some control in the decision making (options b, c, or d), but 94 percent of mothers believe that they have some control in the decision making. The corresponding figures for UJ are 52 percent and 97 percent, respectively. In terms of father's control (options a, c, or d), the corresponding figures are 76 percent mothers and 93 percent fathers in UI, and 78 percent mothers and 98 percent fathers in UJ. These survey responses indicate that both the father and mother each believes that they individually have more control

¹⁸ We also find that the combined father and mother allocations from UI did not differ significantly from the couple distribution from UJ.

¹⁹ A number of related questions in the survey relate to who makes the following decisions: (i) Overall household matters; (ii) Education; (iii) Health care; (iv) Shopping; and (v) Time allocation (Going outside the home or work). For overall household matters, fathers' and mothers' answers differ in only a few households. But for other specific decisions, fathers' and mothers' answers differ significantly. We focus here on the decisions related to children's education, given that the parents in the experiment are deciding on allocating money that goes to school children.

over the decision making process than what the spouse believes and also, this gap is larger for mother's control than for father's control. This might reflect noncooperative bargaining between fathers and mothers in their decision making.

We test whether parental decisions are different between these two types of households. The chi-square test suggests that in UJ (but not UI), households with different responses²⁰ by parents made significantly more biased choices compared to households with the same response by both parents ($p = 0.05$). Thus, this result suggests that the more biased split in joint decisions than in individual decisions can be explained, at least partly, by the noncooperative bargaining behaviour between the parents in the household decision making process.

Our results indicate that both the father and mother deviate from their individual preferences, and that the deviation is greater in the case of the mother.²¹ This again suggests that the aggregate behaviour of a couple is not a simple extrapolation of any one individual's preferences and, hence, the collective model (Browning and Chiappori 1998) is more applicable to the household decision making process than is the unitary model. The result that none of the households chooses an extreme choice in the joint decision also indicates that joint decisions are made more balanced by softening extreme individual preferences.

4.3 UI and UJ, Regression Analysis

Table 3 reports the marginal effects from GLM and the LPM estimations based on equation (1), for the UI sample. The regressions control for individual and household level characteristics. The results in Panel A suggest that the proportion allocated to girls does not differ significantly by parents' gender. The results in Panel B indicate that mothers are not significantly more likely to be unbiased than fathers. The results in Panel C offers no evidence that either parent is more inclined to be girl based. Results do not change when we take into account of sample selection using a Heckman-type selection correction model. These results are consistent with the results from nonparametric tests reported above.

In Table 4 we compare individual and joint allocation decisions. The regressions control for individual and household level characteristics. We report marginal effects from GLM and the

²⁰ Households with "different responses" refer to those where husband and wife report differently in the survey about the decision making within households.

²¹ This is consistent with Carlsson et al. (2012); their result from an experiment on intertemporal choice suggests that both parents influence the joint decision, with the father exerting a stronger influence.

LPM estimates based on equation (2). Column 1 compares combined allocations of couples from UI with that of UJ. Columns 2 and 3 compare the individual decisions of fathers and mothers, respectively, in UI with the joint decisions of couples in UJ.

Panel A reports marginal effects from GLM estimation where the dependent variable is the proportion of the endowment allocated to girl. The coefficient estimates suggest that parents making joint decisions (UJ) are significantly less generous to girls relative to fathers and mothers combined and fathers alone. Panel B presents the LPM regression estimates for parental bias. The dependent variable =1 if the parent(s) are unbiased (i.e., split the endowment evenly between boy and girl). The results suggest that parents are significantly more likely to be unbiased in individual decisions than in joint decisions. The probability of father (mother) being unbiased is 22 (27) percentage points higher in individual decision than in joint decisions by both parents. These results again confirm that parents exhibit more gender bias when they make the decision jointly than individually. Panel C presents the LPM regression estimates for the subsample of parents who reveal a bias. The results reveal no evidence of systematic bias toward any particular gender. These results are consistent with the results from nonparametric tests reported above.

4.4 Testing if True Preferences are Revealed, UI and UJ versus RI and RJ

Previously, we noted that biased subjects in the UI and UJ unwilling to reveal their biases could disguise their true preferences by selecting a more equal distribution. To test if this is so, we included two treatments (RI for individual decisions and RJ for joint decisions) which restrict subjects' choices to either heavily bias boys or heavily bias girls. Biased parents must either reveal their true biases or reveal the opposite preference. It is reasonable to assume that the allocation decision will reflect the true bias; i.e., the percentage of choices biasing girls should be significantly different from 50%. If instead, parents are not systematically biased, then, when forced to choose between a boy biased and a girl biased allocation, parents will choose randomly; the percentage of choices biasing girls will not differ significantly from 50%.

Table 1 (columns 3 and 4) reports the mean proportion allocated to girl and the percentage of girl biased allocations. On average, fathers, mothers, and couples are as likely to bias girls as boys; for each decision maker, the mean proportion allocated to girl is insignificantly different from 50% (p-values > 0.10 in each case, two-tailed test). Binomial proportions tests fail to reject

the null hypotheses that fathers, mothers, and couples chose the girl biased allocation at random (p-values > 0.10 in each case, two-tailed test).

Table 5 reports results from GLM and LPM regressions based on equations (3) and (4), with a sample consisting of individual decisions from UI and RI (column 1) and a second sample consisting of joint decisions from UJ and RJ (column 2), respectively. In order to maintain comparability, we include only biased parents from UI and UJ, as parents in RI and RJ are forced to be biased.²² The results suggest that the treatment condition has no significant impact on parental allocation or bias toward a particular gender, implying that the subjects in UI and UJ revealed their true preferences. We also do not find any significant difference between fathers' and mothers' behaviour.

4.5 Role of Individual and Household Characteristics

When we explore whether basic individual or household characteristics explain the differences in parental attitude within subjects of each treatment, a few interesting patterns emerge (see Table 6). First, parental education is positively correlated with an unbiased joint attitude. In the joint decision in UJ, mothers are more educated in the unbiased group compared to those in the biased group. This difference mainly arises from the difference between unbiased and boy-biased groups. Fathers are also more educated in the unbiased group compared to the boy-biased group. This seems to suggest that in joint household decisions, low parental education is associated with a boy-biased attitude, while higher parental education is associated with a more egalitarian attitude.

Second, household income is associated with only the father's individual decision in UI. Household income is significantly higher in households with girl-bias, compared to households with an unbiased father, and also when compared to households with a boy-biased father. Third, the number and gender composition of children is correlated with parental attitude. The number of children is higher in households with a girl-biased mother compared to households with an unbiased mother, as well as households with a boy-biased. In UJ with the joint decision, the ratio of sons to daughters is lower in unbiased households than in biased households. The ratio of sons

²² We also run regressions including all parents in the unrestricted treatment groups rather than only biased parents. The results remain robust and are available upon request.

to daughters is higher in girl-biased households than in unbiased households. In UI, with individual decisions, the ratio of sons to daughters is higher in households with a biased mother compared to households with an unbiased mother.

7. Conclusion

Gender bias in household behaviour in developing countries has been widely studied in the literature. The general, though not universal, conclusion is that parents are biased toward their sons, with evidence suggesting that parents care more about educating and maintaining the health of their male children. This observed bias might arise from a natural response to sociocultural factors (the tendency for male children to support parents financially in their old age) and labour market factors (discrimination in favor of males in employment and wages), or from an inherent bias toward particular sex that is independent of any direct return to the parents.

This paper is the first to look at the important and unresolved question: Do parents exhibit an inherent gender bias, a bias independent of any direct economic return from the child to the parents? We measure parental attitude toward different-gendered children through an artefactual field experiment, involving 1,764 individuals (882 couples) who have school-age children, conducted in rural Bangladesh. Participants make either individual or joint decisions to divide an endowment between anonymous boys and anonymous girls. We remove any direct benefit to the parents by having the allocated sums distributed to schools that their children may or may not attend, to provide prizes for students. We also check the robustness of our results using a restricted allocation decision.

Our results indicate that, on average, there is no systematic inherent gender bias by either parent. Furthermore, among biased parents, neither fathers nor mothers are systematically biased for either gender. We also find that joint decisions exhibit more bias than individual decisions, but the bias does not systematically favor a particular gender. The results tend to suggest noncooperative bargaining behaviour between fathers and mothers in our sample. Comparing biased and unbiased parents, we observe some significant differences in individual and household characteristics that may explain this bias. Another contribution of the paper is that the results suggest that, on average, the subjects do not tend to misreport their preferences in an artificial experiment framework.

One concern regarding our results is whether the experimental design is able to disentangle bias due to pure parental preferences from bias due to different perceived returns. For example, if parents (and their offspring) do not benefit from their allocation choices, then when making those choices they may take into account the (perceived) return of investing in an anonymous boy versus investing in an anonymous girl. In a society such as Bangladesh, where bias toward boys is a common phenomenon, one would then expect to find that the experiment participants would bias their allocations toward boys, both due to any inherent bias for boys as well as the higher expected returns for boys in the labour market.

A second concern is that in our setting, if awareness building makes people realize that women have been disadvantaged over a long period and that they need to be supported, inequality aversion might bring about a women-friendly attitude (see, for example, Fehr and Schmidt 1999). On the other hand, if people believe that preferential treatment for girls is antithetical to long-held sociocultural or religious norms and traditions in a patriarchal society, then this might strengthen taste-based discrimination (Goldin 2002; Rudman and Fairchild 2004).²³ The overall effect of these counteracting forces is likely to be ambiguous.

The result of no systematic bias against any particular gender is consistent with the inequality aversion of households suggested by earlier studies in Bangladesh (e.g., Pitt et al. 1990), or in other developing countries (e.g., Deaton 1989). However, the important distinction of our study is that our results show the inequality aversion in parents' attitude, not in the actual allocation of household resources. While we do not find any systematic inherent gender bias, it does not necessarily imply that no gender bias exists in actual household behaviour. Our results merely suggest that there is no systematic inherent gender bias among parents. It therefore implies that actual bias, if any, arises from differential return of investment in boys versus girls, which might be due to sociocultural factors, such as economic dependence on sons or labour market discrimination. This calls for important policy intervention to provide equal opportunity to males and females in the society, or old-age security system. This type of experiment could be applied in situations where voters allocate money between projects targeted to benefit girls versus boys.

²³ For example, Beaman et al. (2009) provide experimental and survey evidence indicating that while exposure to female leaders (through quota) improves perceptions about female leaders and weakens gender role stereotyping, it does not alter preferences for male leaders by both genders.

Identifying the preferences of people and their inherent bias in such a way would be useful for governments to target programs appropriately.

Note that Bangladesh differs from other developing countries in several aspects, given its own religious and sociocultural setting as well as the overwhelming progress in sociocultural development and women's empowerment in recent decades (Sen 2013). In recent decades, Bangladesh has achieved tremendous progress in terms of girls' education and female employment compared to neighboring countries with similar sociocultural backgrounds. The rapidly expanding NGO activities, the microcredit programs, and the developing garment sector have been key driving forces in increasing the mobility and social interactions of rural women. In addition, the government has undertaken several initiatives to foster female education and employment. In addition to their economic impact, these programs might also exert a sociocultural impact through changing behavioural norms and attitude in Bangladeshi society in terms of women's roles and participation in socioeconomic activities. Therefore, caution should be made in generalizing the results from this study toward other developing countries.

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Table 1: Allocation Decisions by Treatment

Treatment	UI	UJ	RI	RJ
Mean proportion allocated to girl (Std. Dev.)				
	(1)	(2)	(3)	(4)
Father	50.4% (8.6)		50.9% (16.7)	
Mother	49.9% (5.9)		50.4% (16.7)	
Joint		49.5% (8.6)		51.0% (16.7)
Percentage Unbiased				
Father	63.5%			
Mother	70.0%			
Joint		40.1%		
Percentage girl biased (if biased)				
Father	50.4%		52.7%	
Mother	50.5%		51.1%	
Joint		46.6%		52.9%
N	310	197	186	189

Table 2: Treatment UI, Bias by Couple

		Father		
		Boy Biased	Unbiased	Girl Biased
Mother	Boy Biased	14	18	15
	Unbiased	29	159	29
	Girl Biased	14	20	12

Table 3: Effect of Parent Gender on Allocation, GLM and LPM Estimates^a

	(1)	(2)
Panel A: GLM (Dependent variable: Proportion allocated to girl)		
Variable	Coefficient	
Mother	-0.009 (0.007)	-0.010 (0.007)
N	620	
Panel B: LPM Dependent variable: parent is unbiased (=1)		
Mother	0.061 (0.048)	0.073 (0.047)
N	620	
Panel C: LPM Dependent variable: parent is girl biased (=1) ^b		
Mother	-0.015 (0.088)	-0.026 (0.085)
N	206	
Individual control	Yes	Yes
Household control	No	Yes

Notes: Panel A reports marginal effects. Standard errors in the parentheses are corrected for clustering at village level. Individual controls include age and indicator for education level; household controls include yearly income, number of sons, number of children (set of dummies) and religion (Muslim=1). The sample includes all participants of UI group in panels A and B, and participants in UI group who are biased in Panel C.

a – Complete regression results are available on request.

b – If biased.

Table 4: Individual vs. Joint Decisions ^a

	Combined UI vs. UJ	Father UI vs. UJ	Mother UI vs. UJ
Panel A: GLM Dependent variable: proportion allocated to girl			
Variable	Coefficient		
Joint Decision	-0.01** (0.01)	-0.01** (0.01)	-0.01 (0.01)
N	507		
Panel B: LPM Dependent variable: parent is unbiased (=1)			
Joint Decision	-0.13** (0.05)	-0.22** (0.05)	-0.27** (0.05)
N	507		
Panel C: LPM Dependent variable: parent is girl biased (=1) ^b			
Joint Decision	-0.06 (0.06)	-0.07 (0.07)	-0.09 (0.07)
N	254	231	211

Notes: Coefficients in Panel A are marginal effects. Standard errors in the parentheses are corrected for clustering at village level. The sample includes all parents of UI and UJ in panels A and B, and parents in UI and UJ who are biased in Panel C. The table reports the results with full control including individual and household characteristics.

a – Complete regression results are available on request.

b – If biased.

** Significant at the 5 percent level.

Table 5: Restricted vs. Unrestricted Decisions^a

	Individual Decisions	Joint Decisions
Panel A: GLM Dependent variable: proportion allocated to girl		
Variable	Coefficient	
Restricted All	-0.00 (0.01)	0.02 (0.02)
Mother	-0.00 (0.01)	
N	578	307
Panel B: LPM Dependent variable: parent girl biased (=1)		
Restricted All	0.01 (0.05)	0.08 (0.06)
Mother	-0.02 (0.05)	
N	578	307

Notes: Standard errors in the parentheses are corrected for clustering at village level. The table reports the results with full control including individual and household characteristics.

a – Complete regression results are available on request.

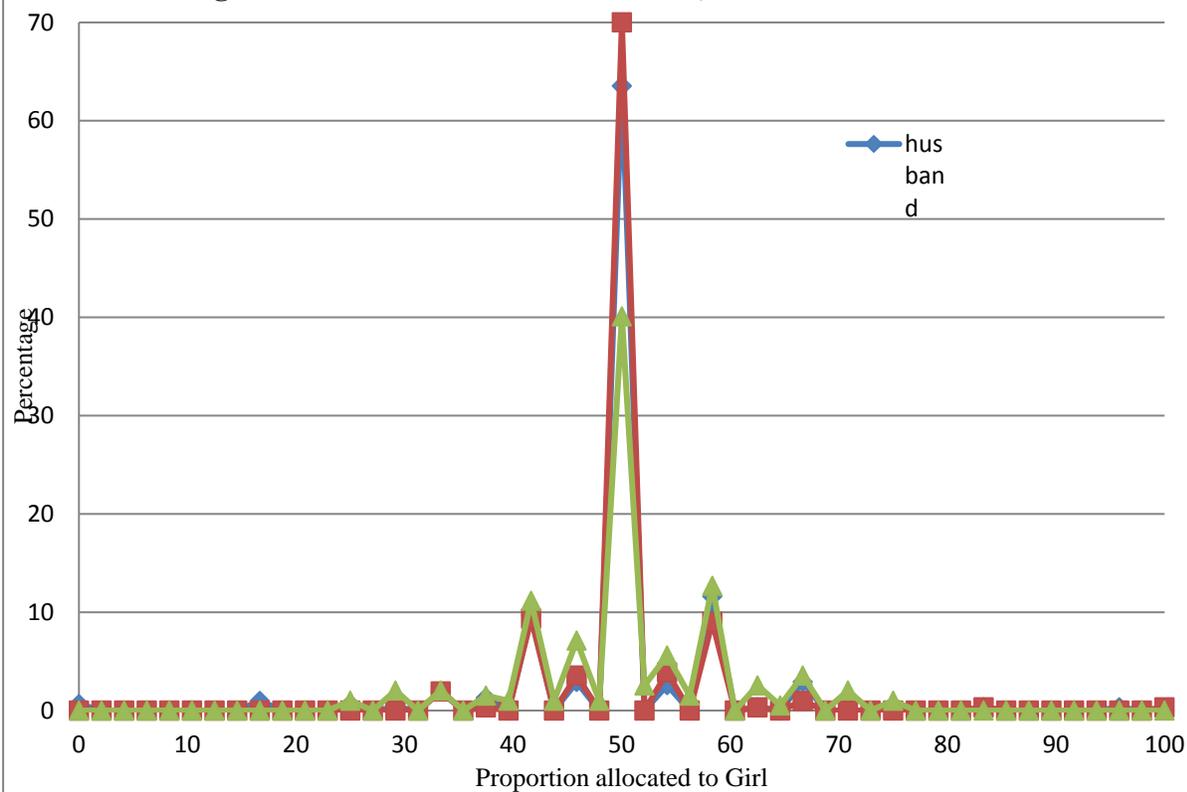
Table 6: Tests of Differences in Characteristics by Bias

Characteristic	Treatment group	Comparison	Mean Difference	t-test p-value ^a
Mother's years of schooling	UJ	Unbiased vs. Biased	1.28	0.02
	UJ	Unbiased vs. Boy-biased	1.67	0.01
Father's years of schooling	UJ	Unbiased vs. Boy-biased	1.48	0.07
Household income (thousand taka)	UI-father	Girl-biased vs. Unbiased	28	0.02
	UI-father	Girl-biased vs. Boy-biased	37	0.06
Ratio of sons to daughters	UJ	Unbiased vs. Biased	-0.20	0.08
	UJ	Unbiased vs. Girl-biased	-0.26	0.07
	UI- mother	Unbiased vs. Biased	-0.16	0.08
Number of children	UI- mother	Girl-biased vs. Unbiased	0.30	0.03
	UI- mother	Girl-biased vs. Boy-biased	0.41	0.01

Notes: The table only reports the characteristics that are significantly different across groups by bias.

a – two-tailed test.

Figure 1: Distribution of Endowment, UI and UJ Treatments



For Online Publication
Appendix
(NOT FOR PUBLICATION)

Table A1: Individual and Household Descriptive Statistics by Treatment

	UI		UJ		RI		RJ	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Father's age	43.2	6.61	42.3	6.13	44.2	7.47	42.8	6.59
Mother's age	34.7	5.52	33.6	5.20	34.9	5.81	34.7	5.46
Father's education	0.551	–	0.473	–	0.638	–	0.529	–
Mother's education	0.460	–	0.375	–	0.568	–	0.485	–
Number of children	2.73	0.842	2.93	1.04	3.10	1.19	2.94	1.06

Figure A1. Choice sets in unrestricted and restricted INDIVIDUAL treatments

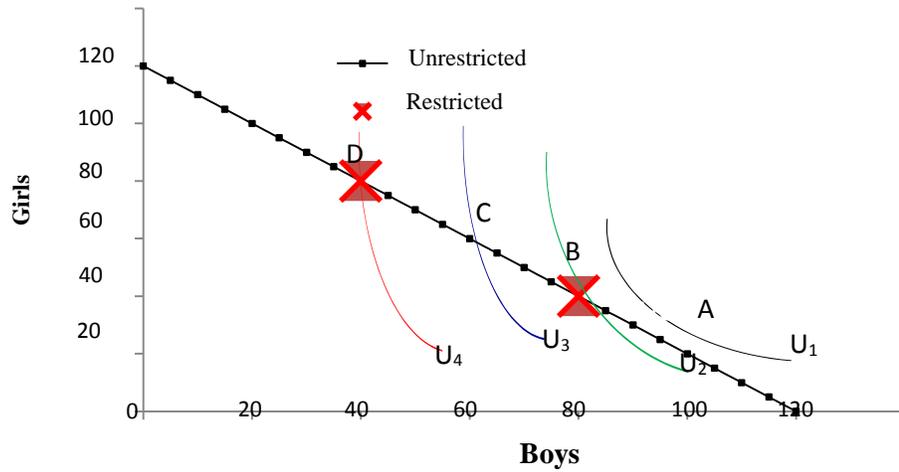
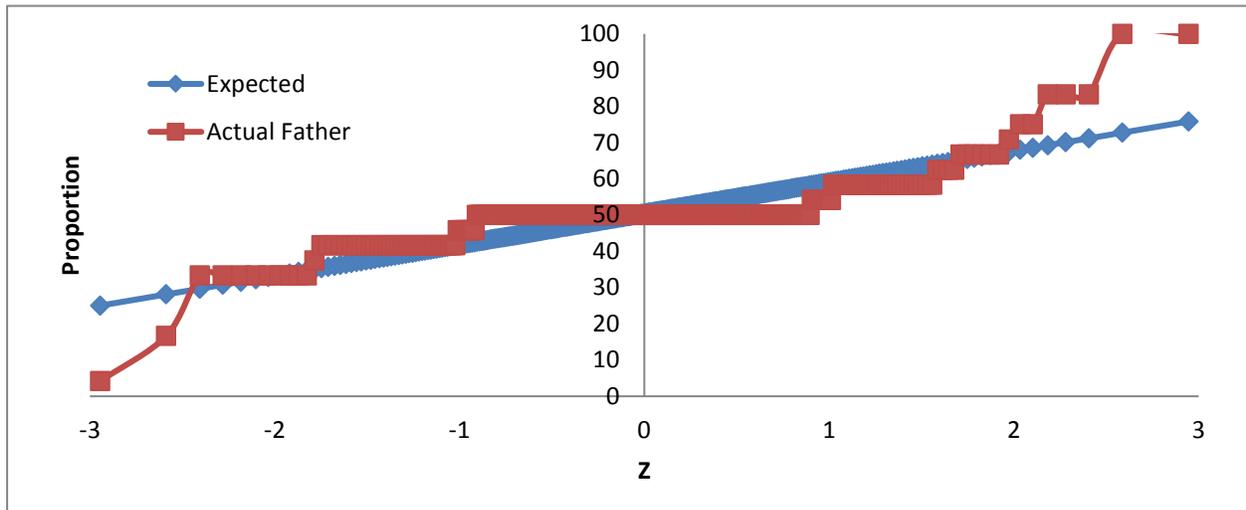
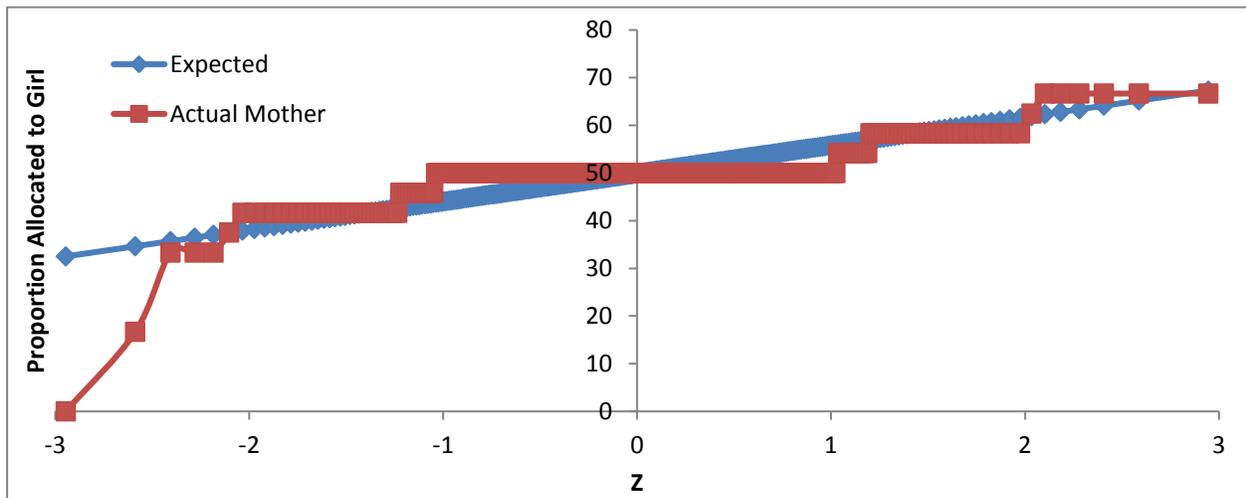


Figure A2: Tests of Normality

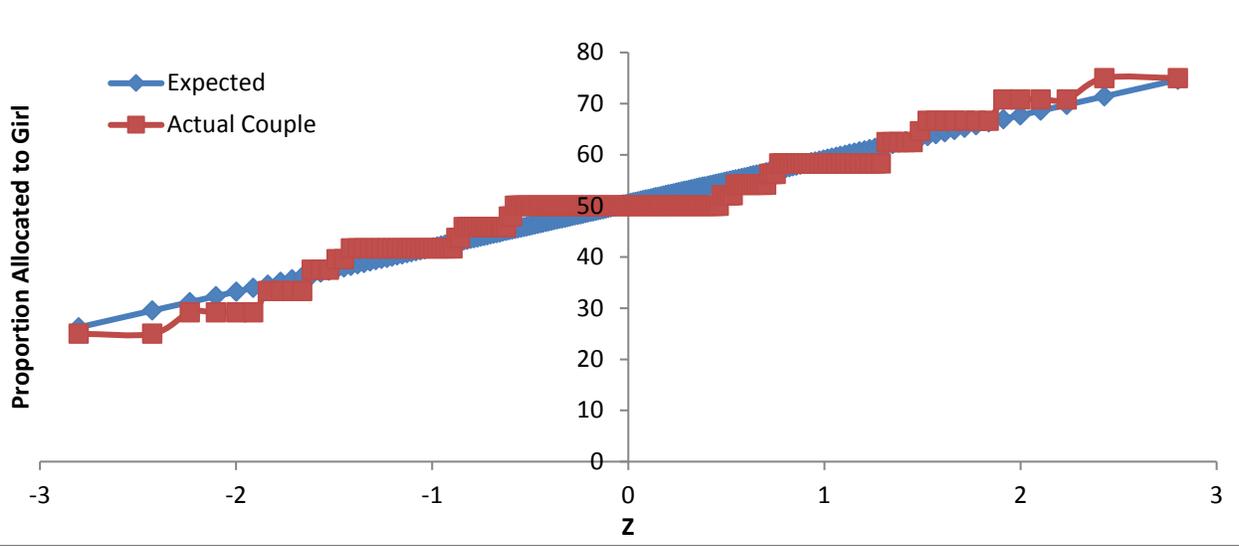
A: UI Fathers



B: UI Mothers



C: UI Couples



Instructions for the game (translated from Bengali)

Today I am going to play a game with you. I will give you some money to divide between an anonymous girl student and an anonymous boy student. I am giving you two envelopes; the envelope with a picture of a girl is for a girl student and the envelope with a picture of a boy is for a boy student. You will go to the next room and divide the money between the two envelopes according to your preferences. **You can divide the money any way you like. You can even give the full amount to one and give nothing to the other.**²⁴ Then you will come out of the room and hand over the envelopes to me. We will give the money to a local school authority to be used for giving gifts to the girl students and the boy students. The gifts might be in the form of books or other academic materials decided by the school authority and gifts given to boys and girls will depend on the choices made by all the parents participating in the experiment.

I want to let you know that no one else except you will know your decision. You will be assigned an ID number. This ID number will be assigned randomly so that your information will remain confidential. The ID numbers are never associated with specific participant names in this experiment. Therefore, it is not possible for anyone—including the researcher—to find out the identity of a particular participant. Thus, the researcher only knows the choice made by a participant with a particular ID number, but will not be able to know his/her name. Moreover, research findings from this experiment will be used in such a manner that the identity of any participant will not be known. Therefore, it is absolutely up to your discretion as to how you divide the money between the boy and the girl and it will remain secret to all. I will not open your envelopes until I will collect all the envelopes from other households participating in the game. Similarly, no one else will know about your decision unless you tell them and I suggest you do not disclose your decision to anybody. I also want to make sure that the money in the envelopes will remain the same as you put there. I will put the envelopes you give me in a sealed box. After collecting all the envelopes from other households, I will hand over the box to the co-

²⁴ In case of restricted allocation (RI and RJ), the instruction mentions, "The money is divided into two parts (80 taka and 40 taka in case of RI and 160 taka and 80 taka in case of RJ). You will give one part to a girl and another to a boy according to your choice. You cannot give both sums to one and nothing to the other."

ordinator of this experiment, who will then open each envelope, keep a record of the data, and allocate the money to the nominated school according to your preferences. The envelopes will be opened in the presence of a representative from the school receiving the money and a local leader. You are also invited to observe the procedure and we will inform you of the time and venue of the ceremony after the experiment. You will receive a participation fee of taka 120 for participating in the experiment. You may choose to discontinue participation at any stage of the experiment, and in that case you will receive part of the participation fee.