Dads and Daughters: Disentangling Altruism and Investment Motives for Spending on Children*

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Abstract

This paper tests whether mothers and fathers differ in their spending on their daughters relative to their sons. We compare mothers' and fathers' willingness to pay (WTP) for specific goods that enhance children's human capital, diverging from the previous literature's approach of analyzing the expenditure effects of mothers' versus fathers' income. Our method, which we apply in Uganda, allows us to estimate gender differences and explore mechanisms with greater precision. A second innovation is that we examine *why* spending patterns differ between mothers and fathers, e.g., altruism, personal returns to investing in children. We find that fathers have a lower WTP for girls' human capital than boys' human capital, whereas mothers exhibit the opposite pattern. We also find evidence that altruism plays a role in the mother-father differences: fathers' WTP for goods that simply bring joy to their daughters is lower than their WTP for such goods for their sons, but mothers' is not.

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1 Introduction

Do fathers invest less in their daughters than their sons? Are mothers less discriminatory against their daughters? If true, these relationships would be important for policy, as they would imply that improvements in gender equality may be self-reinforcing: as women gain more say in household decision-making, household spending on daughters may increase, resulting in even better female outcomes and more gender equality in the next generation.

In this paper, we examine if and why fathers underspend on their daughters' health and education more than mothers do. We do so by eliciting and comparing mothers' and fathers' willingness to pay (WTP) for various goods for their sons and daughters. We conduct the study in eastern Uganda among a sample of 1,084 two-parent households with young children in which we interviewed one randomly selected, or usually both, of the parents (separately).

Using this approach, our first main finding is that fathers have a lower WTP for girls' human capital than boys' human capital. In contrast, mothers have a higher WTP for girls' than boys' human capital.

A key contribution of our study is that we then investigate the underlying reason for these mother-father differences. In a review paper summarizing the available evidence on potential mother-father differences in son-daughter preferences in 2005, Lundberg (2005) noted that "one central unanswered question for economists is whether these differences emerge from parental preferences, from differences in constraints, or from both." Today we still know remarkably little about the answer to that question.

The preference-based explanation is simple: fathers could simply love their sons more than their daughters. The second explanation we consider is one based on the returns to investment ("investment-based" explanation). Mothers might expect to be more dependent on support from their children in old age than fathers, as women have lower earnings potential and longer life expectancy than men, on average. This could cause mothers to spend more on their daughters than fathers do if, for example, daughters are more likely to help support their parents in old age than sons.

To test between these hypotheses, we examine whether there exist similar mother-father son-daughter WTP differences for goods that bring joy to the children but do not add to their human capital: toys and candy. Under an investment-based explanation, one would expect the gaps to be observed for human capital goods but not toys and candy. Conversely, if the patterns are similar for both types of goods, this would be consistent with a preference-based

explanation.

We find evidence in support of a preference-based explanation: Our second main finding is that fathers also have a lower WTP for goods that bring joy for their girls than for their boys, suggesting that they have less altruism and/or love for their daughters than their sons. Mothers, in contrast, have no lower WTP for goods that bring joy for their girls than for their boys.

To further probe the different explanations, we collect data on which parent the respondents view as caring about the children more. We find that the mother-father differences are driven entirely by households where both parents believe the mother loves the children more than the father does, which could proxy for loving girls more than the father does in a context where everyone might love their sons. To test whether beliefs about total or personal returns to investing in children underlie the patterns, we collect data on these beliefs and examine heterogeneity in the WTP differences based on these beliefs. We do not find evidence for investment-based explanations, although we cannot reject that they play a role as well.

Our paper makes two contributions to the literature. First, we propose and implement a way of measuring parents' spending preferences that gives us enough statistical power to reject that mothers and fathers have the same spending patterns for their sons and daughters. Our method, which is to elicit WTP for children's goods, has high statistical power because it zeros in on the expenditure category of interest. In contrast, the standard approach used in previous research has been to examine the effects of exogenous changes in male versus female income, asking: Does a change in income for mothers lead to larger spending on, say, girls' education, or children's education in general, than the same change in income for fathers? However, children's health and education — and goods assignable to children more generally — constitute a modest share of household expenditures in most contexts. Detecting mother-father differences off a small base is statistically challenging. While a few studies can reject that women's income and men's income have identical effects (e.g., Lundberg et al. (1996)) or can rule out modest gender differences (e.g., Somville et al. (2020)), many other studies have insufficient statistical power to test for mother-father differences. Even fewer studies have the power to examine whether mother-father patterns differ for sons versus daughters, and we are unaware of other papers that statistically reject that mothers and fathers have the same spending patterns on their sons relative to daughters.[1] To give an

[1]For example, Duflo (2003) compares outcomes for girls and boys when grandmothers or grandfathers

example of the statistical power of our approach relative to the standard approach, Haushofer and Shapiro (2016) examine the effects of large cash transfers in Kenya and report that the minimum detectable effect size gap between male and female grant recipients for their health and education outcomes is 0.24 to 0.25 standard deviations (SD). (Perhaps unsurprisingly, they do not find a significant gender difference.) Our analysis, using a comparable number of households, has a much smaller minimum detectable effect size for the mother-father difference in spending on children – 0.08 SD – as well as for mother-father differences in spending on sons relative to daughters – 0.12 SD.[2]

Our second contribution is to investigate why mothers and fathers spend differently on their children. Here, we add to a quite small literature. One related paper is Doepke and Tertilt (2019), which presents and tests a model in which mothers and fathers have identical preferences, but mothers spend more than fathers on children's human capital because each parent specializes in providing different public goods for the household.

2 Data

The data for the study were collected in the district of Iganga in eastern Uganda. The sample comprises two-parent households with a child in primary school, specifically grade 4 to 6. In the first wave of data collection (March to May 2013) we surveyed one randomly-selected parent per household. The randomization ensures balance in household and child characteristics when we make comparisons between mothers and fathers. In the second wave of data collection (September to October 2013), we returned to a subset of the households, specifically who also had a child age 3 to 8 years old and surveyed the other parent.

We focused on households with children in grade 4 to 6 in the original sampling because the education good we offered to parents in the first wave was practice exams that primary schools administer to students each term for a fee. We collaborated with 40 government

received old-age pensions in South Africa, but one likely cannot reject at standard significance levels that grandmothers' income has the same effect on on boys' and girls' health, or that income for grandmothers and grandfathers in South Africa has the same effect on children's health.

[2]This ex post minimum detectable effect is calculated as 2.8 multipled by the standard error of the estimate. Haushofer and Shapiro (2016) do not report their minimum detectable effect for mother-father differences in spending on sons relative to daughters but we presume that it is higher than the 0.24 to 0.25 SD for overall mother-father differences. Other studies in economics on mother-father differences in investment in children's human capital include Thomas (1994), Qian (2008), and Benhassine et al. (2015). Another related study is Nikiforidis et al. (2018), which surveyed a small sample of mothers or fathers visiting a zoo in the US and asked them to choose between a boy's or girl's backpack and posed a similar question about a U.S. treasury bond to an Amazon MTurk sample, with the main finding that choices were gender-concordant.

primary schools to sell exam vouchers to parents of grade 4 to 6 students, and then for each voucher redeemed, to reimburse the school for the full price they normally charge for the exams. We conducted the second wave of data collection with the subset of families that also had a younger child because one of the health goods we offered were rubber shoes for this age range.

To identify households for the study, we began with a listing of eligible households in the participating schools. The first eligibility criterion was that the child lived with both biological parents (defined as each parent spending at least two nights a week in the household, and for polygamous households that the father spent more nights per week with this household than with other co-wives and children). The second was that for the current academic term (Term 1 of the 2013 school year), the child's parents had not paid for all of the practice exams the school offered. The reason for this restriction is that the survey elicited WTP at different prices up to but not exceeding the market price, and households already purchasing the good at market price generate no variation in WTP. In the few cases where there were two or more eligible siblings in the same household, we randomly selected one focal child. In the survey and elicitation of WTP, the practice exams were intended for and most of the survey questions referred to this focal child.

We randomly selected whether to interview the mother or the father, stratified on school and whether the household is polygamous. A surveyor visited the home and administered a screening questionnaire with the parent to confirm eligibility. The final sample comprises 1084 households that met the eligibility criteria and agreed to participate in the study.

The randomly chosen parent was interviewed without her spouse or children, other than infants and toddlers, present. The survey took approximately 75 minutes to complete. In the first wave, the participant received 8000 or 10,000 Ugandan shillings (1 USD $\approx$ 2600 UGX) as compensation for his or her time and to minimize cash constraints affecting WTP. (The payment level was randomized in order to test for income effects on WTP.) In the second wave, all respondents received 9000 UGX for participating.

The first part of the survey collected standard household composition and family background information and income and assets for each parent. The next part elicited the respondent's WTP for a set of goods. The survey also asked questions about education preferences, old age support, and spending norms.

Procedure for WTP elicitation

To elicit WTP, we used the Becker-DeGroot-Marschak (BDM) mechanism, asking the respondent if he or she was willing to purchase the good at a series of prices, in declining order from the market price to a price near zero (Becker et al., 1964).[3] The decrement varied by good and was chosen so that respondents were asked about roughly 12 price levels per good. The respondent was told that after the price questions, one of the price levels would be randomly chosen and she would purchase the good from us at that price if and only if her answer had been that she wanted to buy it at that price. The surveyor explained the procedure in detail to ensure that the respondent understood the procedure, and we also asked debrief questions (such as regret about one's choices) to confirm her understanding. The selection of the randomized price and exchange of money and goods, if applicable, was conducted just after the BDM questions were asked for a good. In the second wave, to increase sample size without increasing study costs, we grouped five of the goods, and first randomly chose one good and then one price level for that good; respondents were informed in advance that a transaction could only occur for one of these five goods; this two-step randomization occurred after the BDM questions for all five goods.

Also to increase sample size, in each wave we asked WTP in a similar but non-incentivized way for several additional goods. Respondents knew in advance that for these goods, no transaction would take place. For the non-incentivized goods, the surveyor showed the actual good to the respondent so that the good was specific and concrete. Appendix B provides validating evidence that the non-incentivized WTP appears to have worked very similarly to actual WTP (e.g., with similar correlations with assets and wealth), potentially since it was juxtaposed with incentivized WTP which could have put respondents into the right mindset. As a result, we pool incentivized and non-incentivized WTP in our main specifications for statistical power.

In the second wave of data collection, we revisited 729 of the original 1084 households and surveyed the other parent. The reason for revisiting a subsample was budgetary constraints. The focal child was now a child age 3 to 8 in the household. One of the goods we sold in this wave were rubber-soled shoes for this young child, and we attempted to interview all 686 households with a child age 3 to 8 where, according to the parent interviewed in the first wave, the child did not own shoes. We completed interviews with 681 of these

[3]Several recent studies have validated the use of BDM in developing countries including Berry et al. (2020) and Burchardi et al. (2021).

households. We also resurveyed an additional 48 households with a child age 3 to 8 who was described in the first wave as owning shoes already. The survey administered in the second wave was similar to the first one except that the young child was the focal child; most of the survey questions and goods sold pertained to this child, but there were also questions and goods pertaining to the older child. (Hereafter we refer to the two focal children as the older and younger child.) Also, in the second wave, the goods sold were different and more numerous than in the first wave.

Children's goods

We used several criteria when choosing which goods to offer parents. First, we wanted parents to be familiar with the good and its market price; otherwise, based on piloting, variation in perceived quality of the good or beliefs about whether the good could be purchased elsewhere for less than the market price we indicated would add noise to and potentially bias the results. Second, the good should be something that most households value at less than the market price, but place some value on, so that there is variation in WTP. Third, the good should not be particularly appealing to one gender, *within* the category of human capital; the goods are intended to represent the broad category of human capital, so while the whole category might be favored more by one gender, we would not want a good that, say, fathers idiosyncratically like more than mothers do. Fourth, there were practical considerations such as the good being available in sufficient quantity for us to purchase, small and light enough for surveyors to carry around on foot, and not too expensive. In addition to doing extensive preliminary fieldwork to choose goods that met these criteria, we also asked questions on the survey to verify this assumption.

In the first wave, we elicited WTP for practice exams administered by the schools. Schools offer exams during and end of each of the three terms of the school year. The tests are administered during the school day and graded by the teacher, but only for students who pay a supplement. The exams do not count toward grade progression. Schools purchase these tests from testing companies, and charge a fee to students either to cover their procurement or photocopying costs, or simply as a source of revenue. Our survey was conducted during Term 1, and we sold a bundle of all exams for the rest of the school year (two mid-term exams and one end-of-term exam in each of Terms 2 and 3), valued at 6000 UGX. We sold a paper voucher and also provided each school with a list of students who had purchased

vouchers.[4]

In the first wave, we also asked about WTP for two other human capital goods in a non-incentivized way: deworming medicine for the older child (market price of 4000 UGX) and, if the household had a child age 3 to 8, rubber-soled shoes for this child (2000 or 2500 UGX, with the price varying by child foot size, which we proxied with age).[5] Many young children do not wear shoes, and being barefoot is a risk factor for intestinal worms, as well as cuts and other injuries to the feet.

In the second wave, we offered were rubber-soled shoes for the young child. We also elicited WTP for a grade-appropriate math workbook for the older child (4500 UGX) using BDM and, deworming medicine for the younger child (4000 UGX) and practice exams for the older child for the first two terms of the following school year (6000 UGX) in a parallel but non-incentivized manner.

We also elicited WTP for fun goods for children that are not human-capital enhancing. In the second wave, where the focal child was a younger child, we used the same goods, regardless of child gender: a rubber ball (1500 UGX) and candy (3000 UGX).[6]

Benchmark goods

We elicited WTP for a few goods for use by adults. As shown in Dizon-Ross and Jayachandran (forthcoming, 2022), controlling for the WTP for these "benchmark goods" allows us to increase precision and control for differences in cash-on-hand, understanding of the BDM procedure, etc. Through piloting, we identified adult goods that are not gendered. In the first wave, the adult good was a metal cup for drinking (3600 UGX) and in the second wave, the two adult goods were a poster (2000 UGX) and a pair of jerry cans (4000 UGX). The first WTP elicited in each wave was for an adult good, with the goal of concentrating any gift-exchange behavior in these goods' WTP.

In addition, as a validation of the BDM method in this context, in the first wave, we elicited the WTP (non-incentivized) for a good that was intentionally chosen to be gendered,

[4]We made follow-up visits to each school in Terms 2 and 3 to make sure that the students who purchased the exams through us were given them.

[5]We asked about deworming only for those randomized to receive the 10,000 UGX payment for participating. The reason was, first, so that the higher compensation was for a longer survey and to minimize respondents complaining if they heard that someone else got paid more for the same activity, and, second, to keep the average survey length shorter.

[6]In the first wave, we offered a separate toy for girls (teddy bear) and boys (toy truck) because of feedback in piloting that different toys are appropriate for each gender. To make comparisons across boys and girls, however, it is important to use the same gender-neutral toy, so we exclude this toy from our current analysis.

namely a a kitchen sieve (2000 UGX). If women had not exhibited a higher WTP for this good, then this would have been an indication that the BDM was not effective at measuring preference differences. Reassuringly, women have a 0.14 SD higher WTP for the sieve than men do.

Survey questions to test mechanisms

We test two main hypotheses about why spending patterns might differ between mothers and fathers, and for each one, we ask explicit survey questions. First, mothers and fathers might differ in how much they care about children's well-being. Our strongest test of this hypothesis is to examine WTP for fun child goods, but we also asked direct questions such as which parent cared more about the children.

Second, mothers and fathers might differ in how much they will personally benefit from having higher human capital daughters and sons, specifically because of financial support from their children. We asked whether the respondent though she or her spouse would be more dependent on financial support from children and how support from a child differed by gender (as well as birth order).

3 Empirical Strategy and Results

Spending on children's goods

We begin by testing whether parents collectively spend more on their daughters or sons and whether one parent spends more on average on their children than the other. To do so, we estimate the following equation:

$$WTP_{ihgc} = \alpha + \beta Girl_{ihc} + \gamma Mother_{ihc} + \delta X_{ihgc} + \epsilon_{ihgc} \tag{1}$$

where each observation is parent i in household h asked about a good g for child c. The independent variable of interests are $Girl$, an indicator for the child being female and $Mother$, an indicator for the respondent being female. In principle, we could estimate the difference using a single good, but for both statistical power and to make the results less specific to a particular good, we pool several goods. To make WTP comparable across goods, we normalize the WTP for each good by its within-sample standard deviation, with the results robust to other normalizations. The vector of control variables X includes good-by-survey-wave fixed effects, and stratum or household fixed effects. To increase precision, we also

elicit WTP for adult goods (for which men and and women have similar preferences) and control for $AdultGoodWTP$ in equation (1).[7] The standard errors allow for clustering within a household.

Column (1) of Table 1 presents the results. There is no statistically significant difference between parents' WTP for goods for their daughters and compared to for their sons or statistical difference between mothers' and fathers' WTP overall.

Table 1: Fathers Spend Less on Girls but Mothers Do Not

	(1)	(2)	(3)	(4)
Girl	-0.035	-0.102***	-0.069*	-0.096**
	[0.024]	[0.032]	[0.036]	[0.037]
Girl × Mother		0.135***	0.079	0.146***
		[0.047]	[0.053]	[0.053]
Mother	-0.041	-0.109***	-0.111***	-0.076*
	[0.028]	[0.036]	[0.040]	[0.043]
p-val: Girl + Mother × Girl = 0		0.331	0.813	0.186
p-val: Mother + Mother × Girl = 0		0.465	0.444	0.095
Dep. Var. Mean Father-Boy	1.979	1.979	1.841	1.979
Fixed effects	Stratum	Stratum	Stratum	HH
Goods included	All	All	Incentivized	All
Number of observations	6,688	6,688	4,000	6,688

Next, to understand whether girl-boy spending preferences differ across mothers and fathers, we estimate the following equation:

$$WTP_{ihgc} = \alpha + \beta Girl_{ihc} + \delta Mother_{ih} \times Girl_{ihc} + \lambda Mother_{ih} + \gamma X_{ihgc} + \epsilon_{ihgc} \qquad (2)$$

In this case, the coefficient on $Girl$ tells us how much lower fathers' WTP is for girls than boys, and the coefficient on $Mother \times Girl$ tells us how different the $Girl$ effect is for mothers than fathers.

[7]This control variable also addresses several other potential confounds that might vary by parent gender such as the respondent overstating WTP to please the surveyor or out of gratitude for receiving payment for participating in the study; understating WTP due to misunderstanding that truth-telling is the dominant strategy; having a high WTP because of self-control problems and worry about how he or she would spend any leftover cash; and having a high WTP because his or her spouse would claim any leftover cash.

Column (2) of Table 1 shows that fathers have a lower WTP for goods for their daughters while mothers do not. The coefficient on *Girl* is negative and significant, suggesting that fathers have a 0.10 SD lower WTP for daughters than sons. The coefficient on $Mother \times Girl$ is positive, significant, and similar in magnitude to the *Girl* coefficient, which means that the net effect of *Girl* for mothers is 0. At the bottom of the table we report this p-value for whether mothers spend equally on daughters and sons ($Girl + Mother \times Girl$).

Note that mothers' spending level for sons is lower than fathers', as seen from the main effect of *Mother*. Combining this fact with the positive $Girl \times Mother$ effect, on net, mothers and fathers spend an indistinguishable amount on daughters. (The bottom of the table reports the p-value for this test, $Mother + Mother \times Girl$). Thus the key difference between fathers and mothers is that only fathers spend more on their sons than their daughters. The lower average spending of mothers is consistent with their typically having less control over household income than fathers do.

These findings are robust across several different specifications. Column (3) verifies the robustness of this result to limiting to the goods where we incentivized the WTP elicitation. The precision of the estimates falls, and the magnitude of the coefficients decreases somewhat, but the qualitative takeaway is the same: fathers have significantly lower spending on sons than daughters, whereas mothers do not. Column (4) shows that the results are also robust to including household fixed effects in the estimation. Finally, Appendix Table A.1 shows that the findings are robust to normalizing the WTP for each good by its sample mean. In that specification, the main effect of -0.06 for *Girl* indicates that fathers have 6% lower WTP for goods for their girls than for their boys. Meanwhile, mothers again spend similarly on both genders.

Spending on human capital

The child development implications of parents' spending preferences depend on whether the differences documented in Table 1 hold for human capital in particular. Column (1) of Table 2 estimates equation (2) using human capital goods only. Again, fathers spend significantly more on sons than daughters, with an effect size of -0.11 SD. Mothers, however, if anything spend more on daughters than sons, as $Mother + Mother \times Girl$ is a positive 0.04 SD (p-value 0.056). Figure 1(a) depicts the estimates graphically. Columns (2) and (3) of Table 2 show that the patterns are qualitatively similar for the two subcategories of human capital – education and health – with the magnitude and significance of the coefficients larger

for health. Appendix Table A.2 shows that the patterns remain the same when we limit to incentivized goods only, but the estimates are imprecise.

Table 2: Fathers Spend More on Boys' Human Capital and Mothers Spend More on Girls'

	Goods included		
	Human capital	Education	Health
	(1)	(2)	(3)
Girl	-0.105***	-0.081	-0.138***
	[0.036]	[0.051]	[0.052]
Mother	-0.074*	-0.064	-0.073
	[0.039]	[0.052]	[0.052]
Girl × Mother	0.147***	0.085	0.199***
	[0.051]	[0.070]	[0.075]
p-val: Girl + Mother × Girl = 0	0.257	0.930	0.248
p-val: Mother + Mother × Girl = 0	0.056	0.639	0.024
Dep. Var. Mean Father-Boy	2.042	1.618	2.380
Number of observations	5,230	2,542	2,688

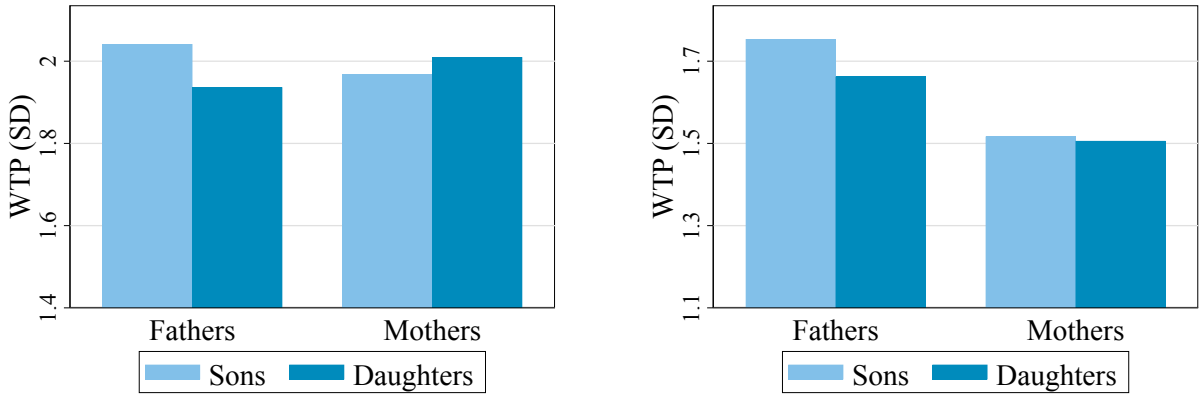
Mechanisms

What underlies these differences between mothers and fathers in their spending on sons versus daughters? We begin by testing whether differences in altruism towards daughters relative to sons plays a role. We do so by examining parents' WTP for goods that are purely for their children's enjoyment – and do not build human capital. Differential WTP for those goods by child gender suggests differences in altruism towards children.[8] We first estimate equation 2 using only the "pure enjoyment" (non-human capital) goods and display the results in Figure 1. Among fathers, WTP for daughters is considerably lower than for boys, while, among mothers, the gap is negligible.

To formally test for the differences in patterns between human capital and non-human capital, we estimate equation 2 with all goods, both human capital and non, and with all

[8]Appendix Figure A.1 verifies that the number one value parents thought that one of these goods – the ball – had for their children was increasing the child's happiness. Moreover, the reasons listed are similar across child gender. The results for the other good, candy, are similar.

Figure 1: For Both Human Capital and Non-Human Capital, Fathers Spend Less on Girls While Mothers Do Not



(a) Human capital

(b) Non-human capital

Notes: This figure presents the estimates from Table 3, column (1).

regressors interacted with a dummy for the good not being a human capital good. We display the results in Table 3, column (1).

The results show that father have a lower WTP for enjoyment goods for their daughters , just as they do for human capital goods. The p-value for this test ($Girl + Girl \times NonHumanCapital$) is 0.07 is reported at the bottom of the table. This suggests that they have lower altruism for their daughters than sons. The estimate is statistically indistinguishable from the estimate with human capital goods, as evidenced by the fact that the coefficient for $Girl \times NonHumanCapital$ in Table 3, column (1) is near 0 in magnitude and statistically insignificant. In contrast, mothers have no lower WTP for their daughter's enjoyment than their sons, as seen in Figure 1(b).[9] Unlike for human capital, mothers' WTP for non-human capital is not actually *higher* for their daughters than sons (although we cannot reject that it is higher). Indeed, Table 3 column (1) shows that we cannot reject that the $Mom \times Girl$ effect is the same for human capital and non-human capital (p-value = 0.31), and that differential altruism toward girls between mothers and fathers fully underlies mothers' and fathers' differences in their willingness to spend on their daughters.

[9]Mothers also have markedly lower spending on non-human capital goods for both sons and daughters, as evidenced by the negative $Mother \times NonHumanCapital$ coefficient. While this could reflect mothers having lower altruism overall towards their children, it could also reflect other factors such as mothers not believing in spending on "frivolous" goods or mothers not liking these goods in particular. These other factors, however, should not differ between sons and daughters and so should not affect our coefficient of interest, $Girl \times Mother$.

Table 3: Altruism Appears to Explain Some of Mother-Father Differences

	Covariate is:		
	Non-human capital good	Believe mothers love more	Believe girls support more and mothers receive more
	(1)	(2)	(3)
Girl × Mother × Covariate	-0.067	0.227**	0.039
	[0.086]	[0.111]	[0.109]
Girl × Mother	0.147***	0.029	0.131*
	[0.052]	[0.085]	[0.078]
Girl × Covariate	0.014	-0.124	-0.060
	[0.057]	[0.079]	[0.078]
Girl	-0.105***	-0.068	-0.096*
	[0.037]	[0.059]	[0.056]
Mother × Covariate	-0.163**	-0.017	-0.012
	[0.065]	[0.085]	[0.084]
Mother	-0.074*	-0.059	-0.068
	[0.040]	[0.067]	[0.062]
p-val: Mother × Girl + Mother × Girl × Cov. = 0	0.312	0.000	0.026
p-val: Girl + Girl × Cov = 0	0.070	0.000	0.004
Dep. Var. Mean Father-Boy	1.979	2.074	2.074
Goods included	All	Hum Cap	Hum Cap
Number of observations	6,688	4,645	4,645

We next provide a second test of the hypothesis that altruism underlies the mother-father differences in discrimination against daughters. Here we conduct heterogeneity analysis using a proxy for whether the mother is the more altruistic parent within the household. We estimate equation 2 using human capital goods only, and fully interact all regressors with a dummy for whether a household is in the roughly 50% of households where both parents identify the mother as the parent who cares more about the children. (In the other 50% of households, either only one or neither of the parents identified the mother as the more loving parent.) While we did not ask about which parent cared more for their girls in particular, in a context where boys might be more universally beloved, we believe caring more about

children in general may also proxy for caring more about female children.

Column (2) of Table 3 shows that mothers' greater WTP for daughters than fathers comes fully from the households that believe the mother loves the children more. The $Girl \times Mother$ coefficient — which is the $Girl \times Mother$ effect among households who do not believe the mothers love the children more — is small in magnitude and indistinguishable from zero. In contrast, the $Girl \times Mother$ effect among the households the believe that mothers love more is a significant 0.26 SD. In addition, the negative $Girl$ effect among fathers is three times the magnitude and only statistically significant in the subsample that believes mothers are the more loving parent (p-value on $Girl + Girl \times Covariate < .01$), although we cannot reject equality in the $Girl$ coefficient across the subsamples.

This evidence suggests that altruism is important in explaining the mother-father differences in son preference. However, altruism is not mutually exclusive with investment motives; do those contribute as well? If so, then we would expect the negative $Girl$ and positive $Girl \times Mother$ effects to be concentrated among households where the parents believe that (a) mothers will receive more support from their children later in life than fathers will, and (b) that daughters support their parents more than sons. We use survey measures to construct an indicator that a parent believes both (a) and (b) are true, which we consider a measure of mothers receiving higher return on investment (ROI) from investing in daughters than fathers. We then average this measure at the household level and estimate equation 2 using human capital goods only and fully interacted with a dummy that the household is in the top half of households for this measure ("high-ROI-for-mothers" households). We present the evidence in column (3) of Table 3. While the point estimate suggests that the $Girl \times Mother$ effect is 0.04 SD more positive in the high-ROI-for-mothers subsample, and the $Girl$ effect 0.06 more negative, we cannot reject equality of the coefficients across subsamples. We view this as weak evidence that ROI motives might also play a role.

To the extent that investment motives are the "residual explanation" for mother-father differences varying between human capital and non-human capital, the estimates in column (1) are also consistent with investment motives playing a role. The $Girl \times Mother \times NonHumanCapital$ coefficient is negative but insignificant. The sign of the coefficient suggests that mothers' relatively higher spending on daughters is especially pronounced for human capital, which is what one would expect if there were investment motives. This difference is also visible if one compares Figures 1(a) and 1(b). Mothers spend the same amount on their sons and daughters' non-human capital, but spend more on their daughters' human

capital than their sons'.

To summarize, we find that differential altruism towards daughters underlies some of the mother-daughter differences in WTP for human capital of daughters relative to sons, while our evidence is inconclusive on whether investment motives also play a role.

4 Conclusion

In this paper, we revisit the classic research question in family economics of whether mothers and fathers spend differently on their children,. We do so using a different approach than past studies: We elicit each parent's WTP for spending on goods for their children. The advantages of this approach, compared to using exogenous changes in women's and men's income, are that it provides considerable statistical power to study the research question and flexibility to choose goods with attributes that are useful for testing mechanisms. We apply this method in rural Uganda.

We find that fathers but not mothers spend less on daughters than sons. We then use the WTP data to investigate why the mother-father differences exist. Specifically, we test whether the data support a preference-based explanation, in which mothers care about daughters relatively more than fathers do, or an investment-based explanation, in which mothers enjoy a higher financial return on investment in girls, for example because they will be more reliant on them for old-age support. One test we use is based on comparing goods with different attributes: We examine parents' WTP for goods that bring joy to the children but do not build their human capital. We find similar patterns for these non-human-capital goods as we did for human capital and conclude that mothers' greater altruism toward their daughters plays an important role in driving the spending differences.

Our investigation into what underlies parental spending differences is far from the final word on this question. We do not consider all possible explanations, and we leave unexplored the deep causes of preference differences. For example, the literature in sociology and psychology has proposed that parents identifying more with same-gender children is one important factor (Belsky, 1979; Nikiforidis et al., 2018). Further exploring the reasons for parental differences in spending is a fruitful area for research, and we believe that WTP elicitation could be a useful research design to use.

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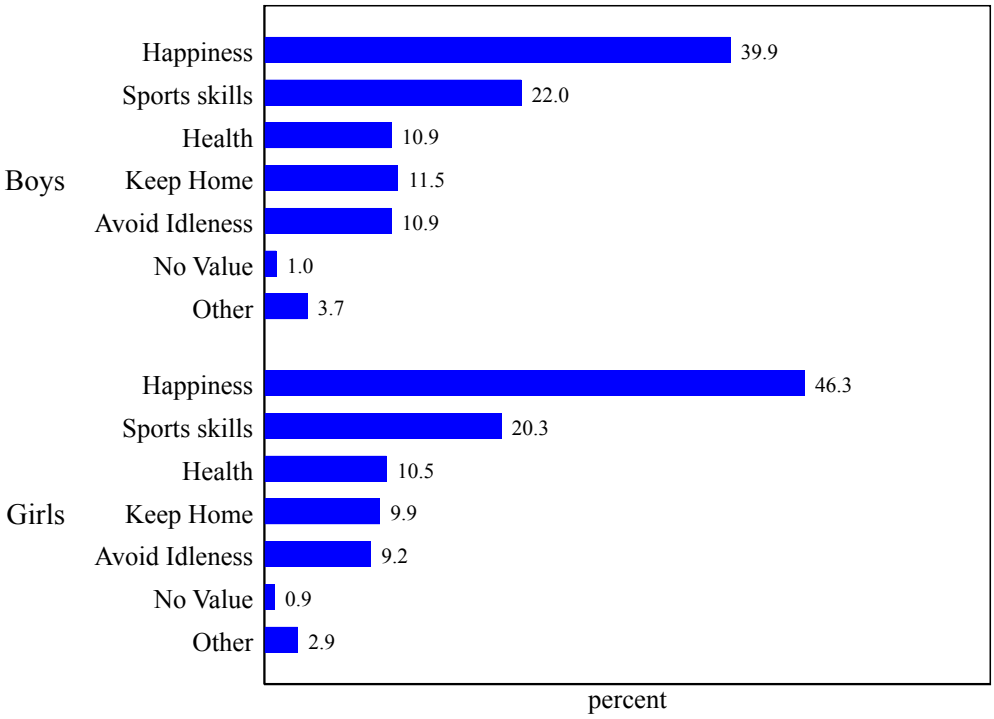
A Appendix Figures and Tables

Appendix Figure A.1: Parents' Statements of the Ball's Primary Value, by Child Gender



Appendix Table A.1: Robustness to normalizing by mean WTP

	(1)	(2)	(3)	(4)
Girl	-0.021	-0.056***	-0.038*	-0.048**
	[0.014]	[0.019]	[0.022]	[0.021]
Girl × Mother		0.071***	0.044	0.072**
		[0.027]	[0.032]	[0.030]
Mother	-0.031*	-0.067***	-0.067***	-0.048**
	[0.016]	[0.021]	[0.024]	[0.024]
p-val: Girl + Mother × Girl = 0		0.469	0.811	0.271
p-val: Mother + Mother × Girl = 0		0.842	0.376	0.311
Fixed effects	Stratum	Stratum	Stratum	Household
Goods included	All	All	Incentivized	All
Number of observations	6688	6688	4000	6688

Appendix Table A.2: Robustness of human capital results to including incentivized goods only

	Goods included		
	Human capital	Education	Health
	(1)	(2)	(3)
Girl	-0.058	-0.046	-0.092
	[0.045]	[0.055]	[0.088]
Girl × Mother	0.073	0.047	0.137
	[0.063]	[0.075]	[0.133]
Mother	-0.040	-0.031	-0.059
	[0.046]	[0.056]	[0.084]
p-val: Girl + Mother × Girl = 0	0.757	0.986	0.647
p-val: Mother + Mother × Girl = 0	0.474	0.755	0.427
Dep. Var. Mean Father-Boy	1.891	1.553	2.584
Fixed effects	Stratum	Stratum	Stratum
Number of observations	2,542	1,813	729

B Validation of Non-Incentivized WTP

To assess the performance of non-incentivized WTP elicitation, we examine WTP for the one good that we asked the full sample about in both waves but where one wave was non-incentivized and the other was incentivized: tests. We first use LASSO to identify the primary predictors of WTP in the baseline wave, where the elicitation was incentivized. The two primary predictors are a principal component analysis (PCA) index of household assets, and the parent's belief about whether the tests we were offering were higher quality than the tests available in their child's school.

Table A.3 shows that these same predictors significantly predict non-incentivized WTP, and that there is no difference in the predictive coefficients between incentivized and non-incentivized WTP. The table presents a regression of WTP for the tests, pooled across non-incentivized and incentivized observations, regressed on the assets PCA, an indicator for the parent thinking the tests are higher quality, and both of their interactions with a dummy for whether the WTP elicitation was incentivized.

Note that while there is no significant difference in the predictors of WTP between incentivized and non-incentivized WTP, there is a negative main effect of being incentivized (i.e., WTP for the incentivized tests is lower). However, in this data, the incentivized dummy is collinear with being in the follow-up survey wave, and so we cannot distinguish whether this negative main effect simply reflects time effects.

Appendix Table A.3: Incentivized and Non-Incentivized WTP Have the Same Predictors

	(1)
Assets PCA	0.084**
	[0.037]
Assets PCA × Incentivized	0.016
	[0.046]
High-quality tests	0.353***
	[0.076]
High-quality tests × Incentivized	0.142
	[0.095]
Incentivized	-0.303***
	[0.057]
Number of observations	1,813