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Abstract

This report examines the impacts of an unconditional cash transfer in Lesotho, the Child Grants Programme, aimed at enhancing children's nutrition and schooling. Using an experimental impact evaluation design, the analysis looks specifically at gender-differentiated impacts on children's school participation and time use among agricultural households two years after the start of the programme. In addition, the paper tests whether household structure and gender of the designated cash recipient influences the programme's impact on child welfare. The analysis finds that the cash transfers led to different outcomes for girls and boys, overall favouring secondary school-aged girls. As a result of the CGP, girls in this age group were less likely to *miss* school, spent more time *at* school, and faced a reduced time burden in household chores. The report also finds that the programme's overall impacts are influenced by household structure. While the general results are maintained in households with a married couple present, in *de jure* female-headed households, outcomes improved among secondary school-aged boys relative to secondary school-aged girls. By contrast, having the father as recipient was more likely to have positive impacts on girls' schooling, decrease boys' labour in farming while simultaneously increasing boys' labour input in household chores. The results challenge the idea that there are gender preferences in schooling in Lesotho and suggests that impacts on child welfare are influenced by time and labour constraints and by gender-based differences in opportunity costs of a child's time. *Ex ante*, baseline differences among boys and girls in schooling and labour participation show that boys are at a disadvantage in terms of missing school and spending more time in crop and livestock activities. Hence, in general, while secondary school-aged girls benefit to a greater extent from the cash transfer, the programme largely fails to mitigate the opportunity cost among agricultural households of boys' time going to school relative to engaging in labour activities. The findings have implications for the design of cash transfer programmes and make the case for additional support for labour-constrained agricultural households to achieve the intended objectives of the programme.

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Keywords: Cash Transfers, Gender, Child Schooling, Child Time Use, Child Farm Labour, Female Headed Households

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Abbreviations

CGP	Child Grants Programme
CT	Cash Transfer
DiD	Difference-in-Differences
FAO	Food and Agriculture Organization of the United Nations
FHH	Female-headed household
IPW	Inverse Probability Weighting
MHH	Male-headed household
MoSD	Ministry of Social Development
OPM	Oxford Policy Management
RCT	Randomized Control Trial
UNICEF	United Nations Children's Fund

Introduction

Family and child allowances constitute about 16 percent of total spending on cash transfers (CTs) worldwide (World Bank, 2015). Several of these programmes focus on increasing household child investment behaviour particularly in nutrition and schooling. Old age social pensions and poverty-targeted cash transfers similarly have human capital investment objectives. The impacts of CTs on child welfare have been widely studied (Hoop and Rosati, 2013) and overall show positive results in schooling, and in some cases a reduction of child labour.[1] For example, the work of Bourguignon *et al*. (2003), Cardoso and Souza (2004), Handa *et al*. (2009) and Skoufias and Parker (2001) focus on the impacts of conditional CTs on child labour and schooling, in particular Brazil's Bolsa Familia and Mexico's Progresa (now called Prospera). These large CT programmes mandate child school attendance (among other conditionalities), thus improving attendance significantly. In Chile, Martorano and Sanfilippo (2012) find positive impacts of Chile Solidario cash transfers on child attendance rates, especially among secondary students. Similar impacts on education investments in children are found among unconditional CTs in Africa. Edmonds (2006) focuses on pensions to the elderly in South Africa, finding this leads to significant increases in schooling and reduction in labour for children, mostly among boys. Examining a monthly CT for the ultra-poor in Malawi, Miller and Tsoka (2012) find improved education and reduced labour outcomes among children in beneficiary households. More recently, Akresh *et al*. (2013) find increased child attendance rates due to a cash transfer programme in Burkina Faso; and Handa *et al*. (2015) find increased school enrolment, particularly amongst older children, and decreased child wage labour as the result of a cash transfer programme in Zambia. Overall, the bulk of evidence shows that there are substantial impacts on child schooling (enrolment and attendance), particularly at secondary school level where attendance tends to be lower in poor households (World Bank, 2014).

A remaining important question about CTs is whether impact levels are equitable between boys and girls with regard to education and use of their labour. The bulk of studies on CTs suggest no consistency of higher impacts in education for either girls or boys, but rather these programmes work towards reducing *ex ante* schooling gender inequalities. However, the impacts on child labour are still inconclusive and gendered, determined by the market (the types of jobs available for girls and boys and the relative gender roles assigned to

[1] With the term "child labour", organizations, such as the International Labour Organization, often define work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development. Engagement of children in labour activities can be difficult and demanding, hazardous and even morally reprehensible. With the available survey instrument used to collect the data for this study, it is impossible to disentangle the many kinds of work children do. For this reason, in this report we adopt the "economic" approach to the term child labour, for which terms such as child labour, child work or engagement of children in family farming or wage labour can be used interchangeably.

them), the household structure and characteristics, and the ways in which child labour complements adult labour in the household (World Bank, 2014). The bulk of studies also suggest that outcomes are influenced by the kind of activities performed by boys and girls in the household, their related opportunity costs, their compatibility with schooling, and boys' and girls' available leisure time (World Bank, 2014). Both economic and household chores count, as the latter, when performed by children, also frees adults' time.

In relation to household decision-making on child investment by gender, preference in the use of the transfers in child investments is also relevant. Since the seminal work of Becker (1965, 1981), economists have built on his theory of choice framework to analyse intra-household and intergenerational resource transmission. The findings of Emerson and Souza (2002) in Brazil provide strong evidence that parental child preferences may generate a gender bias in human capital investments among children. The authors find that higher parental schooling increases the probability that a child will attend school and decreases the likelihood that the child will be a labourer. However, while both father's and mother's schooling has strong impacts on a son's education and labour, in their study only mother's schooling affects the probability that a daughter works. In addition, non-labour income (e.g. transfers) of either parent has an impact on a son's school attendance but not a daughter's.

A strand of the literature looks into the impacts of gender-based programme features but remains inconclusive on the policy implications. For example, Mexico's Progresa provided larger transfers to households with girls in order to reduce the gender gap in schooling enrolment (Handa *et al.*, 2009). However, empirical evidence has not confirmed whether observed larger impacts on girls derive from lower initial enrolment rates for girls or from the higher payments made to those households. Further, various studies have already shown that child welfare is improved when women have control of a greater share of household resources, through income (Thomas *et al.*, 1990; Quisumbing and La Brière, 2000) or dowry (Quisumbing and Maluccio, 2003), making the case for women to be designated cash recipients. However, there is scarce evidence comparing outcomes by gender of transfer recipient. To understand how CT impacts can be driven by child preference by gender, some research has been done on the differentiated impacts by gender of household recipient. In some cases this suggests prevalent gender bias in intra-household resource allocation (see Duflo (2003) on child anthropometric outcomes of a social pension in South Africa) but in others suggesting absence of gender bias (see Akresh *et al.* [2013], on a conditional cash transfer in Burkina Faso on child preventive health care visits). More recently, a randomized control trial on male and female cash recipients of an education grant in Morocco finds slightly differentiated impacts on child schooling by gender, with girls having slightly higher schooling outcomes when mothers receive the transfer compared to fathers. However, this difference is not observed in an unconditional CT applied in the context of the same experiment (Benhassine *et al.*, 2013). Other studies make the case for a strong association between cash given to mothers and child schooling,

nutrition and general welfare (Behrman and Hoddinott, 2005; Manley *et al.*, 2012; Brauw *et al*., 2014). However, most of these studies fail to compare these outcomes to a scenario with male cash transfer recipients.

The impact of gender differences in household structure on cash transfer outcomes for girls and boys has not been widely studied either. An important question is whether female-headed households (FHH), due to their labour constraints, are less likely to substitute child labour for investment in child education – with consequent bearings on intergenerational transmission of poverty. This perspective is relevant, particularly in sub-Saharan Africa, where 26 percent of households are estimated to be headed by a woman and their prevalence has increased since the 1990s (Milazzo and Walle, 2015). The structure of FHH can also vary. *De jure* FHHs are run by single, widowed, divorced or separated women, and differ from *de facto* FHH, in which a husband is temporarily absent, for instance because of working and living abroad. In the context of sub-Saharan Africa, the age of the household head is relevant as, due to the HIV-AIDS pandemic, several FHH are made up of the elderly caring for their grandchildren. The extent to which FHH are disadvantaged relative to male-headed households (MHH) in terms of poverty, labour capacity, access to land and livestock, and lower credit and education varies greatly across studies and contexts (Kossoudji and Mueller, 1983; Handa, 1996; Quisumbing, 1996; Buvini and Geeta, 1997). In addition, for agricultural households facing non-separable production and consumption decisions, the impact of the cash transfer on household production and therefore labour decisions of both adults and children, are expected to be jointly determined with other outcomes such as schooling investment decisions (Benjamin, 1992; Bardhan and Udry, 1999; Handa *et al.*, 2010).[2]

This report aims to fill a gap in the literature on child investment outcomes vis-à-vis the use of their labour by focusing on agricultural households and on gender-based differences in household structure. Using impact evaluation data from the Child Grants Programme (CGP) in Lesotho, we examine the gender-differentiated impacts on child schooling, labour and time use by comparing impacts on outcomes for boys and girls across married MHH and *de jure* FHH. We focus on agricultural households because in Lesotho the majority of child workers are employed in crop and livestock production activities, and this is an important determinant of school enrolment and schooling outcomes (Kimane, 2006).[3] In addition, we analyse potential gender preferences in child investment, depending on the gender of the cash transfer recipient within married MHH.

[2] Microeconomic theory posits that in many developing country settings, especially in rural areas, farm household production and consumption decisions are "non-separable", that is the farm household cannot be viewed as a separate or independent profit-maximizing producer and utility-maximizing consumer. Because of market imperfections, such as missing markets or markets with high transaction costs, households' consumption decisions are thus dependent on production consideration and vice versa.

[3] An agricultural household is defined as a unit engaged in crop production or livestock activities in the 12 months prior to the household survey.

1. The Child Grants Programme in Lesotho

The CGP in Lesotho is an unconditional social cash transfer programme that targets poor rural households with orphans and vulnerable children (OVCs). [4] Its primary objective is to improve the living standards of OVCs so as to reduce malnutrition, improve health status, and increase school enrolment. The transfer value was originally set in 2009, at the beginning of the programme, at a flat rate of LSL120 (US$ 12) per month per household and was disbursed every quarter. This amount corresponded to around 14 percent of the 2013 monthly consumption of an eligible household. Since April 2013, the transfer has been increased and indexed to the number of children, ranging from LSL120 to LSL250 (US$ 25) per month. Programme beneficiaries are selected through a combination of Proxy Means Testing (PMT) and community validation, and are registered in the National Information System for Social Assistance (NISSA) (Pellerano *et al.*, 2014). The evaluation of the programme was carried out as a randomized experiment. Control and treatment households were administered a detailed questionnaire in July-August 2011 (baseline) and during the same months in 2013 (follow-up), so as to avoid seasonality issues.

The impact evaluation report of the CGP (Pellerano *et al*., 2014) suggests that programme messaging affected child schooling. For example, large and significant increases in spending on children's uniforms and school shoes were found, particularly among 6–12 year olds. Further, the CGP was found to have had a large effect on the proportion of children aged 6–19 years who were currently in school. This impact was mainly driven by a large decline in enrolment among older boys aged 13–17 in the control group, which would imply that the transfer helped mitigate that effect for children in beneficiary households. Enrolment for 13–17 year old boys was 6–10 percent higher among beneficiaries and the effect was concentrated among primary school pupils.[5] Impacts of the CGP on girls' schooling outcomes were not statistically significant but followed a similar trend to that for boys. Pellerano *et al.* (2014) also examined the impacts of the CGP on time use by children aged 4–17 years. While statistically significant impacts were not observed, boys enrolled in school from beneficiary households were estimated to spend more time than girls doing homework and/or studying outside school. These results point to potential gender bias - favouring boys - in investment in human capital, despite mostly weakly significant results on schooling and time use outcomes (typical amount of time spent on household chores, in school, working on farm) relative to spending outcomes.

The impact evaluation results from the follow-up study on child schooling and other outcomes were based on the whole sample of treatment and control households. In this paper we focus on a subsample of households engaged in crop production and livestock

[4] A household member is considered a child if aged between 0 and 17 for the purpose of CGP distribution.
[5] Even among children aged 13–17, enrolment for this group in Lesotho is higher at the primary level than in secondary school, suggesting high rates of grade repetition and irregular school progression, which means that roughly 70% of children are not in their corresponding grade based on their age.

rearing at baseline. We focus on this subset because children in this group are particularly vulnerable to shocks that may affect schooling. A qualitative study of the CGP found that children are commonly pulled out of school to engage in labour activities including farm work for boys and washing and child care for girls, especially in households engaged in agricultural activities (Oxford Policy Management, 2014). Our results do not contradict the results of the main impact report but are different in magnitude and significance (not direction), because we focus on the sample of households engaged in agriculture for whom stronger results are expected. In addition to examining general child outcomes, this paper also examines FHH-MHH differences in household structure and gender of transfer recipient. We stratify the sample by gender, and primary school aged children, 6–12 years, and secondary school aged children, 13–17 years.

2. Empirical framework

Although the CGP is an unconditional CT, the programme included strong messaging about spending money on the needs of children. Hence, an increase in child specific investments, particularly in education, and a decrease in their participation in agricultural and household labour would be expected. However, the unconditional nature of the transfer coupled with the vulnerability of recipient agricultural households, could lead households to prioritize different needs over investing in all children equally. Potential alternative spending on consumption includes food and investments in agricultural inputs to increase food production.

Our main hypothesis is that differences in transfer allocation could be driven by differences in household structure, specifically the gender of the household head and her/his relationship to the children living in the household, and by the labour capacity of the household. First, the agricultural household model (Benjamin, 1992; Bardhan and Udry, 1999) predicts that by alleviating household credit constraints, an exogenous increase in income due to cash transfers may affect adult labour and thus, simultaneously affect child labour. If cash transfers increase labour demand, say through greater employment opportunities on-farm, depending on the elasticities of adult and child farm labour with respect to income, both an increase or a decrease in child labour are possible. However, if child and adult labour are imperfect substitutes, then a decrease in child labour is to be expected. Further, if cash transfers increase adult participation in off-farm wage labour, then child labour could increase or decrease depending on the income effect of the transfer and the propensity for a household to hire outside labour. Second, we expect to find gender differences in child investment impacts due to differences in the value of human capital relative to the cost of forgone current earnings for boys and girls, by household structure. Household decisions to invest in child education depend on marginal costs - forgone earnings from child labour and direct education costs - and marginal benefits - higher expected earnings as an adult as they enter the labour market. Investments in child education is also affected by economic shocks and households' inability to cope. CTs may reduce the marginal costs of education by reducing the relative value of children's time in work and leisure compared with school.

If boys expect higher wages and longer time in employment than girls, then the marginal benefit of one extra year of education for boys is higher than for girls, all other factors being equal. If this was the case, we would expect to find CTs having a larger impact on boys than girls. However, if the marginal costs of child education in terms of forgone earnings remain relatively higher for boys compared to girls despite the transfer, then we may find that girls benefit more from the transfer than boys. As presented later in this paper, baseline differences between boys and girls in our sample show that boys of both primary and secondary school age are more likely to miss and repeat school, and are vastly more likely to participate in crop and livestock activities than girls. Boys aged 13-17 years spend

on average one additional hour in a typical day working on farm activities or household chores (mostly on farm activities) compared to girls. Similarly, boys aged 6-12 years spend approximately half an hour more than girls on such activities. This means that among poor households participating in the Lesotho CGP, boys appear to be more disadvantaged than girls with regard to education prospects due to involvement in income generating activities.

From a policy perspective, the observed gendered impacts of the Lesotho CGP on child investments by FHH-MHH would suggest that adjustments need to be made in the allocation of CTs to avoid gender bias in schooling. The results will provide evidence as to whether the CGP design should go beyond advocating investment in child education, to include gender-specific features and complementary support to ensure equal promotion of boys' and girls' education.

In addition to examining differences in investments in boys and girls by household structure, we analyse differences based on the gender of the cash transfer recipient. We test the assumption of unitary household decision-making by comparing child outcomes by the gender of the transfer recipient within married MHH, in which intra-household resource allocation decisions can be made solely or jointly. By looking at both the role of household structure (FHH-MHH) and intra-household decision-making, we provide some insights into whether household economic constraints or parental preferences drive differences in investment in boys and girls. However, as the treatment was not randomized by household structure or within households, both FHH-MHH and gender of recipient within MHH can be potentially endogenous. We assume that the bias that may occur while sorting across FHH and MHH can be adequately controlled for by using potential differences in observable characteristics such as household composition.

The paper ends with a discussion of differences in characteristics by household structure, impacts on adult labour allocation and other household decisions. Combining the impacts with potential explanations of why such gender differences in child outcomes are observed, can help inform decision makers about the implications of providing undifferentiated cash transfers to different types of households. We hypothesize that household structure could impact investments in children if different types of households prioritize the use of the transfer and the opportunity cost of a child's time differently. While the CGP was expected to promote child health and education, other unintended consequences such as increased purchase of crop inputs and increased agricultural production on kitchen garden plots were found among beneficiary households (Daidone *et al*., 2014). We investigate whether such changes varied by type of household and hence could have caused differences in investments in children.

3. Data & Empirical Strategy

Data

The empirical analysis uses both baseline and 24-month follow-up data. These surveys were representative of phase 1-round 2 of the CGP pilot programme, which covered five districts – Qacha's Nek, Maseru, Leribe, Berea and Mafeteng – in ten Community Councils (CCs) made up of 96 Electoral Divisions (EDs). EDs were split equally into treatment and control arms through public lottery events in each CC. Two criteria were used to determine households' eligibility for CGP: 1) having at least one resident child aged 0–17 years; 2) being among the poorest households in the community.[6]

For this analysis we include only agricultural households comprised of *de jure* unmarried FHH and married MHH. Within the total sample 98 percent of FHH were unmarried, and 85 percent of MHH were married. Further, 86 percent of the total sample at baseline consisted of agricultural households involved in crop production and/or livestock rearing. Our panel retains households that were doing any type of agricultural activity, either crop production or livestock rearing, at baseline and comprises of 1,006 households in each survey year. There was no attrition within this sample, although attrition for the overall sample was 6 percent.[7] Our final sample included 468 control and 538 treatment households.

3.1. Baseline household summary statistics

Table 1 Panel A presents summary statistics at baseline in 2011 across treatment and control households, while Panel B compares means across *de jure* unmarried FHH and married MHH. The sample of households is restricted to unmarried FHH and married MHH in both panels. The 24-month panel survey for the Lesotho CGP uses a randomized experimental design. However, as the sample is restricted to unmarried FHH and married MHH in agricultural households, some differences between the treated and control groups exist. Pairwise tests indicate that many differences across treatment and control samples are not significant, but from Panel A of Table 1 we find that heads in treatment households have 0.31 more years of education and there are 0.59 more household members: these differences are significant. Household composition for adult members over 18 differs by 0.33 members and is statistically significant. Similarly there is a significant difference between treatment and control groups for members' aged 0–5 years. Controlling for differences in household composition is likely to be important for measuring the impact of cash transfers on child outcomes as this reflects labour composition. Lastly, we find a

[6] For more details about the identification process of the poorest households, see (Pellerano *et al.*, 2014)
[7] The purpose of the survey was to track children. In some cases the children of one household from baseline may have split into multiple households at follow-up. For analytical purposes households containing the majority of baseline children were taken as the follow-up household (additional details and discussion in Pellerano *et al*., 2014).

significant difference between treatment and control groups in household participation in crop production, with control households 5 percent less likely to participate, and producing on average 0.15 fewer types of fruits and vegetables. Both crop production and livestock rearing are important household economic activities for the poor and vulnerable households sampled in Lesotho, with 88–93 percent and 72–74 percent engaged in crop production and livestock rearing respectively.[8]

Table 1 Panel B compares the samples of unmarried FHH to married MHH, finding significant differences in the characteristics of the head of household and attributes of the household. As anticipated, heads in FHH are on average 10.7 years older than those in MHH. FHH heads are also more educated and have 0.9 years more schooling than MHH heads. Figure 1 and Figure 2 show the distribution of age and years of schooling by household structure. These indicate the larger densities at higher levels of both age and education for FHH relative to MHH. Other significant differences include marginally larger households, with more members over 18 years old in MHH compared to FHH. Further, while there is no difference in household engagement in crop production by household structure, MHH produce fractionally more fruits and vegetables than FHH. From Figure 3, the distribution of land by household structure does not seem to differ across FHH and MHH[9], contrary to expectations. This suggests that on average both FHH and MHH are likely to engage in crop production. Lastly, there is a large difference in the likelihood of engaging in livestock rearing: 80 percent among MHH and just 66 percent among FHH. Figure 4 shows that a much higher proportion of FHH own no livestock and ownership of higher numbers of livestock is generally lower among FHH compared to MHH. On average MHH own 3.25 more livestock than FHH, and the difference is statistically significant.

One concern when comparing the impact of the CGP on child outcomes by FHH-MHH is that household structure may be correlated with some omitted characteristic that interacts with the treatment. This means that difference in the impacts of cash transfers could be attributed to the difference between FHH and MHH when in fact it stems from omitted variable bias. To mitigate this possibility we control for time-variant observed characteristics that differ across households such as the demographic composition of households, and characteristics of the household head. In addition, the use of individual fixed effects helps reduce bias that may stem from both individual and household unobserved time invariant factors. Given that the specifications used in our analysis control

[8] Results presented do not use Propensity Score Matching (PSM) techniques, like reweighting for the propensity score, since impact estimates are virtually unchanged. This suggests that controlling for observables is sufficient to mitigate differences between control and treatment groups. Results are available on request to the authors.

[9] Post survey data cleaning revealed that there may be some measurement error in household estimation of owned land. We assume that errors are random and not defined by household structure. We also only use land area owned to compare distributions.

for time variant characteristics, there is some concern that we are including covariates that might be affected by the treatment. Controlling for baseline characteristics does not alter treatment impacts and we find no evidence that the covariates used in the analysis are affected by the treatment, thus our preferred specification uses time-variant covariates with individual fixed effects.

3.2. Baseline child outcomes by gender

In Table 2 we compare how girls and boys differed before CGP payments started, particularly in the outcome variables of interest. With respect to older children, aged 13 to 17 years (Panel A), 56 percent of girls were enrolled in the last three grades of primary school (years 5 to 7), compared to 63 percent of boys in the same age group. However, among the same age category, 39 percent of girls were in secondary school, compared to 22 percent of boys. At baseline, 77 percent of boys aged 13 to 17 years ever-repeated school (20 percent more than girls) and 37 percent of them missed school in the 30 days prior to the baseline survey (10 percent more than girls). Hence, schooling among older boys in agricultural households appeared more volatile and less favoured than for girls. This implies that the value of current earnings for a large share of older-age boys relative to the opportunity cost of schooling may be considered greater than the value of future earnings, resulting in a lower share of boys participating in school. In addition, researchers in the area of education observe that boys in Lesotho have lower enrolment rates than girls, and that in the context of the HIV-AIDS pandemic, there has been growing pressure for boys to support their households economically (Nyabanyaba, 2008).

In terms of labour and time use, 46 percent of older boys participated in own crop or livestock activities in the week prior to the survey, compared to only 7 percent of girls. In addition, boys in this age group spent on average 2.5 days per week on such activities compared to girls who spent just 0.26 days. However, while older girls (aged 13–17 years) spend roughly 42 minutes in a typical day engaged in household chores, boys spend roughly 11 minutes less on such activities. This confirms well established gender roles in rural households among secondary school-aged boys and girls, seen not only in Lesotho but in many rural settings. When time spent in farm activities and household chores is added up, the results show that in a typical day boys spend on average nearly one hour more on these than girls. This difference is statistically significant and would add up to a large difference between secondary school aged boys and girls over a week. Hence, we find that older boys are typically more disadvantaged than girls among poor agricultural households in Lesotho, with regard to time spent on non-leisure and non-schooling activities, and in schooling participation.

Among younger children (Panel B in Table 2), all girls and boys aged 6–12 years were enrolled in school. However, as with older boys, we observe that younger boys aged 6–12 years have higher repetition rates than girls (55 vs. 42 percent) and are more likely to have missed school in the 30 days prior to the survey (27 vs. 20 percent). Further, around 30

percent of boys were engaged in farm activities in the week preceding the survey, compared to just 5 percent of girls. Although in a typical day girls spend around 91 minutes on household chores (28 minutes more than boys), boys spend roughly half an hour more on farming activities and chores together. Again as with older boys, the baseline statistics indicate that younger boys are more disadvantaged than younger girls in school participation, and spend more time on labour activities.

Gender differences in labour allocation within the household also have implications on child investment outcomes as a result of cash transfers, as household chores tend to be more compatible with schooling than agricultural tasks. Therefore, girls are better able to combine schooling with household tasks (World Bank, 2014).

3.3. Baseline child outcomes by household structure

We next examine differences in observed child characteristics across FHH and MHH. For secondary school aged children (Panel A, Table 3), there is a stark contrast in terms of their relationship to the household head. Specifically, 71 percent of children in MHH are sons or daughters of the head while only 43 percent in FHH have this relationship. Further, only 17 percent of boys and girls in MHH are the grandchildren of the head, as opposed to 52 percent of grandchildren in FHH. This difference, together with others such as the age of the household head, could lead to differences in the observed child outcomes by household structure. Grandmothers may view the value of the human capital relative to the opportunity cost of time differently to mothers and fathers. Moreover, households headed by a female elder may face very different constraints in terms of labour capacity and access to assets and services than households headed by younger males.

In terms of education outcomes, we do not observe meaningful differences between MHH and FHH for older children (Panel A, Table 3). Only 27–28 percent of secondary school aged children are enrolled in junior secondary school (Forms A-C), while most of them (59–61 percent) were enrolled in primary school (years 5–7), below the optimal level of education. This is indicative of a lack of resources for children of this age group to remain in school, due to household economic constraints, and of a high level of grade repetition. Further, there are no significant differences across MHH and FHH for other key schooling indicators, neither in the likelihood of repeating school (69 vs. 67 percent), nor in the likelihood of having missed school days in the month prior the baseline survey (34 vs. 32 percent). However, older children from FHH were 7 percent more likely to have been enrolled in school in the current year – a significant difference.[10]

Consistent with the above, we also observe a large difference in the likelihood of older children participating in farm labour in the seven days prior to the survey (34 percent in

[10] Looking across labour categories, we find that children of all age groups in Lesotho are most likely to be engaged in farming and livestock activities with less than 5 percent working on off-farm wage activities.

MHH vs. 24 percent in FHH). In a typical day, older children in MHH spend 81 minutes on farm activities, while those in FHH spend just 35 minutes. However, the same children in FHH spend on average 84 minutes on chores while those from MHH spend 66 minutes. Older children from MHH also spend less time at school and doing homework than those from FHH. These differences are all significant and suggest that farming activities take precedence in MHH, where livestock is more prevalent and livestock activities take up more time among male children. From the summary statistics, there is likely to be greater substitution of labour activities for schooling among older children in MHH compared to FHH. Older children from FHH spend more time engaged in household chores, most likely because children are less likely to engage in livestock rearing in FHH and are more likely to substitute for FHH time on chores, including fetching water, sibling care, cleaning, cooking, washing and shopping.

In Table 3, Panel B we present differences across FHH and MHH for younger children. The trends for children of primary school age were similar to those for older children, with younger children from FHH more likely to be grandchildren of the head and those from MHH more likely to be sons or daughters of the head. However, contrary to schooling trends among older children, younger children from MHH are 7 percent more likely to be attending primary school (years 1-2) – a significant difference. Almost all children aged 6–12 years are enrolled in the current survey year at baseline. Hence for younger children we only analyse schooling decisions at the intensive margin.[11] Among MHH, 28 percent of younger children had missed at least one day of school in the last 30 days compared to 18 percent of children in FHH.

Only a small proportion of younger children have been engaged in farm labour in the last 30 days but children in MHH were 6 percent more likely to have participated than those in FHH. Young children from MHH were significantly more likely in 2011 to have spent more time on farming activities, and significantly less time on chores in a typical day than those from FHH.

[11] The distinction between the extensive and intensive margins in microeconometric studies originates from the labour supply literature, where it is common to identify labour supply by two factors: the participation of workers in the labour market (the extensive margin) and the number of hours/days supplied by those workers (the intensive margin). By analogy, most outcomes in applied economics can be analysed by looking at: 1) the probability of the occurrence of a specific event (extensive margin), such as the share of children enrolled in school or the share of households engaged in farm production; 2) the intensity of this event, conditional on its occurrence, such as the number of days of school attendance or the quantity of maize produced in kilograms.

3.4. Impact of cash transfers on child schooling, time-use and labour

Our empirical framework is based on two fundamental assumptions: i) differences between treated (eligible, cash recipient) and control (eligible, not cash recipient) groups can be mitigated by conditioning on observables, at community, household and individual level; ii) unobservable differences for individuals are time invariant and can be controlled for through individual fixed effects. We can recover the Average Treatment Effect on Treated (ATET) of the cash transfer on child level outcomes by estimating the following Difference-In-Difference (DID):

$$\begin{aligned} Y_{iht} &= \gamma_0 + \gamma_1 Treat_h * Post_t + \gamma_2 Post_t \\ &+ \gamma_3 \mathbf{X}_{iht} + \gamma_4 \mathbf{Z}_{ht} + \gamma_5 \mathbf{Q}_{ct} + \beta_d * \eta_t + \delta_i + \epsilon_{iht} \end{aligned} \tag{1}$$

where i refers to individual, h household, c community, d district and t survey year (t = 2011, 2013). Dependent variable Y is characterized by outcomes for youth labour, schooling and time use. $Treat_h$ is an indicator variable set to 1 if the household is a cash transfer beneficiary and $Post_t$ is an indicator denoting the follow-up period. We denote by X_{iht} a vector of individual control variables. Similarly, Z_{ht} and Q_{ct} are household and community controls respectively.

We include $\beta_d * \eta_t$ district-time fixed effects to purge any time-district specific difference from the estimation. Individual fixed effects are used to control for time-invariant individual, household and community characteristics. Household covariates include age of head, education of head, household size and household composition (to control for potential differences in labour constraints), while community variables consist of price, wage and shock indicators. Of interest to measure the impact of the CGP on child outcomes is the coefficient γ_1, the DID estimator.

Further we estimate the discrete impacts of cash transfers on gender bias in child outcomes as follows:

$$\begin{aligned} Y_{iht} &= \alpha_0 + \alpha_1 Treat_h * Post_t * Girl_i + \alpha_2 Treat_h * Post_t + \\ &+ \alpha_3 Post_t * Girl_i + \alpha_4 Post_t \\ &+ \alpha_5 \mathbf{X}_{iht} + \alpha_6 \mathbf{Z}_{ht} + \alpha_7 \mathbf{Q}_{ct} + \beta_d * \eta_t + \delta_i + \epsilon_{iht} \end{aligned} \tag{2}$$

The above equation differs from the first equation only in its incorporation of the Girl_i indicator denoting if the sample individual is a girl.[12] Here, we are interested in coefficients α_1 and α_2 that measure difference in schooling, labour and time use outcomes across boys and girls, and the general treatment impact.

Similar to equation (2) we examine the impacts of cash transfers by household structure on child outcomes, for a sample stratified by girls and boys, as well as age groups 6–12 years (primary) and 13–17 years (secondary):

$$\begin{aligned} Y_{iht} &= \alpha_0 + \alpha_1 Treat_h * Post_t * FemHead_h + \alpha_2 Treat_h * Post_t + \\ &+ \alpha_3 Post_t * FemHead_h + \alpha_4 Post_t \\ &+ \alpha_5 \mathbf{X}_{iht} + \alpha_6 \mathbf{Z}_{ht} + + \alpha_7 \mathbf{Q}_{ct} + \beta_d * \eta_t + \delta_i + \epsilon_{iht} \end{aligned} \tag{3}$$

where FemHead_h is set to one if the household is *de jure* female headed.

Lastly, for the married MHH sample, we estimate the impact of the gender of cash transfer recipient on outcomes:

$$\begin{aligned} Y_{iht} &= \alpha_0 + \sum_{j=1}^{\tilde{}} \alpha_{1j} Treat_{hj} * Post_t + \alpha_2 Post_t + \\ &+ \alpha_3 \mathbf{X}_{iht} + \alpha_4 \mathbf{Z}_{ht} + \alpha_5 \mathbf{Q}_{ct} + \beta_d * \eta_t + \delta_i + \epsilon_{iht} \end{aligned} \tag{4}$$

where Treat_{h1} is an indicator set to 1 if the household received a treatment and the gender of the recipient was female. Similarly, Treat_{h2} is an indicator set to 1 if the household treatment recipient was male. For equations (3) and (4) a potential threat to identification stems from the fact that household structure (FHH-MHH) and gender of recipient within MHH are potentially endogenous and systematically correlated with observed household characteristics as well as other unobservable factors. To mitigate such concerns we control for observable household characteristics and utilize individual fixed effects, which should minimize time-invariant individual and household differences.

As described above, one of the concerns with respect to measuring the impact of the cash transfers on child outcomes by household structure stems from the endogeneity of household structure. Unobserved factors are likely to determine survival of FHH leading

[12] Note that 'Girl' indicator and 'FemHead' indicator (from subsequent equation), and treatment indicator, are omitted due to individual fixed effects.

to sample selection bias that can be mitigated through the use of an endogenous switching model (Maddala, 1983; Lee and Brown, 1989; Lokshin and Zurab, 2004; Alene and Manyong, 2007). For this reason, we include as a robustness check a set of results based on an endogenous switching regression model (see Appendix, Section A.) to measure the impact of cash transfers on child outcomes by household structure.

4. Results

4.1. Gender-differentiated Impacts of CGP on Household Child investments: Child Schooling, Time Use and Labour Investments

Table 4 Panel A presents the results from the estimation of equation (1) on the impact of the CGP on children in agricultural households. We find that older children (aged 13–17 years) were 12 percentage points more likely to be enrolled in school and are 20 percentage points less likely to have missed any days of schooling in the last 30 days (columns 2 and 3 respectively), but among younger children (aged 6-12 years), on average we find no such impacts as a result of the CGP. In Panel B we look at the heterogeneous impacts of the CGP by gender of the child, obtained by estimating equation (2). In the pooled regression, we find no signs of significant differences in investment in boys relative to girls. However, estimating equation (1) for boys and girls separately and by age groups provides some evidence that, on average, a large impact is observed among older girls in CGP beneficiary households. These were 24 percentage points more likely to be enrolled in school in the current year and 32 percentage points less likely to have missed school in the past 30 days compared to older girls in control areas. However, as noted, this impact was not significantly different to that observed for boys, as shown by the interaction term of Panel B. We also find from the equation for young boys aged 6–12 years that they were 13 percentage points more likely to have missed school in the last 30 days. This impact is not significantly different among boys and girls in the pooled sample, but contradicts expectations.

Looking at the impact of the CGP on the time use of girls and boys (Table 5, Panel A), we observe that it caused a marked reduction – by 45 minutes in a typical day - in time spent on household chores for older children. In addition, from column (3) the time spent by older children (13-17 years) at school increased by nearly one hour in a typical day. These changes are significant gains for poor and vulnerable households accessing the CGP. Further, from column (6) of Table 5, we find that older children were likely to have worked 0.9 fewer days on the farm in the past week. The results for time use and farm labour for older children complement the results observed in Table 4 of CGP impacts on child schooling. From Table 5 Panel A, columns (7) to (12), the CGP's impacts on time use and labour for younger children were minimal. The only impact from column (8) is a counter intuitive increase for all younger children in participation in family labour, including farm labour, by nearly 13 minutes in a typical day.

Panel B of Table 5 provides estimates of the impacts of CGP differentiated by gender and age group. From column (1) in the pooled regression we find that as a result of the CGP, older girls spent significantly less time, almost one hour per day, than boys on household chores. This result is reinforced in the equation for girls, where for the interaction

coefficient, we observe an 85 minutes reduction in time spent on chores. While the result for the difference between girls and boys on time spent at school is insignificant (column 3), from the subsamples equations we find that girls spent 140 minutes more in a typical day at school. This result is significant in the regression that includes only girls in the sample. We also find that the difference between boys and girls in days spent on farm labour over the past week was significant. This was driven by a significant decline among boys of 1.23 fewer days worked on the farm. This is not unusual as a larger proportion of older boys engage in livestock herding and crop production in Lesotho, while girls typically spend more time on household chores. However, in terms of time allocation, older girls benefited more from the CGP, spending more time in school and less time on household activities.

From Panel B, Table 5, columns (7) to (12), we do not find large differential impacts of the CGP between girls and boys aged 6–12 years. However, in column (7) we find that young girls spent 23 minutes less than boys on household chores, but the difference is not maintained when analysing the subsample of girls separately. Further, we find the unusual result from the coefficients on the stratified sample that young boys spent 25 minutes more in a typical day engaged in family labour due to the CGP. This result complements the earlier result that the cash transfer also increased the likelihood that young boys had missed school in the past 30 days.

Overall, the results on child schooling, time use and labour impacts of the Lesotho CGP suggest gender differences in outcomes among agricultural households. This favours older female children, with this group being less likely to miss school, more likely to spend more time at school and spending less time on household chores. Despite the positive results, overall programme outcomes do not seem to be working towards a reduction in existing inequalities between girls' and boys' education among agricultural households in Lesotho. To decrease gender inequality, a higher positive impact in schooling would be needed among older boys relative to older girls. In addition, while older boys' schooling outcomes have increased and their labour time has decreased, a substitution effect on agricultural tasks is affecting young boys, indicating that household labour constraints persist, despite the cash transfer.

4.2. Gender and Age-Differentiated Impacts of CGP on Child Outcomes, by Household Structure

Having analysed whether the Lesotho CGP impacts child schooling, labour and time use outcomes, and whether it generates differential impacts for girls and boys, we examine whether impacts differ by household structure. In Table 6 we interact an indicator variable for FHH with the treat∗post variable as in estimation equation (3). We further stratify the sample, showing differential impacts by FHH-MHH structure for the whole sample, and boys and girls samples separately. Our results on child schooling for older children aged 13–17 years, presented in Table 6, Panel A, shows in the first column that there is a positive differential impact on all children in FHH relative to MHH with regard to likelihood of repeating a school year. As observed in both the pooled sample (coefficient on treat∗post∗FemHD) and the sample stratified by household structure, this difference stems from a significant 18 percentage point reduction in likelihood of ever repeating a school year in MHH. In addition, from the samples stratified by girls and boys, columns (2) and (3), we find that the differential impact by household structure on school repetition is driven by a significant 40 percentage point decline in schooling repetition among older girls in MHH. Similar impacts for schooling repetition are not observed for older boys or girls in FHH. In column (4) for the full sample of older girls and boys, we do not find differences in CGP impacts by household structure. However, for the sample stratified by MHH-FHH, Table 6, we do find a large positive impact on schooling enrolment among older children in FHH. From columns (3) and (4) this impact is concentrated among boys in FHH, where older boys (aged 13 to 17 years) in FHH were 34 percentage points more likely to enroll. We also find a smaller, 18 percentage point increase in enrolment among older girls (aged 13 to 17 years) in MHH as a result of the CGP (significant at 10 percent level). Similarly, from column (8) we observe a decline in likelihood of missing school in the 30 days prior to the survey, concentrated among girls in MHH, though the pooled sample does not indicate a statistically significant difference between girls in FHH and MHH.

Interestingly, for younger children (aged 6–12 years), while we did not find substantial general impacts of the cash transfer on schooling outcomes at the intensive margin (within the last 30 days), from Panel B Table 6, we find that in FHH both young boys and girls were more likely - by 18–26 percentage points - to have missed school as a result of the CGP. We only find this result among children in FHH. From columns (1) to (6) in panel B, we find that young girls aged 6–12 years in MHH were 23 percentage points less likely to have missed any school in the last 30 days, creating a significant differential across girls in FHH and MHH. In addition, girls in MHH are likely to have missed 2.2 fewer days of school in the past 30 days. This result for younger children suggests higher labour constraints amongst FHH relative to MHH. Given the lower labour capacity of FHH, a substitution effect led younger boys to spend less time at school and more time working on the family farm, as older boys increased school participation and reduced farm labour as a

result of the cash transfer.

The results on schooling indicate that both older and younger girls in MHH are likely to gain from access to the CGP in Lesotho. However, in FHH we observe some benefits to the CGP concentrated among older boys. That is, in MHH the CGP resulted in a gender bias that favours girls, while older boys in FHH are more likely to attain positive school enrolment outcomes as a result of the transfer.

Similar results can be viewed in Table 7 and Table 8 distinguishing between the impacts of the CGP by household structure on girls' and boys' time use and farm labour outcomes. From Table 7, Panel A, comparing time use outcomes across FHH and MHH, we find no differential impacts. However, for the coefficients from the stratified samples, we find older girls in MHH were less likely to engage in household chores, by over one hour in a typical day, while older boys were more likely to engage in chores by nearly an hour, suggesting a substitution effect of girls' time for boys' time. Despite the lack of a significant difference in the pooled regressions, from Panel A, Table 7, columns (7) to (9) indicate that in FHH older children spent an additional 114 minutes per day at school. This is statistically significant and concentrated among boys in FHH who spent an additional 79 minutes per day at school as a result of the CGP transfer. By contrast, in MHH older girls spent an additional 119 minutes. These results complement the impacts of the CGP on schooling outcomes across household structures observed for older children.

From Table 7, Panel B, columns (1) to (6) show no significant impacts of the CGP on time use in chores and family labour for younger children aged 6–12 years across household structures, with the exception of time use patterns observed within the stratified sample for young boys on family labour. We find that young boys in FHH spent an additional 43 minutes engaged in family labour in a typical day as a result of the CGP payment. Based on previously observed results for schooling among primary school aged children in FHH this indicates that young boys may be substituting for some of the burden reduced among older boys in FHH. Similarly, from columns (8) and (9) in Panel B we find young children in FHH are statistically more likely to spend time in school than children in MHH. Again, while younger girls in FHH spent an additional 35 minutes in school in a typical day as a result of the cash transfers, younger boys spent 42 minutes less for the same reason.

Finally, looking at impacts of the CGP on farm labour participation by FHH-MHH structures, we found no differential impact on FHH in the pooled regressions. However, from the coefficients of the equations stratified by FHH and MHH, older girls in FHH were less likely – by 42 percentage points - to have engaged in farm labour in the last seven days as a result of the CGP, and work 1.51 fewer days, while older boys in FHH worked 2 fewer days in the past week. Similar results are observed in MHH among older boys with a reduction by 34 percentage points in farm labour in the previous week, and 2.3 fewer days in the past week. All of these results are statistically significant. For younger children aged 6–12 years, very limited impacts on farm labour are observed. The exception in columns

(9) and (12) is that young boys in FHH were 22 percentage points more likely to have worked in the past week and worked 1.19 additional days. This result corroborates previous findings of labour-substitution impacts of cash transfers between older and younger boys in FHH.

4.3. Gender and Age-Differentiated Impacts of CGP on Child Investment, by Gender of Transfer Recipient in MHH

To assess the influence of potential gender bias towards boys or girls, we analyse the impacts on child investment by the gender of the cash transfer recipient within the sub-sample of married MHH.[13] In Table 9, Treat1∗Post denotes the CT's impact for households with female recipients, while Treat2∗Post isolates the CT's impact for households with male recipients. From columns (1) to (3), for children aged 13–17 years, it is clear that older boys were significantly less likely to have ever repeated a school year, while only girls in households with male recipients were significantly less likely – by 59 percentage points - to have repeated a school year. Columns (4) to (9) show clearly that, regardless of the gender of the transfer recipient, girls were significantly more likely to be enrolled in school and less likely to have missed any school in the last 30 days.

Panel B of Table 8 indicates that only younger girls (aged 6–12 years) in households with male CT recipients were significantly more likely to benefit from improved schooling outcomes due to the CGP. We find in columns (3) and (5) that, with male recipients, young girls were 31 percentage points less likely to have missed school in the last 30 days and were likely to have missed 2.69 fewer days.

Table 10 distinguishes the impact of cash transfers on child time use outcomes by gender of the recipient within the sub-sample of married MHHs. Panel A, columns (1) to (3) indicate that participation in household chores among older boys (aged 13–17 years) increased significantly and is nearly double in households with male cash transfer recipients. By contrast, there was a significant decline – 80 minutes in a typical day - in participation in household chores among girls with male CT recipients. Results that distinguish between male and female transfer recipients were weak for most of the other time use activities among older children. In column (8) of Panel A, we find that the previously observed impact of an increase in time spent at school for older girls is concentrated in households where women are the recipients of cash transfers.

In Panel B, for younger children we find very weak gender differentiated impacts of cash transfers by gender of the transfer recipient. Lastly, from Table 11, we only find impacts on farm labour in the last 7 days among older boys. Where males are the recipients of cash transfers, older boys were significantly less likely to have engaged in farm labour and had spent 3.5 fewer days on this type of labour in the past week. Overall, the analysis by gender

[13] We cannot test this potential gender bias by the gender of cash recipients in FHH, since we selected those households where *de jure* or *de facto* women are single. Hence only women receive the cash.

of cash recipient suggests that gender bias in child schooling is weak, at least in households where both parents are present. Positive and significant results in schooling for both girls and boys are observed, regardless of the gender of the recipient. However, our results suggest that in the specific context of the Lesotho CGP, when males receive the cash, older boys spend less time on farm labour but more time both at school and engaged in household chores.

4.4. Substitution Effects: Impacts of CGP on Adult Labour Investments, by Household Structure

In this section, we examine whether the observed impacts of the CGP on child schooling and labour are also related to changes in adult labour supply induced by the programme. We measure the impact of cash transfers on farm and off-farm labour for adults aged 18-65 years, under the assumption of imperfect substitution across adult and child labour. From Table 12, Panel A, we find that the cash transfer had a positive and significant differential impact on participation of FHH in farm labour in the week prior to the survey. From the coefficients on the stratified equations in columns (1) and (2), Table 12, we find that adult females in FHH were 12 percentage points more likely to engage in own farm labour as a result of the CGP, while females in MHH were 10 percentage points less likely to work on the farm as a result of the CGP; these are significant at the 5 and 10 percent levels respectively. From columns (4)–(9) in Panel A, we find no significant impacts of the CGP programme on adult off-farm wage or non-farm own enterprise labour participation at the intensive margin, except for a negative 4 percentage point reduction in the participation of adult males in FHH in non-farm own enterprise labour, significant at the 10 percent level.

From Panel B, at the extensive margin we find that the CT significantly increased the likelihood of female adults in FHH working on farming by 1.5 days relative to those in MHH. From the stratified equations we find that females in FHH spent more time (0.43 days) on own farm work while reducing time spent on wage labour (probably casual temporary work) by 0.49 days. For women in FHH the increase in number of days spent on the farm almost entirely offsets the reduction in time spent in wage labour. By contrast, females in MHH reduced own farm labour by a significant 0.71 days, while males in MHH reduced wage labour by an also significant 0.57 days. Hence, in MHH we observe a reduction in labour of some type for both men and women.

Results from previous sections indicate that in FHH boys benefit more from the cash transfer than girls in terms of time dedicated to schooling, farm or livestock activities and other time use. The results just discussed for adult women in FHH can at least partially explain the impacts on children. Given cash transfers have a significant positive impact on farm labour participation for women in FHH, this could partially offset child labour on farms. As older boys are more likely to participate in farm and livestock rearing, we can expect cash transfers in FHH to reduce labour for this cohort and increase time spent in

schooling. However, as older girls are more likely to engage in household chores, we can expect that the increase in farm labour of adult women in FHH leads to an increase in time spent on household chores for older girls. On the other hand, for adults in MHH we find that adult women reduce farm labour while adult men reduce wage labour, which could lead to a substitution effect for child labour that is the opposite of results observed for older children in FHH. If women in MHH dedicate less time to farm labour, then it is likely that they dedicate more time to household activities, leading to the observed improved outcomes in time use and schooling for older girls.

4.5. Robustness check: Endogenous Switching Regime Results by Household Structure

Subsection 4.2 outlines the impacts of the CGP on children by FHH-MHH structure in a simple difference-in-difference framework. However, if sample selection into or out of FHH exists and cannot be explained by observed characteristics, then we would expect the coefficients of the simple model to be biased. Hence, using maximum likelihood estimation in the endogenous switching framework, in which the first regime is MHH and the second regime is FHH, we estimate the impacts of cash transfers on schooling, time use and farm labour. In Appendix Table A.1 we show results from the endogenous switching model for continuous outcomes for which the maximum likelihood estimators converged in the empirical estimation. We discuss results from the table for which at least one correlation coefficient is found to be significant, suggesting that unobserved heterogeneity does affect headship status and that, in turn, this affects the particular child outcomes discussed.

From Panel A, Table A.1 shows nearly a 40 minute reduction in time spent on household chores for older children in MHH. The result is statistically significant at the 10 percent level. Older girls in MHH were less likely to engage in household chores, but the result is not statistically significant, while boys were more likely to engage in chores by 27 minutes per day (significant at 10 percent level). The observed results are consistent with the results from the simple DID estimation, in which a similar substitution effect of girls' time for boys' is observed. The results also indicate that older girls in MHH spend nearly 2 hours more per day at school (statistically significant), confirming similar results from the DID model, which explain the reduction in time spent on household activities.

Among FHH we find that older boys were significantly less likely – by 1.3 days - to have engaged in farm labour over the past week, while older girls spent an additional 45 minutes a day on household chores. The results match findings presented earlier from the DID framework, but we find no statistically significant evidence that older boys from FHH spend more time in school in the endogenous switching model. Nonetheless, these results confirm our findings that in FHH older boys gain more from the cash transfer while some negative impacts are observed among older girls.

In Table A.1., Panel B presents results across MHH and FHH regimes for children aged 6 to 12 years. For children in the MHH regime, the only statistically significant results we find are that children are likely to spend 15 minutes per day less on family labour. In particular younger boys spent nearly 30 minutes less per day on family labour. In FHH, younger girls spent 15 minutes less per day on household chores, 13 minutes less on family labour and spend nearly half an hour more per day in school. These results are all statistically significant at the 5–10 percent level. Again, similar to results from the simple DID model, younger boys are found to have spent nearly half a day more in the previous week engaged in farm labour.

5. Discussion & Conclusion

In this paper we use data from a randomized control trial aimed at measuring the impacts of the Lesotho Child Grants Programme, a cash transfer directed at poor households with children, to investigate gender differences in household child investment behaviour. The analysis focuses on a sub-sample of agricultural households, as in Lesotho the majority of child labourers are employed in crop and livestock production activities, and this is an important determinant of school enrolment and schooling outcomes. In addition to observing impacts among boys and girls of different age cohorts, we seek to examine whether gender-differentiated impacts vary according to household structure. This exercise furthers the understanding of the different constraints experienced by different types of households and how they respond to them when accessing cash transfers. We therefore analyse impacts in child investments by agricultural MHHs and *de jure* FHH, the latter having lower labour capacity - constrained by older age of the head and higher household dependency ratio. Finally, we explore the relationship between gender-differentiated impacts and potential gender bias as determined by who in the household receives the cash transfer. This seeks to further the evidence for or against the idea of male or female child preferences by gender of the head of household, particularly in schooling. We hypothesize that in the Lesotho CGP, it is household structure, and therefore a household's capacities and constraints, rather than gender bias which leads to the observed gender-differentiated impacts on child investments.

First, we find clear gendered impacts of the cash transfer among agricultural households. Older girls in treatment households benefited significantly more in terms of increased schooling enrolment, fewer missed days of school, and time use activities shifting away from household chores, like fetching water, sibling care, cooking and cleaning, towards schooling related activities. Among older boys too, we note a significant decline of 1 day less spent working in crop production or livestock activities as a result of the transfer. These results are not unusual as a larger proportion of older boys engage in livestock herding and crop production in Lesotho, while girls typically spend more time on household chores. However, older girls benefited more than boys from the CGP cash transfer, considering that girls were already in an advantaged position before the introduction of the cash transfer. From a theoretical perspective, this could firstly suggest that parental preferences favour the allocation of resources towards older girls. Or it could indicate that the current opportunity cost of boys' time, despite the cash transfer, is higher than the future benefit of human capital development, and this difference for boys exceeds that of girls. If households rely more on boys for sustaining current agricultural incomes (which is suggested by other work in Lesotho), it is plausible that the size of the transfer was not large enough to increase secondary school aged boys' participation in schooling, but sufficiently large to incentivize girls to attend school. Moreover, results on the impact of the CGP on adult labour investments in MHH show that adult women are more likely to

reduce their farm labour, while older men reduce casual agricultural wage labour. Hence, a plausible explanation for the reduction in older girls' time spent on household chores, and increase in schooling would be a substitution effect with adult labour.

Second, we confirm that in agricultural *de jure* FHH improved schooling outcomes and a reduction in the time burden of farm labour are observed for older boys. The treatment impacts are not as strong as among older girls in these households. We hypothesize that female-heads of FHH, where a larger proportion of the children are grandchildren as opposed to sons or daughters of the head, may respond differently when accessing additional income through the CT, and may have different preferences in relation to gender and child education. One hypothesis is potential male bias reflected in positive impacts on older boys' education. Given the *ex-ante* disadvantages for older boys, this is a positive outcome of the programme. Adding to this, smoothing of constraints to invest in alternative agricultural activities by *de jure* FHH (increased by bulky transfer payments and by messaging on agricultural investments linked to the Food Emergency Grant), may have led to an increase in both adult women's and younger boys' agricultural labour participation. In this situation, girls may still be required to participate in household chores like childcare, cooking and cleaning, leading to insignificant changes in the use of girls' labour.

In MHH girls benefitted much more in terms of schooling and time use outcomes than boys in the treatment evaluation. This would suggest that in MHH, where a larger proportion of older boys engage in crop production and livestock activities (80 percent in MHH compared to 66 percent in FHH), the opportunity cost of boys' time may still be too high relative to girls', despite access to the cash transfer.

Finally, the analysis also suggests that child investment, particularly for girls, may not be driven by the gender of the transfer recipient - the mother or father - contrary to what is suggested by some previous literature. In fact, receipts by the father - at least in Lesotho's context - may be more likely to have positive impacts on girls and increase boys' labour input in household chores. Or more plausibly, rather than male or female preference, it is the household structure and constraints that determine these differentiated effects.

From the perspective of programme design, our findings suggest that an undifferentiated cash transfer for different types of households, as in the case of the CGP in Lesotho, should at least include gender-specific messaging to promote equal benefits for boys and girls in schooling. In addition, higher transfer levels and other mechanisms that could facilitate household access to agricultural labour (e.g. through hired labour) or access to technologies that require lower labour input would be required for children to be able to spend more time at school and increase their educational level.

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Tables

Table 1 Summary statistics: comparing across treatment and control groups (for unmarried FHH and married MHH sample), and by household structure

	2011 (Baseline)				
Panel A*	Control (n=468)		Treatment (n=538)		Diff (p-val)
	Mean	Std. error	Mean	Std. error	
de jure FHH (/100)	0.52	(0.50)	0.48	(0.50)	0.223
Age of household head	52.30	(15.10)	52.90	(14.70)	0.492
Years of schooling of household head	3.96	(2.83)	4.27	(2.92)	**0.091**
Household Size	5.48	(2.11)	6.07	(2.48)	**0.000**
Household Composition:					
Mem 0-5 years	0.76	(0.82)	0.94	(1.01)	**0.002**
Mem 6-12 years	1.12	(0.90)	1.21	(1.06)	0.155
Mem 13-17 years	0.76	(0.81)	0.75	(0.78)	0.860
Mem Over 18 years	2.84	(1.39)	3.17	(1.55)	**0.001**
District:					
Maseru	0.22	(0.42)	0.24	(0.43)	0.570
Leribe	0.18	(0.38)	0.15	(0.36)	0.233
Berea	0.32	(0.47)	0.25	(0.43)	**0.023**
Mafateng	0.25	(0.44)	0.35	(0.48)	**0.001**
Qacha's Neck	0.03	(0.18)	0.02	(0.13)	**0.075**
Household participates in crop production	0.88	(0.32)	0.93	(0.25)	**0.009**
num. of goods (incl. fruits and veg.)	1.65	(1.01)	1.80	(0.95)	**0.013**
num. of crops	0.96	(0.84)	1.04	(0.83)	0.129
Household participates in livestock rearing	0.72	(0.45)	0.74	(0.44)	0.454
num. of livestock owned	5.08	(7.77)	4.98	(8.22)	0.839
	MHH (Married)		FHH (single divorced, widowed)		Diff (p-val)
Panel B	(n=470)		(n=536)		
	Mean	Std. error	Mean	Std. error	
Age of household head	47.30	(14.80)	58.00	(12.80)	**0.000**
Years of schooling of household head	3.67	(3.10)	4.59	(2.56)	0.000
Household Size	6.10	(2.34)	5.49	(2.30)	0.000
Household Composition:					
Mem 0-5 years	0.99	(0.97)	0.71	(0.87)	0.000
Mem 6-12 years	1.22	(1.01)	1.12	(0.97)	0.117
Mem 13-17 years	0.68	(0.80)	0.84	(0.78)	**0.001**
Mem Over 18 years	3.21	(1.46)	2.82	(1.49)	**0.000**
District:					
Maseru	0.25	(0.43)	0.21	(0.41)	0.214
Leribe	0.15	(0.35)	0.18	(0.38)	0.160
Berea	0.31	(0.46)	0.26	(0.44)	**0.076**
Mafateng	0.28	(0.45)	0.33	(0.47)	**0.056**
Qacha's Neck	0.03	(0.16)	0.02	(0.15)	0.639
Household participates in crop production	0.92	(0.28)	0.90	(0.30)	0.502
num. of goods (incl. fruits and veg)	1.81	(1.01)	1.64	(0.95)	**0.007**
num. of crops	1.08	(0.88)	0.92	(0.78)	**0.002**
Household participates in livestock rearing	0.80	(0.40)	0.66	(0.47)	**0.000**
num. of livestock owned	6.20	(9.42)	3.85	(6.04)	**0.000**

Notes: *While baseline treatment and control groups are not balanced across some variables, using a Propensity Score Matched (PSM) sample does not change the main results of the analysis, suggesting that controlling for observables mitigates differences between control and treatment group

Table 2 Summary statistics: comparing child outcomes by gender of child

Panel A	2011 (Baseline) Child aged 13–17 years						
	Boys			Girls			Diff (p-val)
	Mean	Std. error	obs.	Mean	Std. error	obs.	
Age	14.90	(1.40)	417	14.8	(1.38)	344	0.611
Current level of education:							
No school	0.00	0.00	315	0	(0.00)	287	.
Primary (Year 1 -2)	0.01	(0.10)	315	0	(0.07)	287	0.401
Primary (Year 3 -4)	0.14	(0.34)	315	0.04	(0.20)	287	**0.000**
Primary (Year 5 -7)	0.63	(0.48)	315	0.56	(0.50)	287	**0.072**
Secondary - Junior (Forms A -C)	0.21	(0.41)	315	0.35	(0.48)	287	**0.000**
Secondary -High (Forms D -E) or higher	0.01	(0.11)	315	0.04	(0.20)	287	**0.016**
Dependant variables							
Schooling:							
Ever repeated school	0.77	(0.42)	399	0.57	(0.50)	333	**0.000**
Enrolled in school this year	0.81	(0.39)	402	0.87	(0.34)	330	**0.030**
Missed school in the last 30 days	0.37	(0.48)	388	0.27	(0.44)	324	**0.003**
Labor (crop and livestock, last 7 days):							
Participated in own farm activities	0.46	(0.50)	417	0.07	(0.26)	344	**0.000**
Days participated in own farm activities	2.50	(3.10)	417	0.26	(1.17)	344	**0.000**
Time Use (time spent on typical day):							
chores (mins/ day)	63.30	(81.60)	375	91.70	(91.40)	304	**0.000**
farm activities (mins/day)	94.70	(163.00)	377	8.37	(42.30)	307	**0.000**
school(mins/day)	307.00	(182.00)	389	335.00	(185.00)	324	**0.039**
homework(mins/day)	34.80	(44.00)	389	45.60	(56.80)	324	**0.004**
Panel B	Child aged 6–12 years						
	Boys			Girls			Diff (p-val)
	Mean	Std. error	obs.	Mean	Std. error	obs.	
Age	9.06	(2.02)	587	8.95	(2.09)	575	0.388
Current level of education:							
No school	0.00	(0.03)	531	0.00	(0.05)	528	0.535
Primary (Year 1 -2)	0.48	(0.50)	531	0.39	(0.49)	528	**0.001**
Primary (Year 3 -4)	0.37	(0.48)	531	0.38	(0.49)	528	0.801
Primary (Year 5 -7)	0.14	(0.35)	531	0.23	(0.42)	528	**0.000**
Dependant variables							
Schooling:							
Ever repeated school	0.55	(0.50)	536	0.42	(0.49)	527	**0.000**
Enrolled in school this year	1.00	(0.07)	536	1.00	(0.07)	528	0.868
Missed school in the last 30 days	0.27	(0.44)	526	0.20	(0.40)	523	**0.016**
Labor (crop and livestock, last 7 days):							
Participated in own farm activities	0.30	(0.46)	587	0.05	(0.21)	575	**0.000**
Days participated in own farm activities	1.64	(2.76)	587	0.21	(1.08)	575	**0.000**
Time Use (time spent on typical day): chores (mins/ day)	31.20	(47.10)	569	42.40	(52.80)	552	**0.000**
farm activities (mins/day)	50.60	(115.00)	569	2.93	(23.60)	556	**0.000**
school(mins/day)	340.00	(109.00)	574	340.00	(115.00)	558	0.970
homework(mins/day)	18.40	(32.60)	573	25.70	(42.20)	558	**0.001**

Table 3 Summary statistics: comparing child outcomes by household structure

Panel A	2011 (Baseline) Child aged 13–17 years						
	MHH (Married)			FHH (single, divorced, widowed)			Diff (p-val)
	Mean	Std. error	obs.	Mean	Std. error	obs.	
Age	14.80	(1.42)	332	14.90	(1.37)	429	0.308
Girl (proportion)	0.46	(0.50)	332	0.43	(0.50)	429	0.366
Rel. to HH head:							
Son or daughter	0.71	(0.45)	332	0.43	(0.50)	429	**0.000**
Grand child	0.17	(0.38)	332	0.52	(0.50)	429	**0.000**
Current level of education:							
No school	0.00	0.00	254	0.00	0.00	348	.
Primary (Year 1 -2)	0.02	(0.13)	254	0.00	0.00	348	**0.014**
Primary (Year 3 -4)	0.10	(0.30)	254	0.09	(0.28)	348	0.530
Primary (Year 5 -7)	0.59	(0.49)	254	0.61	(0.49)	348	0.651
Secondary - Junior (Forms A -C)	0.28	(0.45)	254	0.27	(0.44)	348	0.724
Secondary -High (Forms D -E) or higher	0.01	(0.10)	254	0.04	(0.19)	348	**0.033**
Dependant variables							
Schooling:							
Ever repeated school	0.69	(0.46)	314	0.67	(0.47)	418	0.555
Enrolled in school this year	0.80	(0.40)	314	0.87	(0.34)	418	**0.012**
Missed school in the last 30 days	0.34	(0.47)	309	0.32	(0.47)	403	0.581
Labor (crop and livestock, last 7 days):							
Participated in own farm activities	0.34	(0.47)	332	0.24	(0.43)	429	**0.002**
Days participated in own farm activities	1.91	(2.92)	332	1.16	(2.41)	429	**0.000**
Time Use (time spent on typical day):							
chores (mins/ day)	66.10	(81.30)	300	83.90	(91.10)	379	**0.008**
farm activities (mins/day)	81.70	(159.00)	302	35.50	(100.00)	382	**0.000**
school(mins/day)	307.00	(191.00)	310	330.00	(176.00)	403	**0.088**
homework(mins/day)	35.40	(52.40)	310	43.30	(48.30)	403	**0.038**
Panel B	Child aged 6–12 years						
divorced, widowed)	MHH (Married)			FHH (single, divorced, widowed)			Diff (p-val)
	Mean	Std. error	obs.	Mean	Std. error	obs.	
Age	8.92	(2.06)	566	9.10	(2.05)	596	0.128
Girl (proportion)	0.52	(0.50)	566	0.49	(0.50)	596	0.359
Rel. to HH head							
Son or daughter	0.63	(0.48)	566	0.28	(0.45)	596	**0.000**
Grand child	0.29	(0.45)	566	0.67	(0.47)	596	**0.000**
Current level of education:							
No school	0.00	(0.05)	506	0.00	0.00	553	0.236
Primary (Year 1 -2)	0.47	(0.50)	506	0.40	(0.49)	553	**0.014**
Primary (Year 3 -4)	0.35	(0.48)	506	0.39	(0.49)	553	0.184
Primary (Year 5 -7)	0.17	(0.38)	506	0.21	(0.41)	553	0.141
Dependant variables							
Schooling:							
Ever repeated school	0.50	(0.50)	507	0.47	(0.50)	556	0.273
Enrolled in school this year	0.99	(0.08)	509	1.00	(0.06)	555	0.552
Missed school in the last 30 days	0.28	(0.45)	503	0.18	(0.39)	546	**0.000**
Labor (crop and livestock, last 7 days):							
Participated in own farm activities	0.20	(0.40)	566	0.14	(0.35)	596	**0.008**
Days participated in own farm activities	1.02	(2.29)	566	0.81	(2.13)	596	**0.097**
Time Use (time spent on a typical day):							
chores (mins/ day)	33.50	(49.00)	542	40.30	(51.60)	579	**0.025**
farm activities (mins/day)	32.20	(95.50)	544	20.80	(75.40)	581	**0.027**
school (mins/day)	342.00	(114.00)	548	338.00	(109.00)	584	0.591
homework (mins/day)	22.50	(41.10)	547	21.60	(34.00)	584	0.682

Table 4 Impact of cash transfers on child schooling outcomes

Panel A	Schooling outcomes					
	Child aged 13-17				Child aged 6-12	
	Ever repeated a school year	Enrolled in school this academic year	Missed any days of school in the last 30 days (unconditional)	How many days of school missed in those 30 days (conditional on enrolled this academic year)	Missed any days of school in the last 30 days (unconditional)	How many days of school missed in those 30 days (conditional on enrolled this academic year)
	(1)	(2)	(3)	(4)	(5)	(6)
Treat*Post	-0.06	0.12**	-0.20**	0.66	0.06	-0.22
	(0.049)	(0.054)	(0.087)	(0.493)	(0.051)	(0.306)
Individual F.E.	Y	Y	Y	Y	Y	Y
Observations	1,578	1,580	1,547	1,258	2,191	2,175
R squared	0.163	0.305	0.243	0.277	0.133	0.097
Panel B	Schooling outcomes: heterogeneous impacts by gender					
	Child aged 13-17				Child aged 6-12	
	Ever repeated a school year	Enrolled in school this academic year	Missed any days of school in the last 30 days (unconditional)	How many days of school missed in those 30 days (conditional on enrolled this academic year)	Missed any days of school in the last 30 days (unconditional)	How many days of school missed in those 30 days (conditional on enrolled this academic year)
	(1)	(2)	(3)	(4)	(5)	(6)
Treat*Post*Girl	-0.01	0.06	0.03	0.82	-0.04	-0.45
	(0.103)	(0.099)	(0.118)	(0.673)	(0.105)	(0.667)
Treat*Post	-0.06	0.10	-0.13	0.30	0.08	0.03
	(0.066)	(0.067)	(0.080)	(0.622)	(0.078)	(0.413)
Individual F.E.	Y	Y	Y	Y	Y	Y
Observations	1,578	1,580	1,547	1,258	2,191	2,175
R squared	0.163	0.314	0.243	0.283	0.134	0.100
Coefficients from equation stratified by gender						
Treat*Post	-0.02	0.24***	-0.32***	0.16	0.04	-0.53
(GIRL eqn)	(0.071)	(0.074)	(0.105)	(0.453)	(0.062)	(0.47)
Treat*Post	-0.1	0.06	-0.09	-0.3	0.13*	0.31
(BOY eqn)	(0.085)	(0.077)	(0.084)	(0.743)	(0.075)	(0.425)

Standard errors clustered at the community level, in parentheses. *** indicates p<.01; ** indicates p<.05; * indicates p<.10

Table 5 **Impact of cash transfers on child time use and labour outcomes**

Panel A	*Time use and labor activities on a typical school day*											
	Child aged 13–17						Child aged 6–12					
	Time Use (mins/day)			Farm Labor (last 7 days)			Time Use (mins/day)			Farm Labor (last 7 days)		
	Chores[a]	Fam.Labor[b]	At school	Hmwk./study	Worked	Days worked	Chores[a]	Fam.Labor[b]	At school	Hmwk./study	Worked (0/1)	Days worked
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treat*Post	-45.11**	-13.82	59.01**	2.37	-0.10	-0.90***	-3.78	12.84**	-6.79	4.91	0.00	-0.13
	(18.513)	(20.745)	(24.849)	(6.748)	(0.070)	(0.340)	(6.278)	(6.225)	(11.825)	(5.043)	(0.047)	(0.287)
Indiviual F.E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,502	1,509	1,558	1,558	1,621	1,621	2,313	2,319	2,331	2,330	2,378	2,378
R squared	0.186	0.147	0.195	0.215	0.179	0.169	0.175	0.073	0.154	0.200	0.140	0.120
Panel B	Time use and labor activities on a typical school day: heterogeneous impacts by gender											
	Child aged 13–17						Child aged 6–12					
	Time Use (mins/day)			Farm Labor (last 7 days)			Time Use (mins/day)			Farm Labor (last 7 days)		
	Chores[a]	Fam.Labor[b]	At school	Hmwk./study	Worked	Days worked	Chores[a]	Fam.Labor[b]	At school	Hmwk./study	Worked (0/1)	Days worked
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treat*Post*Girl	-58.04*	-36.68	55.52	15.40	0.15	1.11**	-23.41**	-1.81	34.15	-11.48	0.07	0.84
	(33.387)	(40.936)	(55.523)	(14.483)	(0.100)	(0.531)	(11.281)	(14.280)	(22.520)	(9.041)	(0.088)	(0.547)
Treat*Post	-21.10	2.33	32.34	-3.75	-0.17**	-1.37***	8.76	15.72	-23.87	10.64*	-0.04	-0.58
	(18.558)	(32.871)	(35.453)	(9.784)	(0.083)	(0.431)	(9.442)	(11.331)	(17.470)	(6.276)	(0.076)	(0.492)
Individual F.E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,502	1,509	1,558	1,558	1,621	1,621	2,313	2,319	2,331	2,330	2,378	2,378
R squared	0.217	0.162	0.210	0.219	0.183	0.177	0.185	0.119	0.161	0.206	0.142	0.126
Coefficients from equation stratified by gender												
Treat*Post	-84.91***	2.52	140.63***	12.45	-0.08	-0.22	-10.66	4.27	3.05	-3.13	-0.07*	-0.22
(GIRL eqn)	(28.552)	(8.252)	(38.187)	(9.608)	(0.091)	(0.365)	(7.230)	(4.394)	(12.028)	(6.822)	(0.038)	(0.181)
Treat*Post	-8.80	-33.10	6.18	-8.96	-0.11	-1.23**	0.93	24.47*	-14.21	14.62**	0.06	-0.10
(BOY eqn)	(17.154)	(41.442)	(37.429)	(10.516)	(0.103)	(0.553)	(10.068)	(13.798)	(17.667)	(6.170)	(0.082)	(0.534)

Notes: **Chores**[a] include Helping at home - fetching water, sibling care, cleaning, cooking, washing, and shopping.
Family labour[b] includes family farming/herding and other family business.
Standard errors clustered at the community level, in parentheses. *** indicates p<.01; ** indicates p<.05; * indicates p<.10

Table 6 Distinguishing Impact of cash transfers on child schooling by household structure

Panel A	Child aged 13 –17											
	Compare FHH with MHH											
	Ever repeated a school year			Enrolled in school this academic year			Missed any days of school in the last 30 days (unconditional)			How many days of school missed in those 30 days (conditional on enrolled this		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treat*Post*FemHD	0.24**	0.17	0.07	0.06	-0.11	0.28*	-0.08	-0.09	-0.14	0.41	-1.74**	2.44***
	(0.118)	(0.177)	(0.150)	(0.093)	(0.147)	(0.141)	(0.126)	(0.221)	(0.169)	(0.635)	(0.769)	(0.825)
Treat*Post	-0.18**	-0.28**	-0.16	0.10	0.29***	-0.10	-0.07	-0.26*	-0.01	0.35	1.25*	-1.88*
	(0.083)	(0.125)	(0.118)	(0.076)	(0.109)	(0.111)	(0.105)	(0.151)	(0.128)	(0.639)	(0.717)	(1.009)
Individual F.E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,578	730	848	1,580	729	851	1,547	718	829	1,258	617	641
R squared	0.175	0.284	0.299	0.307	0.366	0.429	0.244	0.323	0.343	0.291	0.440	0.499
Coefficients from equation stratified by FHH (unmarried) and MHH(married)												
Treat*Post	0.11	-0.22	0.01	0.27***	0.15	0.34***	-0.11	-0.24	-0.15	0.72*	0.53	0.04
(FHH-Unmarried)	(0.077)	(0.191)	(0.115)	(0.072)	(0.110)	(0.079)	-0.103	-0.18	-0.117	(0.368)	-0.548	-0.305
Treat*Post	-0.18**	-0.40***	-0.14	0.07	0.18*	-0.16	-0.12	-0.41***	-0.04	0.57	-0.83	-0.91
(MHH - Married)	(0.078)	(0.128)	(0.149)	(0.080)	(0.101)	(0.128)	-0.106	-0.151	-0.149	(0.678)	-1.678	-1.34

Panel B	**Child aged 6–12**					
	Compare FHH with MHH					
	Missed any days of school in the last 30 days (unconditional)			How many days of school missed in those 30		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)
Treat*Post*FemHD	0.22**	0.24**	0.19	0.89*	0.81	0.80
	(0.108)	(0.121)	(0.147)	(0.492)	(0.659)	(0.762)
Treat*Post	-0.04	-0.07	0.04	-0.65	-0.92	-0.09
	(0.079)	(0.094)	(0.114)	(0.401)	(0.667)	(0.617)
Individual F.E.	Y	Y	Y	Y	Y	Y
Observations	2,191	1,091	1,100	2,175	1,088	1,087
R squared	0.146	0.210	0.260	0.101	0.117	0.257
Coefficients from equation stratified by FHH (unmarried) and MHH(married)						
Treat*Post	0.20**	0.18*	0.26**	0.46*	-0.11	1.30***
(FHH-Unmarried)	(0.076)	(0.099)	(0.107)	(0.273)	(0.512)	(0.429)
Treat*Post	-0.12	-0.23**	-0.03	-1.20**	-2.20*	-0.59
(MHH - Married)	(0.095)	(0.105)	(0.145)	(0.553)	(1.257)	(0.923)

Standard errors clustered at the community level, in parentheses. *** indicates p<.01; ** indicates p<.05; * indicates p<.10

Table 7 **Distinguishing Impact of cash transfers on child time use by household structure**

	Time use activities on a typical day (mins/day)											
Panel A	Child aged 13–17											
	Compare FHH to MHH											
	Chores[a]			Fam.labor[b]			At School			Hwmk./study		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treat*Post*FemHD	39.83	48.75	10.92	5.59	10.17	-16.80	35.84	44.42	68.84	-7.78	-19.13	9.43
	(27.997)	(63.934)	(28.620)	(38.639)	(13.171)	(61.040)	(55.328)	(115.024)	(57.849)	(15.400)	(24.554)	(16.816)
Treat*Post	-62.39**	-106.54**	-15.76	-25.77	-9.61	-27.19	42.26	123.92*	-33.67	7.26	15.51	-12.46
	(26.687)	(44.658)	(25.842)	(29.436)	(12.678)	(56.128)	(39.323)	(73.297)	(49.799)	(11.195)	(18.281)	(13.364)
Individual F.E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,502	689	813	1,509	695	814	1,558	722	836	1,558	722	836
R squared	0.200	0.422	0.316	0.162	0.319	0.274	0.198	0.284	0.325	0.218	0.366	0.258
Coefficients from equation stratified by FHH (unmarried) and MHH(married)												
Treat*Post	-14.02	-23.87	-11.70	-27.91	19.84	-48.83	114.35***	106.50	79.02*	4.93	-1.78	-4.09
(FHH-Unmarried)	(18.760)	(54.247)	(21.574)	(25.253)	(26.613)	(46.220)	(39.295)	(86.251)	(42.495)	(9.326)	(15.952)	(14.828)
Treat*Post	-60.83**	-64.59**	62.03**	15.36	-28.47	39.84	35.92	119.02**	-19.67	10.62	1.75	24.05
(MHH - Married)	(27.558)	(29.078)	(29.370)	(28.556)	(17.391)	(85.514)	(33.922)	(58.049)	(61.884)	(14.281)	(20.960)	(20.397)
Panel B	Child aged 6–12											
	Compare FHH to MHH											
	Chores[a]			Fam.labor[b]			At School			Hwmk./study		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treat*Post*FemHD	10.04	3.64	1.03	17.66	8.26	37.98	50.37**	74.36***	35.81	4.74	0.43	8.88
	(13.073)	(13.689)	(18.443)	(13.085)	(8.407)	(28.105)	(24.276)	(24.924)	(34.803)	(10.915)	(15.622)	(12.842)
Treat*Post	-9.70	-14.08	2.00	9.76	1.78	12.59	-31.91*	-34.29*	-33.78	0.38	-5.61	8.37
	(8.035)	(8.742)	(12.785)	(9.217)	(6.798)	(20.074)	(18.552)	(17.353)	(26.808)	(7.116)	(10.421)	(7.816)
Individual F.E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,313	1,139	1,174	2,319	1,145	1,174	2,331	1,148	1,183	2,330	1,148	1,182
R squared	0.181	0.256	0.264	0.137	0.139	0.227	0.165	0.240	0.265	0.211	0.279	0.259
Coefficients from equation stratified by FHH (unmarried) and MHH(married)												
Treat*Post	2.13	-9.86	8.06	27.94***	14.29	43.65**	1.88	35.27**	-41.56**	3.78	-4.89	7.64
(FHH-Unmarried)	(10.216)	(9.773)	(13.783)	(9.631)	(9.007)	(20.368)	(13.689)	(15.387)	(20.835)	(7.296)	(9.222)	(9.193)
Treat*Post	-7.00	-2.33	-8.11	18.41	0.08	33.92	-12.00	-50.86**	10.77	3.53	1.00	9.87
(MHH - Married)	(8.571)	(9.640)	(14.919)	(11.348)	(5.517)	(25.997)	(23.783)	(22.004)	(31.375)	(6.346)	(10.719)	(7.481)

Notes: **Chores**[a] include Helping at home - fetching water,sibling care, cleaning, cooking, washing, and shopping.
Family labour[b] includes family farming/herding and other family business.
Standard errors clustered at the community level, in parentheses. *** indicates p<.01; ** indicates p<.05; * indicates p<.10

Table 8 **Distinguishing Impact of cash transfers on child farm labour by household structure**

	Crop and livestock activities (last 7 days)											
	Child aged 13–17						Child aged 6–12					
	Compare FHH to MHH											
	Worked (0/1)			Days worked			Worked (0/1)			Days worked		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treat*Post*FemHD	0.02	0.22	-0.17	0.42	0.77	0.09	0.07	0.02	0.16	0.42	-0.09	0.97
	(0.171)	(0.229)	(0.237)	(0.756)	(0.570)	(1.175)	(0.087)	(0.077)	(0.132)	(0.514)	(0.359)	(0.832)
Treat*Post	-0.11	-0.13	-0.01	-1.17**	-0.52	-1.31*	-0.04	-0.07	-0.04	-0.36	-0.17	-0.65
	(0.108)	(0.141)	(0.153)	(0.506)	(0.450)	(0.776)	(0.071)	(0.065)	(0.108)	(0.415)	(0.297)	(0.695)
Individual F.E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,621	749	872	1,621	749	872	2,378	1,174	1,204	2,378	1,174	1,204
R squared	0.181	0.271	0.295	0.173	0.161	0.276	0.145	0.184	0.238	0.122	0.166	0.228
Coefficients from equation stratifted by FHH (unmarried) and MHH(married)												
Treat*Post	-0.16	-0.42**	-0.24	-1.35***	-1.51*	-2.06**	0.08	-0.02	0.22**	0.42	-0.22	1.19*
(FHH-Unmarried)	(0.103)	(0.168)	(0.151)	(0.502)	(0.892)	(0.858)	(0.063)	(0.050)	(0.100)	(0.406)	(0.272)	(0.697)
Treat*Post	-0.13	-0.10	-0.34***	-1.03**	-0.27	-2.30***	-0.06	-0.04	-0.11	-0.38	0.17	-1.09
(MHH - Married)	(0.080)	(0.136)	(0.128)	(0.436)	(0.473)	(0.651)	(0.081)	(0.080)	(0.134)	(0.474)	(0.327)	(0.885)

Standard errors clustered at the community level, in parentheses. *** indicates p<.01; ** indicates p<.05; * indicates p<.10

Table 9 **Distinguishing Impact of cash transfers on child schooling outcomes by recipient gender for married MHH**

Panel A	Child aged 13–17 MHH - by household recipient gender											
	Ever repeated a school year a school year			Enrolled in school this academic year academic year			Missed any days of scholl in the last 30 days (unconditional)			How many days of school missied in those 30 dayas (conditional on enrolled this academic year)		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$Treat1 * Post$	-0.27**	-0.38	-0.69***	0.22**	0.85***	0.06	-0.36**	-1.09***	-0.16	-1.53**	-0.11	0.22
	(0.126)	(0.245)	(0.204)	(0.100)	(0.206)	(0.268)	(0.146)	(0.214)	(0.293)	(0.727)	(1.017)	(0.236)
$Treat2 * Post$	-0.37**	-0.59**	-0.93***	0.16	0.78***	0.01	-0.28**	-0.83***	-0.24	-0.78	0.85	12.88***
	(0.163)	(0.259)	(0.316)	(0.101)	(0.171)	(0.292)	(0.136)	(0.232)	(0.357)	(0.927)	(1.202)	(0.251)
Post	0.20	-0.45	0.71	-0.36	-1.35***	-0.02	0.72***	2.02***	0.38	2.21*	1.15	-10.57***
	(0.304)	(0.336)	(0.633)	(0.245)	(0.331)	(0.588)	(0.269)	(0.393)	(0.649)	(1.257)	(1.108)	(0.584)
Individual F.E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	663	348	315	664	346	318	657	344	313	527	294	233
R squared	0.347	0.465	0.513	0.442	0.712	0.709	0.390	0.553	0.650	0.258	0.545	0.742

Panel B	Child aged 6–12 MHH - by household recipient gender					
	Missed any days			How many days of school		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)
Treat1*Post	-0.12	-0.19	-0.07	-1.56*	-2.16	-1.30
	(0.103)	(0.122)	(0.169)	(0.914)	(1.523)	(1.353)
Treat2*Post	-0.15	-0.31*	0.01	-1.15*	-2.69*	0.12
	(0.127)	(0.164)	(0.173)	(0.680)	(1.376)	(1.168)
Post	-0.28	0.50**	-0.36	-1.43	4.19**	-3.06
	(0.196)	(0.236)	(0.328)	(1.923)	(1.896)	(2.141)
Individual F.E.	Y	Y	Y	Y	Y	Y
Observations	1,020	518	502	1,009	517	492
R squared	0.230	0.349	0.418	0.202	0.335	0.392

Recipient gender Treat 1 is an indicator equal to one if recipient of cash transfer in HH was female Treat 2 is an indicator equal to one if recipient of cash transfer in HH was male
Standard errors clustered at the community level, in parentheses. *** indicates p<.01; ** indicates p<.05; * indicates p<.10

Table 10 **Distinguishing Impact of cash transfers on child time use by recipient gender for married MHH**

Panel A	Child aged 13–17 MHH - by household recipient gender											
	Time use on a typical day (mins/day)											
	Chores[a]			Fam. Labor[b]			At school			Hmwk./study		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$Treat1 * Post$ ¤	-57.78	-45.47	59.88*	26.49	-22.21	50.64	54.00	161.24**	-9.75	14.10	19.08	13.59
	(34.919)	(45.527)	(35.118)	(57.161)	(18.647)	(120.444)	(42.500)	(80.232)	(71.561)	(16.405)	(23.171)	(28.289)
$Treat2 * Post$ ¤¤	-68.05**	-79.53**	107.27***	1.32	-32.75	61.22	7.69	86.63	-114.38	-2.78	-11.74	18.56
	(32.609)	(38.445)	(38.762)	(41.266)	(22.944)	(139.927)	(39.667)	(62.452)	(89.521)	(14.458)	(22.102)	(29.551)
Post	176.55***	171.31**	21.86	33.78	-0.67	381.24**	-152.03	-238.49	-181.04	24.60	34.46	30.40
	(59.783)	(76.188)	(57.962)	(109.108)	(37.132)	(186.961)	(115.530)	(171.634)	(117.061)	(24.868)	(26.803)	(39.565)
Observations	637	331	306	640	334	306	655	344	311	655	344	311
R squared	0.352	0.789	0.574	0.231	0.656	0.474	0.368	0.694	0.586	0.370	0.634	0.519
Panel B	Child aged 6–12 MHH - by household recipient gender											
	Time use on a typical day (mins/day)											
	Chores[a]			Fam. Labor[b]			At school			Hmwk./study		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treat1*Post	-9.57	-18.46	-9.84	32.89*	-1.30	53.40	-26.95	-49.50	0.65	8.52	13.49	14.94
	(11.931)	(14.744)	(18.362)	(17.259)	(7.033)	(32.758)	(29.442)	(31.501)	(41.010)	(7.007)	(14.580)	(9.202)
Treat2*Post	-2.92	9.74	-5.64	8.62	0.67	12.80	3.27	-50.36*	24.57	-3.67	-11.00	3.02
	(12.731)	(13.206)	(20.301)	(13.945)	(5.412)	(30.905)	(25.992)	(28.363)	(37.299)	(7.404)	(12.371)	(7.607)
Post	58.40***	40.63	86.29***	-53.57*	5.50	-85.85*	26.14	100.12	-60.54	14.12	-37.46	21.34
	(22.011)	(32.418)	(28.531)	(27.087)	(16.874)	(50.487)	(62.487)	(61.641)	(70.049)	(25.437)	(47.494)	(15.292)
Observations	1,077	537	540	1,080	540	540	1,087	541	546	1,086	541	545
R squared	0.304	0.350	0.452	0.145	0.250	0.268	0.218	0.326	0.387	0.266	0.380	0.514

Notes: **Chores**[a] include Helping at home - fetching water,sibling care, cleaning, cooking, washing, and shopping.
Recipient gender ¤Treat 1 is an indicator equal to one if recipient of cash transfer in HH was female ¤¤ Treat 2 is an indicator equal to one if recipient of cash transfer in HH was male
Family labour[b] includes family farming/herding and other family business
Standard errors clustered at the community level, in parentheses. *** indicates p<.01; ** indicates p<.05; * indicates p<.10

Table 11 **Distinguishing Impact of cash transfers on child farm labour by recipient gender for married MHH**

Panel A	Child aged 13–17					
	MHH - by household recipient gender					
	Crop and livestock activities (last 7 days)					
	Worked (0/1)			Days worked		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)
$Treat1 * Post$ ❑	0.02	-0.13	-0.08	-0.38	-0.35	-1.25
	(0.110)	(0.161)	(0.153)	(0.670)	(0.685)	(1.176)
$Treat2 * Post$ ❑❑	-0.22**	-0.09	-0.64***	-1.44**	-0.24	-3.51**
	(0.099)	(0.153)	(0.197)	(0.679)	(0.555)	(1.630)
Post	-0.10	0.27	-0.55**	-0.56	0.68	-2.29
	(0.244)	(0.195)	(0.277)	(1.120)	(0.786)	(1.901)
Observations	685	355	330	685	355	330
R squared	0.478	0.388	0.761	0.373	0.333	0.638
Panel B	Child aged 6–12					
	MHH - by household recipient gender					
	Crop and livestock activities (last 7 days)					
	Worked (0/1)			Days worked		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)
Treat1*Post	-0.12	-0.10	-0.12	-0.47	0.01	-0.84
	(0.092)	(0.097)	(0.144)	(0.537)	(0.372)	(0.936)
Treat2*Post	-0.01	-0.01	-0.09	-0.32	0.25	-1.43
	(0.097)	(0.080)	(0.170)	(0.574)	(0.330)	(1.109)
Post	-0.02	-0.02	-0.04	-0.31	-0.40	-0.55
	(0.188)	(0.170)	(0.265)	(1.216)	(0.681)	(1.880)
Observations	1,116	553	563	1,116	553	563
R squared	0.214	0.348	0.343	0.180	0.357	0.324

Recipient gender ¤Treat 1 is an indicator equal to one if recipient of cash transfer in HH was female ¤¤ Treat 2 is an indicator equal to one if recipient of cash transfer in HH was male

Standard errors clustered at the community level, in parentheses.*** indicates p<.01; ** indicates p<.05; * indicates p<.10

Table 12 Distinguishing Impact of cash transfers on adult labour by household structure

Panel A	Adult aged 18-60								
	Worked (0/1)								
		Farm Labor			Off-Farm Wage Labor			Non-Farm Own Enterprise	
sample:	ALL	WOMEN	MEN	ALL	WOMEN	MEN	ALL	WOMEN	MEN
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat*Post*FemHD	0.15**	0.27**	-0.01	-0.03	-0.03	-0.01	-0.03	-0.04	-0.02
	(0.072)	(0.104)	(0.101)	(0.060)	(0.071)	(0.092)	(0.038)	(0.054)	(0.027)
Treat*Post	-0.07	-0.14**	0.02	-0.04	-0.05	-0.02	0.02	0.02	0.01
	(0.051)	(0.063)	(0.071)	(0.054)	(0.064)	(0.072)	(0.024)	(0.032)	(0.023)
Individual F.E.	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	4,416	2,414	2,002	4,416	2,414	2,002	4,416	2,414	2,002
R squared	0.062	0.105	0.100	0.285	0.311	0.311	0.052	0.094	0.104
Coefficients from equation stratifted by FHH (unmarried) and MHH(married)									
Treat*Post	0.06	0.12**	-0.06	-0.07	-0.08	0.04	0.03	0.06	-0.04*
(FHH-Unmarried)	(0.060)	(0.060)	(0.097)	(0.059)	(0.074)	(0.096)	(0.031)	(0.046)	(0.024)
Treat*Post	-0.03	-0.10*	0.05	-0.07	-0.06	-0.07	-0.01	-0.01	0.00
(MHH - Married)	(0.050)	(0.057)	(0.077)	(0.064)	(0.071)	(0.084)	(0.023)	(0.031)	(0.025)
Panel B	**Days Worked**								
		Farm Labor			Off-Farm Wage Labor			Non-Farm Own Enterprise	
sample:	ALL	WOMEN	MEN	ALL	WOMEN	MEN	ALL	WOMEN	MEN
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat*Post*FemHD	1.01**	1.52**	0.50	-0.32	-0.40	-0.22	-0.07	-0.16	0.07
	(0.450)	(0.631)	(0.623)	(0.230)	(0.273)	(0.408)	(0.188)	(0.263)	(0.138)
Treat*Post	-0.50*	-0.93**	0.00	-0.27	-0.13	-0.49*	0.06	0.13	-0.03
	(0.286)	(0.355)	(0.428)	(0.203)	(0.221)	(0.294)	(0.099)	(0.135)	(0.111)
Individual F.E.	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	4,416	2,414	2,002	4,416	2,414	2,002	4,416	2,414	2,002
R squared	0.068	0.104	0.114	0.074	0.084	0.131	0.054	0.097	0.107
Coefficients from equation stratifted by FHH (unmarried) and MHH(married)									
Treat*Post	0.40	0.43*	0.14	-0.60***	-0.49**	-0.76*	0.19	0.33	-0.03
(FHH-Unmarried)	(0.392)	(0.243)	(0.641)	(0.212)	(0.198)	(0.403)	(0.183)	(0.284)	(0.055)
Treat*Post	-0.38	-0.71**	0.02	-0.34	-0.19	-0.57*	-0.06	-0.02	-0.07
(MHH - Married)	(0.278)	(0.337)	(0.481)	(0.222)	(0.203)	(0.343)	(0.086)	(0.109)	(0.126)

Standard errors clustered at the community level, in parentheses. *** indicates p<.01; ** indicates p<.05; * indicates p<.10

Figures

Figure 1 **Distribution of age of head by household structure for agricultural households**

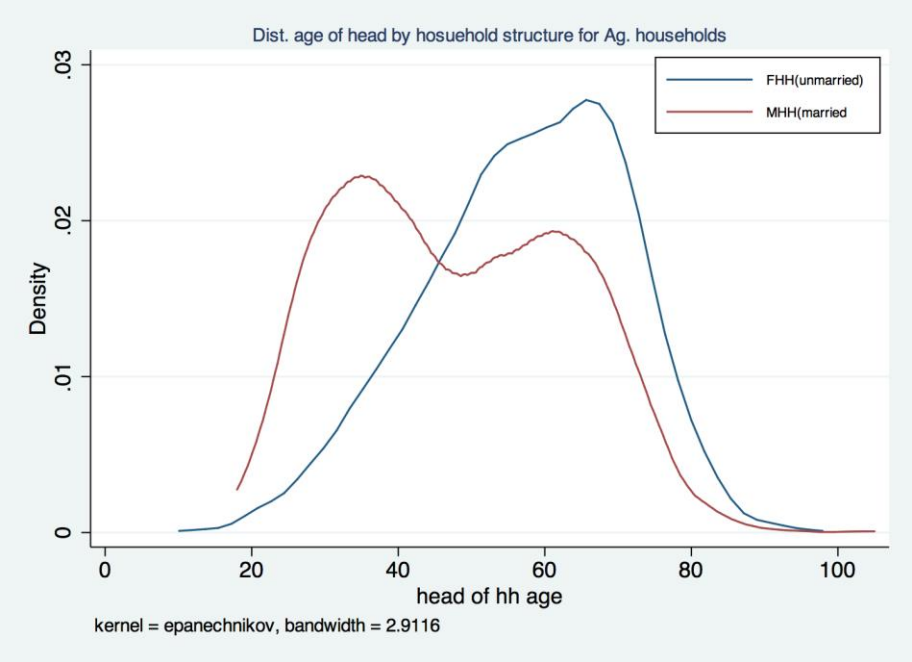


Figure 2 **Distribution of years of schooling of head by household structure for agricultural households**

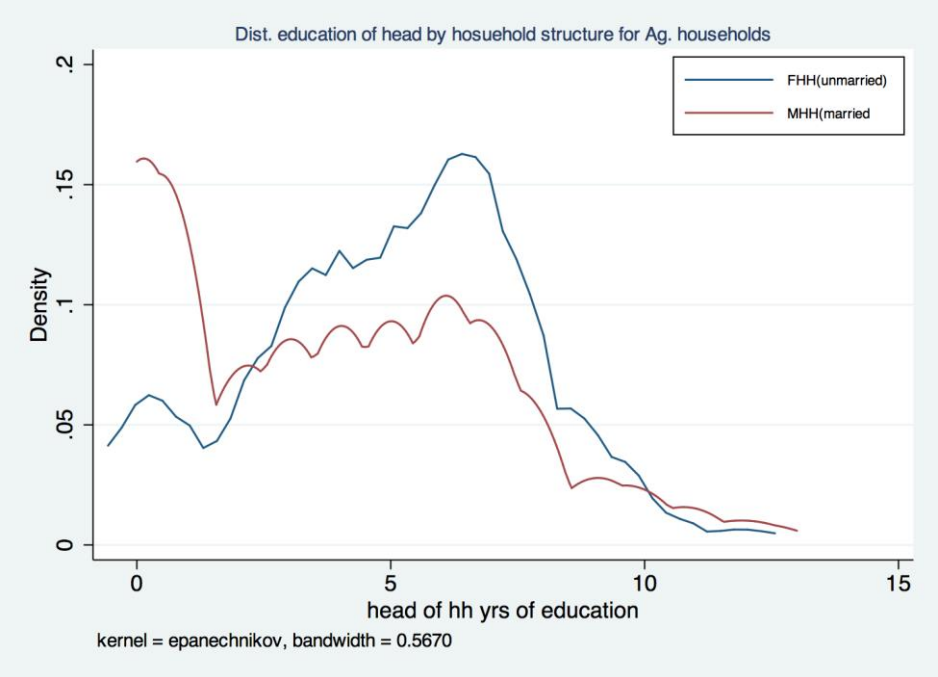


Figure 3 **Distribution of land area owned by household structure for agricultural households**

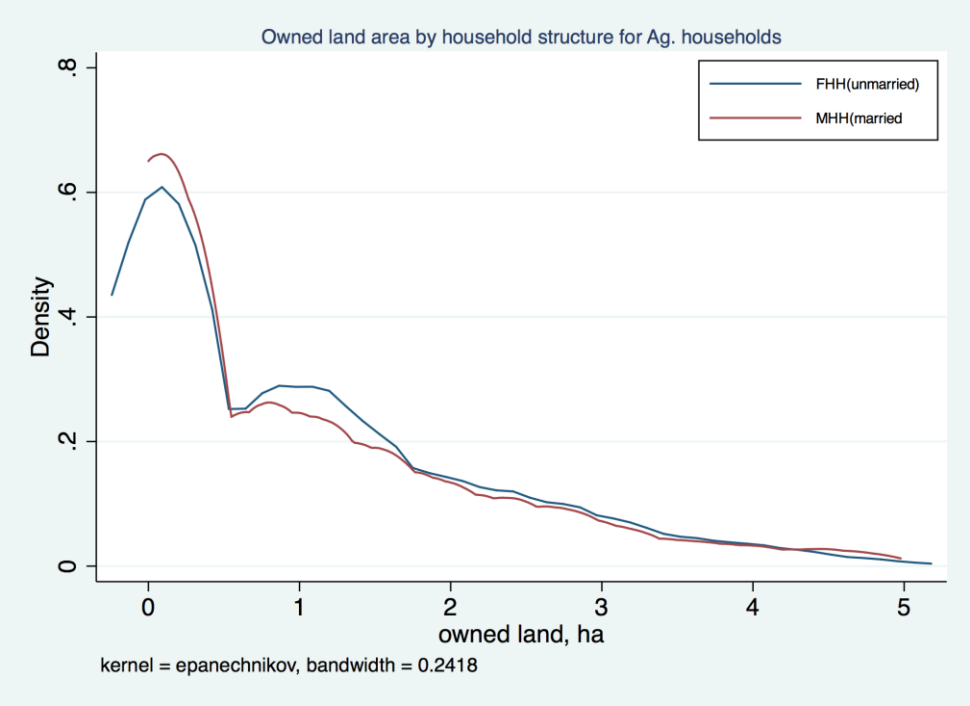
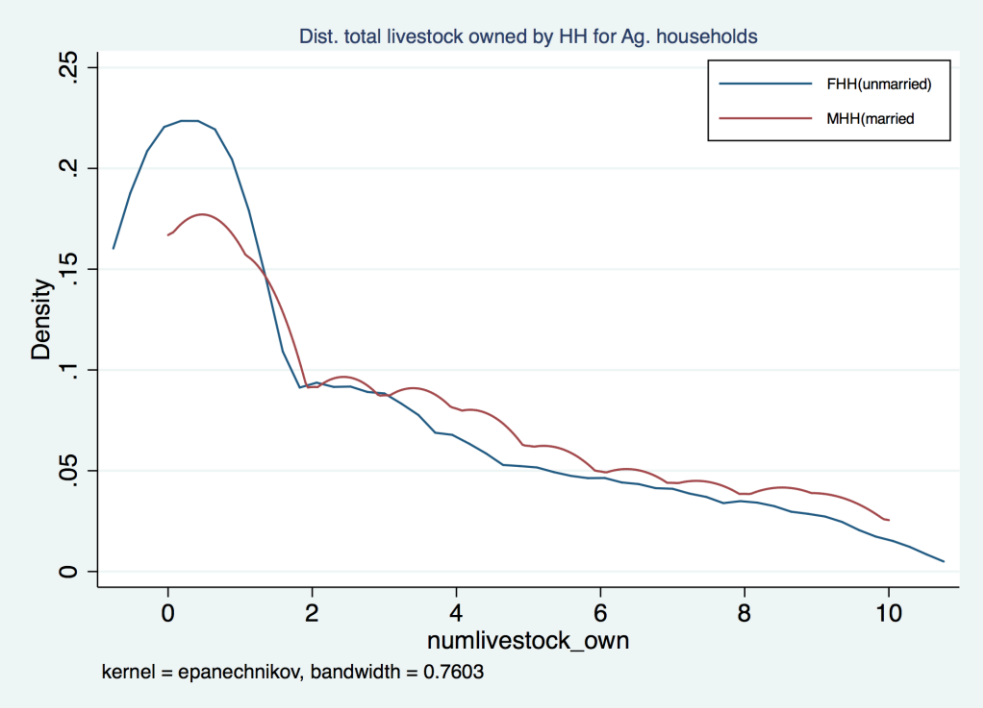


Figure 4 **Distribution of number of livestock in household by household structure for agricultural households**



Appendix

In this section we describe a model we use as a robustness check to mitigate sample selection bias generated by household selection into FHH units. To estimate (1) from the main specification, stratified for MHH and FHH, we estimate an endogenous switching regression model. If Y_{i1t} is the potential outcome when individuals fall into the MHH regime and Y_{i2t} is the outcome when individuals fall into the FHH regime, then the potential outcome can be denoted as a function of all observable characteristics, the treatment, and unobservable error terms ξ_{i1} and ξ_{i2}. The latent propensity to fall into FHH can be denoted by a criterion function I_i that determines which regime the agent faces and explained by some exogenous shifters Z_i:

$$\begin{aligned} I_i=1 \text{ if } \quad & \omega Z_i + \mu_i > 0 \\ I_i=0 \text{ if } \quad & \omega Z_i + \mu_i \leq 0 \end{aligned} \tag{5}$$

$$\begin{aligned} \text{Regime 1 (FHH):} \quad & Y_{i1t} = \gamma_0 + \gamma_1 Treat_h * Post_t + \gamma_2 Treat_h + \gamma_3 Post_t + \gamma_4 X_{i1t} \quad \text{if } I_i=1 \\ & + \gamma_5 Z_{1t} + \gamma_6 Q_{ct} + \beta_d * \eta_t + \delta_i + \xi_{i1t} \\ \text{Regime 2 (MHH):} \quad & Y_{i2t} = \gamma_0 + \gamma_1 Treat_h * Post_t + \gamma_2 Treat_h + \gamma_3 Post_t + \gamma_4 X_{i1t} \quad \text{if } I_i=0 \\ & + \gamma_5 Z_{2t} + \gamma_6 Q_{ct} + \beta_d * \eta_t + \delta_i + \xi_{i2t} \end{aligned} \tag{6}$$

where ω and γ_i denote vectors of parameters. Suppose ξ_{i1t} and ξ_{i2t} denote unobservable error terms of the two regimes, and together with μ_i, assume have a trivariate normal distribution with mean zero. If the likelihood of being in FHH is uncorrelated with unobservables, i.e. $Cov(\mu_i, \xi_{iht})=0$, and $\xi_{i1t} = \xi_{i2t} = \xi_{iht}$ then the simple DID model would yield unbiased treatment impacts. However, if $\xi_{i1t} \neq \xi_{i2t}$, the estimation may face an endogeneity bias through sorting on the household structure. Then any shifter Z_i that explains the selection into FHH will be correlated with the error terms in the observed outcomes equations.

An endogenous regime-switching regression model can be used to mitigate such a bias generated by differences across FHH-MHH household selection and to estimate the impact of cash transfers under each regime. This can be achieved by maximizing the following likelihood function:

$$Ł = \prod_{i=1}^{n} [f(Y_{iht}|I_i = 1) * P(I_i = 1)]^{I_i} [f(Y_{iht}|I_i = 0) * P(I_i = 0)]^{(1-I_i)} \tag{7}$$

Where $P(I_i=1)$ is the probability of remaining as an independent FHH and $f(Y_{iht}| I_i = 1)$ and $f(Y_{iht} | I_i = 0)$ are conditional distributions of the observed outcomes.

Then, if we assume, joint normality of the error terms, the first term in the likelihood function can be represented as:

$$f(Y_{iht}|I_i=1)*P(I_i=1)=f(Y_{i1t}|\omega Z_i+\mu_i>0)*P(\omega Z_i+\mu_i>0)=\int_{-\infty}^{-\omega Z_i} g(\xi_{i1t},\mu_i)d\mu_i \quad (8)$$

$$=\frac{1}{\sigma_1}*\phi\left(\frac{\xi_{i1t}}{\sigma_1}\right)*\int_{-\infty}^{-\omega Z_i}\left(\frac{1}{\sqrt{1-\rho_1^2}}*\phi\left(\frac{\mu_i-\rho_1\frac{\xi_{i1t}}{\sigma_1}}{\sqrt{1-\rho_1^2}}\right)\right)d\mu_i$$

where σ_1 is the standard deviation of the error term ξ_{i1t}, ρ_1 is the correlation coefficient between ε_{i1t} and μ_i, and $\varphi(.)$ is the standard normal probability distribution function. The second part of the log likelihood function can be similarly derived. Hence a final log-likelihood function can be estimated as:

$$lnL=\sum_{i=1}^{n} I_i*\left[\phi\left(\frac{\xi_{i1t}}{\sigma_1}\right)-ln\sigma_1-ln\phi\left(\frac{\omega Z_i+\rho_1\frac{\xi_{i1t}}{\sigma_1}}{\sqrt{1-\rho_1^2}}\right)\right] \quad (9)$$

$$+(1-I_i)*\left[\phi\left(\frac{\xi_{i2t}}{\sigma_2}\right)-ln\sigma_2+\left(1-ln\phi\left(\frac{\omega Z_i+\rho_2\frac{\xi_{i2t}}{\sigma_2}}{\sqrt{1-\rho_2^2}}\right)\right)\right]$$

Using the above likelihood function we can derive the impacts stratified by regime for continuous outcomes under the assumption that error terms across regimes are not independent. With this model, if one of the correlation coefficients ρ_1 or ρ_2, are statistically significant in the estimation then household structure (i.e. FHH vs MHH) is potentially endogenous and results from the endogenous switching regression are unbiased. We estimate the switching model for continuous outcomes of number of days of school missed in past 30 days, time use outcomes, and hours spent working on the farm in the last week.

Table A.1. **Endogenous Switching Regime: Impact of cash transfers on child time use and labour by household structure**

Panel A	Child aged 13–17 Compare FHH to MHH											
	Time use activities									Labor		
	Chores[a]			Fam.labor[a]			At School			Days worked on farm in last week		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Regime 1 (MHH):	-38.589**	-18.114	27.3 00*	-15.685	0.001	0.001	-0.597	120.620***	9.959	-0.001**	-0.003	-0.002
Treat*Post	(16.985)	(28.071)	(14.004)	0.000	(0.001)	(1.212)	0.000	(43.119)	(82.574)	0.000	(0.006)	(0.002)
Regime 2 (FHH):	12.267	45.143*	-13.971	-3.140	6.064	-47.108	-2.110	47.142	36.059	-0.289	1.128	-1.328**
Treat*Post	(21.483)	(27.077)	0.000	(17.284)	(11.688)	(29.329)	(29.043)	(108.247)	(38.147)	(0.405)	(0.873)	(0.585)
Corr coefficients:												
ρ_1	0.027	0.085	0.028	0.046	0.033	0.111	0.392*	-0.460***	0.258	-0.730*	-0.480	-0.258
	(0.087)	(0.074)	(0.039)	(0.046)	(0.102)	(0.096)	(0.222)	(0.087)	(0.121)	(0.419)	(0.377)	(0.221)
ρ_2	-0.295**	-0.229***	-0.213***	-0.026	-0.083	0.022	0.092	0.021	-0.039	-0.067***	-0.063	-0.028*
	(0.135)	(0.065)	(0.058)	(0.050)	(0.027)	(0.158)	(0.661)	(0.556)	(0.122)	(0.027)	(0.073)	(0.015)
Panel B	Child aged 6 –12											
	Time use activities									Labor		
	Chores[a]			Fam.labor[a]			At School			Days worked on farm in last week		
sample:	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS	ALL	GIRLS	BOYS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Regime 1 (MHH):	3.226	-0.284	1.892	-15.194*	3.008	-29.373*	8.180	-11.691	-1.780	0.000	0.000	0.000
Treat*Post	(11.241)	(7.915)	(8.831)	(7.871)	(3.937)	(15.340)	(10.636)	(15.285)	(15.844)	0.000	(0.001)	(0.001)
Regime 2 (FHH):	-5.132	-15.846*	7.680	15.231	-13.737**	19.936	9.156	28.509**	0.199	-0.031	0.001	0.480**
Treat*Post	(6.881)	(8.505)	(9.823)	(9.274)	(5.480)	(18.060)	(11.445)	(13.170)	(13.183)	(0.357)	(0.001)	(0.239)
Corr coefficients:												
ρ_1	-0.791	-0.195**	-0.900	0.11***	0.053	0.114***	0.275***	-0.128***	0.879***	-0.704	-0.957***	-0.955
	(0.595)	(0.095)	(0.595)	(0.047)	(0.036)	(0.044)	(0.050)	(0.051)	(0.060)	(0.427)	(0.100)	(0.607)
ρ_2	-0.121	-0.158***	-0.184	-0.023	-0.014	-0.051	-0.057	-0.054	-0.066	0.015	-0.063	-0.024
	(0.023)	(0.034)	(0.030)	(0.034)	(0.020)	(0.043)	(0.070)	(0.100)	(0.210)	(0.021)	(0.025)	(0.022)

Notes: **Chores**[a] include Helping at home - fetching water,sibling care, cleaning, cooking, washing, and shopping.
Family labour[b] includes family farming/herding and other family business.
Robust standard errors, clustered at the community level. Standard errors on Treat*Post obtained by cluster-bootstrapping the parameter estimate (1000 replications).
*** indicates p<.01; ** indicates p<.05; * indicates p<.10

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