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HETEROGENEOUS IMPACTS OF AN UNCONDITIONAL CASH TRANSFER PROGRAMME ON SCHOOLING: EVIDENCE FROM THE GHANA LEAP PROGRAMME

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Abstract: The paper uses data from a quasi-experimental evaluation to estimate the impact of the Ghanaian Government's unconditional cash transfer programme on schooling outcomes. It analyses the impacts for children by various subgroups – age, gender, cognitive ability – and finds consistent impacts. There are differences across gender, especially on secondary schooling, with enrolment significantly higher for boys 13 years or older. For girls, the effect of the Livelihood Empowerment Against Poverty (LEAP) programme is to improve current attendance among those who are already enrolled in school (across all age groups). The authors found a significant effect on the expenditure on schooling items such as uniforms and stationary for these groups, which helps to explain the pathway of impact because these out-of-pocket costs are typically important barriers to schooling in rural Ghana and most of Africa.

Keywords: schooling, Ghana, unconditional cash transfer, propensity score matching.

JEL Classification: I25, O15, I38

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List of Acronyms

3ie	The International Initiative for Impact Evaluation
BECE	Basic Education Certificate
CCT	Conditional Cash Transfer
DD	Difference-in-Differences
DFID	The (UK) Department for International Development
IPW	Inverse Probability Weighting
ISSER	Institute of Statistical, Social and Economic Research
LEAP	Livelihood Empowerment Against Poverty
NHIS	National Health Insurance Scheme
OVC	Orphan or Vulnerable Child
PSM	Propensity Score Matching
PWD	Person living with a Disability
SSA	Sub-Saharan Africa
UCT	Unconditional Cash Transfer
WASCE	West African Secondary School Certificate Examination

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I. INTRODUCTION

What is the effect of an unconditional cash transfer programme on schooling outcomes for children? There is growing evidence from Africa that unconditional cash transfers have positive outcomes not just on consumption and food security (The Kenya CT-OVC Evaluation Team, 2012c), but also on human capital development such as education and health outcomes (Davis & Handa, 2014). In this paper we document the human capital effects of Ghana's flagship poverty alleviation programme, the Livelihood Empowerment Against Poverty (LEAP), a cash transfer targeted to households who are ultra-poor and fall into specific demographic groups. While schooling impacts of conditional cash transfers (CCTs) have been well documented (Attanasio et al., 2010; Dammert, 2010; Schultz, 2004), the evidence from unconditional programmes (UCTs) is somewhat less well-established, though results from ongoing large-scale evaluations suggests that these are also positive and sometimes larger than those reported for CCTs. In CCTs that are conditional on school enrolment, reported increases in school enrolment are typically a direct consequence of programme design and implementation – whether transfers are high enough and conditions are enforced. In unconditional programmes on the other hand, any impact on schooling reflects the underlying preferences of the household with respect to schooling – in this case the income elasticity of demand.[1] Where this elasticity is high, the expected impact of a UCT will be correspondingly higher. Indeed in a CCT there may be a considerable number of beneficiaries for whom the transfer is infra-marginal and the programme exerts only an income effect; in such cases the extra administrative cost of monitoring conditions may not be worth the extra gain in terms of increased school enrolment.

In a recent paper Akresh, de Walque, and Kazianga (2013) suggest that the income and price effects may vary by individual child within a family, so that conditions might be binding for some children but not others. They suggest for example that in some parts of Africa, the girl child or those who have perceived 'low ability' might be marginalized with respect to schooling, and that a CCT might be more effective at pulling these children into school. This idea is rooted in literature that suggests that in low-resource settings, parents can either display compensating behaviour, by investing more inputs in less endowed children, or display investment behaviour by rewarding, i.e. investing more inputs in higher ability children (Behrman, Rosenzweig, & Taubman, 1994). This theory builds on seminal work by Becker and Tomes (1976) who posit that parents will invest more in the human capital of well-endowed children. The underlying presumption nevertheless is that a 'market failure' exists which the condition addresses, such as lack of information about the benefits of education or credit constraints; alternatively a rights-based approach might also support conditions in order to protect the rights of marginalized or socially excluded children. Under either scenario, there remains the question of whether a conditional cash transfer (versus provision of information or addressing social norms) is the appropriate instrument to address the underlying problem.

[1] The income elasticity is particularly important in a context of credit constraints. Rural poor households in Africa often have no access to financial markets to borrow for education or other productive investments (e.g. Barrett, Reardon, and Webb (2001))

Our paper contributes to the small but growing body of literature on the impact of UCTs on schooling outcomes. A recent systematic review comparing schooling impacts of CCTs versus UCTs found that both CCTs and UCTs improve the likelihood of being enrolled in and attending school, with no significant difference between the size of the impacts, but when programmes were qualitatively classified according to their enforcement of conditions, larger impacts emerged among CCTs (Baird, Ferreira, Özler, & Woolcock, 2013). This same review identified only five studies investigating the impact of a UCT on schooling, compared to 26 studies on the impacts of CCTs.

Therefore, documented impacts of CCTs on education are many. For instance, Mexico's *PROGRESA* increased enrolment by 7 percentage points, or 8 percentage points for the secondary school transition (De Brauw & Hoddinott, 2011; Schultz, 2004), while Colombia's *Familias en Acción* increased enrolment rates by 5-7 percentage points (Attanasio et al., 2010). In Africa, the Tanzanian Productive Social Safety Net Programme had no impact on school enrolment but did lead to a rise of 15 percentage points in Standard 7 completion rates among children 15-18 years, suggesting that the CCT fostered grade progression among those already in school, rather than drawing new children into the school system (Evans, Hausladen, Kosec, & Reese, 2014). We have identified only one other published peer reviewed article that provides evidence on the schooling impacts of a national unconditional cash transfer programme from sub-Saharan Africa. This showed an impact of 8 percentage points (The Kenya CT-OVC Evaluation Team, 2012a).

The present study thus contributes to the limited evidence on the impact of a UCT in Africa on schooling. We also go beyond average treatment effects and look at impacts by age-group, gender of child, and by baseline cognitive ability, the latter to test the hypothesis that 'marginal' children, those with low ability, are less likely to be sent to school in the absence of conditions.

The results indicate the LEAP Programme has had positive impacts on schooling enrolment and attendance and these impacts are distributed across all age groups and among marginal and non-marginal children. However there are important gender differences among secondary-age children with much larger effects among boys age 13 and older and even larger impacts among low-ability boys. For girls on the other hand, the effect of LEAP is to improve current attendance among those who are already enrolled in school (across all age groups). In short, moving beyond averages provides additional insights on the nuances around programme impacts, as well as indications of complementary services or messaging to address sub-groups that are least impacted by the programme. We also provide evidence on the potential pathway through which LEAP affects schooling outcomes.

II. LEAP PROGRAMME AND EDUCATION IN GHANA

The Livelihood Empowerment Against Poverty (LEAP) programme is Ghana's flagship social protection programme, initiated in 2008 and reaching more than 116,000 extremely poor households as of October 2015. The programme aims to alleviate short-term poverty by delivering direct cash payments, and to push long-term human capital development, by providing health insurance and encouraging school enrolment. LEAP targets extremely poor households which have a household member in any of the following demographic groups: orphan or vulnerable child (OVC), elderly poor,

or person with extreme disability unable to work (PWD). At the time of data collection for this study, LEAP households received a bimonthly transfer of Ghanaian cedi (GH¢) 16 - 30 (approximately US$ 11 - 21 based on the exchange rate of April 2010), depending on the number of eligible household members. The transfer size is low compared to similar cash transfer programmes, representing just over 11 per cent of household consumption at baseline and, due to persistent inflation, 7 per cent of household consumption at endline (Davis & Handa, 2015; Handa et al., 2014).[2] Moreover, during the 24-month period of the impact evaluation, due to operational delays, beneficiaries received only 20 months of payments which were distributed irregularly without following the bimonthly payment pattern. Aside from the cash transfer, programme participants are also entitled to free health insurance under the National Health Insurance Scheme (NHIS) and by the 24-month follow-up over 90 per cent of beneficiaries were enrolled in the NHIS.

In theory, transfers for the elderly poor and PWD unable to work are unconditional, but transfers to households with OVCs are conditional with the following rules: 1) Enroll and retain all school-age children in the household in public basic schools; 2) Beneficiaries must be card bearing members of the NHIS; 3) Register new born babies (0 -18 months) with the Birth and Deaths Registry and complete the Expanded Programme on Immunisation; 4) Ensure that no child in the household is trafficked or engaged in any activities constituting the worst forms of child labour.

In practice however, household compliance with conditions are not verified and the transfer to households with OVC can therefore also be characterized as unconditional.[3]

Schooling system in Ghana

Ghana's basic education system comprises 11 years of schooling, divided up into two years of kindergarten, six years of primary school and three years of junior secondary/high school. There is no certificate of completion after primary school, but junior high school ends on the Basic Education Certificate (BECE). Children who pass the BECE are able to continue schooling at the senior secondary level which includes senior secondary school or vocational/technical training and generally lasts an additional three years. At the end of senior secondary school, students are subjected to the West African Secondary School Certificate Examination (WASCE), which gives access to tertiary education. Schooling is free and compulsory between the ages of 4 and 15. The official language of instruction is English, although a local language may be used in the first three years of basic education, from kindergarten to year three.

Ghana has made significant progress towards universal primary education over the last ten years. Net enrolment rates for primary education increased from 60.5 per cent in 2004 to 88.8 per cent in 2014. However, net enrolment at the secondary level (junior and senior combined) drops to 55 per cent, though it has increased from approximately 40 per cent in 2004. In addition, gender parity has been

[2] Consequently, the transfer size was tripled in January 2012 and increased again in July 2015. The increase in January 2012 only affected the beneficiaries in the study after endline data collection was completed. Transfer beneficiaries now receive a bimonthly transfer of GH¢ 64 - 106 (approximately US$ 19 – 31), depending on the number of beneficiaries in the household.

[3] Indeed 83 per cent of the beneficiary households believed that there were no conditions for the LEAP programme (Park, Handa, Darko Osei, & Osei-Akoto, 2012).

achieved at the primary and junior secondary level, but at the senior secondary level the gender parity index is 0.94, indicating that more boys than girls attend school at this level (UNESCO Institute for Statistics, 2014).

Despite the progress towards universal education, barriers towards schooling remain for certain subgroups. An estimated 428,604 children of primary school age and 191,532 children of junior high school age were not in school in 2014 (UNESCO Institute for Statistics, 2014). Out-of-school children are more often from poor families and have parents who never attended school. Children in Northern Ghana are more likely to be out of school than children in other regions in Ghana; gender gaps are also higher in Northern Ghana and ethnic disparities also persist (UNICEF Ghana, 2012).

For girls, major barriers to continued education include early marriage, child fostering and lack of proper sanitation facilities at school. Also a lack of perceived benefit and low levels of parental education contribute to drop-out. Children with disabilities or special needs are particularly vulnerable, as schools do not have the appropriate facilities or skills to deal with their special needs. Further, risk of abuse at school hinders children from going regularly. Despite the absence of official school fees, some direct and indirect costs of schooling remain, such as transportation, stationery, food and sanitary materials for girls. These costs increase with the level of schooling, and children from poor families are therefore at increased risk of drop-out once they reach secondary level (National Development Planning Commission, 2015). Further barriers include opportunity costs, because children often need to contribute to their family's livelihood activities, and migration, when parents seek other income-generating activities outside their original settlement (UNICEF Ghana, 2012).

III. DATA, STUDY DESIGN AND EMPIRICAL STRATEGY

Data used for this study come from the LEAP impact evaluation, a longitudinal propensity score matching design. The evaluation design is somewhat 'fortuitous' in that baseline data was collected by leveraging an existing survey effort that was being conducted by Yale University and the Institute for Statistical, Social and Economic Research (ISSER) during the time that the Ministry of Gender, Children and Social Protection was contemplating an evaluation of LEAP. The ISSER survey covered both rural and urban households across all of Ghana and consisted of 4,999 households; 699 future beneficiaries of LEAP were added to the ISSER survey in 2010 and constituted the baseline. From the larger ISSER survey, a comparison group of 699 households was selected, using one-to-one propensity score matching (PSM), drawn from a sub-sample of households (N=2,330) residing in communities and districts that were geographically close to LEAP districts or that were geographically similar. The propensity score was calculated for each of these 2,330 households using a probit model that included all variables used by the LEAP programme in ranking households for eligibility. These variables include household demographic composition and number of orphans, age, sex and education of the household head, employment status of household members, housing quality, ownership of livestock, and community variables such as prices and distance to facilities.

The matching procedure gives us a total of 1,398 baseline households (699 ISSER, 699 LEAP) who were targeted for re-interview 24 months after the implementation of LEAP. In addition to the 699 comparison households, 215 ISSER households that were in the same communities to be visited

and that had a balancing score closest to the 699 matched households were also re-interviewed in order to increase the overall sample size. Ultimately 646 from the original 699 ISSER group and 643 households for the LEAP treatment group plus the additional 215 households in comparison communities were re-interviewed, giving a total sample size of 1,504 households in both waves or 1,613 households in the entire study.[4] Attrition in the longitudinal sample was not systematic and was not found to alter the internal validity of the results (Handa et al., 2014). There are 2,218 and 1,945 children between the ages of 5 and 17 within these households at baseline and endline respectively. Table 1 provides a description of the above categorization of data.

Table 1 - *Sample size*

Round	Control		Treatment		Total	
	Household	Children 5 -17	Household	Children 5 -17	Household	Children 5 -17
Baseline	914	1,239	699	979	1,613	2,218
24-months follow-up	858	1,076	646	869	1,504	1,945
	1,772	2,315	1,345	1,848	3,117	4,163

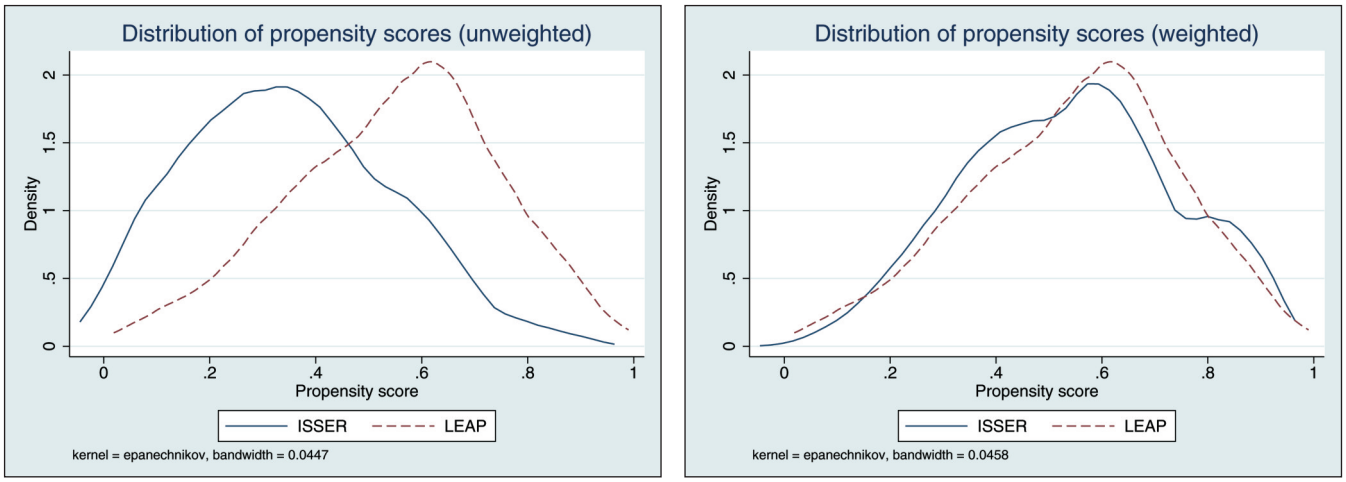
Using PSM, we are able to compare households that are similar to one another except in one important respect, that of the treatment. The literature assessing PSM indicates that the technique can mimic a social experiment if data from both the treatment and comparison group are collected in the exact same way, with identical survey instruments, and if households are followed longitudinally in order to control for fixed unobservable differences across households as well as communities in which the households reside (Diaz & Handa, 2006; Handa & Maluccio, 2010; Heckman, Ichimura, & Todd, 1997). The LEAP evaluation satisfies these criteria: data from the ISSER and LEAP samples were collected by the exact same field teams using the same field procedures at the same time, using identical survey instruments (the LEAP survey instrument was actually a sub-set of the larger ISSER instrument), and followed longitudinally. Indeed the design of the LEAP evaluation was somewhat opportunistic in that the existence of a large national household survey was being conducted at the exact moment that the impact evaluation was being discussed, and Yale and ISSER agreed to allow the evaluation to 'piggy-back' on to their survey.

Given the loss to follow-up of some households and the addition of the 215 extra households in the comparison group, we chose to calculate new propensity scores on the final sample and use these new scores as 'weights' in the impact estimates – this technique is known as 'inverse probability weighting' and allows us to eliminate any remaining imbalance in baseline characteristics between the LEAP and comparison group. Specifically, the inverse probability weighting (IPW) (Hirano, Imbens and Ridder, 2003; Imbens and Wooldridge, 2008; Veras Soares, Perez Ribas and Issamu Hirata, 2010; Wooldridge, 2007) technique uses (ps/(1-ps) as the weight for each comparison household (where ps is the balancing or propensity score) in the statistical

[4] Funding for the follow-up survey on the comparison group was provided by the International Initiative for Impact Evaluation (3ie) through its Open Window call for proposals.

analysis to reflect how similar it is to a LEAP household (the higher the score, the more similar, and the greater the weight). These weights are calculated using a regression model similar to the one used in the original matching analysis, but using this restricted sample (Table A-1 in the Appendix). Figure 1 shows the distribution of propensity scores with and without the probability weights. The weighting leads to a distribution of scores among ISSER households that is much more similar to that of LEAP households.[5]

Figure 1 - ***Distribution of propensity scores in LEAP and ISSER sample, unweighted and weighted***



Source: Authors' calculations

When treatment and comparison group are randomly assigned, and their characteristics fully balance at baseline, it is typically sufficient to show unbiased impact estimates by simple mean comparisons at endline. However, since our comparison group is derived from non-experimental methods, we estimate programme impact in a multivariate framework in order to control for factors that are not fully balanced across comparison and treatment group and may be strong predictors of outcome indicators. Controlling for such factors also increases the efficiency of our estimates by reducing the residual variance in the model. Since LEAP households and ISSER households reside in different communities, it is also important to control for community characteristics to capture potential influence of location on our outcomes of interest. We further employ a difference-in-differences (DD) methodology to account for baseline differences between the two groups. As a result our basic model is the following multivariate DD model:

$$S_{itjc} = \beta_0 + \beta_1 T_t + \beta_2 LEAP_i + \beta_3 (T \times LEAP)_{it} + \sum_{j=1}^{j} (\theta_j X_j)_{it} + \varepsilon_{it}$$

In this framework, S_{itjc} is one of the schooling indicators described above for child *i* at time *t* in household *j* in cluster *c*; *T* is a dummy (indicator) variable equal to 1 if the observation pertains to the post-intervention period (2012); *LEAP* is a dummy variable to indicate if the individual was a recipient of a cash transfer; β_3 captures the DD estimate of impact – the interaction

[5] The difference in the distribution of the propensity scores between the unweighted samples is largely due to the special nature of the LEAP sample (households with orphans, people with a disability etc.) compared to a nationally representative sample of the ISSER households.

between T and $LEAP$; X is a set of control variables; ε is the error term. The control variables include age, gender, school and marital status of household head, demographic composition of the household, log of household size and age and sex of the child. The control measures are from the baseline data set only. Finally, we add to this specification a vector of cluster fixed effects since households in the control group (ISSER sample) are pulled from a national survey and therefore come from potentially geographically different areas than the treatment (LEAP) households. We only present the estimate β_3 in our tables below, as it is the main parameter of interest which captures the impact of the LEAP programme. All estimates are weighted using the IPW approach as described above.

We run separate regressions for each sub-group of children we are analysing. We estimate impacts on children by gender, by age group (5-12 year-olds and 13-17 year-olds), by cognitive ability (based on Raven's score) and by combination of each of these subgroups.

Our identification strategy to retrieve the average treatment effect of LEAP is complex, so we briefly summarize its main features. The core design is a longitudinal propensity score matching one, where the comparison group is culled from a national household survey that took place at the same time as the evaluation, allowing future LEAP households to be incorporated into that survey. The matched comparison of 699 households plus 215 extras were re-interviewed two years later along with the LEAP households. Due to challenges in finding good matches for LEAP in the national survey, we apply IPW and covariate adjustment to account for imbalance across the two groups. We also use DD estimation to account for any baseline imbalance in outcomes, and add cluster fixed effects to control for unobserved heterogeneity across space among the two groups.[6]

IV. DESCRIPTIVE STATISTICS

Baseline characteristics

Table 2 (page 13) reports mean characteristics at baseline for LEAP households and the matched ISSER sample. As mentioned above, given the eligibility criteria, LEAP households are more likely to be older, have a single head of household, and have more orphans. The challenge in this study design is to find ISSER households with similar characteristics to LEAP households. This is reflected in Table 2, where we see that the LEAP sample has more households with orphans than the matched sample and household heads who are more likely to be women, widowed and have no schooling. With the IPW however, the balance in terms of key characteristics between the two groups improves considerably.[7] For example, 27 per cent of LEAP households contain an orphan, compared to only 17 per cent in the ISSER comparison group; but with the IPW, the mean for the ISSER comparison groups is now 25 per cent and no longer statistically different from the LEAP group.

Table 3 presents baseline characteristics for the main group of interest, children aged 5-17 years old. On average, children are about 11 years old, with approximately half of the sample females.

[6] As a robustness check, we perform the same regression with individual fixed effects, and retrieve very similar results (see Additional Tables A-5 – A-10).

[7] From a statistical point of view, it is normal to find imbalances even after applying IPW, as full balance can only be achieved through random assignment (Imbens and Wooldridge, 2008).

Table 2 - ***Mean baseline characteristics of LEAP and ISSER samples***

		Unweighted		Weighted	
	LEAP (1)	ISSER 699 (2)	ISSER 914 (3)	ISSER 699 (4)	ISSER 914 (5)
Demographics:					
Household size	3.83	3.69	3.76	3.83	3.83
Children under 5	0.44	0.45	0.51	0.46	0.48
Children 6-12	0.77	0.76	0.78	0.83	0.82
Children 13-17	0.54	0.50	0.50	0.52	0.51
Elderly (>64)	0.76	**0.65**	**0.56**	0.83	0.77
Number of orphans	0.62	**0.34**	**0.29**	0.65	0.59
Orphan in household	0.27	**0.19**	**0.17**	0.28	0.25
Head Characteristics:					
Female household	0.59	**0.55**	**0.50**	0.64	0.61
Age of head	60.92	59.42	**56.87**	**62.97**	61.38
Widowed	0.39	**0.30**	**0.26**	0.41	0.38
Head has schooling	0.30	**0.47**	**0.50**	0.31	0.34
Household characteristics:					
No cooking	0.09	0.07	**0.06**	0.08	0.08
No toilet	0.31	0.31	0.31	0.34	0.34
Pit latrine	0.30	**0.42**	**0.43**	0.31	0.32
Thatch roof	0.31	**0.23**	**0.23**	0.29	0.28
Crowd	0.69	0.71	0.70	0.69	0.68
Shared dwelling	0.28	0.27	0.25	0.29	0.28
Unprotected water	0.21	0.23	0.23	0.24	0.24
Any livestock owned	0.40	0.44	0.44	0.42	0.42
Per capita spending (GHc)	55.46	**60.06**	**50.68**	47.47	48.34
	N = 699	N = 699	N = 914	N = 699	N = 914

Bold indicates mean is statistically different from LEAP mean at 5 per cent level.
Columns 2 and 4 are means from the original matched sample while columns 3 and 5 include the 215 extra households that were interviewed in 2012.

Table 3 - ***Baseline Characteristics of LEAP and ISSER children aged 5-17 years and households with children aged 5-17 years***

		Unweighted		Weighted	
	LEAP (1)	ISSER 699 (2)	ISSER 914 (3)	ISSER 699 (4)	ISSER 914 (5)
Age	11.07	11.02	10.91	11.26	11.21
% of females	0.47	0.47	0.48	**0.54**	**0.53**
	N = 979	N = 925	N = 1,239	N = 925	N = 1,239
Household size	5.25	4.99	5.06	5.27	5.27
Orphan in household	0.45	**0.31**	**0.27**	0.46	0.42
Number of orphans	1.04	**0.54**	**0.46**	1.10	1.00
Female household	0.58	0.56	**0.50**	**0.66**	0.62
Age of head	55.79	55.16	**53.38**	56.49	55.53
Widowed	0.36	**0.26**	**0.21**	0.41	0.37
Head has schooling	0.34	**0.50**	**0.53**	0.37	0.39
	N = 408	N=409	N = 540	N = 409	N = 540

Bold indicates mean is statistically different from LEAP mean at 5 per cent level.

The household characteristics in which these children live are also presented in Table 3. Again, the IPW technique dramatically improves the balance between the samples in terms of household characteristics.

Table 4 reports means of schooling indicators at baseline. We track two schooling indicators: 1) whether a child is currently enrolled in school, and 2) whether a child has missed ANY school in the last week, as a measure of school attendance. These two indicators are sometimes referred to as the extensive margin of schooling (enrolment) and the intensive margin for schooling (attendance). Each indicator is reported by the parent or caregiver of the child during the household survey. Enrolment is high, 90 – 93 per cent for children in both samples. However, the LEAP kids are more likely to have missed some school in the last week. We show baseline and follow-up means by gender, age group and cognitive ability in the Appendix (Tables A-2, A-3 and A-4).

Table 4 - ***Baseline schooling outcomes***

	LEAP			ISSER (weighted)		
	Mean	SD	N	Mean	SD	N
Missed any school	**0.21**	0.41	844	**0.13**	0.33	953
Currently enrolled	0.93	0.25	908	0.90	0.30	1,047

Bold indicates mean is statistically different from LEAP mean at 5 per cent level.

Baseline Schooling Indicators

Figures 2 and 3 show the baseline schooling indicators for boys and girls by age. Figure 2 indicates that enrolment for all three subgroups of children is high, especially for children between 5 and 12 years. It starts dropping from age 13 onwards, especially for girls. In terms of attendance, girls below the age of 10 who are enrolled are less likely to miss school time, compared to boys (Figure 3). However, this trend reverses after age 10, when a higher share of girls are missing more school time than boys. This underlines the importance of understanding whether LEAP is able to increase school attendance for girls older than 10 years.

Figure 2 - ***Share of children enrolled***

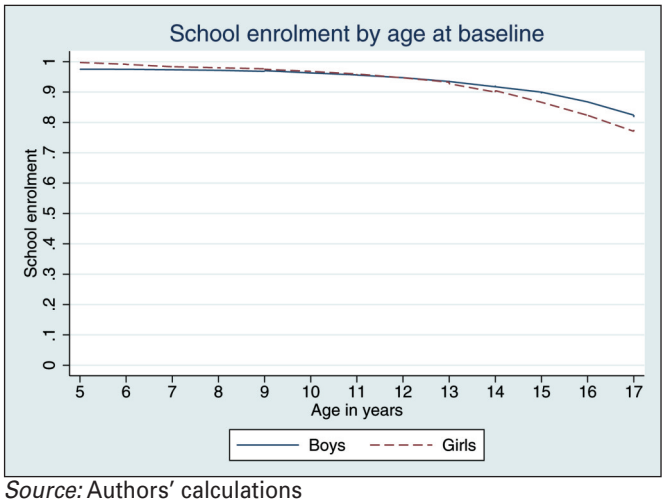
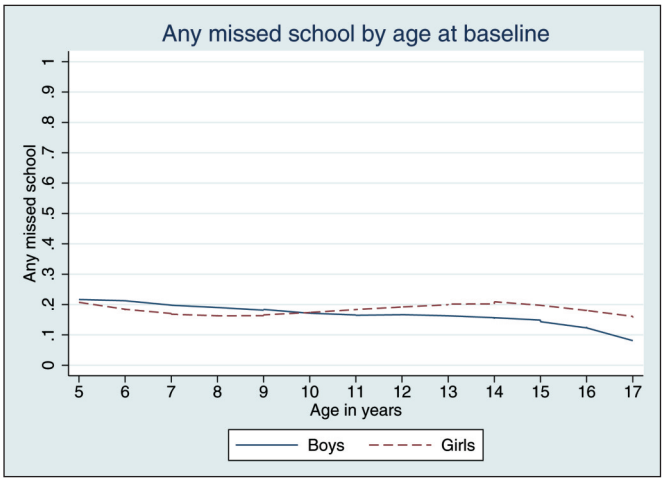


Figure 3 - ***Share of children missed any school***

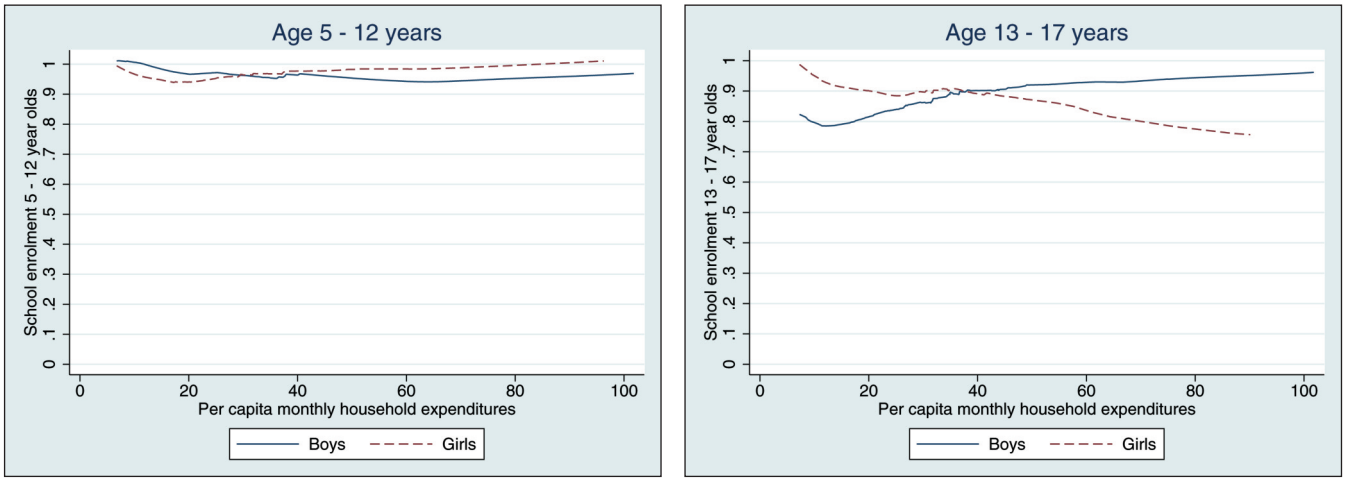


Source: Authors' calculations

Hypotheses

Before presenting the results, we use the baseline data to predict the likely impact of LEAP on the two schooling indicators. We present the relationship between per capita household

Figure 4 - ***Relationship between per capita expenditures and school enrolment, by age group and sex***



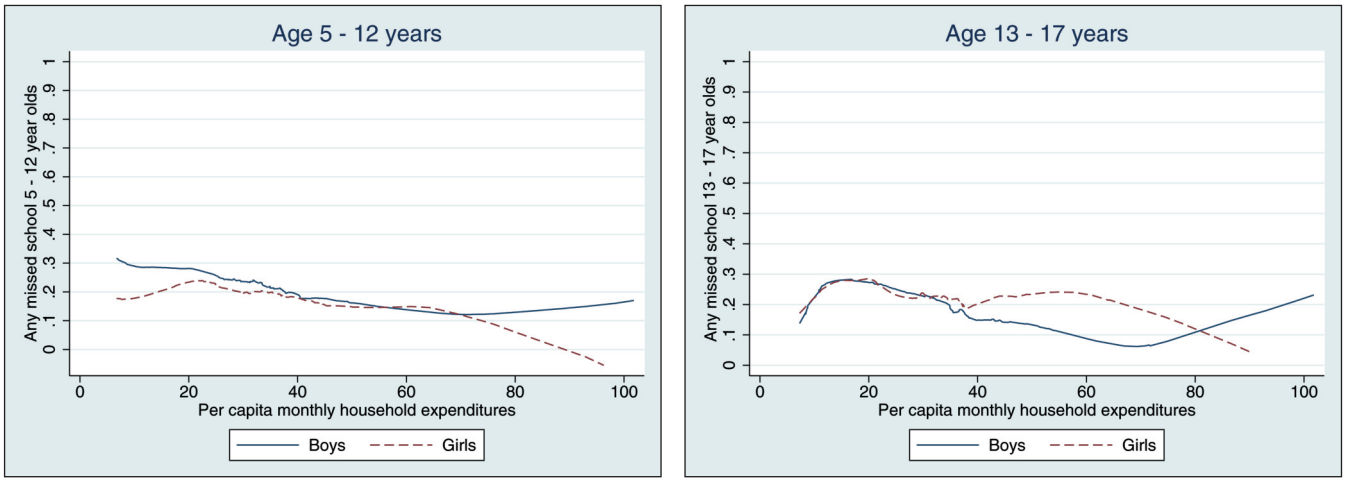
Source: Authors' calculations

Note: Baseline data for LEAP households. Top 5 per cent of the consumption distribution excluded

consumption and school enrolment in Figure 4 for two age groups. The left panel shows that at baseline, school enrolment for children aged 5-12 years was nearly universal, irrespective of the level of household consumption. Girls in this age group tended to be enrolled more often than boys at higher consumption levels, but the differences are small. The right-hand panel indicates that school enrolment for boys aged 13-17 years increased with the household consumption. For girls in this age range, the opposite is true and while their enrolment rate is higher than for boys at low levels of household consumption, when the household income rises, enrolment decreases to a level below that of boys.

Figure 5 shows the relationship between per capita consumption and any missed school. For children aged 5-12 years, the graph shows a declining line, indicating that younger children in richer households miss less school than their poorer counterparts. Towards the end of the distribution, this income effect appears to be stronger for girls than for boys. The relationship between any missed school and consumption for older children is also negative, especially for boys. For girls, there is a slight increase in the centre of the distribution, but the general trend is decreasing.

Figure 5 - ***Relationship between per capita expenditures and any missed school, by age group and sex***



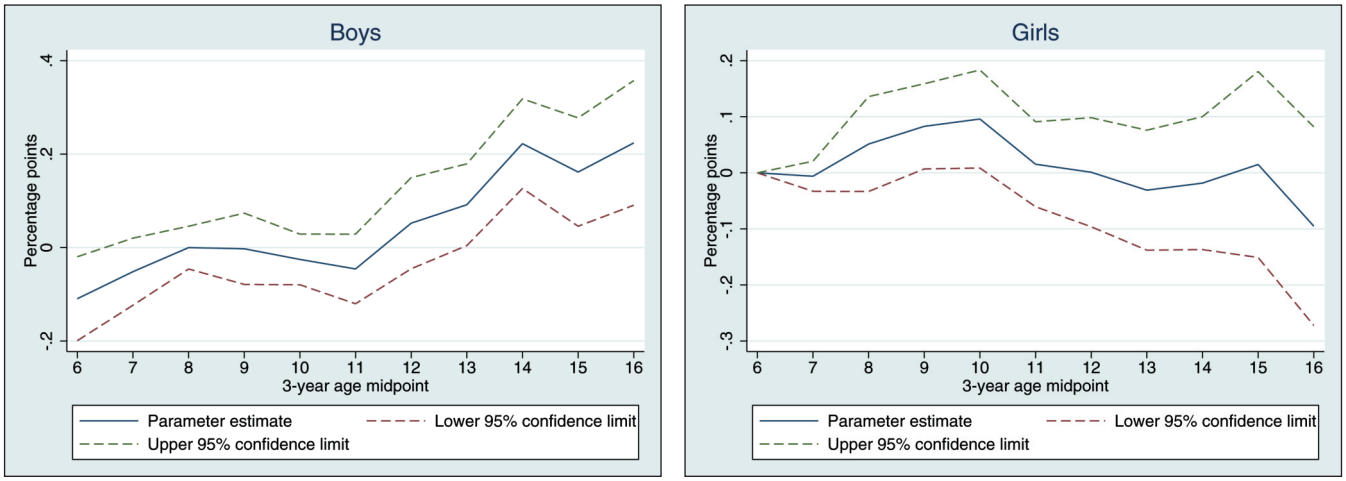
Source: Authors' calculations
Note: Baseline data for LEAP households. Top 5 per cent of the consumption distribution excluded

In addition to the above, we attempt to predict the impacts of the LEAP programme on schooling by estimating the relationship between income (proxied by total household per capita consumption) and school enrolment. For boys and girls independently, we regress school enrolment on a series of three year age groups using a basic set of covariates (household composition, schooling, age and sex of household head, community fixed effects) and (log of) per capita consumption.[8] We recover the coefficient of per capita consumption (a proxy for the income elasticity of demand for schooling) for each of the age bands and plot the result in Figure 6 along with the confidence interval.

[8] The age groups are constructed as follows: for age group 6, we take all children aged 5, 6 and 7. For age group 7, we take all children aged 6, 7 and 8, etc. We combine children in these age bands to increase sample size for each regression.

These ex-ante 'income' effects are statistically significant for boys aged 13-16 years (this is where the lower confidence bound is either above or close to 0), but not for girls, (where the confidence interval always includes 0). This is in line with Figure 4 above, indicating that with increased income, enrolment for older boys increases, but not for older girls. For children younger than 13, the effect is not significant for either boys or girls, which is in line with Figure 4 above.

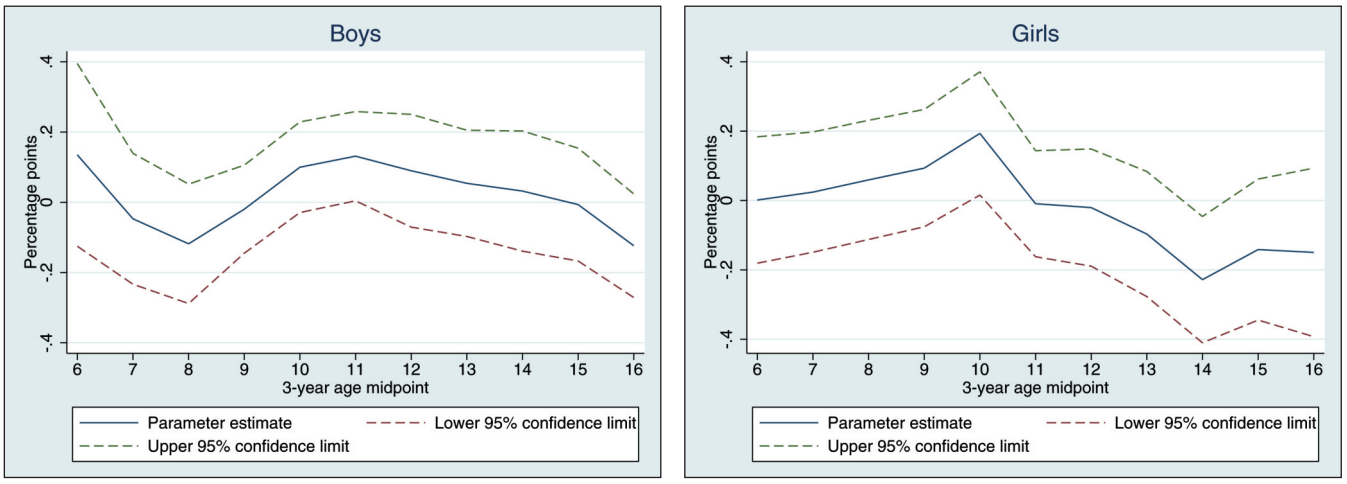
Figure 6 - ***Relationship between school enrolment and per capita consumption for boys (left panel) and girls (right panel)***



Source: Authors' calculations

We perform the same technique with our second schooling indicator, any missed school. For boys, we find no significant ex-ante income effects for any missed school, i.e. the confidence interval of the estimate includes 0 for each age band. The right-hand graph shows that the estimate is negative for girls older than 12 years, but only significant for the age band 13-15-year-olds.

Figure 7 - ***Relationship between any missed school and per capita consumption for boys (left panel) and girls (right panel)***



Source: Authors' calculations

Based on the above analysis, we may expect impacts from LEAP on school enrolment to be strongest among older boys, but not for children younger than 13 or older girls. LEAP is not likely to have a large impact on any missed school, but there could be an effect for older girls.

V. RESULTS

Impacts on school enrolment

Table 5 shows impact estimates of the LEAP programme for several subgroups of children. The first column shows no impact of LEAP on school enrolment when grouping all children together. When disaggregating by age and gender, another picture emerges. There is a statistically significant impact on enrolment of eight percentage points for children who are 13 years or older (column 5) and no corresponding impact in the 5-12 years age group (column 2). This latter result likely reflects a ceiling effect at younger ages, since primary school enrolment is almost universal in Ghana. As shown in the bottom two rows of the table, enrolment rates for children below the age of 13 are already around 95 per cent.

Table 5 - ***LEAP impact estimates on school enrolment***

	Children 5 - 17 years (1)	Children 5 - 12 years			Children 13 - 17 years		
		All (2)	Boys (3)	Girls (4)	All (5)	Boys (6)	Girls (7)
Impact	0.004	-0.007	-0.049**	0.011	0.081**	0.203***	0.013
	(0.25)	(-0.53)	(-2.14)	(0.62)	(2.44)	(4.31)	(0.25)
Observations	3,809	2,326	1,218	1,108	1,483	802	681
R-squared	0.183	0.241	0.369	0.197	0.309	0.456	0.367
LEAP baseline mean	0.931	0.966	0.966	0.966	0.875	0.867	0.884
ISSER baseline mean	0.899	0.943	0.883	0.991	0.831	0.812	0.851

t-statistics in parentheses – *** p<0.01, ** p<0.05

We also observe a negative impact on school enrolment for boys aged 5-12 years old of five percentage points. This effect is likely due to the relatively low baseline value of the boys in the comparison group (88.3 per cent) and the subsequent catch-up of this group to 97.7 per cent at follow-up (Appendix Table A-1). In fact, the enrolment rates for boys aged 5-12 years old in the LEAP programme also increased, from 96.6 per cent at baseline to 98.2 per cent at follow-up. Due to the large difference between the LEAP group and ISSER group at baseline, the impact estimate is negative, though the overall level of enrolment among LEAP households is actually slightly higher than among comparison households at follow-up.

For the older age group, the impact of LEAP is concentrated on boys, with an impact on enrolment of a rather large 20 percentage points. The impact for older girls is small and insignificant.

This finding is in line with our ex-ante analysis, which showed that in richer households, older boys were more likely to be enrolled than older girls.

Impacts on any missed school

To analyse the impact of LEAP on the intensive margin of schooling, we present the estimates on any missed school in Table 6. Column 1 shows that LEAP has an overall impact of 8.5 percentage points on the likelihood of missing any school. Columns 2 – 7 further disaggregate this effect by age group and gender. It appears that LEAP has the most impact on missing any school for younger children, 10.5 percentage points for children 5-12 years old. Both boys and girls between 5 and 12 years old are missing less school due to the LEAP programme (13 percentage points for boys and 8 percentage points for girls). The impact estimate for children older than 12 is not significant (column 5). However, for older girls, LEAP reduces the likelihood of missing any school (10 percentage points at 10 per cent significance) among those who are already enrolled in school, an effect which was also suggested by the ex-ante analysis.

Table 6 - ***LEAP impact estimates on any missed school***

	Children 5 - 17 years (1)	Children 5 - 12 years			Children 13 - 17 years		
		All (2)	Boys (3)	Girls (4)	All (5)	Boys (6)	Girls (7)
Impact	-0.085***	-0.105***	-0.130***	-0.083**	-0.054	0.004	-0.098*
	(-4.08)	(-3.93)	(-3.10)	(-2.23)	(-1.50)	(0.07)	(-1.75)
Observations	3,560	2,243	1,173	1,070	1,317	722	595
R-squared	0.188	0.228	0.274	0.316	0.255	0.296	0.383
LEAP baseline mean	0.209	0.207	0.224	0.188	0.212	0.200	0.226
ISSER baseline mean	0.125	0.124	0.130	0.120	0.128	0.134	0.121

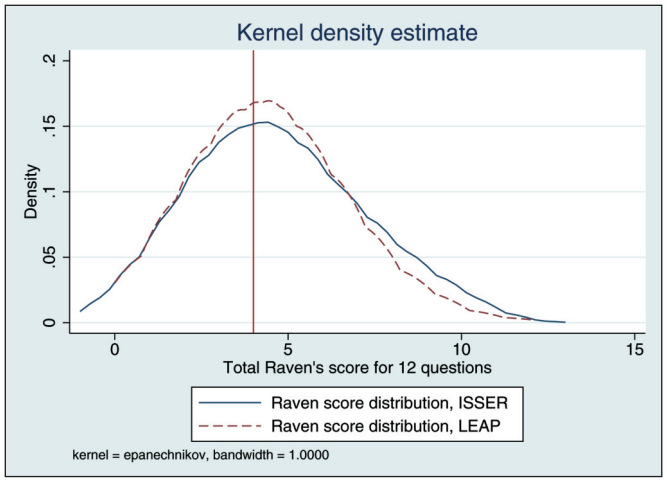
t-statistics in parentheses – *** p<0.01, ** p<0.05, * p<0.1

Impact estimates by cognitive ability of the child

As described in the introduction, some have suggested differential impacts of CCTs and UCTs on school enrolment, based on whether parents display compensating or investment-type behaviour with respect to schooling decisions for their children. The survey instrument used for the impact evaluation included a Raven's Coloured Progressive Matrices test to measure a child's cognitive ability. This test is a measure of a child's problem solving ability, and it does not require formal schooling. The child was given a batch of 12 questions, each comprising a set of images, and was asked to select the image that completes the picture. At baseline, the sample mean for the Raven score was 4.6 with a median of 4. Accordingly we define higher ability children as those who have a baseline Raven's score equal to or above the (rounded) mean of 5 and lower ability children with a total score lower than 5. Figure 8 below shows the distribution of Raven's scores for both

the matched ISSER sample and the LEAP households. Children in the ISSER sample have on average scored better than the children in the LEAP sample at baseline (4.43 vs. 4.68). However, the share of lower ability children is equal in both groups (53 per cent and 51 per cent).

Figure 8 - ***Density graph Raven's scores at baseline, ISSER and LEAP samples***



Source: Authors' calculations

Table 7 (page 21) reports results on school enrolment by cognitive ability of the child, as determined by the Raven's score, to see whether parents favour one type of child or another. For children with lower cognitive ability, the strongest programme impact is for children 13-17 years old, with a point estimate of 22 percentage points. We also observe a negative impact on school enrolment for lower ability children 5-12 years old. Similar to the findings on younger boys above, this is explained by the relatively low baseline value of the comparison group (see also Table A-2 in the Appendix). We find (weakly) significant results for higher ability children, especially for boys, and older children, but the size of the impacts is much lower than for lower ability children.

Finally, Table 8 (page 21) presents the impact estimates for our second schooling indicator by cognitive ability of the child. None of the estimates for higher ability children are significant, but we find significant impacts for lower ability children, and within this group strong impacts for children 5-12 years old and boys (13 percentage points reduction).

Impact on schooling inputs

In this section we explore the potential pathway through which LEAP has generated its impact on schooling outcomes. Section 2 above has already discussed that despite the absence of official fees for education in Ghana, some indirect costs remain, such as school supplies and uniforms, and these costs increase at the secondary level (National Development Planning Commission, 2015). Fortunately, our data include individual education expenditure on several items for each child who is enrolled in school. We can therefore test whether households have increased the schooling expenditures for their children. We run a series of regressions in the same multi-variate framework presented in equation 1, one for each schooling expenditure item, using the log of expenditure

Table 7 - ***LEAP impact estimates on school enrolment by cognitive ability of the child***

	Children 5 - 17 years	Children 5 - 12 years	Children 13 - 17 years	Boys 5 - 17 years	Girls 5 - 17 years
	(1)	(2)	(3)	(4)	(5)
Lower ability children					
Impact	-0.002	-0.064**	0.220***	-0.045	0.053
	(-0.07)	(-2.24)	(3.64)	(-1.13)	(1.53)
Observations	1,299	954	345	683	616
R-squared	0.268	0.317	0.594	0.365	0.368
LEAP baseline mean	0.958	0.970	0.910	0.967	0.948
ISSER baseline mean	0.890	0.892	0.885	0.809	0.963
Higher ability children					
Impact	0.041*	0.014	0.085*	0.054*	0.036
	(1.80)	(0.61)	(1.87)	(1.76)	(1.07)
Observations	1,305	730	575	706	599
R-squared	0.232	0.311	0.376	0.362	0.302
LEAP baseline mean	0.954	0.972	0.927	0.949	0.960
ISSER baseline mean	0.972	0.979	0.957	0.974	0.970

Table 8 - ***LEAP impact estimates on any missed school by cognitive ability of the child***

	Children 5 - 17 years	Children 5 - 12 years	Children 13 - 17 years	Boys 5 - 17 years	Girls 5 - 17 years
	(1)	(2)	(3)	(4)	(5)
Lower ability children					
Impact	-0.087**	-0.128***	0.003	-0.128**	-0.024
	(-2.26)	(-2.74)	(0.04)	(-2.20)	(-0.45)
Observations	1,229	915	314	652	577
R-squared	0.278	0.327	0.469	0.302	0.425
LEAP baseline mean	0.214	0.199	0.279	0.242	0.181
ISSER baseline mean	0.149	0.152	0.139	0.125	0.167
Higher ability children					
Impact	-0.054	-0.063	-0.068	-0.022	-0.059
	(-1.45)	(-1.14)	(-1.19)	(-0.40)	(-1.08)
Observations	1,232	700	532	664	568
R-squared	0.238	0.294	0.417	0.322	0.303
LEAP baseline mean	0.227	0.222	0.235	0.257	0.196
ISSER baseline mean	0.128	0.125	0.133	0.169	0.097

t-statistics in parentheses – *** p<0.01, ** p<0.05, * p<0.1

as the dependent variable.[9] We look at overall schooling expenditure per child as well as the two key sub-components of uniforms and supplies, which make up on average 25 per cent of the total. We estimate the impacts on several subgroups by age, sex and cognitive ability.

Table 9 presents the estimates for children by age groups, and for the older age group we further disaggregate by sex of the child. Among younger children there is no discernible increase in school spending, much as there is no overall positive impact on school enrolment. However, we observe large programme-induced increases in spending on exactly the groups where we see the largest enrolment impacts – older children, and particularly older boys.

Table 10 (page 23) presents the estimates for children by cognitive ability, age group and sex of the child. Note that we use the full age range (5-17 years) for the estimates on boys and girls, in line with the estimates in Tables 7 and 8, due to smaller sample sizes for this analysis. Here again we see the largest impacts among the groups where we also see the largest impacts on school enrolment, notably lower-ability children aged 13-17. These results provide important corroborating evidence that the results on schooling outcomes reported above are not spurious, and that LEAP appears to loosen the constraint on out-of-pocket costs to enable children in beneficiary households to enroll in school.

Table 9 - ***LEAP impact estimates on schooling expenditures***

	Children 5 - 17 years	Children 5 - 12 years	Children 13 - 17 years	Boys 13 - 17 years	Girls 13 - 17 years
	(1)	(2)	(3)	(4)	(5)
Uniforms and sports clothes	-0.085	-0.201*	0.169	0.655***	-0.051
	(-0.99)	(-1.89)	(1.11)	(2.94)	(-0.22)
Books and school supplies	-0.094	-0.131	0.019	0.622***	-0.433*
	(-1.25)	(-1.49)	(0.14)	(3.19)	(-1.96)
Total schooling expenses	0.063	-0.021	0.494***	0.956***	0.241
	(0.63)	(-0.19)	(2.60)	(3.49)	(0.81)
Observations	3,809	2,326	1,483	802	681

t-statistics in parentheses – *** p<0.01, ** p<0.05, * p<0.1

VI. DISCUSSION AND CONCLUSION

The results in this paper show that Ghana's LEAP programme has had strong impacts on children's schooling, in particular on certain subgroups. By moving beyond average treatment effects, we provide important insights on the nuances around the programme impacts. Among older (secondary-age) children where out-of-pocket costs are highest, the programme has increased enrolment by 8 percentage points, with the largest impacts on boys. In contrast, among younger children where enrolment rates are already high, programme impacts are on the intensive margin, increasing full attendance by 11 points with, again, slightly stronger effects for boys. An anomalous

[9] We use log of expenditure + 1 to avoid having missing values for the log variable if expenditure is 0.

Table 10 - ***LEAP impact estimates on schooling expenditures by cognitive ability of the child***

	Children 5 - 17 years	Children 5 - 12 years	Children 13 - 17 years	Boys 5 - 17 years	Girls 5 - 17 years
	(1)	(2)	(3)	(4)	(5)
Lower ability children					
Uniforms and sports clothes	-0.140 (-0.96)	-0.214 (-1.25)	0.650** (1.99)	-0.067 (-0.31)	-0.208 (-1.01)
Books and school supplies	-0.237* (-1.93)	-0.524*** (-3.71)	0.673** (2.32)	-0.097 (-0.56)	-0.319* (-1.70)
Total schooling expenses	0.219 (1.33)	-0.230 (-1.17)	1.840*** (5.25)	0.144 (0.59)	0.181 (0.78)
Observations	1,299	954	345	683	616
Higher ability children					
Uniforms and sports clothes	-0.137 (-0.95)	-0.371** (-1.97)	0.090 (0.35)	0.357* (1.87)	-0.495** (-2.20)
Books and school supplies	-0.004 (-0.03)	0.040 (0.26)	0.009 (0.04)	0.152 (0.89)	-0.150 (-0.81)
Total schooling expenses	0.110 (0.72)	0.121 (0.65)	0.144 (0.54)	0.140 (0.69)	0.151 (0.64)
Observations	1,305	730	575	706	599

t-statistics in parentheses – *** p<0.01, ** p<0.05, * p<0.1

result is the slightly negative impact on enrolment among younger boys, which is driven by the combination of catch-up in the comparison group and a ceiling effect in the treatment group where the baseline enrolment rate was already 97 per cent.

We perform two extensions to these basic estimates. First we test whether the programme has stronger effects for children of lower ability at baseline, and find the largest programme effects (22 percentage points) on older children age 13-17 of lower ability and an overall larger effect on the full sample of children of low ability compared to all children of high ability. On the other hand among younger children age 5-12 years, the estimated negative impacts of the programme are driven by children of low ability, who presumably started school later given the overall near universal enrolment rates among this age group, a phenomenon similar to that of 'red-shirting' in the United States (Bassok and Reardon, 2013). In any case, the strong results among older children would seem to support compensating behaviour, or at the very least, that conditionality is not necessary to induce parents to send so-called 'marginal' children to school.

The main limitation of this study is the inability to identify perfect comparison matches to LEAP in the ISSER national household survey. We overcome this challenge by applying a series of

econometric techniques to the data, including post-matching inverse probability weights, covariate adjustment, difference-in-differences and cluster fixed effects. These applications, along with the fact that the programme is supply driven and not subject to self-selection, strengthens the causal claims we can make given the available data.

When comparing the magnitude of the school enrolment impacts of LEAP to the impact from programmes that condition cash on schooling, such as Mexico's *PROGRESA*, Colombia's *Familias en Acción* and the Tanzanian Productive Social Safety Net Programme, LEAP's impacts on children's schooling are remarkable. The range of impacts from these conditional programmes are generally between 7 and 15 percentage points, varying per subgroup. For some of the subgroups in our analysis, the impact surpasses these numbers.

Our results contribute to the growing literature of the impacts of UCTs on human development in sub-Saharan Africa. Currently there are over a dozen programmes in the region with long term development goals such as the LEAP programme, almost all of which are unconditional. Early results suggest that these UCTs generate impacts on schooling that are in the same range as those from CCTs from other parts of the world. Of course a UCT also allows families to use cash in ways they feel will best improve their long-term well-being. Also, considerable economic and productive effects have been documented among UCTs in Africa, which are much larger and more consistent than the effects found from CCTs in Latin America (Davis, 2014). Such results suggest that programme conditionality is not always necessary to improve children's human capital, as households appear willing to invest in both long- and short-term activities when given the choice.

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ADDITIONAL TABLES

Table A 1 - ***Probit of selection into treatment at baseline, 1,598 observations***

Variable description	Coefficient	S.E.	Significance
# household members under 5	-0.0905	0.0919	
# household members 6-12	0.0866	0.0815	
# household members 13-17	0.0131	0.0988	
# household members 18-64	0.2269	0.0852	**
# male household members over 64	0.8224	0.2470	***
# female household members over 64	0.5982	0.1676	***
orphan living in household	-0.1221	0.2769	
# orphans living in household	0.3202	0.1034	**
female headed household	-0.0844	0.2030	
head of household age	-0.0205	0.0061	***
head of household widow	0.2075	0.1970	
head of household attended school	-0.6526	0.1532	***
food expenses per AE	-0.0012	0.0022	
at least one member has NHIS	0.4135	0.1389	**
% household members cannot at all carry a heavy load	1.9158	0.2523	***
% household members cannot at all bath him/herself	2.3516	1.0485	*
cropping and/or livestock farming	-0.6200	0.1614	***
household run a non-farm enterprise	0.2577	0.1507	
household does not cook	0.3964	0.2904	
=1, no toilet facilities	0.0911	0.1757	
=1, pit latrine	-0.1370	0.1654	
=1, material of wall: cement	-0.3282	0.1656	*
=1, material of floor: cement	-0.1685	0.1598	
=1, material of roof: thatch/palm	0.1449	0.1812	
# rooms per household member	-0.8951	0.2996	**
=1, household shares dwelling	-0.0593	0.2317	
shared dwelling * # rooms per household member	0.3931	0.2579	
House conditions: good	-0.6775	0.1764	***
=1, household uses a room exclusively for cooking	-0.4639	0.1431	**
drinking water from protected well	0.7839	0.2716	**
value of cassava harvest	-0.0014	0.0007	
value of cocoa harvest	-0.0012	0.0004	**
value of maize harvest	-0.0003	0.0005	
value of yam harvest	-0.0001	0.0002	
value of rice harvest	0.0011	0.0007	
household received private cash transfer	-0.4126	0.1677	*
household received private in-kind transfer	0.7783	0.1682	***
# sheep	0.0245	0.0234	
# goats	-0.0050	0.0206	
# chickens	0.0569	0.0241	*
cropped land - hectares	-0.0515	0.0377	
value of durables	-0.0005	0.0001	***
value of agricultural assets	-0.0062	0.0061	
head of household age * # chicken	-0.0010	0.0004	*
head of household age * # rooms	0.0038	0.0014	**
head of household age * value of agricultural assets	0.0001	0.0001	
fire/flood/wind in community, 2009	1.6219	0.1470	***
land dispute in community, 2009	-1.5820	0.3602	***
epidemic disease in community, 2009	0.4238	0.2112	*
price cassava	0.1625	0.0579	**
price maize	0.1897	0.0573	***
price yam	-0.0120	0.0107	
price bean	-0.0122	0.0105	
% households connected to electricity in the community	-0.0060	0.0033	
# hrs per day electricity is available in the community	0.0354	0.0118	**
constant	-0.6688	0.5481	

Note: * p<0.1, ** p<0.05, *** p<0.01

Table A 2 - ***Mean schooling outcomes for school children at baseline and follow-up (by age group and gender)***

	ISSER				LEAP				ISSER				LEAP			
	Baseline		Follow-up		Baseline		Follow-up		Baseline		Follow-up		Baseline		Follow-up	
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
BOYS AND GIRLS, Ages 5 – 12									**BOYS AND GIRLS, Ages 13 – 17**							
Any Missed School	583	0.124	613	0.054	537	0.207	510	0.057	370	0.128	359	0.042	307	0.212	281	0.057
Enrolled	623	0.943	627	0.985	557	0.966	519	0.983	424	0.831	397	0.889	351	0.875	311	0.904
BOYS, Ages 5 – 12									**BOYS, Ages 13 – 17**							
Any Missed School	304	0.130	315	0.069	281	0.224	273	0.062	202	0.134	203	0.031	170	0.200	147	0.054
Enrolled	326	0.883	323	0.977	291	0.966	278	0.982	225	0.812	221	0.880	196	0.867	160	0.919
GIRLS, Ages 5 – 12									**GIRLS, Ages 13 – 17**							
Any Missed School	279	0.120	298	0.042	256	0.188	237	0.051	168	0.121	156	0.052	137	0.226	134	0.060
Enrolled	297	0.991	304	0.991	266	0.966	241	0.983	199	0.851	176	0.899	155	0.884	151	0.887

Table A 3 - ***Mean schooling outcomes for children with low cognitive ability at baseline and follow-up (by age group and gender)***

	ISSER				LEAP				ISSER				LEAP			
	Baseline		Follow-up		Baseline		Follow-up		Baseline		Follow-up		Baseline		Follow-up	
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
	BOYS AND GIRLS with low cognitive ability, Ages 5 – 12								**BOYS AND GIRLS with low cognitive ability, Ages 13 – 17**							
Any Missed School	266	0.152	222	0.062	261	0.199	173	0.035	71	0.139	106	0.043	61	0.279	76	0.079
Enrolled	284	0.892	230	0.979	270	0.970	177	0.977	84	0.885	114	0.858	67	0.910	80	0.950
	BOYS with low cognitive ability, Ages 5 – 12								**BOYS with low cognitive ability, Ages 13 – 17**							
Any Missed School	128	0.142	117	0.102	140	0.229	101	0.040	38	0.079	55	0.001	38	0.289	40	0.075
Enrolled	137	0.779	120	0.988	143	0.979	103	0.981	44	0.907	59	0.809	41	0.927	41	0.976
	GIRLS with low cognitive ability, Ages 5 – 12								**GIRLS with low cognitive ability, Ages 13 – 17**							
Any Missed School	138	0.158	105	0.027	121	0.165	72	0.028	33	0.204	51	0.087	23	0.261	36	0.083
Enrolled	147	0.992	110	0.970	127	0.961	74	0.973	40	0.864	55	0.916	26	0.885	39	0.923

Table A 4 - ***Mean schooling outcomes for children with high cognitive ability at baseline and follow-up (by age group and gender)***

	ISSER				LEAP				ISSER				LEAP			
	Baseline		Follow-up		Baseline		Follow-up		Baseline		Follow-up		Baseline		Follow-up	
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
	BOYS AND GIRLS with high cognitive ability, Ages 5 – 12								**BOYS AND GIRLS with high cognitive ability, Ages 13 – 17**							
Any Missed School	317	0.105	391	0.051	276	0.214	337	0.068	299	0.125	253	0.041	246	0.195	205	0.049
Enrolled	339	0.984	397	0.987	287	0.962	342	0.985	340	0.817	283	0.903	284	0.866	231	0.887
	BOYS with high cognitive ability, Ages 5 – 12								**BOYS with high cognitive ability, Ages 13 – 17**							
Any Missed School	176	0.122	198	0.054	141	0.220	172	0.076	164	0.149	148	0.044	132	0.174	107	0.047
Enrolled	189	0.975	203	0.972	148	0.953	175	0.983	181	0.789	162	0.914	155	0.852	119	0.899
	GIRLS with high cognitive ability, Ages 5 – 12								**GIRLS with high cognitive ability, Ages 13 – 17**							
Any Missed School	141	0.092	193	0.048	135	0.207	165	0.061	135	0.101	105	0.038	114	0.219	98	0.051
Enrolled	150	0.990	194	0.999	139	0.971	167	0.988	159	0.848	121	0.893	129	0.884	112	0.875

Table A 5 - ***LEAP impact estimates on school enrolment (Fixed Effects Estimates)***

	Children 5 - 15 years (1)	Children 5 - 10 years at baseline			Children 11 - 15 years at baseline		
		All (2)	Boys (3)	Girls (4)	All (5)	Boys (6)	Girls (7)
Impact	0.032**	-0.042**	-0.109***	0.009	0.090***	0.131***	0.045
	(2.06)	(-2.43)	(-3.59)	(0.49)	(3.28)	(3.69)	(1.01)
Observations	2,990	1,669	848	821	1,321	741	580
R-squared	0.183	0.241	0.369	0.197	0.309	0.456	0.367
LEAP baseline mean	0.009	0.018	0.052	0.004	0.069	0.093	0.055
ISSER baseline mean	0.931	0.926	0.849	0.989	0.934	0.912	0.951

Table A 6 - ***LEAP impact estimates on any missed school (Fixed Effects Estimates)***

	Children 5 - 15 years (1)	Children 5 - 10 years at baseline			Children 11 - 15 years at baseline		
		All (2)	Boys (3)	Girls (4)	All (5)	Boys (6)	Girls (7)
Impact	-0.083***	-0.085**	-0.128**	-0.059	-0.078*	-0.074	-0.079
	(-3.01)	(-2.23)	(-2.26)	(-1.10)	(-1.91)	(-1.25)	(-1.40)
Observations	2,821	1,615	819	796	1,206	683	523
R-squared	0.097	0.100	0.137	0.073	0.091	0.115	0.054
LEAP baseline mean	0.213	0.215	0.234	0.194	0.211	0.230	0.188
ISSER baseline mean	0.131	0.141	0.148	0.137	0.122	0.140	0.108

t-statistics in parentheses – *** p<0.01, ** p<0.05, * p<0.1

Table A 7 - ***LEAP impact estimates on school enrolment by cognitive ability of the child (Fixed Effects Estimates)***

	Children 5 - 15 years	Children 5 - 10 years	Children 11 - 15 years	Boys 5 - 15 years	Girls 5 - 15 years
	(1)	(2)	(3)	(4)	(5)
Lower ability children					
Impact	0.008 (0.32)	-0.092*** (-3.05)	0.120** (2.42)	-0.016 (-0.38)	0.034 (1.05)
Observations	1,299	864	435	682	617
R-squared	0.000	0.042	0.085	0.002	0.014
LEAP baseline mean	0.958	0.977	0.922	0.967	0.948
ISSER baseline mean	0.890	0.859	0.924	0.809	0.963
Higher ability children					
Impact	0.051** (2.35)	-0.017 (-0.72)	0.102*** (3.00)	0.044 (1.46)	0.059* (1.83)
Observations	1,287	570	717	697	590
R-squared	0.029	0.004	0.085	0.029	0.031
LEAP baseline mean	0.956	0.983	0.938	0.947	0.965
ISSER baseline mean	0.972	0.982	0.964	0.974	0.970

Table A 8 - ***LEAP impact estimates on any missed school by cognitive ability of the child (Fixed Effects Estimates)***

	Children 5 - 15 years	Children 5 - 10 years	Children 11 - 15 years	Boys 5 - 15 years	Girls 5 - 15 years
	(1)	(2)	(3)	(4)	(5)
Lower ability children					
Impact	-0.040 (-0.94)	-0.044 (-0.79)	0.002 (0.03)	-0.120* (-1.91)	0.028 (0.46)
Observations	1,229	835	394	651	578
R-squared	0.113	0.142	0.055	0.147	0.078
LEAP baseline mean	0.215	0.215	0.215	0.243	0.181
ISSER baseline mean	0.149	0.161	0.137	0.125	0.167
Higher ability children					
Impact	-0.088** (-2.06)	-0.043 (-0.68)	-0.130** (-2.26)	-0.066 (-1.05)	-0.091 (-1.55)
Observations	1,215	551	664	655	560
R-squared	0.084	0.051	0.122	0.126	0.050
LEAP baseline mean	0.232	0.202	0.253	0.266	0.197
ISSER baseline mean	0.127	0.147	0.113	0.170	0.095

t-statistics in parentheses – *** p<0.01, ** p<0.05, * p<0.1

Table A 9 - ***LEAP impact estimates on schooling expenditures (Fixed Effects Estimates)***

	Children 5 - 15 years	Children 5 - 10 years	Children 11 - 15 years	Boys 11 - 15 years	Girls 11 - 15 years
	(1)	(2)	(3)	(4)	(5)
Uniforms and sports clothes	-0.046	-0.252*	0.168	0.392*	0.000
	(-0.42)	(-1.81)	(0.96)	(1.73)	(0.00)
Books and school supplies	-0.045	-0.239**	0.064	0.423**	-0.227
	(-0.50)	(-2.15)	(0.43)	(2.17)	(-0.96)
Total schooling expenses	0.190*	-0.128	0.446**	0.412*	0.498
	(1.69)	(-0.88)	(2.47)	(1.81)	(1.63)
Observations	2,990	1,669	1,321	741	580

Table A 10 - ***LEAP impact estimates on schooling expenditures by cognitive ability of the child (Fixed Effects Estimates)***

	Children 5 - 15 years	Children 5 - 10 years	Children 11 - 15 years	Boys 5 - 15 years	Girls 5 - 15 years
	(1)	(2)	(3)	(4)	(5)
Lower ability children					
Uniforms and sports clothes	-0.077	-0.268	0.220	-0.109	-0.009
	(-0.47)	(-1.42)	(0.67)	(-0.47)	(-0.04)
Books and school supplies	-0.187	-0.526***	0.159	-0.158	-0.106
	(-1.35)	(-3.29)	(0.61)	(-0.80)	(-0.52)
Total schooling expenses	0.231	-0.362*	0.942***	0.280	0.157
	(1.26)	(-1.69)	(2.76)	(1.06)	(0.59)
Observations	1,299	864	435	682	617
Higher ability children					
Uniforms and sports clothes	-0.220	-0.525**	0.015	0.305	-0.593**
	(-1.33)	(-2.18)	(0.07)	(1.50)	(-2.22)
Books and school supplies	-0.005	-0.232	0.160	0.242	-0.183
	(-0.04)	(-1.39)	(0.81)	(1.35)	(-0.92)
Total schooling expenses	0.180	0.072	0.266	0.133	0.280
	(1.13)	(0.33)	(1.15)	(0.63)	(1.12)
Observations	1,287	570	717	697	590

t-statistics in parentheses – *** p<0.01, ** p<0.05, * p<0.1