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# **Education of biological and fostered children in Ghana: The influence of relationships with the household head and household structure**

Christian Kweku Darko<sup>a</sup>, Fiona Carmichael

## **Abstract**

This study investigates how household structure and relationship with head of household impact on the education of children in Ghana. We estimate educational participation and selectivity-corrected educational progress conditional on participation and find that fostered children are less likely to participate in education. Fostered children in dual-parent headed households also make less educational progress compared with biological children. In single parent headed households, there is no significant equivalent difference in educational progress for fostered children and biological children. However, in single parent headed households with a high female-to-male labour force participation ratio, fostered children have lower educational progress than biological children.

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## **Introduction**

The practice of fostering is common in most parts of Sub-Saharan Africa (SSA) and in Ghana almost 12 per cent<sup>1</sup> of children of school-going age reside in foster households, often with the hope of improving their educational attainment. The allocation of children into non-biological households can happen for a variety of reasons, for example to strengthen family ties, to provide supporting labour, educational motives, and as a mechanism for securing future financial gains for the family and the child (Serra, 2009). However, as parents are generally assumed to be more altruistic towards their own-birth children (Hamilton, 1964a; 1964b; Becker and Tomes, 1986; Becker, 1991) the education of fostered, non-biological children may be affected negatively. This idea of parental investment in own-birth children is consistent with arguments in evolutionary biology (Hamilton (1964a, 1964b) that altruistic behaviour is an increasing function of the level of genetic relationship between individuals.

The education of foster children has received considerable attention in the literature on family structure and children's education in developing countries (Pilon, 2003; Akresh, 2009; Zimmerman, 2003; Hampshire et al, 2015; and Lachaud et al., 2016). This body of research largely concurs that foster children are generally more disadvantaged in terms of their schooling than biological children. This study contributes to this research by estimating how educational progress in addition to school enrolment and attendance differs between fostered and biological children. The study also distinguishes between single and dual-parent headed households. A methodological contribution is made using the two-stage Heckman correction technique to control for sample selection into education. This study additionally considers the effect of household members' employment on children's education. This is an important consideration, particularly in Ghana where the labour force participation rate for females aged 15 years and above increased from 67.6 per cent in 2005 to 75.6 per cent in 2016 (World Development Indicators, 2017). Female involvement in economic activities is usually assumed to enhance women's bargaining power and thereby improve outcomes for children (Doss, 2013; Imai et al., 2014). However, it is also possible that women's labour force participation can be detrimental to child development. Sundaram and Vanneman (2008) find that in India higher rates of female labour force participation have negative effects on children's educational outcomes, particularly girls. Webbink et al. (2013) also find that in developing countries,

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<sup>1</sup> Based on the authors' own calculations using data from the fifth and sixth rounds of the Ghana Living Standards Survey.

maternal employment is positively related to child labour, although this is less true for rural boys.

The results of this study indicate that fostered children are less likely to be in school than the household head's biological children, but this effect is only significant in dual-parent headed households (when other factors are controlled for). However, the results of the selection-corrected educational progress estimations show that the educational progress of fostered children lags behind that of biological children in dual-parent headed households. The analysis also suggests that fostered children make less educational progress in single-parent headed households when the hours of employment of female household members is high relative to that of males.

The remainder of the paper is structured as follows. The next section provides an overview of previous research in this area and considers the country context of Ghana. The following section provides a description of the data and variables used in the analysis and outlines the empirical estimation techniques. Next, the results of the empirical analysis are presented and the final section concludes.

## **Research Context**

Two main strands of the literature on child fostering and child outcomes can be identified. The first is a family perspective that compares fostered children with own siblings who are not fostered (Beck et al., 2015; Akresh 2004; 2009). Due to data limitations, previous studies have often focused on host families without consideration of some of the characteristics that identify sending families (Zimmerman, 2003). An exception is Akresh (2009) who found that households that experienced negative shocks were more likely to send out children to foster families. In terms of the educational impacts, the findings of Akresh (2004) for Burkina Faso show that fostered children and host siblings are equally likely to be enrolled in school. However, in relation to biological siblings of fostered children, the authors find that fostered children have a higher likelihood of enrolment than left behind biological siblings. In a similar study for Senegal, Beck et al. (2015) examined whether fostering is detrimental to foster children's education and their involvement in child labour activities, by comparing left behind biological siblings and host siblings. The authors do not find differences between host siblings and fostered children in terms of education, but instead, the authors observe educational advantages in favour of fostered children relative to left behind siblings.

Another strand of the literature is related to family structure – “recomposed family” and children’s outcomes (DeBell, 2008; Ginther and Pollak, 2004; McLanahan and Sandefur, 1994). Families are classified based on the relationship between children and parent(s). For instance, McLanahan and Sandefur (1994) found that children who grow up in single-parent headed households achieve lower levels of educational attainment compared with those who grow up with both parents. Findings of Ginter & Pollack (2004) also show that children raised in traditional nuclear families (with both biological parents) have better educational outcomes than children from blended families (stepchildren and half-siblings). Other studies find similar effects of family structure on child outcomes (Case et al., 2001).

Other related studies on recomposed families associate crisis such as death or illness of biological parents (De Walque, 2009; Ainsworth and Filmer, 2006; Case and Ardington, 2006; Bennell, 2010), and divorce (Gähler & Palmtag, 2015) as reasons for fostering. The related empirical findings indicate that such situations put foster children at greater risk of being exploited through child labour and this can lead to lower educational attainment (Case et al, 2004; Ainsworth et al, 2005; Bennell, 2005). For instance, adverse effects of maternal and paternal orphanhood on educational attainment of children have been found for Tanzania (Beegle et al., 2006) South Africa, (Case and Ardington, 2006) and for a number of SSA countries (Case et al., 2004). In a recent study on educational attainment and progression in Cameroon, Tenikue's (2017) results indicate that the probability of educational progression is higher for children of household heads, although the distinction between biological and fostered children is not the focus of that study. There are however contrary findings that children placed with fostered families are not always disadvantaged mainly because parents that decide to adopt are wealthier (Ainsworth & Filmer, 2002).

The current research is more closely related to the second strand of literature. However, due to data limitations, our analysis focuses on household structure rather than family structure. The data we use does not allow for a precise identification of a fostered child’s relationship to their foster parents. We are only able to precisely identify whether or not a child is a biological child of the household head or not. Previous research on the determinants of school enrolment in Ghana has examined a number of possible influences. For example, Seshie-Nasser & Oduro (2016) investigated gender differences in delayed primary school enrolment and the role of poverty. Gaddah et al. (2016) examine the role of education subsidy in school enrolment. Other studies that have looked at educational attainment include Glewwe & Ilias (1996), who investigate the role of economic growth and school quality, and Nguyen & Wodon (2014) who use a decomposition analysis to analyse key determinants of the gender gap in educational

attainment. However, this research has not explicitly focused on household structure nor children's relationship with the household head. We address these gaps in knowledge by explicitly considering how household structure and relationships impact on the education of children, distinguishing between biological and fostered children. Household structure is captured by recording whether the biological or fostered child lives in a dual or single-parent headed household. The presence of siblings is also taken into account. The hypothesis that differential treatment is received by fostered children is examined by analysing educational participation and a measure of years of schooling (capturing educational progress) using data from the fifth and sixth rounds of the Ghana Living Standards Survey (GLSS). Given that some fostered children may substitute for adult household members' labour when they are unavailable due to labour market participation, we also test for the possible labour market influences. We treat the decisions to participate and progress in education separately using the Heckman procedure that accounts for selection into education.

## **Data**

Data used for this study are drawn from the fifth (2005-06) and sixth (2012-13) rounds of the Ghana Living Standards Survey. This is a nationally representative survey initiated in 1980 by the Policy Research Division of the World Bank. The fifth round of the survey covered 580 enumeration areas and 1,200 in the sixth round. The enumeration areas were stratified into the ten administrative regions and each region was sub-divided into rural and urban areas. A minimum of 400 households from each of the 10 regions were sampled in the fifth round, leading to a total of 8,687 households. For the sixth round of the survey, a total of 16,772 households were interviewed. The survey collects detailed information on household and individual characteristics for all household members including children. Individual level information includes current education, employment, and the relationship of the individual to the head of household. Our sub-sample includes children aged 7 to 18 years. We restrict the upper age to 18 years since by age 18 all children are expected to have completed senior secondary school. Pre-tertiary education which starts at age 6 is expected to last a total of 12 years (6 years of primary education, 3 years each of junior and senior secondary education) provided there are no entry delays, grade repetitions, and grade jumps. We restrict the lower age to seven since the education participation variable we employ (see below) captures children who are enrolled and have attended school in the last 12 months. This ensures that the sample will include children that have participated in school from the compulsory school start age of six. These restrictions resulted in 21,721 children, of which 18,773 (86.4 per cent) were

recorded as participating in school. Some observations were lost due to missing values for some of the variables of interest particularly the average years of education of household head and spouse. The final sample of children used in the educational progress regression analysis was reduced to 12,575 children. The sampled children live in households where either the household head lives with a spouse or is single. We refer to these households as either single or dual-parent headed households.

Following these restrictions, the sub-sample is composed of 10,002 households, of these 2,299 and 7,703 are from the fifth and sixth rounds respectively. In the sample, 26 per cent of children live in single-parent headed households with the remaining 74 per cent residing in dual-parent headed households. Thirteen per cent of children are fostered children who are not the biological children of the head of household. They may be related to the household head (recorded as 'other relative') but not as a child or grandchild, a non-relative or formally adopted child. In the sample of fostered children, 73 per cent are classified as 'other relatives', 18 per cent are 'adopted', and the remaining 9 per cent are 'non-relatives'. The latter include house-holds (or servants).

The GLSS data do not record the closeness of the relationship between the head of household and fostered children who are categorised as 'other relatives'. This limits the analysis since the education of fostered children is likely to depend on the distance of the relationship between themselves and the head of household. A further limitation of the GLSS data is that, it is not possible to identify whether the spouse of a household head is a stepparent or a biological parent of a child. It could therefore be the case that some children classified as biological children live in dual-parent headed households where one of their parents is a stepparent. In addition, the GLSS does not capture data on the origin of fostered children and their household characteristics. This limits our analysis further as we are unable to determine whether educational outcomes of fostered children have improved due to fostering and how this compares with educational outcomes of foster siblings who were left behind, as explored by Akresh (2004) and Beck et al. (2015).

### **Table 1 HERE**

Table 1 shows summary statistics for individual and household characteristics conditional on the household structure and the relationship of child to the household head. Table 2 shows education participation rates and education progress further stratified by the biological relationship of the child to the head of household. The figures in Table 1 shows that in single-parent headed households, 81 per cent of children are biological children compared

to 90 per cent in dual-parent headed households. Children are marginally more likely to be female in single-parent headed households.

Columns 1 and 2 of Table 1 show that dual-parent headed households appear to be more educated and richer: the average number of years of education is slightly higher in dual-parent headed households (8 years compared with 7.9 for single-parent headed households)<sup>2</sup> and mean household income is also higher in dual-parent headed households (although the difference in the former is not statistically significant). However, the average level of educational attainment in the community is higher for single-parent headed households. As one would expect, the size of the household as well as the number of infant siblings (0-5 years) are both higher in dual-parent headed households and the differences are statistically significant. While children in single-parent headed households appear to spend less time on domestic work than those in dual-parent headed households, the difference is insignificant.

Columns 3 and 4 shows further summary statistics for biological and fostered children. Although fostered children are more common in single-parent headed households who are on average poorer (as shown in column 1), the figures in columns 3 and 4 indicate that fostered children are no more or less likely to live in wealthier households. However, they do live in more educated (as indicated by average years of education of household head and spouse) and larger households and in communities with higher mean educational attainment.<sup>3</sup> Nevertheless, the figures indicate that the educational progress of fostered children is poorer compared with that of biological children. Further correlation analysis (see Table A2 in the Appendix) shows that children's educational progress, regardless of their biological relationship with the head of household is positively related to household income, education of household head and spouse, and educational attainment within the local community, although for fostered children, the positive association between educational progress and household head and spouse education is larger ( $r=0.10$ ) than among biological children ( $r=0.08$ ). Together, these findings suggest that fostered children are advantaged by being placed in richer and more educated households.

Table 2 additionally shows that in both single parent and dual-parent headed households, biological children have higher rates of participation in education. However,

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<sup>2</sup> In dual-parent headed households, this is the average years of schooling of the household head and his/her spouse.

<sup>3</sup> In a multivariate regression model (not reported) that simultaneously controlled for a range of other factors, the probability of a child being fostered was also positively and significantly related to parents' education and also household income.



children in single-parent headed households who are in education appear to make better educational progress. Table A1 in the Appendix provides definitions of all the variables. Further details of the derivation of constructed variables are provided in the Empirical Specification section below.

**Table 2 HERE**

**Empirical specification**

The model estimates a schooling participation equation and an educational progress equation taking account of bias due to selection into education. Selection bias needs to be accounted for in the educational progress estimation since children that achieve more, by completing a higher level of education, are unlikely to be a random draw from the population, but instead are a self-selected group. For instance, more ambitious and more highly motivated children are more likely stay on in school longer than children with less ambition and motivation. School enrolment is also likely to be influenced by differences in household head resources and incentives (Kingdon, 2002). Not taking this possibility into account would bias estimates for educational progress. As such, school participation needs to be treated separately from the decision to undertake further years of schooling (Kingdon, 2002). This self-selection is accounted for by using the two-stage Heckman procedure (Heckman, 1979) described below.

**Educational participation**

The first stage schooling participation equation (1) is estimated using a discrete choice probit model based on maximum-likelihood. Using this procedure, the Inverse Mills Ratio (IMR) often referred to as lambda, is derived. The IMR is then included as an additional explanatory variable in the educational progress equation (2). IMR captures the effect of unobservable factors that jointly influence the propensity to participate in education and educational progress. The equation describing the schooling participation of the child is given by:

$$\Pr(EDUCPART_i = 1) = \beta_1 HHEDUC_i + \beta_2 FOSTERED_i + \beta_3 X_i + \beta_4 g_i + v_i \quad (1)$$

The dependent variable indicates schooling participation.  $EDUCPART_i$  is 0 if the individual is not currently enrolled in school *and* has not attended school in the past 12 months, and 1 otherwise. This measure which captures attendance as well as enrolment is used rather than a simple indicator of enrolment as in Ghana almost 97 per cent of children are enrolled in

school.<sup>4</sup> The extra criteria of attendance identify children that are involved in educational activities in addition to being merely enrolled. The probability of the child being enrolled and attending school is assumed to be dependent on level of education of the household head and his/her spouse, *HHEDUC*. This variable is constructed using the average years of education of the household head and his/her spouse (if also a household member). The education of the household head (and spouse if applicable) may also capture the wealth, credit constraints and borrowing limits of the household. *FOSTERED* is a dummy variable that indicates the relationship of the child to the household head; 1 if the child is fostered and 0 if a biological child.  $X_i$  is a vector of individual and household characteristics, including the child's gender, household income, urban or rural location, number of siblings, household size, region and religion. The inclusion of an indicator of the number of pre-school siblings (0 to 5 years) provides an indication of the opportunity costs of the child's schooling and sibling competition for resources. Location and regional dummy variables are included to account for unobservable regional policies and development. The weekly hours of household work completed by the child are included as time spent on housework can affect educational participation. A variable that measures the average educational attainment of the population of the local area (in years) where the child resides is included. Local average educational attainment is a possible indicator of community economic development, and therefore the educational progress of a child is expected to be higher where average education is higher. In addition, parents living in communities where educational attainment is generally higher may have a better appreciation of the value of education as a means to access more labour market opportunities. We also include a dummy variable indicating the data collection round to capture any possible effect of time on educational participation and progress.

$g_i$  is a variable that is not included in the educational progress regressions but satisfies the exclusion restrictions. The restriction requires that this variable should directly affect educational participation but should not have a direct effect on educational progress. To proceed with the Heckman approach, we use the number of siblings of school-going age (6 to 18 years) as an exclusion restriction. The identification strategy is that having more children of school-going age in the household may impact on the educational enrolment of other siblings, but once the child is enrolled in school this should no longer have an effect on their progress.

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<sup>4</sup> Based on the authors' own calculations using the fifth and sixth rounds of the Ghana Living Standards Survey.

For instance, as the number of siblings of school-going age increases, the extra cost associated with enrolling one more child may be considerably lower than the cost associated with educating the first child. Cornwell et al. (2005) explain this relationship in terms of economies of scale of schooling. In addition, having a sibling already in school increases the likelihood of a child wanting to be in school. This may therefore increase the social expectation on the household to also send other siblings to school. For a developing country, this is plausible, since due to financial constraints and parents' resourcefulness, older siblings pass on their books, uniforms, and even accompany younger siblings to school.

### **Educational Progress**

The second stage of the estimation procedure focusses on the educational progress of biological and fostered children in households with single and dual parents. The educational progress equation includes the Heckman selection term, *IMR* (lambda) derived from equation (1) and is of the form:

$$EDUCPROG_i = \beta_1\theta_i + \beta_2FOSTERED_i + \beta_3X_i + \beta_4IMR + v_i \quad (2)$$

where *EDUCPROG* records the educational progress of the child. *EDUCPROG* is derived by weighting the years of completed education by the expected number of years of education for the relevant age group. For instance, with a compulsory school start age of 6, a child who is 13 years is expected to have completed 7 years of schooling. If this child has actually completed 7 years of schooling, then the value of this child's educational progress will be 1. A value of less than 1 is observed if the child has attended less years of schooling than the average for their age. If a child has more years of schooling than the expected years of schooling for their age because they have stayed on in education for longer, a value of more than 1 will be observed. Lower (higher) values of the dependent value therefore indicate lower (higher) than average progress for the child's age. Since the sample consists of children of different ages, this measure of educational progress captures the educational progress of the child relative to that of other children of a similar age. The measure provides sufficient variation in the dependent variable. *IMR* is the selection term (lambda) derived from equation (1). All the other variables in the vector *X* are as previously defined.

### **Results**

Table 3 shows the probit estimates for educational participation (equation (1)) for children in single-parent headed households and dual-parent headed households (columns 1

and 2). Marginal effects are reported. Columns 3 and 4 show the results for the Heckman corrected OLS estimates for educational progress for single and dual-parent headed households' conditional on participation.

The results in column 1 show that fostered children in single-parent headed households are less likely to participate in school than biological children, although this effect is insignificant. In dual-parent headed households, the effect is significant and suggests that being a fostered child reduces the probability of participating by 0.05. The average years of education of head of household and spouse, as expected, has a positive influence on educational participation for children in dual-parent headed households. In both household types, we find positive effects of the number of siblings of school-going age (6 to 18 years) in the household on educational participation. The addition of another child aged 6 to 18 years increases the probability of the child's participation by approximately 2 and 1.6 percentage points for single and dual-parent headed households respectively. However, the addition of a child aged 0 to 5 years only has a positive effect on participation in dual-parent headed households and a negative effect on participation in single-parent headed households. After controlling for the presence of children of different ages, household size has an adverse effect on participation for children in both single and dual-parent headed households, although the effect is only weakly significant for dual-parent headed households.

Surprisingly, average educational attainment in the local community has adverse effects on educational participation for children in both household types. A possible explanation is that in communities with higher educational attainment, parents and other adult family members are more likely to be in employment which would limit their time at home. We find evidence of a positive relationship between local community average educational attainment and hours of work in the data. This could therefore impact negatively on school participation. A similar explanation may underlie the significant negative effect of household income on educational participation for single-parent headed households only, since higher income may be due to employment participation. However, there are no significant effects of time spent on household work or gender. Urban residence has a significant, positive effect on participation for children in both single and dual-parent headed households.

Columns 3 and 4 show the results for the estimates for educational progress conditional on participation. Fostered children make less good progress in dual-parent headed households. This is the same pattern as in the participation estimations (column 2).

**Table 3 HERE**

The results indicate that being a fostered child in dual-parent headed households reduces educational progress by approximately 8 percentage points. There are no significant effects of the average years of education of household head and spouse in either single or dual-parent headed households. In contrast to the participation estimates, local community average educational attainment has a positive effect on educational progress for children in both types of households. This is consistent with the notion that, children who grow up in poor neighbourhoods, often characterised by fewer years of education, tend to have worse outcomes, in terms of lower educational attainment and higher school dropout rates (Overman, 2002; Harding 2003). Also, in contrast to the participation estimates, household income is related positively to the educational progress of children in both household types. In dual-parent headed households, living in households with children less than five years old has adverse effects on educational progress, possibly because the presence of infants requires some children to spend time providing sibling care. In contrast, living in a larger household has a positive effect on educational progress in dual-parent headed households. Weekly hours of unpaid work in the home have no significant effect on educational progress in single-parent headed households but a significant and negative effect in dual-parent headed households. There are no significant effects of residence in an urban location. Being female on other hand increases educational progress in both single and dual-parent headed households by 1 and 6 percentage points respectively (reflecting the higher average educational progress for girls compared with boys), although this effect is only significant in dual parent-headed households.

Both IMR selectivity terms are negative which is somewhat surprising. This indicate that the joint effect of unobservables is negatively correlated with educational progress. The negative signs suggest that children who are more likely to participate in education make less progress relative to other children of the same age (after controlling for observed attributes). The negative effect of the selectivity term can be interpreted to suggest that education participation is simply not enough to secure educational progress, perhaps more so for the less advantaged.

Together these results identify adverse effects on educational participation and progress for fostered children compared with biological children, although the effects are significant only for dual-parent headed households. Overall, the results are largely consistent with previous related studies that have either considered the achievements of orphans or have controlled for the relationship of children with the household head. However, the findings additionally highlight the importance of household structure. The lack of a significant effect for fostered children in single-parent headed households may be linked to the lower wealth of

these households, which would provide less scope to differentiate between biological and fostered children. The disproportionate share of female heads in single-parent households is also a possible explanation of the lack of significance. 82 per cent of single-parent households in the sample are headed by females, and it may be that female heads treat children in the household more equally.

### **Female labour force participation**

As mentioned, it is possible that the negative effects of being a fostered child on educational participation and progress could be linked to labour market participation of adults in the household, particularly females. Households with high employment participation may have more motivation to educate their children if they have a greater appreciation of the positive association between labour force participation and children's schooling. On the other hand, in households where more adults are employed, the opportunity cost of investing in foster children's education may be higher. In the specific context of Ghana, participation of women in the labour market over the last few decades may have led to a situation where in some households the labour of children, particular fostered children, substitutes for that of working females. Indeed, in the GLSS dataset, there is positive association between women's hours of paid work and the hours of housework undertaken by fostered children. This effect is tested for in the multivariate models by including an independent variable measuring the ratio of female-to-male working hours within the household and additionally interacting this measure with the biological status of the child in the household. We use a ratio measure of female labour force participation (in hours) rather than simply hours of work, as a ratio can better capture the relative importance of female involvement in and commitment to the labour force. With generally lower female employment rates, a relatively high gender participation ratio would signify higher female commitment to work within the household. A higher gender participation ratio potentially also signifies higher opportunity costs of schooling.

The results of this exploration are shown in columns 1 and 2 of Table 4. In these estimations, the gender participation ratio is insignificant, and the interaction term is negatively significant for single-parent headed households only. This suggests that in single-parent headed households relatively higher female hours of work have a negative effect on the educational progress of fostered children. As household income is controlled for, this effect is not explained by financial factors. It is, however, consistent with Hamilton's (1964a, 1964b) argument that altruistic behaviour is an increasing function of the level of genetic relationship between individuals. The result suggests that while foster parents or other household members may

reap the benefits of higher female hours of paid work, a fostered child may bear a cost. The result may also be explained in part by the overrepresentation of female heads of household in single-parent headed households for whom hours of paid work may reflect necessity (as noted, 82 per cent of single-parent headed households in the sample are headed by females). The significance of the interaction term for single-parent headed households contrasts with the results in Table 3 and suggests that in these households fostered children are only disadvantaged when female household members are strongly committed to the labour market. However, these results need to be interpreted with caution, they show an association, but further research is needed to test causality.

**Table 4 HERE**

**Summary and Conclusion**

This research examines how household structure affects the educational participation and progress of fostered and biological children using household survey data for Ghana. Although the data do not allow for identification of the origins and characteristics of the sending households of fostered children the summary analysis shows that fostered children tend to live in households and communities characterised by higher educational attainment (in line with Akresh 2004; 2009). Fostered children may therefore be in improved position relative to their situation prior to being fostered, a common motivation for fostering (Serra, 2009). The analysis also finds strong positive effects of both household and community educational levels on children's educational progress, the community effect being indicative of neighbourhood effects on child development. However, these advantages may not benefit fostered children to the same extent as biological children particularly in dual-parent headed households. The results of the analysis indicate that participation in education is lower by 5 percentage points for fostered children in dual-parent headed households compared with biological children. When they do participate in education, the progress of fostered children lags behind that of biological children by approximately 8 percentage points in dual-parent headed households. The negative effect is consistent with ideas in evolutionary biology (Hamilton (1964a, 1964b) which suggest that parents behave more altruistically towards their own offspring. The negative effect is also consistent with Case et al. (2004) and Ainsworth et al. (2005; 2006) who find lower enrolment for non-biological children when they reside with distant or unrelated relatives, although our data do not allow this particular distinction to be made. While this effect is found within dual-parent headed households, which are also on average richer, it is less evident in single-parent headed households which are already poorer. Single-parent household

heads are also more likely to be female and they may treat fostered children more like their own children. Further research is needed to understand how these differences in household structure impact on children's education.

Although there were no equivalent negative effects for dual-parent headed households, the ratio of female-to-male hours of paid work appear to have a negative effect on the educational progress of fostered children in single-parent headed households. While the country context is different, this result is in line with the study by Pradhan et al. (2015), who argue that high female employment participation rates in poorer rural households in India, often characterised by lower levels of education, are explained by the need to meet minimum consumption requirements. The negative effect of female-to-male hours of paid work on educational progress is understandable in a developing country context where the household labour of children can substitute for that of working females. However, the effects appear to be more evident for fostered children. The result suggests that improved access to the labour market for women needs to be accompanied by measures that support schooling particularly within single-parent headed households that are anyway more likely to be female-headed. Otherwise there is a risk that the educational progress of fostered children in single-parent headed households will suffer. That is, children who may have been fostered with the intention of advancement in school may therefore end up spending more time doing unpaid home work than they expected (Serra, 2009). The finding raises important concerns about the adverse effect of parental employment on children's educational development and by implication their future employment outcomes.

A limitation of our study is that the data do not allow more precise identification of a foster child's relationship to the household head. This limits our analysis, since for example, the education of fostered children could depend to some extent on the closeness or distance of the relationship with the household head. Similarly, in dual-parent headed households, it is possible that some biological children could be living with a stepparent and the effects on educational progress could differ for such children, as evidenced in the literature (Ginter & Pollack, 2004). Since education participation and progress are partly a function of a child's schooling history, lack of such information for fostered children who have moved away from their birth parents' home environment further limits this analysis. Lack of data on origin and characteristics of sending households is a further limitation. According to Akresh (2004; 2009), children are more likely to be fostered from households that have experienced negative income shocks that could affect parents' ability to finance education. In such cases, a move from the home of their biological parents could benefit children, 'insulating' them from these kinds of



shocks (Akresh, 2004, 2009) especially if they move to a wealthier and more educated household. Availability of data on sending households could have enabled us to examine for instance, whether educational outcomes of fostered children in host households improve because of fostering, relative to foster siblings left behind. Similarly, such data would allow for analysis of some of the causal mechanisms of fostering.

To summarise, the main findings of this study are that children's development is influenced by household structure and relationships and in particular, whether the child is the biological child of the head of household or fostered. The research suggests that it is important to incorporate a wide array of family-related influences in future research on the educational attainment of children in developing countries and their transitions into adulthood. One important policy implication for fostering in Ghana is that foster parents may need to be facilitated to invest more in the human capital of their foster children.

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## Tables

**Table 1: Sample characteristics by household structure and biological relationship of child to head of household.**

	(1) Single-parent headed households			(2) Dual-parent headed households			(3) Biological children			(4) Fostered children		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Fostered child	4,621	0.19	0.39	14,152	0.10*** (15.05)	0.31						
Female Child	4,621	0.52	0.50	14,152	0.48** (4.12)	0.50	16,435	0.48	0.50	2,338	0.55*** (-6.13)	0.50
Average years of education of household head and spouse	3,255	7.92	4.43	10,560	8.02 (-1.25)	3.93	11,975	7.82	3.94	1,840	9.13*** (-12.50)	4.59
Household income (log)	4,621	1.17.	2.27	14,152	1.27* (-2.35)	2.40	16,435	1.24	2.37	2,338	1.31 (0.71)	2.40
Household size (number of adults and children)	4,621	4.95	2.00	14,152	7.57** (-52.38)	3.20	16,435	6.92	3.14	2,338	6.94 (-1.51)	3.29
Number of siblings 0 to 5 years	4,621	0.12	0.39	14,152	0.44*** (-26.15)	0.81	16,435	0.37	0.75	2,338	0.33 (0.63)	0.69
Local community average educational attainment <sup>a</sup>	4,621	6.13	1.84	14,152	5.52*** (18.85)	1.96	16,435	5.62	1.94	2,338	6.04*** (-6.74)	1.98
Urban residence	4,621	0.50	0.50	14,152	0.35*** (17.90)	0.48	16,435	0.38	0.48	2,338	0.45** (-4.26)	0.50
Hours of domestic work by child per week	4,339	10.89	13.45	12,690	11.05 (-0.61)	14.94	14,908	11.08	14.68	2,121	10.52 (1.25)	13.82
Educational progress	4,621	0.66	0.47	14,152	0.62*** (4.21)	0.51	16,435	0.63	0.52	2,338	0.61** (3.22)	0.42
Education participation	5,553	0.83	0.37	16,168	0.88*** (-8.11)	0.33	18,885	0.87	0.34	2,836	0.82*** (6.66)	0.38

Notes: \*\*\*, \*\*, \* In t test of difference in means, difference is significant at 99%, 95% and 90% levels respectively (t statistic in parentheses).

<sup>a</sup> Local community educational attainment measured by average years of schooling.

<sup>b</sup> Educational progress measured by age adjusted years of schooling.

**Table 2: Educational participation by household structure and biological relationship of child to head of household**

	Single-parent headed households				Dual-parent headed households			
	Biological children		Fostered children		Biological children		Fostered children	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Participation	0.84	0.37	0.82	0.39	0.88	0.32	0.83***	0.38
			(1.36)				(7.29)	
Educational progress	0.66	0.48	0.65	0.43	0.63	0.52	0.59*	0.42
			(0.53)				(2.48)	

Notes: \*\*\*, \*\*, \* In t test of difference in means difference is significant at 99%, 95% and 90% levels respectively (t statistic in parentheses). Tests conducted for fostered children and biological children based on family structure.

**Table 3: Educational participation and progress**

	(1)	(2)	(3)	(4)
	Single-parent headed households	Dual-parent headed households	Single-parent headed households	Dual-parent headed households
	Probit (marginal effects)		OLS selectivity-corrected	
Fostered child	-0.0299 (0.0203)	-0.0508*** (0.0130)	0.0189 (0.0330)	-0.0782*** (0.0250)
Average years of education of household head and spouse	0.0033 (0.0025)	0.0061*** (0.0013)	-0.0035 (0.0034)	0.0002 (0.0028)
Local community average educational attainment	-0.0173*** (0.0061)	-0.0228*** (0.0031)	0.0580*** (0.0130)	0.0676*** (0.0086)
Female child	0.0263 (0.0169)	-0.0060 (0.0083)	0.0066 (0.0262)	0.0566*** (0.0150)
Household income (log)	-0.0122*** (0.0044)	0.0001 (0.0023)	0.0294* (0.0166)	0.0114 (0.0082)
Household work hours per week	-0.0001 (0.0004)	0.0000 (0.0002)	-0.0009 (0.0010)	-0.0012** (0.0005)
Number of siblings 0-5 years	-0.0499** (0.0229)	0.0295*** (0.0084)	0.0081 (0.0518)	-0.0629*** (0.0154)
Number of siblings 6-18 years	0.0207* (0.0106)	0.0160*** (0.0050)		
Household size	-0.0011 (0.0070)	-0.0060* (0.0032)	0.0072 (0.0086)	0.0106*** (0.0036)
Urban residence	0.0366* (0.0204)	0.0205* (0.0108)	0.0088 (0.0380)	0.0197 (0.0195)
IMR			-1.0018** (0.4002)	-0.4957** (0.2508)
Round dummy	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes
Religion dummies	Yes	Yes	Yes	Yes
F-statistic	16.89	90.78	7.63	27.51
Observations	3,769	11,233	3,049	9,526
R-squared			0.054	0.070

Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4: Educational progress and adult employment participation**

	(1) Single-parent headed households	(2) Dual-parent headed households
Fostered child	0.0559 (0.0409)	-0.0742** (0.0338)
Average years of education of household head and spouse	-0.0016 (0.0040)	-0.0017 (0.0031)
Local community average educational attainment	0.0750*** (0.0149)	0.0681*** (0.0092)
Female child	-0.0266 (0.0324)	0.0483*** (0.0167)
Household income (log)	0.0476** (0.0197)	0.0209** (0.0083)
Household work hours per week	-0.0003 (0.0013)	-0.0012** (0.0005)
Number of siblings 0-5 years	0.0437 (0.0569)	-0.0576*** (0.0172)
Household size	0.0115 (0.0099)	0.0088** (0.0037)
Urban residence	0.0095 (0.0445)	0.0073 (0.0205)
Female to male working hours	0.0016 (0.0048)	-0.0007 (0.0019)
Female-to-male working hours x Fostered child	-0.0231*** (0.0080)	0.0099 (0.0176)
IMR	-1.4990*** (0.4269)	-0.6413** (0.2649)
Round dummy	Yes	Yes
Regional dummies	Yes	Yes
Religion dummies	Yes	Yes
F-statistic	7.79	19.76
Observations	1,577	7,657
R-squared	0.110	0.064

Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Appendix

**Table A1. Definition of variables**

Variable	Definition
Educational progress	Educational progress of the child. Derived by weighting the years of completed schooling of the child by the expected number of years of schooling for the relevant age group.
Educational participation	Dummy variable. 1 if the child is currently enrolled in school and has attended school in the past 12 months. 0, otherwise.
Fostered child	Dummy variable. 1 if the child is not a biological child of the household head. 0 if child is a biological child of the household head.
Female child	Dummy variable. 1 if female, 0 if male.
Average years of education of household head and spouse	Average educational attainment of household head and his/her spouse in years.
Local community average educational attainment	Level of educational attainment (in years) in the community where the child resides.
Household income	Log of annual income of the household in Ghana Cedis.
Hours of domestic work	Total number of hours per week that the child engages in domestic work. These include: collecting firewood; fetching water; washing clothes; ironing; cleaning; shopping; running errands; washing dishes/pots; taking care of children; taking care of elderly care; taking care of the sick.
Number of siblings 0 to 5 years	Total number of siblings aged 0 to 5 years.
Household size	Total number of people residing in the house.
Urban residence	Dummy variable. 1 if the child resides in an urban area, 0 if rural.

**Table A2. Correlation coefficients for biological and fostered children**

**Panel a: Biological children**

	Educational progress	Average years of education of household head and spouse	Household income (log)	Household size	Local community average educational attainment
Educational progress	1				
Average years of education of household head and spouse	0.083***	1			
Household income (log)	0.173***	-0.187***	1		
Household size	-0.009	-0.141***	0.065***	1	
Local community average educational attainment	0.186***	0.475***	0.006	-0.281***	1

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



**Panel b: fostered children**

	Educational progress	Average years of education of household head and spouse	Household income (log)	Household size	Local community average educational attainment
Educational progress	1				
Average years of education of household head and spouse	0.099***	1			
Household income (log)	0.142***	-0.196***	1		
Household size	-0.003	-0.113***	0.004	1	
Local community average educational attainment	0.170***	0.456***	0.054*	-0.251***	1

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$