An Empirical Analysis on the Determinants of Child Labor in Cocoa Production in Ghana

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Abstract

In the past decade, various concerns have been raised about child labour use in the agricultural sector of Ghana. The agricultural sector of Ghana employs over 65% of the country's labour force. Evidence suggests that children constitute the largest proportion of household labour with about 14% contribution of labour to the Ghanaian cocoa sub sector. A study commissioned by ILO/IPEC in 2004 under the West Africa Cocoa and Commercial Agriculture Project (WACAP) also confirmed the incidence of child labour in cocoa producing regions of Ghana. The International Labour Organization contends that children's work which does not interfere with their education is permitted from the age of 12 years but the worst forms of child labour includes enslaving children, forcibly recruiting children as prostitutes, trafficking and forcing children into illegal activities and exposing them to hazardous work. Whilst some have argued in the economic literature that the use of children in farms is part of their socio-economic development, UNICEF's conventions argue that child labour cannot be substitute for child work. This paper investigates this phenomenon by employing a survey data from 100 cocoa producing households in the Western Region of Ghana where the bulk of Ghanaian cocoa are produced.

A logit model was used to investigate the factors which influence the farmers' decision to use children on cocoa farms instead of using them for other activities that do not impinge on the child's development negatively. The extent of child work on cocoa farms was also examined empirically with a Tobit model. The empirical results reveal that household characteristics such as the age of the farmer, the number of adults in the household and the number of children less than 18 years of age significantly influence the probability to employ children on the cocoa farms. Farm characteristic such as the proportion of farms under sharecropping contracts statistically had negative influence on the probability to employ children on cocoa farms, a result which is consistent with theory. These empirical findings were further confirmed as Tobit estimates which examined the extent of child labour on the farm showed that cocoa farmers tend to use their children for longer hours on their farms if adult family labor in the households decreases and children less than 18 years increases.

1. Introduction

The problem of child labour in agricultural production in Sub-Saharan Africa has become a topical issue in the economics literature. Whilst some have argued that the use of children in farms is part of their socio-economic development, others are of the view that child labour cannot be substitute for child work (UNICEF, 2005). For instance children constitute the largest proportion of household labour with about 14% contribution of labour in Ghanaian cocoa farms (WACAP 2003). Cocoa has continued to play a major role in Ghana's economy since it is the major export crop as well as the biggest foreign exchange earner for Ghana. After Cote D'Ivoire, Ghana is the next largest producer of cocoa in the world (USDA 2005). Ghana's Gross Domestic Product (GDP) in 2005 stood at 36.77% with the agriculture sector contributing about 37.0%. The cocoa sub-sector alone contributed 12.8% (State of the Ghanaian Economy Report 2005).Cocoa is cultivated in the forest zones of Ghana with the Western, Ashanti, Eastern, and Brong Ahafo regions contributing about 90% of national production. Western region accounts for about 50% of national cocoa output (COCOBOD 2006).

Most of the cocoa farms are owned by farmers who usually reside in the urban areas of the country but engage labourers to take care of the farms for them. The sources of farm labour used on these farms include the farmers themselves, household members, hired labour, labour exchange and extension service staff (COCOBOD 2006). Farmers tend to use the cheapest form of available labour due to the influence of producer prices, yields and excessive taxation. Coupled with this, the unstable global price index as well as high wages of hired farm labour compels cocoa farmers to reduce labour cost on the farm by employing children.

United Nations Children and Education Fund (UNICEF's) conventions propose that child work and not child labour can be used in farming as it assists in the social development of children. UNICEF thus defines child work as "children's participation in economic activity that does not negatively affect their health and development or interfere with their education (UNICEF, 2005). The International Labour Organization also contends that, work that does not interfere with children's education (light work) is permitted from the age of 12 years (ILO Convention 138). The worst forms of child labour according to the ILO Convention 138 includes enslaving children, forcibly recruit

children as prostitutes, trafficking and forcing children into illegal activities and exposing them to hazardous work.

In West Africa, children use machetes to clear fields, apply pesticides, harvest cocoa pods and slice them to remove the beans (Harkin Engel Protocol, 2002). There is also strong evidence to suggest that trafficking and bondage have been used to supply children to the workforce. As much as the Harkin Engel protocol allows cocoa buying countries to stop buying from cocoa producing countries when child labourers are found to be involved in cocoa production, the Harkin Engel protocol has consistently been violated.

Although UNICEF's convention allows the use of child work, it discourages the use of child labour of all forms. The Government of Ghana is making efforts to reduce the use of child labour for cocoa production through the cocoa mass spraying exercise, poverty reduction programmes, improved access to education (school feeding programme and scholarships) and better prices for cocoa, but the situation is still prevalent (COCOBOD, 2007). This raises a number of questions: To what extent is children been used in cocoa production in the Bibiani – Anhwiaso – Bekwai District of Ghana? What are the determinants of child labour use in cocoa production in the Bibiani – Anhwiaso – Bekwai District? These are the questions this paper seeks to address.

The aim of the paper is to examine the determinants of child labour use in cocoa production in the Western region of Ghana; specifically the paper seeks to identify the roles of children in cocoa production and also to quantify the magnitude of the effects of the determinants of child labour in cocoa production in Ghana

Various studies have examined child labour in general. For example, high incidence of child labour has been recorded in Brazil (Emerson and Souza, 1998). Serious concerns about child labour in the cocoa industry of Cote D'Ivoire have been raised (Boas and Huser, 2006).A survey conducted by Kyeremanteng (2007) at the Asempaneye district of the Western region of Ghana assessed the level of child labour in cocoa production but these studies lacked empirical content. The current paper adds to the debate on the use of children in cocoa farms by employing an empirical analysis to examine the extent of child labour in cocoa production in Ghana.

The paper is organized as follows: Section two discusses the incidence of child labour in cocoa production in Ghana. Section three formulates the theoretical model of the

paper. Data and definition of variables are presented in Section four. The empirical results are discussed in Section five. Section six concludes the paper.

2. Incidence of child labour in cocoa production in Ghana

In the past decade, various concerns have been raised about child labour use in the agricultural sector of Ghana where cocoa in particular plays a major role. The agricultural sector of Ghana employs over 65% of the country's labour force (State of the Ghanaian Economy Report, 2005). Children constitute the largest proportion of household labour with about 14% contribution of labour in Ghanaian cocoa farms (WACAP 2003).

Normally, children assist parents in the household domestic chores such as cooking, minding of babies either at home or on the farms as a means of transmitting skills from parents to children. This process of the child's development is unfortunately being abused by some parents in less developed economies. The issue of children been used on cocoa farms in Ghana at the detriment of their socio-economic development has become topical.

A study commissioned by ILO/IPEC in 2004 under the West Africa Cocoa and Commercial Agriculture Project (WACAP) on child labour in selected cocoa growing communities in Ghana identified an average of 42 children work as full time labourers per a community, totaling 1,764 children in all 42 communities. Of all such child labourers in full- time employment which constitute 8.7%, and who work 6 – 7 days per week, do not attend school. The child unit of the Ministry of Manpower, Youth and Employment (MMYE) in 2005 also found from their study in 5 selected districts that out of 1,671 questionnaires administered, 685 were child workers.

Evidence of involvement of children of school going age in cocoa farming was also found. Out of the 78 selected children, 24% had never worked on cocoa farms for income, 68% and 8% worked temporary and permanent basis during the 2003/4 cocoa season. About 37% of the cocoa farmers also indicated that they engaged children to work on their farms during the 2003/4 cocoa season. The main activity assigned to children on cocoa farms was weeding (28%). Spraying which could be dangerous to their health was undertaken by 8.2% and 2.4% by parents/caretakers. On the average, children worked for 6.5 hours a day and 3 days per week. About 8% of permanent child workers

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were involved in activities considered as child labour on cocoa farms because they worked at the expense of their health and/or education. Children's Act 560 acknowledged that about 68% of the children engaged in activities in the cocoa industry could be described as child work.

3. Theoretical model

The paper seeks to examine the factors which influence cocoa farmers' decision to use their children on cocoa farms instead of using them for other activities (especially allowing them to attend school etc). In deciding whether to use the child on the farm, the farmer weighs up the expected utility of wealth from using the child on the cocoa farm, $U_C^*(W)$ and the expected utility of wealth from other activities, $U_{CN}^*(W)$ where W represents the net returns from wealth. With this assumption, the farmer would use the child on the cocoa farm if

$$U_C^*(W) > U_{CN}^*(W) \tag{1}$$

The parameters of this decision are usually unobservable, but we can represent it by a latent variable

$$U_C^*(W) = 1 \text{ if } U_C^*(W) > U_{CN}^*(W) \text{ and}$$
$$U_C^*(W) = 0 \text{ if } U_C^*(W) < U_{CN}^*(W) \tag{2}$$

The utility of using a child on a cocoa farm by the farmer can then be related to a set of explanatory variables, X such that

$$U(W) = \varphi' X_i + \mu_i \tag{3}$$

where φ' is a vector of parameters and μ is the disturbance term with zero mean and variance σ_μ^2. The disturbance term captures measurement errors and unobserved factors.

The variable X include household characteristics such as age, education and children of the farmer and farm characteristics such as number of cocoa farms owned by the farmer, proportion of farms under sharecropping contract and wages to hired farm labor. Equation (3) and $U_i^*(W)$ may also be expressed as

$$\Pr(U = 1) = \Pr(U_C^*(W) > U_{CN}^*(W)$$
$$= \Pr(\mu_i > -\varphi'X_i) = 1 - \psi(-\varphi X_i) \tag{4}$$

where ψ is the cumulative distribution for μ. Although the assumptions about ψ can lead to different models, we employ a logit model, which assumes a logistic distribution (Maddala, 2001). For the purposes of exposition, let the relationship between the decision variable A and the explanatory variables X be represented by

$$A_i = \varphi'X_i + \mu_i \tag{5}$$

Specifically, we specify the empirical model as

$$CLAB_i = \varphi_0 + \varphi_1\ AGE_i + \varphi_2\ AGE2_i + \varphi_3\ HEDU_i + \varphi_4\ NDULT_i + \varphi_5\ NCHILD_i$$
$$\qquad\quad (+)\qquad\quad (-)\qquad\quad (-)\qquad\quad (-)\qquad\quad (+)$$
$$+\ \varphi_6\ NFARMS_i + \varphi_7\ TENURE_i + \varphi_8 WAGE_i + \mu_i$$
$$\qquad (+)\qquad\qquad (-)\qquad\qquad (+)$$

where

CLAB denotes a binary choice variable equal 1 or 0 otherwise.

AGE denotes the age of farmer (years)

HEDU denotes the education of the farmer (years)

NDULT represents the number of adults in household

NCHILD represents the number of children of the farmer who are less than 18 years

TENURE denotes the proportion of farms under sharecropping contract

WAGE denotes the wage rate to hired farm labor

φ_0 is the constant term

φ_1 to φ_8 are the unknown parameters to be estimated and

μ is the disturbance term.

4. Data and definition of variables

A cross-sectional data collected among 100 cocoa producing households in the Bibiani-Anhwiaso-Bekwai District of Western Region of Ghana between November and December 2007 was employed in the study. The Bibiani-Anhwiaso-Bekwai district is one of the thirteen administrative districts in the Western Region of Ghana. Its geographical size is about 73 sq.km. Total population is estimated to be about 120,869 with 47.5% male and 52.5% female (National Population Census, 2005). The agricultural sector is the most important sector employing more than half of the district's labour force. Specifically, the agriculture sector alone employs about 65.4 % of the labour force with 34.6 % female participation in the year 2000 (Population and Housing Census Report, 2000) and 61% of the labour force with 34% female participation in the year 2005 (Bibiani-Anhwiaso-Bekwai District Survey, 2005). Although the district has both rural and urban settlements, the rural settlements accounts for 63%. The implication here is that the district is basically rural; therefore agriculture can be used as a development focus in order to reduce poverty in the district. The district has three urban centers; Bibiani, Sefwi Bekwai and Awaso. These towns account for 37% of the total population, with the district capital alone constituting 22.1% of the total population in the district.

A multistage sampling procedure was employed. The first stage involved purposive sampling where the Western Region was chosen due to its economic importance as the leading producer of cocoa in the 2005/2006 cocoa season. About 50% of the volume of cocoa produced in Ghana was from the Western Region. In the second stage, the Bibiani – Anhwiaso – Bekwai district was chosen among the 13 administrative districts through random sampling procedure. In the next stage, 10 communities from the district were randomly selected. The communities included Wenchi, Dominibo, Kunkunso, Ankra – Muano, Chirano, Subiri Nkwanta, Asawinso Anwhiaso, Mornor and Subiri. Finally, about 100 cocoa producing households were selected randomly from the 10 communities. The head of the households as well as children below 18 years were interviewed using a semi-structured questionnaire.

The data collected included information on household demographics (age, sex, marital status, history of migration), household characteristics (number of adults, number of children), farm characteristics (number of farms owned, distance from farm to home). Figure 1 shows some of the activities undertaken by children in cocoa farms. Scooping (23%) dominated the activities children were engaged in compared to weeding which dominated the MMYE survey in 2005. Low children participation in activities such as application of fertilizer, plucking of pods, sanitation and pruning was because of the health hazards associated with them and in some cases, lack of skills to undertake these activities

Figure 1. Activities undertaken by children on cocoa farms
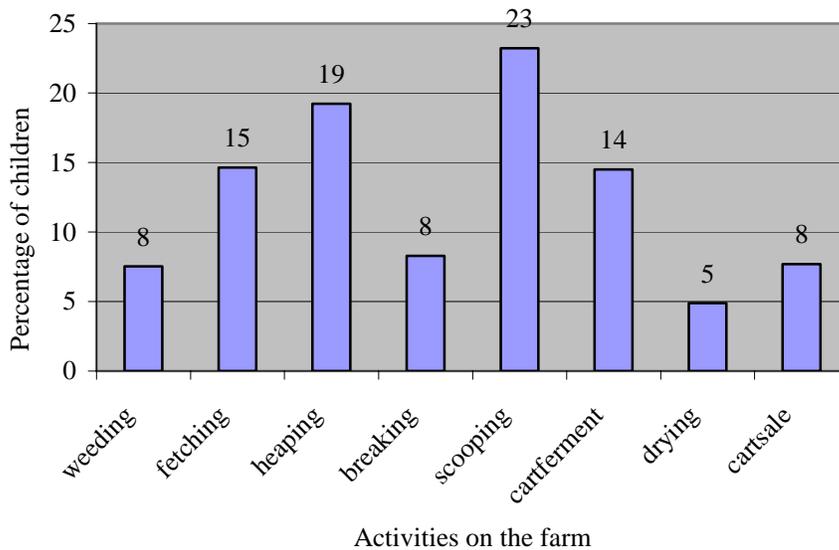
Source: Field survey, 2007.

The descriptive statistics of the variables used in the regression models are provided in Table 1. The mean age of the household head was 46 years. The average level of education was 3 years with a maximum of 5 years and minimum of 1 year. The mean number of adults was 4 and the average number of children (<18 years) was 2. The average number of farms within the household was 3 with a maximum of 6 farms and a minimum of 1 farm. The average wage rate was GH¢ 1.74 with a maximum of GH¢ 6 and a minimum of GH¢ 1.0.

The dependent variable is a binary choice variable which indicates 1 if the household employs a child in any activity on the cocoa farm and zero otherwise. The age of the farmer is expected to exhibit a positive relationship to the employment of children due to lifecycle effects. Younger farmers may have children who are too young to work on the farm than older farmers. Farmers with higher level of formal education are less likely to

Table 1 Descriptive statistics of variables used in the regression model

Variables	Description	Mean	S.d	Min	Max
CLAB	1 if farmers employs child on cocoa farm, zero otherwise	0.60	0.49	0	1
AGE	Age of the farmer (in years)	45.55	15.06	22.00	92.00
NDULT	Number of adults (more than 18 years)	3.59	1.924	.00	9.00
NCHILD	Number of children (less than 18 years)	1.87	1.69	.00	6.00
HEDU	Years of formal education (in years)	2.59	0.99	1.00	5.00
TENURE	Proportion of plots under sharecropping contract	0.73	0.45	.00	1.00
WAGE	Wage rate of hired labour (GH¢/day)	1.74	0.76	1.00	6.00
NFARM	Number of cocoa farms of farmer	3.11	1.30	1.00	6.00

Source: Field survey, 2007

employ children as labourers on cocoa farms. Household heads would prefer adult labour (>18 years) to child labour due to the tediousness of farm work. Adult labour availability within the household would therefore reduce the probability of child labour on the farm. More children (<18 years) in the household would rather increase the probability of child labour on the farm. The higher the number of cocoa farms owned by the farmer, the higher the probability to use children on the farm. A sharecropper supplies labour for a share of the output so it is expected that households with a high proportion of plots under sharecropping arrangements would employ less children on the farm. Higher wages would induce cocoa farmers to employ more children on the farm in order to reduce cost of hired farm labour.

5. Empirical results

The empirical results are presented in this section. Table 2 reports the logit estimates of the probability to employ a child on cocoa farms. To measure the performance of the model, the McFadden R^2 and log likelihood are reported. The McFadden R^2 of 0.596

indicates that the model predicts correctly the use of children on cocoa farms for 60% of the sample. To ascertain that the model has a well-behaved residual, the White-test was employed to test for homoscedastic variance in the residual. The LM-statistics of 0.0635 with a *p-value* of 0.969 indicates the absence of heteroscedasticity in the residuals.

All the variables in the model had the correct *a priori* signs. As expected, the age of the farmer had a positive significant influence on the probability to employ children on cocoa farms. The marginal effect of 0.0374 also indicates that the probability to use children on cocoa farms is about 3.7% as the age of the farmer increases. The education variable had the expected negative sign but it was not significantly different from zero even at 10% level. The negative significant influence of number of adult on the probability to employ children on cocoa farms confirms the hypothesis that more adults in the household reduce the probability to employ children on cocoa farms. The marginal effect of -0.0575 also indicates that there is about 6% lower probability to use children on

Table 2. Logit estimates on the use of children on cocoa farms

Variable	Coefficient	Marginal effect	z-statistic
Constant	-6.6418		-1.71*
AGE	0.2237	0.0374	2.41**
AGE2	-0.2001	-0.0335	-2.36**
HEDU	-0.3157	-0.0528	-0.90
ADULT	-0.3436	-0.0575	-1.89**
NCHILD	1.8725	0.3134	3.31***
NFARMS	0.1237	0.0207	0.49
TENURE	-1.3415	-0.1870	-2.44**
WAGE	0.5708	0.0955	0.61
Log likelihood	-26.439	*White*	0.0635 (0.969)
McFadden R^2	0.595	*Wald chi(8)*	34.14(0.000)
Observations	97		

Note: McFadden $R^2 = 1 - L_U / L_R$, where L_U = unrestricted maximum likelihood and L_R = restricted maximum likelihood. The marginal effects of the probit model is evaluated as $\partial E(A/X_i)/\partial X_i = \psi(\varphi X_i)\varphi$. *, **, and *** denotes significant at 10%, 5% and 1% respectively.
Source: Field survey, 2007.

cocoa farms as the number of adults (>18 years) increases. The variable representing number of children (< 18 years) had the expected positive significant influence on the use of children on cocoa farms. The marginal effect of 0.3134 indicates that there is about 31.3% higher probability to use children on cocoa farms as children (<18 years) increase.

The empirical result lends credence to our earlier result that as the number of adult family members decreases, the farmer tend to substitute child labour for adult labour on the farm. The wages to hired farm labour had the expected positive although it was not significantly different from zero even at 10% level. This empirical finding suggests that as the wages to hired farm labour increases, there is a higher probability that cocoa farmers would employ more children on the farm. The variable representing the number of farms owned by the cocoa farmer was not statistically significant but it had the expected positive sign. Proportion of plots under sharecropping contracts had a significant negative relationship with the probability to employ children on cocoa farms. The marginal effect was -0.187 indicating that if the farmer has a higher percentage of his farms under sharecropping contracts where the farmer and his tenants share labour inputs on the farm, then there is about 19% lower probability to employ children on the farm because of the extra labour input from the sharecropping contract.

To examine the extent of child labor on cocoa farms, we quantify the magnitudes of the effects of determinants of child labour with the Tobit model (Greene, 2000) by using the number of hours of worked by children on cocoa farms as the dependent variable. The empirical results are reported in Table 3. All the variables in the model had the correct *a priori* signs. In particular, the marginal effects of the number of adults (> 18 years) in the

Table 3. Tobit estimates on the use of children on cocoa farms

Variable	Coefficient	Marginal effect	z-statistic
Constant	-7.3076		-0.44
AGE	0.0875	-0.5674	0.16
HEDU	-1.0936	-1.2288	-0.76
ADULT	-1.7082	1.0199	-1.98**
NCHILD	2.7260	0.3258	2.98***
NFARMS	0.5219	-0.2788	0.48
TENURE	-1.8998	2.4583	-0.60
WAGE	4.6185	0.7993	1.36
Log likelihood	-257.75	*Observations*	97
McFadden R²	0.0355	*LR chi2(8)*	18.99(0.0149)

Note: McFadden $R^2 = 1 - L_U / L_R$, where L_U = unrestricted maximum likelihood and L_R = restricted maximum likelihood. *, **, and *** denotes significant at 10%, 5% and 1% respectively.
Source: Field survey, 2007.

household and the number of children (< 18 years) were significantly different from zero at 5% and 1% levels respectively. Statistically, these empirical results lend support to the logit estimates. The empirical findings suggest that cocoa farmers would use their children for longer hours on the farm if adult family labor in the households decreases. When adult labour decreases, farmers tend to use children (< 18 years) for longer hours on the farm. In support of this hypothesis, the variable representing children (< 18 years) statistically turned out to be significantly positive. The wages to hired farm labour had the expected positive influence on how long children would be used on cocoa farms but this variable was statistically insignificant even at 10% level. The same empirical results were obtained for age, education, number of farms and proportion plots under sharecropping variables.

6. Summary and conclusions

We analyzed in this paper the role of children in cocoa production in Ghana. In particular, we examined the factors which influence the farmers' decision to use his children on the cocoa farm instead of other activities which do not impinge negatively on the child's health and development. Children were found to be involved in various activities such as scooping, weeding, plucking of pods and pruning, gathering and heaping of pods carting of fermented beans, carting of dry beans for sale. About 23% of the children were involved in scooping of cocoa on the farm. Whilst weeding by children on cocoa farms was 8%, application of fertilizer, plucking of pods and pruning recorded a low percentage of children involvement. The empirical results reveal that household characteristics such as the age, the number of adults and the number of children (< 18 years) influence the use of children on cocoa farms. Farm characteristic such as the proportion of farms under sharecropping contracts statistically reduce the use of children on cocoa farms, a result which is consistent with theory. These empirical findings were further confirmed as Tobit estimates explaining the extent of child labour on cocoa farms showed longer hours of child work as adults (>18 years) decreases and children (< 18 years) increases.

These findings call for some policy direction towards the cocoa sub-sector in Ghana if child labour in cocoa production is to be minimized. These include child labour

sensitization programmes by NGO's, governmental agencies and all stakeholders involved in children welfare for farmers to create awareness on the effects of the use of children in cocoa production.

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