



A Re-Examination of the Determinants of Child Labour in Côte d'Ivoire

About Pokou Edouard

Department of Economics and Management University of Jean Lorougnon Guede, Daloa, Côte d'Ivoire

Abstract

This last year, the extent of poverty and socio-economic crises in some African countries, particularly in Côte d'Ivoire have favoured child labour. Thus, despite the political fight against this phenomenon, it's remains a concern. This research therefore aims to identify the determinants of child labour in Côte d'Ivoire, using 2005 data from the national survey on child labour with 5,571 children. The descriptive statistic showed that 1,509 (27.09%) were in child labour category: 743 boys (27.04%) and 766 girls (27.14%). The estimated multinomial logit presented that household poverty and low level of parent's education remains a determinant of child labour. In addition, the permanent employment of the household in agriculture reduces child labour. Thus, policy makers can modernize agriculture. This strategy will allow the use of modern technology inaccessible to children and improve agricultural productivity. With a guaranteed minimum price for agricultural production poor households will earn higher incomes. In addition, targeted free schooling is required.

Keywords: Child labour; Education and inequality; Multinomial logit, well-being of the household.



CC BY: [Creative Commons Attribution License 4.0](https://creativecommons.org/licenses/by/4.0/)

1. Introduction

Generally, in Africa, child labour is part of education and socialization. However, socio-economic crises in some African countries in recent years have favoured the employment and exploitation of children. In literature, this concept of child labour has several definitions (Bandiera *et al.*, 2017; Crépon *et al.*, 2015; Kazianga *et al.*, 2012). In this research, our definition will be based on several criteria: (i) dangerous nature activities prohibited to all children aged 5-17 years by decree no. 2250 of 14 March 2005 in Côte d'Ivoire (Table-A1); and (ii) dangerous intensive activities whether in field of System of National Account (SNA) production boundary or not. In other words, our definition considers household chores under the Child Labour Convention no. 190 according to ILO. Thus, child labour is all dangerous nature or intensive activities carried out by children aged 5-17 years.

Education and poverty are two fundamental axes in the context of the objective Sustainable Development Goals (SDGs). Côte d'Ivoire, like other developing countries, is characterized by important household poverty. For example, in recent years the poverty rate is 46.3% (INS, 2015). At this rate, it would be difficult for these households to send their children to school. These children will be exposed to child labour. The magnitude of this modern scourge can be explained by the poverty scale. This intuitive assertion finds its basis on the Basu and Van (1998) model. These authors base their analysis on the luxury axiom of poverty. Using microeconomic data and various methodological approaches, many studies test and confirm this axiom (Najeeb, 2007; Zapata *et al.*, 2011). However, although these studies agree with this axiom, some are qualified. Indeed, with a simple logit, Ray (2000) found mixed results in Pakistan and Peru. In fact, the income that the household plans as the minimum acceptable may vary from one period to another, from one country to another, and from one region to another. In some countries, households are more vulnerable to monetary poverty than others.

Other authors mention the wealth paradox (Bhalotra and Heady, 2003; Luiz *et al.*, 2015) showing that child labour is more important in the richest households. In fact, these authors hypothesize that rural households that own land tend to send their children to work rather than to school. This analysis assumes that land is an important source of wealth for rural households. The principle is that households with high much tend to send their children to work if they cannot use what is available in the labour market or rent a portion of their land. From an empirical point of view, Luiz *et al.* (2015) find evidence of a positive relationship between land wealth and child labour only for children in the upper quantiles of the distribution. This paradox of wealth is mitigated by Nkamleu (2006) in the case of the Côte d'Ivoire cocoa sector. Using a bivariate probit model and a multinomial logit model, results show that the effect of different proxies of wealth commonly used have the opposite results on child labour.

Education also plays an important role in explaining child labour. From a theoretical point of view, the models of Ranjan (1999) and Baland and Robinson (2000) seek to identify the reasons why households do not invest in the education of children. For these authors, the weakness of investment in education is due to household poverty and imperfect capital markets. Indeed, parents are unable to borrow on the credit market to finance their children's education. Instead, they send children to the labour market. In Côte d'Ivoire, the socio-economic context makes it difficult for parents to access credit facilities to finance the education of their children. This budget constraint indicates that expenditure on education by the family is function of the level of poverty. Guarcello *et al.* (2010) confirm this in Guatemala. These authors estimate a multinomial logit and provide a sensitivity analysis to evaluate the robustness of the estimates due to the presence of unobservable characteristics. Their results show that credit rationing is an important determinant of schooling and child labour. Exposure to negative shocks also strongly

influences the decisions of households and pushes children to work, while access to the adaptation mechanisms such as insurance tend to promote education and reduce child labour.

In addition to the poverty or the imperfection of the capital market, child labour is also the result of weakness of parents' education combined with income poverty (Emerson and Souza, 2003). Parents with a low level of accumulated human capital are more sensitive to monetary poverty and put children to work. Thus, higher parental education levels increase the odds of education and decrease those of child labour (Tzannatos, 2003; Zapata *et al.*, 2011). Some authors in their studies also use variables that influence decisions on schooling and child labour (Ersado, 2005; Najeeb, 2007). They show that when schooling costs rise, children work or combine school and work. The authors use these variable or other characteristics of the community to control the endogeneity of the expenditure of education due to child labour. They calculate the average costs of the expenditure of schooling of the parents in the geographical unity of survey. In Nigeria, Jane (2009) found that controlling schooling costs shows that household wealth has a positive effect on attendance at primary school. However, the income elasticity for girls is higher than for boys. In other words, when the possibilities of free education are offered, parents send their children to school.

In these analyses, whether poverty or imperfect capital markets or a combination of both, parental choice is usually limited to the simple dichotomy between work and education. This is the case, for example, in some studies in Côte d'Ivoire (Abou, 2016a; Nkamleu, 2009). School and work are not mutually exclusive. Children combine school and work. In general, their work can help finance their studies when the head of the household is unable to meet cost of education. This multi-activity is mainly practised in many developing countries. Therefore, studies estimating the explanatory factors of child labour consider the choices of parents (Guarcello *et al.*, 2010; Najeeb, 2007; Nkamleu, 2006).

Apart from poverty and human capital variables, the literature suggests other explanatory factors of child labour. These include parents' salaries, the demographic composition of the household, age of children etc (Lambert and Dumas, 2008; Soares *et al.*, 2012). This paper focuses on the key determinants of child labour. Thus, our contribution in this research is to review the determinants of child labour by measuring poverty by household expenditures per capita. This is based on specific data from surveys on child labour. Also, the paper separately estimates an equation for girls and boys to better assess the influence of the determinants of child labour by sex. This approach would better inform policies. The paper is organized as follows. Section 0 describes the employed methodology and presents the data. The estimation results are shown in Section 0. Section 0 concludes.

2. Econometric Methodology and Data

2.1. Econometric Methodology

This study used the Soares *et al.* (2012) model that is basis for the above-mentioned research. So, these authors consider an economy where the decision of the well-being of the household is taken unilaterally by the head of household. The one derives its utility and current consumption and human capital (education) from children. In its decision, the household is subject to two constraints based on budget and time. Poor households will send their children into the labour market to relieve the budget constraint (Basu and Van, 1998). In addition, these households must divide the time allocated to work and to education. In this case, households consider the future well-being of children (Baland and Robinson, 2000). However, our approach is to consider a combination of static and dynamic frameworks to explain child labour. Thus, Soares *et al.* (2012) highlight four main results: (1) the child is neither in school nor at work (none); (2) the child goes to school only, in other words, time is allocated exclusively to school and not at work (school only); (3) the child works only, otherwise its time is allocated exclusively to work and not in school (work only); and (4) the child goes to school and works. This last result assumed that the household shares the child's time between school and work (school and work).

Empirically, testing these theoretical results using econometric analysis has always been difficult due to lack of data on child labour in household surveys. In recent years, efforts to collect specific data on child labour have emerged through the Statistical Information and Monitoring Programme on Child Labour (SIMPOC) of ILO. The multinomial logit model has become a specification in response to data on child labour and school attendance (Zapata *et al.*, 2011). This specification assumes that the household compares the expected utilities of the choice of children's activity simultaneously. The unordered nature of categorical variables in this specification indicates that a household decides to children's activity in one step. Let us consider the static model where $n = 1, \dots, N$, household chooses modality $i = 1, \dots, J$ providing it the greatest utility. The model of the following form is called multinomial logit.

$$Y_{in} = \begin{cases} 1 & \text{si } U_{in} \geq U_{jn} \text{ pour } j = 1, \dots, J \\ 0 & \text{si non} \end{cases} \quad (1)$$

With, $U_{in} = \beta X_{in} + \varepsilon_{in}$, Y_{in}

denotes the choice observed, U_{in} is an unobservable random variable representing the utility of modality (i) as perceived by household (n); X_{in} is a vector $(1 \times K)$ of the explanatory variables which characterizes modality (i) and the household (n). These variables are the characteristics of the household, the characteristics of the head of the household, the demographic composition of the household, and the characteristics of the child, (β) being the

parameter to be estimated; ε_{in} is the error term ($\varepsilon_{in} \sim (0,1)$). In this paper, the following data consider the four categories of the dependent variable above:

- 1: Neither school nor work
- 2: School only
- 3: School and work
- 4: Work only

Since the modality neither school nor work (none) will be used as a category basis then the number of parameters to be estimated will be $(3 \times K)$ explanatory variables. Assume that the error term (ε_{in}) with are independent and identically distributed (iid) by Gumbel law, the equation to be estimated has this form:

$$P(Y_{ij} = J) = \frac{e^{\beta X_{in}}}{\sum_{j=1}^J e^{\beta X_{in}}} \tag{2}$$

An inconvenience with the multinomial logit model is that it requires the assumption of the Independence of the Irrelevant Alternatives (IIA) where the odds ratio resulting from the model remains the same, independently of the number of proposed choices (Maddala, 1986). Schooling and the alternative activities of child labour are substitutes. Consequently, the multinomial logit model can overestimate the likelihoods of selection of the decisions of the child’s activity. The pertinence of the specification of the multinomial logit can be tested using the Hausman-McFadden specification test for the presence of IIA (Hausman and McFadden, 1984).

2.2. Data

The general population census of 1998, the standard of living of households’ survey in 2002 and other surveys identified children aged 5-17 years as economically active. Studies are conducted to understand the nature and determinants of this early employment of children, especially in cocoa farming (Nkamleu, 2006). Since 2000 child labour has become a topic of interest for governments. National data are needed to understand the phenomenon and to act for the elimination of hazardous forms of child labour. The national survey on child labour in 2005 was a response to this requirement.

Implemented by the national institute of statistics and SIMPOC/ILO, this household survey has collected information covering 79% of the country. It was not possible to cover the whole country because of the conflict during the period of survey. Thus, considering the weight of the different zones based on the 1998 census, 4,600 households were interviewed in 79% of the country. Based on this database, we extracted information on 5,571 children aged 5-17 years who were economically active. Several questions in the questionnaire and the households with children helped identify these children.

To get information about child labour, we referred to Decree no. 2250 of 14 March 2005 which defines the list of hazardous child labour (Table-A1). Thus, all children aged 5-17 years in this list are in the child labour category. In addition, Côte d’Ivoire, in ratifying Convention no.138, has not set the maximum number of hours of work for these children. In this case, ILO recommends referring to national regulations on working hours for adults. In this study, all children aged 5-17 years who worked more than 40 hours per week are therefore in child labour category. In addition, children aged 5-13 years who spent more than 28 hours per week on household chores are also in child labour category. Thus, of the 5,571 economically active children identified in this study (Table), a total of 1,509 (27.09%) were in child labour category: 743 boys (27.04%) and 766 girls (27.14%). Also, among them, 768 (13.79%) combined school and work and 741 (13.30%) work only. Others (2,095 or 37.61%) were either at school only or they were neither in school nor at work (1,967 or 35.31%).

Table-1. Distribution of children for different categories of activities

| Categories | School only | | School and work | | Work only | | Total of child labour | | Neither school neither work | | Total | |
|--------------|--------------|--------------|-----------------|--------------|------------|--------------|-----------------------|-------------|-----------------------------|--------------|--------------|------------|
| | Number | % | Number | % | Number | % | Number | % | Number | % | Number | % |
| Sex | | | | | | | | | | | | |
| Boys | 1,127 | 41.01 | 438 | 15.94 | 305 | 11.10 | 743 | 27.04 | 878 | 31.95 | 2,748 | 49.33 |
| Girls | 968 | 34.28 | 330 | 11.70 | 436 | 15.44 | 766 | 27.14 | 1089 | 38.57 | 2,823 | 50.67 |
| Total | 2,095 | 37.61 | 768 | 13.79 | 741 | 13.30 | 1,509 | 27.0 | 1,967 | 35.31 | 5,571 | 100 |

Source: ENTE, Côte d’Ivoire (2005) and author’s calculations

This study highlights several variables based on the data presented from the literature. All variables used are presented in table.

Table-2. Descriptive statistics and measure of explanatory variable

| Variables | Measure | Whole | | Boys | | Girls | |
|--|--|---------|---------|---------|---------|---------|---------|
| | | Mean | S.E. | Mean | S.E. | Mean | S.E. |
| Characteristics of household | | | | | | | |
| Size of household | The total number of children | 4.166 | 2.329 | 4.239 | 2.287 | 4.094 | 2.368 |
| | Number of children aged 0–4 years | 0.861 | 1.029 | 0.856 | 1.052 | 0.866 | 1.006 |
| | Number of children aged 5–13 years | 2.399 | 1.535 | 2.419 | 1.561 | 2.381 | 1.510 |
| | Number of children aged 5–14 years | 0.904 | 1.039 | 0.902 | 1.033 | 0.907 | 1.045 |
| Income of household | Household expenditures per capita | 204,440 | 315,904 | 200,575 | 305,852 | 208,200 | 325,401 |
| Characteristics of household head | | | | | | | |
| Sex | 1 = Man | 0.777 | 0.415 | 0.804 | 0.396 | 0.751 | 0.432 |
| | 2 = Woman | 0.222 | 0.415 | 0.195 | 0.396 | 0.248 | 0.432 |
| Level of education | 0 = Uneducated | 0.538 | 0.498 | 0.544 | 0.498 | 0.533 | 0.498 |
| | 1 = Primary | 0.183 | 0.387 | 0.183 | 0.386 | 0.184 | 0.388 |
| | 2 = Secondary | 0.221 | 0.415 | 0.222 | 0.415 | 0.220 | 0.414 |
| | 3 = Higher | 0.056 | 0.229 | 0.050 | 0.218 | 0.061 | 0.240 |
| Employment | 1 = Permanent | 0.561 | 0.496 | 0.565 | 0.495 | 0.557 | 0.496 |
| | 0 = non-permanent | 0.138 | 0.345 | 0.134 | 0.341 | 0.143 | 0.350 |
| Type of employment | 0 = non-agricultural Employment | 0.341 | 0.474 | 0.339 | 0.473 | 0.343 | 0.474 |
| | 1 = permanent agricultural employment | 0.307 | 0.461 | 0.310 | 0.462 | 0.304 | 0.460 |
| | 2 = casual agricultural employment | 0.019 | 0.137 | 0.021 | 0.144 | 0.017 | 0.130 |
| | 3 = seasonal and temporary agricultural employment | 0.024 | 0.155 | 0.023 | 0.150 | 0.026 | 0.159 |

Tableau-2. Continuation

| Area of residence and spatial localization | | | | | | | |
|---|--|--------|--------|--------|--------|--------|--------|
| Area of residence | 1 = Urban | 0.467 | 0.499 | 0.440 | 0.496 | 0.495 | 0.500 |
| | 2 = Rural | 0.532 | 0.499 | 0.559 | 0.496 | 0.505 | 0.500 |
| Spatial localization | 0 = South with Abidjan | 0.146 | 0.353 | 0.159 | 0.366 | 0.133 | 0.340 |
| | 1 = South Abidjan | 0.314 | 0.464 | 0.304 | 0.460 | 0.324 | 0.468 |
| | 2 = Centre-South-West | 0.328 | 0.469 | 0.319 | 0.466 | 0.336 | 0.472 |
| | 3 = Centre-North-East | 0.210 | 0.407 | 0.216 | 0.412 | 0.204 | 0.403 |
| Characteristics of child | | | | | | | |
| Age | Past year | 10.507 | 3.695 | 10.372 | 3.670 | 10.640 | 3.715 |
| Age square / 100 | | 1.240 | 0.806 | 1.210 | 0.798 | 1.270 | 0.813 |
| Sex | 1 = boys | 0.493 | 0.499 | | | | |
| | 2 = girls | 0.506 | 0.499 | | | | |
| Nationality | 1 = Ivorian | 0.814 | 0.388 | 0.819 | 0.384 | 0.810 | 0.392 |
| | 2 = non-Ivorian | 0.185 | 0.388 | 0.180 | 0.384 | 0.189 | 0.392 |
| Orphan status | 1 = Orphan | 0.140 | 0.347 | 0.132 | 0.338 | 0.149 | 0.356 |
| | 0 = Non-orphan | 0.859 | 0.347 | 0.867 | 0.338 | 0.850 | 0.356 |
| Costs of schooling | | | | | | | |
| Education expenditures | Average education expenditure by individuals provided with education in CFAF | 56,190 | 72,568 | 55,365 | 65,278 | 56,995 | 79,026 |

Source: Author's according to the literature review

3. Results and Discussion

As indicated in Table 1, the IIA hypothesis was not rejected (Hausman and McFadden, 1984; Long and Freese, 2006). Thus, we proceed with the interpretation of the results of the multinomial logit (Table-A3).

Table 1. Hausman and McFadden IIA test

| Modalities | Results | Conclusion |
|-----------------|----------------------------------|------------|
| School only | $\text{Chi}^2(50) = -0.0027 < 0$ | Accepted |
| School and work | $\text{Chi}^2(50) = -4.13 < 0$ | Accepted |
| Work only | $\text{Chi}^2(50) = -14.00 < 0$ | Accepted |

Source: ENTE, Côte d'Ivoire (2005) and author's calculations.

The results of the multinomial logit estimation using the maximum likelihood method indicate an acceptable quality adjustment (Table-A2). Indeed, $\text{Prob} > \text{chi}^2 = 0.0000$ shows that the estimated coefficients of the equations are simultaneously different from zero. The parameters of the multinomial logit are difficult to interpret because neither the sign nor the significance of the parameters has intuitive sense. A direct interpretation of the estimated

parameters based on the calculation of the odds ratio exists. However, systematically comparing each category with the reference one sometimes complicates the reading of the results. We interpreted the marginal effects of explanatory variables on the probability of selection for each category. To facilitate reading and some comparisons, we summarized the results of the marginal effects in the Table-A3.

In poor households, when the total number of children increases, some of them go to school and others are sent to the labour market, usually boys (Moyi, 2010; Zapata *et al.*, 2011). Indeed, an additional child in the household significantly reduces the probability of school attendance and increases the one of combined school and work. In addition, the probability of enrolment of boys decreased significantly and the work increased. This result is similar for boys aged 5-13 years. It could be explained by the fact that boys are more likely to help with household work that requires more physical effort (Diallo, 2001). There is also the fact that in our traditional societies, when a household has many boys, some remain outside school to learn and perpetuate the business of the father. Girls on the other hand are usually confined to household chores (Lambert and Dumas, 2008).

The household expenditures per capita used as a proxy for income indicate expected results. Indeed, in the whole sample, extra household expenses significantly increased the chances of education for children and decreased those of working. However, income significantly affects only the work of boys. Indeed, the probability of attending school increases and decreases significantly among boys. This result thus shows that the luxury axiom is confirmed (Goulart and Arjun, 2008; Guarcello *et al.*, 2010) but specifically among boys. In other words, parents send boys to the labour market when income is insufficient to satisfy household consumption. In our estimation, the result among the girls agrees with the luxury axiom but is not significant. This result may be due to the sample used in this research. In addition, we did not consider the income received by women as Irineu and Carvalho (2012) did. Working in Brazil, this author showed that when women earn additional income from social policies, the probability of girls working decreased significantly. Our study considered the household expenditures per capita. So, new estimations with post crisis data will therefore redirect the discussion.

In our study, being a woman promoted child labour when she was the head of household. Indeed, the probability of child labour increased significantly. Specifically, the probability of girls working increased significantly. In addition, the chances that these girls would attend school decreased. These results show that women and their daughters work together Ray (2000) to support some negative shocks such as the household vulnerability during the crisis. This result contrasts with other studies in the literature. Indeed, some studies indicate a substitution between the work of girls and that of their mothers (Lambert and Dumas, 2008). In this case, girls working in the household generally allowed mothers to participate in the labour market.

The positive effect of educational level of the household head on the education of children is important in this paper. Indeed, an increase in the level of education of household head significantly increased the probability of enrolment of children. Moreover, these increased levels significantly decreased the probability of child labour. This is a fundamental result that shows the importance of education of the household head in the explanation of child labour (Nkamleu, 2009; Zapata *et al.*, 2011). At a high level of education, the household head considers the child's future well-being (Baland and Robinson, 2000). Considering the sex of the child, our results indicate that increasing the level of education of the household head had a much more significant impact on the reduction of the boy's work. At this level, only the secondary level of the head of household significantly reduces the probability of girls' work. However, the primary level and the higher level do not give significant results even if they negatively affect girls' work.

The permanent employment of the household head positively and significantly affected the probability of child labour. For example, when the head of household had permanent employment, the probability of the child combining school and work increased and work only also increased. The precarious employment can justify this positive relationship between permanent employment and child labour. By decomposing the type of employment (permanent agricultural employment and casual agricultural employment), it appears that the occasional farm employment significantly promotes the combination of work and school and work only. However, when the permanent employment is agricultural, the probability of child labour decreased significantly and especially for girls. In other words, parents with permanent agricultural employment do not use children particularly girls. In fact, given the crisis, parents used inexpensive adult labour because of the internal migration of population. Thus, these results indicate that parents and child work together when the opportunity arises. This is also one of the reasons for the significant positive relationship between casual agricultural employment and child labour. This result contrasts with those of other studies that show that agriculture is the source of employment of children Diallo (2001); Okurut and Yinusa (2009).

The effect of area residence and spatial localization is considering in this paper. Thus, our result shows that urban areas promote children's schooling. Indeed, in these areas, the odds of children attending school increased significantly. Similarly, regardless of sex, the probability increased with a more significantly robust result among girls. Urban areas also significantly reduced the probability of child labour. This study agrees with those of some authors Diallo (2001); Nkamleu (2009) showing that rural areas favour child labour because of lack of infrastructure. Depending on the geographical location, the probability of child labour in southern region decreased significantly. The probability of combining work and school decreased. However, the likelihood of boys' work rose while it declined among girls. Indeed, in this region, girls' work was sometimes invisible (i.e., it was difficult to consider the hazardous work in the household chores in survey). This suggests that this area is more favourable to boys' work. In the rest of the regions the chance of combining school and work or work only increased significantly regardless of the sex of the child. These results show that the North-East-Centre of the country (savannah) promotes child labour less than other regions do. In addition, the Centre-South-West region is the agricultural zone. This significantly

facilitates the work of boys significantly. This result may be due to the paradox of wealth (Bhalotra and Heady, 2003; Luiz *et al.*, 2015; Oryoe *et al.*, 2017). Indeed, in this area households have fertile lands. Thus, the paradox of wealth deserves to be reconsidered in other future studies because Nkamleu (2006) found a mixed result in the case of Côte d'Ivoire.

As expected, age and age squared were significant for all categories of activity. Thus, overall, the probability of school enrolment increased in the first instance and strongly decreased the second time. In addition, the likelihood of work only increased slightly in the first instance and decreased the second time. These results reflect the fact that children perform manual tasks thus increasing age, the more they can work. In other words, households send older children to the labour market and the youngest to school Soares *et al.* (2012). According to gender, our estimates indicated that the probability of enrolment of younger boys in school was significantly higher than that of girls at a young age. However, as age increases, the probability of enrolment of boys decreased more strongly than that of girls. In addition, the odds of working of younger boys decline slightly and those older increased. Among the girls, the chance of younger girls working increased, but it decreased among older girls. One reason for this is that older boys are sent to the labour market and the girls of this age are directed to marriage. The youngest girls were engaged in the household chores. There is thus substitutability between the younger working children and the older ones. The work of younger children enables older ones who are married to undertake other forms of activity (Lambert and Dumas, 2008). The probability of combining school and work increased when children were younger and decreased with increasing age. In fact, the younger children were more educated, so parents sent them to labour market to finance their schooling.

Nationality of children can influence their choice of activity by the heads of households. Indeed, the probability of child labour of Ivorian children decreased overall. However, the odds of these children enrolling in school increased overall and among girls and boys. This low propensity of Ivorian children to work is explained by the fact that many of them are not sent to the labour market. Indeed, these children may receive support from relatives or the state. As for no-Ivorian children, parents are self-employment in the informal sector. They most therefore use the labour of their children. Indeed, in the informal sector, the economic viability is based on mother's help (Diallo, 2001). In addition, with the loss of one or both parents, orphans may become vulnerable if they are not supported by relatives. Indeed, an orphan is less likely to attend school regardless of sex than other children are. However, the likelihood of combining school and work decreased significantly among all children. This probability also declined strongly and significantly among girls. This case could be explained by the fact that in our society, parents tend to take care of children of deceased parents. Thus, orphans can benefit from support to enable them to work less.

As indicated in Table-A3, the increased costs of schooling significantly and negatively affected the odds of education for children in general, and among girls and boys. However, this increase in the cost of schooling increased the probability of combining school and work for all children or to work only. This result suggests that the direct costs of schooling represent a burden for most poor households. Parents therefore send their children to labour market to finance their education. In Côte d'Ivoire, many children are out of school due to the cost of education (Abou, 2016b; Nkamleu, 2009).

In total, the multinomial logit gave results are consistent with those found in the literature but are sometimes mixed. Given these results, the next section presents policies to enable governments and policy makers to take appropriate measures.

4. Conclusion

Using 2005 data from the national survey on child labour and a multinomial logit, this paper has highlighted the determinants of child labour in Côte d'Ivoire. The results show that poverty explains child labour. That is why the poorest regions favour the phenomenon more. However, the probability that boys work is higher than that of girls. This paper confirms the explanatory power of education of parents in the fight against child labour. One of the fundamental results of this research is that the permanent employment of the household head increases the probability of child labour. However, when that permanent employment is in agriculture, it reduces the likelihood of child labour and significantly for girls. In addition, when farm employment is casual, children of either sex are sent to labour market. Our estimates also showed that the high cost of schooling is a barrier to children's school attendance.

Combating child labour must involve a set of policies in synergy. Specifically, adult education initiatives should be strengthened. Indeed, literacy policy and advocacy should allow adults to understand the positive externalities of education. These factors will also improve agricultural production. However, the problem of household poverty remains. Employment is sometimes precarious and poor households are forced to send their children to work. To improve living conditions, agricultural employment can be useful. Thus, policy makers can modernize agriculture for example. This strategy will allow the use of modern technology inaccessible to children and improve agricultural productivity. With a guaranteed minimum price for agricultural production poor households will earn higher incomes. In addition, targeted free schooling is required. Given the effect of the political crisis of 2002-2010 on the economy, the priority of free schooling may be given to poor regions. The initiative will focus on the construction of school canteens to allow pupils in primary to have a full meal a day. One strategy is to equip schools in these areas with libraries, giving pupils access to books. Parents will partially or completely reduce their spending on education. The enrolment of girls is still resented in some poor areas. To prevent the girls being used as substitutes for their mothers in household chores, awareness must be increased them. At this level, policy makers can use the local language, given the proliferation of radio stations. In addition, the development of income-generating activities for

women is needed. One possibility is to develop subsistence agriculture for women. Thus, in addition to raising awareness about schooling, the income received will enable them to enrol their daughters.

Finally, the fight against child labour should be built and strengthened in social programmes of policy makers of Côte d'Ivoire. Child labour is actual. The establishment and the development of several programs targeting poor households are necessary for the elimination of child labour.

Acknowledgment

I wish to express my deep appreciation to African Economic Research Consortium (AERC) for the financial support to carry out this research. I am also grateful to the resource persons and members of AERC's thematic group A for various comments and suggestions that helped the evolution of this study from its inception to completion. I am indebted to the anonymous referees who reviewed the paper and provided comments and suggestions that helped in shaping and improving the overall quality of the paper. The findings made and opinions expressed in this paper are exclusively those of the author. The author is also solely responsible for content and any errors.

References

- Abou, P. E. (2016a). Does the unavailability of educational resources in schools determine child labor in sub-saharan africa? A micro-econometric analysis from côte d'ivoire pdf logo. *International Journal of Economics & Management Sciences*, 5(2): 326.
- Abou, P. E. (2016b). Does domestic work affect the academic performance of girls in primary school in côte d'ivoire? Empirical evidence from probit model. *European Scientific Journal*, 12(35): 368-81.
- Baland, J. M. and Robinson, J. A. (2000). Is child labor inefficient. *Journal of Political Economy*, 108(4): 663-79.
- Bandiera, O., Burgess, R., Das, N., Gulesci, S., Imran, R. and Munshi, S. (2017). Labor markets and poverty in village economies. *The Quarterly Journal of Economics*, 132(2): 811–70.
- Basu, K. and Van, P. H. (1998). The economics of child labor. *The American Economic Review*, 88(3): 412-27.
- Bhalotra, S. and Heady, C. (2003). Child farm labor: The wealth paradox. *The World Bank Economic Review*, 17(2): 197–227.
- Crépon, B., Devoto, F., Duflo, E. and Parienté, W. P. (2015). Estimating the impact of microcredit on those who take it up: Evidence from a randomized experiment in morocco. *American Economic Journal: Applied Economics*, 7(1): 123-50.
- Diallo, Y. (2001). Les déterminants du travail des enfants en Côte d'Ivoire. Available: <http://ged.u-bordeaux4.fr/ceddt55.pdf>
- Emerson, P. M. and Souza (2003). Is there a child labor trap? Intergenerational persistence of child labor in brazil. *Economic Development and Cultural Change*, 51(2): 376-98.
- Ersado, L. (2005). Child labor and schooling decisions in urban and rural areas: Comparative evidence from nepal, peru, and zimbabwe. . *World Development*, 33(3): 455-80.
- Goulart, P. and Arjun, S. B. (2008). Child labour and educational success in portugal. *Economics of Education Review*, 27(5): 575-87.
- Guarcello, L., Fabrizia, M. and Rosati, F. C. (2010). Household vulnerability and child labor: the effect of shocks, credit rationing, and insurance. *Journal of Population Economics*, 23(1): 169–98.
- Hausman, J. and McFadden, D. (1984). Specification Tests for the Multinomial Logit Model. *Econometrica*, 52(5): 1219-40.
- INS (2015). *Enquete sur le niveau de vie des ménages en Cote d'Ivoire ENV2015*. Institut National de la Statistique: Abidjan.
- Irineu, E. and Carvalho, F. (2012). Household income as a determinant of child labor and school enrollment in brazil: Evidence from a social security reform. *Economic Development and Cultural Change*, 60(2): 399-435.
- Jane, A. L. (2009). Determinants of schooling for boys and girls in Nigeria under a policy of free primary education. *Economics of Education Review*, 28(4): 474-84.
- Kazianga, H., Damien, d. W. and Harold, A. (2012). Educational and child labour impacts of two food-for-education schemes: Evidence from a randomised trial in rural burkina faso. *Journal of African Economies*, 21(5): 723–60.
- Lambert, S. and Dumas, C. (2008). *Le travail des enfants : quelles politiques pour quels résultats ? éd. Editions rue d'Ulm, CEPREMAP*. Laboratoire d'Economie Appliquée: Paris. 75.
- Long, J. S. and Freese, J. (2006). *Regression Models for Categorical Dependent Variables using Stata*. 2nd Edition éd. StataCorp LP ednStata Press books.
- Luiz, R. L., Shirley, M. and Marianne, W. (2015). Child labor and the wealth paradox: The role of altruistic parents. *Economics Letters*, 130: 80-82.
- Maddala, G. S. (1986). *Limited-dependent and qualitative variables in econometrics éd. Cambridge university press*. Cambridge Books: Cambridge.
- Moyi, P. (2010). Household characteristics and delayed school enrollment in Malawi. *International Journal of Educational Development*, 30(3): 236-42.
- Najeeb, S. (2007). Household schooling and child labor decisions in rural Bangladesh. *Journal of Asian Economics*, 18(6): 946-66.

- Nkamleu, G. B. (2006). Poverty and child farm labour in africa, Wealth paradox or bad orthodox. *African Journal of Economic Policy*, 13(1): 1-24.
- Nkamleu, G. B. (2009). Determinants of child labour and schooling in the native cocoa households of côte d'ivoire. Nairobi. *African Economic Research Consortium*: Available: <https://aercafrica.org/wp-content/uploads/2018/07/RP190.pdf>
- Okurut, F. N. and Yinusa, D. (2009). Determinants of child labour and schooling in botswana: Evidence from 2005/2006 labour force survey. *Botswana Journal of Economics*, 6(10): 15-33.
- Oryoie, A. R., Jeffrey, A. and Nicolaus, T. (2017). Child labor and household land holding: Theory and empirical evidence from zimbabwe. *World Development*, 100: 45-58.
- Ranjan, P. (1999). Credit constraints and the phenomenon of child labor. *Journal of Development Economics*, 64(1): 81-102.
- Ray, R. (2000). Child labor, child schooling, and their interaction with adult labor: Empirical evidence for peru and pakistan. *The World Bank Economic Review*, 14(2): 347-67.
- Soares, R. R., Kruger, D. and Berthelon, M. (2012). Household choices of child labor and schooling. *The Journal of Human Resource*, 47(1): 1-31.
- Tzannatos, Z. (2003). Child labor and school enrollment in Thailand in the 1990s. *Economics of Education Review*, 22(5): 523-36.
- Zapata, Z., Dante, C. and Kruger, D. (2011). Child labor and schooling in bolivia: Who's falling behind? The roles of domestic work, gender, and ethnicity. *World Development*, 39(4): 588-99.

Appendices

Table-A1. Decree No 2250 of 14 March 2005 on the determination of the list of dangerous work prohibited for children aged less than 18 years

| Sector of study | Dangerous work |
|-------------------------------------|--|
| Agriculture and Forestry | Felling trees Burning fields Spreading chemicals (insecticide, weed killer, fungicide, dewormed, etc.) Spreading chemical fertilizers; Chemical treatment of seedbeds; Carrying heavy loads. |
| Mines | Drilling and launching mines Transporting fragments or blocks of stone Crushing Mining ore using chemicals such as sodium cyanide, sulphuric acid and sulphur dioxide Work in underground mines. |
| Trade and the Domestic Urban Sector | The sale of pornography Work in bars Recovery of objects in refuse tips |
| Craft Industry | Fitting, grinding, draining, sharpening, rolling, engine overhaul, etc. Manufacturing and repair of firearms Producing charcoal and logging; Motorized leather sandpapering and tanning leather Dyeing and printing. |
| Transport | The apprentice minibus activity commonly known as "gbaka" |

Source: The author based on the Decree no 2250 about dangerous work

Table-A2. Regression coefficients of the multinomial logit of determinants of child labour of aged 5-17 years

| Variables | All children | | | Girls | | | Boys | | |
|---|----------------------|--------------------|----------------------|--------------------|-------------------|----------------------|----------------------|-------------------|----------------------|
| | School only | School and work | Work only | School only | School and work | Work only | School only | School and work | Work only |
| | Coef. | Coef. | Coef. | Coef. | Coef. | Coef. | Coef. | Coef. | Coef. |
| Characteristics of household | | | | | | | | | |
| nbrefts | -0.034** (-2.29) | 0.050*** (2.62) | 0.033 (1.54) | -0.030 (-1.51) | 0.046* (1.70) | 0.010 (0.36) | -0.040* (-1.87) | 0.056** (2.06) | 0.069** (2.11) |
| nbr04 | -0.099*** (-2.91) | 0.018 (0.40) | -0.002 (-0.05) | -0.045 (-0.96) | 0.043 (0.61) | 0.0003 (0.00) | -0.151*** (-3.12) | -0.006 (-0.10) | 0.012 (0.16) |
| nbr513 | 0.028 (1.27) | 0.068** (2.25) | 0.048 (1.48) | 0.042 (1.34) | 0.025 (0.56) | -0.006 (-0.14) | 0.015 (0.45) | 0.104** (2.49) | 0.113** (2.14) |
| nbr1417 | -0.017 (-0.54) | -0.035 (-0.75) | -0.064 (-1.33) | 0.022 (0.52) | -0.018 (-0.28) | -0.035 (-0.56) | -0.061 (-1.31) | -0.055 (-0.84) | -0.086 (-1.13) |
| dep_m | -0.124* (-1.64) | 0.079 (0.76) | -0.126* (-1.67) | 0.115 (1.08) | 0.027 (0.18) | 0.009 (0.06) | 0.145** (2.13) | 0.125 (0.86) | -0.130** (-2.10) |
| Characteristics of head of household | | | | | | | | | |
| femme (*) | -0.112 (-1.30) | 0.137 (1.19) | 0.193* (1.64) | -0.219* (-1.86) | 0.380** (2.39) | 0.272* (1.83) | 0.018 (0.14) | -0.104 (-0.62) | 0.058 (0.30) |
| primary (*) | 0.655*** (7.22) | 0.143 (1.12) | -0.283** (-2.11) | 0.715*** (5.68) | 0.270 (1.46) | 0.072 (0.42) | 0.581*** (4.42) | -0.025 (-0.14) | -0.897*** (-3.89) |
| second (*) | 0.743*** (8.54) | -0.033 (-0.26) | -0.807*** (-5.43) | 0.894*** (7.33) | 0.143 (0.77) | -0.632*** (-3.24) | 0.619*** (4.93) | -0.238 (-1.32) | -1.085*** (-4.71) |
| sup (*) | 1.194*** (7.51) | -0.424 (-1.33) | -0.490* (-1.64) | 1.149*** (5.66) | -0.415 (-0.99) | -0.184 (-0.55) | 1.293*** (5.01) | -0.454 (-0.92) | -1.551** (-2.05) |

Table-A2. (continuation)

| | | | | | | | | | |
|---------------------------------|-----------------------|------------------------|----------------------|-----------------------|------------------------|----------------------|-----------------------|------------------------|----------------------|
| permn (*) | -0.099 (-1.14) | 0.619*** (5.22) | 0.577*** (4.79) | -0.138 (-1.13) | 0.668*** (3.79) | 0.519*** (3.34) | -0.066 (-0.53) | 0.590*** (3.59) | 0.700*** (3.60) |
| agripermn (*) | -0.008 (-0.09) | -0.184 (-1.51) | 0.319** (2.52) | -0.044 (-0.34) | -0.166 (-0.94) | -0.394** (-2.38) | 0.037 (0.27) | -0.182 (-1.06) | -0.244 (-1.24) |
| agrio (*) | -0.193 (-0.66) | 1.572*** (5.06) | 1.451*** (4.47) | -0.138 (-0.35) | 1.679*** (3.73) | 0.973** (2.09) | -0.219 (-0.51) | 1.567*** (3.66) | 2.142*** (4.69) |
| agrist (*) | -0.326 (-1.52) | 0.057 (0.17) | 0.457 (1.56) | -0.177 (-0.65) | -0.001 (-0.00) | 0.303 (0.76) | -0.558* (-1.66) | 0.080 (0.17) | 0.627 (1.44) |
| Area of residence | | | | | | | | | |
| urbain (*) | 0.249*** (3.26) | -1.311*** (-11.28) | -1.121*** (-9.69) | 0.275*** (2.59) | -1.104*** (-6.79) | -0.931*** (-6.17) | 0.206* (1.85) | -1.543*** (-9.18) | -1.395*** (-7.55) |
| Spatial localization | | | | | | | | | |
| sud_abj (*) | -0.044 (-0.42) | -1.013*** (-5.39) | -0.697*** (-4.14) | 0.007 (0.04) | -0.683** (-2.51) | -0.658*** (-2.95) | 0.109 (0.72) | 1.289*** (4.93) | 0.750*** (2.90) |
| sudoc (*) | -0.133 (-1.41) | 0.370*** (2.86) | 0.034 (0.26) | -0.128 (-0.98) | 0.267 (1.41) | -0.030 (-0.17) | -0.026 (-0.16) | 1.745*** (7.37) | 0.867*** (3.50) |
| ctrne (*) | 0.051 (0.49) | 0.323** (2.15) | 0.479*** (3.31) | 0.003 (0.02) | 0.368* (1.69) | 0.432** (2.26) | 0.207 (1.27) | 1.549*** (6.20) | 1.271*** (4.98) |
| Characteristics of child | | | | | | | | | |
| Age | 1.088*** (17.57) | 1.739*** (17.49) | 0.619*** (6.58) | 0.942*** (11.15) | 1.913*** (12.21) | 0.796*** (6.14) | 1.227*** (13.43) | 1.662*** (12.45) | 0.405*** (2.87) |
| age2/100 | -4.831*** (-16.70) | -6.883*** (-15.54) | -1.680*** (-4.10) | -4.303*** (-10.92) | -7.681*** (-11.02) | -2.459*** (-4.43) | -5.334*** (-12.46) | -6.493*** (-10.86) | -0.699 (-1.12) |
| fille (*) | -0.452*** (-6.67) | -0.549*** (-5.84) | 0.154* (1.64) | | | | | | |
| ivoir (*) | 0.354*** (3.80) | 0.848*** (5.50) | -0.667*** (-5.90) | 0.198 (1.53) | 0.601*** (2.73) | -0.724*** (-4.82) | 0.525*** (3.95) | 1.103*** (5.07) | -0.623*** (-3.56) |
| orph (*) | -0.294*** (-2.92) | -0.307** (-2.27) | -0.051 (-0.37) | -0.252* (-1.81) | -0.483** (-2.44) | -0.117 (-0.66) | -0.312** (-2.07) | -0.186 (-0.96) | 0.024 (0.11) |
| Cost of schooling | | | | | | | | | |
| dep_ed | 0.134* (1.68) | 0.434*** (3.74) | 0.689*** (5.67) | 0.041 (0.35) | 0.392** (2.36) | 0.479*** (2.93) | 0.204* (1.69) | 0.519*** (3.13) | 0.987*** (5.27) |
| _cons | -6.749*** (-10.51) | -13.956*** (-14.49) | -7.880*** (-8.32) | -5.923*** (-6.68) | -14.877*** (-10.51) | -7.848*** (-6.05) | -8.159*** (-8.52) | -15.585*** (-11.29) | -8.786*** (-5.94) |
| Log pseudo-likelihood | -6025.029 | | | -3104.431 | | | -2869.626 | | |
| Number of observation | 5,571 | | | 2,823 | | | 2,748 | | |
| Wald chi2(69) | 1743.04 | | | Wald chi2(66) | 833.56 | | Wald chi2(66) | 910.75 | |
| Prob> chi2 | 0.0000 | | | 0.0000 | | | 0.0000 | | |
| Pseudo R ² | 0.1530 | | | 0.1367 | | | 0.1757 | | |

Source: ENTE, Côte d'Ivoire (2005) and author's calculations

Note

*** significant at 1%; ** significant at 5%; and * significant at 10%.

0: Neither school nor work is the reference category of the children's activity.

Z-statistics in bracket is the ratio between the coefficient of estimated parameters and standard deviation.

Table-A3. Marginal effect of multinomial logit of determinants of child labour aged 5-17 years

| Variables | All children | | | Girls | | | Boys | | |
|---|--------------------|------------------------|------------------|--------------------|------------------------|------------------|--------------------|------------------------|------------------|
| | (1) School only | (2) School and Work | (3) Work only | (4) School only | (5) School and Work | (6) Work only | (7) School only | (8) School and work | (9) Work only |
| Characteristics of household | | | | | | | | | |
| nbrefts | -0.010** | 0.006*** | 0.003 | -0.008 | 0.005* | 0.001 | -0.013* | 0.007** | 0.006** |
| nbre04 | -0.020*** | 0.006 | 0.003 | -0.010 | 0.006 | 0.0008 | -0.031*** | 0.007 | 0.005 |
| nbre513 | 0.001 | 0.005** | 0.002 | 0.008 | 0.001 | -0.003 | -0.006 | 0.008** | 0.007** |
| nbre1417 | -0.0003 | -0.001 | -0.005 | 0.006 | -0.002 | -0.004 | -0.007 | -0.0009 | -0.004 |
| dep_m | 0.023* | 0.004 | -0.011* | 0.021 | -0.002 | -0.004 | 0.026** | 0.009 | -0.018** |
| Characteristics of head of household | | | | | | | | | |
| femme (*) | -0.035 | 0.015 | 0.020* | -0.067* | 0.036** | 0.031* | 0.008 | -0.014 | 0.006 |
| primary (*) | 0.135*** | -0.008 | -0.054** | 0.128*** | -0.002 | -0.025 | 0.145*** | -0.015 | -0.090*** |
| second (*) | 0.179*** | -0.018 | -0.104*** | 0.195*** | -0.004 | -0.108*** | 0.170*** | -0.036 | -0.102*** |
| sup (*) | 0.276*** | -0.086 | -0.080* | 0.248*** | -0.074 | -0.055 | 0.332*** | -0.087 | -0.155** |
| permn (*) | -0.067 | 0.054*** | 0.046*** | -0.070 | 0.054*** | 0.048*** | -0.066 | 0.054*** | 0.046*** |
| agriperm (*) | 0.017 | -0.011 | -0.027*** | 0.012 | -0.005 | -0.039** | 0.024 | -0.017 | -0.017 |
| agri (*) | -0.159 | 0.137*** | 0.114** | -0.123 | 0.137*** | 0.077** | -0.193 | 0.139*** | 0.147*** |
| agrist (*) | -0.084 | 0.010 | 0.055 | -0.046 | -0.0008 | 0.041 | -0.136* | 0.025 | 0.066 |
| Area of residence | | | | | | | | | |
| urbain (*) | 0.148*** | -0.120*** | -0.089*** | 0.128*** | -0.089*** | -0.090*** | 0.167* | -0.152*** | -0.086*** |
| Spatial localization | | | | | | | | | |
| sud_abj (*) | 0.061 | -0.086*** | -0.044*** | 0.050 | 0.048*** | -0.059*** | -0.070 | 0.121*** | 0.029*** |
| Sudoc (*) | -0.044 | 0.043*** | -0.0003 | -0.033 | 0.029 | -0.004 | -0.126 | 0.177*** | 0.033*** |
| ctrne (*) | -0.021 | 0.020** | 0.038*** | -0.029 | 0.024* | 0.040** | -0.080 | 0.133*** | 0.064*** |
| Characteristics of child | | | | | | | | | |
| age | 0.119*** | 0.115*** | -0.016*** | 0.089*** | 0.125*** | 0.010*** | 0.146*** | 0.109*** | -0.039*** |
| age2/100 | -0.606*** | -0.449*** | 0.157*** | -0.487*** | -0.499*** | -0.062*** | -0.706*** | -0.418*** | 0.243*** |
| fille (*) | -0.072*** | -0.039*** | 0.043* | | | | | | |
| ivoir (*) | 0.056*** | 0.086*** | -0.097*** | 0.046 | 0.064*** | -0.103*** | 0.064*** | 0.108*** | -0.091*** |
| orph (*) | -0.044*** | -0.017** | 0.012 | -0.028* | -0.033** | 0.007 | -0.054** | -0.004 | 0.015 |
| Cost of schooling | | | | | | | | | |
| dep_ed | -0.019* | 0.024*** | 0.054*** | -0.024 | 0.024** | 0.043*** | -0.016* | 0.025*** | 0.063*** |
| Number of observation | 5,571 | | | 2,823 | | | 2,748 | | |

Source: ENTE, Côte d'Ivoire 2005; author's calculations