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

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Abstract

Despite the political fight against child labour in recent years, this phenomenon remains a concern in Côte d'Ivoire. Several factors explain this social scourge. 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. The estimated multinomial logit showed that household poverty remains a determinant of child labour. In addition, the phenomenon is more obvious in poor areas. However, the results are not very robust. The vulnerability of households encourages parents to send more boys into the labour market than girls. Besides household poverty, education level of the household head also explains child labour with more robust results. The permanent employment of the household head also influences child labour. This indicates that parent's employment is precarious. However, when the employment is in agriculture, child labour decreases significantly, especially that of girls. These results indicate that policy makers should implement policies to fight against child labour and promote schooling. For example, policy makers must strengthen adult literacy, agricultural intensification and further targeted free education to improve the living conditions of households. Thus, parents can educate their children rather than sending them to the labour market.

JEL classification: C35, J22, J23
Key words: Child labour, Multinomial logit, Côte d'Ivoire

1. Introduction

Child labour is a global problem that raises a challenge to development. According to the latest estimation by the International Labour Organization (ILO), 13.6% of children aged 5–17 are in child labour category (Diallo et al., 2011). This phenomenon is also a modern scourge despite the decline from 16% to 13.6%. However, in sub-Saharan Africa, child labour remains a concern. According to ILO (Diallo et al., 2011), all regions of the world have experienced a significant decrease in the rate of child labour except sub-Saharan Africa. In this region compared to others (13.3% in Asia and Pacific, 10% in Latin America and the Caribbean and 6.7% in other regions), the rate of employment of children aged 5–17 remains the highest (25.3%). Côte d'Ivoire is not exempt from this social phenomenon. Indeed, like most sub-Saharan African countries, it has a predominantly agricultural economy (INS, 2008). Moreover, it is in the agriculture sector that the problem of child labour proved acute in the 2000s. Since then, the magnitude of the problem has increased. In 2000, for example, according to the multiple indicator survey of National School of Statistics and Applied Economics (ENSEA,2000), 40% of children in Côte d'Ivoire were in child labour category.

Generally in Africa, child labour is part of education and socialization (Schlemmer, 1996). However, socio-economic crises in some African countries in recent years have favoured the employment and exploitation of children. In literature, this concept has several definitions (Bhukuth, 2009). While some authors use the ILO definition (Grootaert, 1998; Ray, 2000a; Diallo, 2001), others retain the economic and labour intensity (Edmonds and Turk, 2002; Ray, 2002). More and more studies use the dangerous nature (Najeeb, 2007), economic activities and household chores (Guarcello et al., 2010; Zapata et al., 2011) to define child labour. In this research, our definition will be based on several criteria: (1) Dangerous nature activities prohibited to all children aged 5–17 by decree no. 2250 of 14 March 2005 (Table A1 in appendices); and (2) Dangerous intensive activities whether in field of System of National Account (SNA) production boundary or not (Figure A2 in appendices). In other words, our definition takes into account household chores under the Child Labour Convention No. 190[1] according to ILO. Thus, child labour is all dangerous nature or intensive activities carried out by children aged 5–17.

Education and poverty are two fundamental axes in the context of the Millennium Development Goals (MDGs). Côte d'Ivoire, like other developing countries, is characterized by household poverty. For example, the poverty rate increased from 38.4% in 2002 to 48.9% in 2008 (INS, 2008). At this rate, it would be difficult for these households to send their children to school. In 2008, for example, 30% of children aged 5–17 were not attending school (INS, 2008). These minors were thus exposed to child

labour. It is therefore important to consider the explanatory factors of child labour in Côte d'Ivoire. The questions to address are: Does household poverty constrain children to the labour market? Is it the low level of education of household heads or a combination of factors?

The interest of this paper is its link with the development both on the human and economic terms. Childhood is a critical stage of life and it must be respected and honoured. Training is the basis for a transition to a productive adulthood. Thus, the early participation of children in the labour market can be a disinvestment in human capital formation with an associated detrimental effect on future private and social returns. Studies on the determinants of child labour in Côte d'Ivoire exist (Grootaert, 1998; Diallo, 2001; Nkamleu, 2005, 2006, 2009). However, the various crises (economic, social and political) in recent years have made society more vulnerable. In addition, with few robust results and the development of the methodology of national survey on child labour, it is necessary to reconsider the determinants of child labour. Thus, this study aims to identify the explanatory factors of child labour for a better understanding of the phenomenon and policy targeting the groups concerned. Specifically, the study intended to (1) assess the vulnerability of households that contribute to child labour; and (2) identify human capital variables that influence child labour. Fundamentally, this paper will test the hypothesis that the factors that reduce the standard of living of households encourage child labour. The aim is to show that: (1) the monetary poverty of households positively influences child labour; and (2) the low level of education of household head positively influences child labour.

2. Literature review

This review considers two aspects of the determinants of child labour: poverty and the level of education of the household head.

2.1. Vulnerability of household: Poverty as an explanatory factor of child labour

The magnitude of child labour 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 this axiom (Grootaert, 1998; Diallo, 2001; Edmonds and Turk, 2004; Ersado, 2005; Najeeb, 2007; Lachaud, 2008; Zapata et al., 2011). For example, in Vietnam, Edmonds and Turk (2004) confirmed that poverty measured by income of household explains child labour. They used a linear probability model and a non-parametric regression on the data of the standard of living of household surveys of 1992/1993 and 1997/1998. Using expenditure per capita as a proxy for income, Najeeb (2007) in the case of Bangladesh found the same result as Edmond and Turk (2004).Najeeb (2007) estimation with a multinomial logit shows that poverty explains the work of girls more than that of boys. With a sequential probit, Grootaert (1998) in the case of Côte d'Ivoire shows that household poverty of rural areas explains child labour more than that of urban areas. Diallo (2001) confirmed this result. However, he found little robust result because he defined poverty in relation to poverty status (poor or not). Grootaert (1998) constructed a variable indicating whether the income decreased in the lowest quintile using data from three countries in three continents (Africa, Asia and Latin America), Ersado (2005) finds also that child labour is a rural phenomenon in Nepal and in Zimbabwe.

Using others measures, several studies highlight poverty as an explanatory factor of child labour (Lachaud, 2008; Zapata et al., 2011). For example, instead of using the status of poverty, Zapata et al. (2011) underline certain goods which show the wealth of the household (flushing toilet and electricity). The result with a bivariate probit estimation on the basis of the data of Bolivia's national household survey agrees with the luxury axiom of poverty (Basu and Van, 1998). However, although these studies agree with this axiom, some are qualified. Indeed, with a simple logit, Ray (2000a) 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) 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, the authors find that girls from households that are rich in land work more than girls from households that are land poor, as in Ghana and Pakistan. However, these results were less clear for boys. 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.

In summary, monetary poverty explains child labour, verifying the luxury axiom of Basu and Van (1998), even if this link is sometimes not very robust. In addition, when considering the paradox of wealth (Bhalotra and Heady, 2003), the results can be mixed because of the modelling technique and wealth proxies used (Nkamleu, 2006). Child labour therefore must be addressed in a dynamic framework making education or variables influencing it as other explanatory factors of child labour.

2.2. The dynamics of child labour: Education as a determining factor

From a theoretical point of view, the models of Ranjan (1999, 2001) 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 the parents' education parents 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 (Grootaert, 1998; Ray, 2000a; Diallo, 2001; Tzannatos, 2003; Cockburn, 2005; Abou, 2006; Nkamleu, 2009; Zapata et al., 2011). Some authors in their studies also

use variables that influence decisions on schooling and child labour (Grootaert, 1998; Ersado, 2005; Najeeb, 2007). They show that when schooling costs rise, children work or combine school and work. The authors use this 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 (Diallo, 2001; Abou, 2006). 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. This is why studies estimating the explanatory factors of child labour take into account the choices of parents (Ersado, 2005; Nkamleu, 2006; Najeeb, 2007; Guarcello et al., 2010).

Apart from poverty and human capital variables, the literature suggests other explanatory factors of child labour. These include parents' salaries (Soares et al., 2012), the demographic composition of the household (Levison and Moe, 1998; Blunch and Verner, 2000; Soares et al., 2012; Dumas and Lambert, 2008), age of children etc. 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 (Najeeb, 2007). 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. Table A4 in the appendices presents some results of the literature review mentioned in this paper.

3.   Research methodology

The fundamental question in this research was to determine the nature and importance of the variables that explain child labour in Côte d'Ivoire. The presentation of the model, the data and variables of this issue are therefore highlighted in this section.

3.1.   Model

Most theoretical research on household choice of activity of children found their basis in the research by Becker (1960) and by Becker and Lewis (1973) on fertility. In the original model, this decision involves an indirect constraint of maximizing the utility of the household. The head of the household will make a trade-off between the number of children, investment in human capital of children, and the current consumption of household goods. This study used the Soares et al. (2012) model that is basis for the above-mentioned research. So these authors (Soares et al., 2012) 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. Soares et al. (2012) take therefore consider the static and dynamic part of child labour.

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. The first empirical approaches were therefore limited to a binomial specification (probit or logit) which has its advantages. For example, the specification is simple and the properties of the estimators are unbiased. It also helps to have comparable studies which consider only schooling or child labour. However, this approach assumes child labour is the inverse of school

attendance; this is problematic because it ignores the possibility of a child combining work and school, or even the possibility of a child being "inactive" (no school or work). Nkamleu (2006), in his study of the cocoa sector in Côte d'Ivoire, takes this aspect into account in estimating the bivariate probit and multinomial logit.

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 (Edmonds, 2007). 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 $n = 1,....,N$, household chooses modality $i = 1,....,J$ providing it the greatest utility. The model of the following form is called multinomial logit.

$$Y_{in} = \begin{cases} 1 \text{ si } U_{in} \geq U_{jn} \text{ pour } j = 1,....,J \\ 0 \text{ si non} \end{cases}$$

(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 ($\varepsilon_{in} \ \iota(0,1)$). 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 $i = 1, ...J$ are independent and identically distributed (iid) by Gumbel law, the equation to be estimated has this form:

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

(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, 1983). 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).

3.2.   Data and variables

The general population census of 1998, the standard of living of households survey in 2002 and other surveys identified children aged 5–17 as economically active. Studies are conducted to understand the nature and determinants of this early employment of children (Grootaert, 1998; Diallo, 2001), 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 take action 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, taking into account the weight of the different zones based on the 1998 census (Map A in appendices), 4,600 households were interviewed in 79% of the country. Based on this database, we extracted information on 5,571 children aged 5–17 who were economically active. Several questions in the questionnaire and the households with children helped identify these children[2].

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 in appendices). Thus, all children aged 5–17 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 who worked more than 40 hours per week are therefore in child labour category. In addition, children aged 5–13 who spent more than 28 hours per week on household chores are also in child labour category (Figure A2 in appendices). Thus, of the 5,571 economically active children identified in this study (Table 1), 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	%	Num	%	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**	**27.09%**	**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.

The characteristics of household

Our study introduces some variables related to household size. The basic idea is that the demographic composition of the household may influence parents' decisions (Levison and Moe,1998). We considered the number of children in the household. This is the total number of children (*nbrefts*), the number of children aged 0–4 (*nbre04*); the number of children aged 5–13 (*nbre513*); the number of children aged 14–17 (*nbre1417*). The presence of young children in the household increases the demand for domestic work, especially for child care. Considering the lack of household income, households find it difficult to employ someone to fulfil this role. Older siblings are therefore more likely to take this role. However, the effects of the presence of school-age children on the decision of schooling and child labour can be contrasted (Zapata et al., 2011). Indeed, a significant number of children of school-age could reduce the likelihood of enrolment and increase the work of other children. Their number reduces financial resources of the household. However, considering their numbers, the activities can be shared so that the probability of schooling can increase. The question "*please list all persons usually resident in the household, starting with the head of household*" in the household questionnaire highlights this variable. It is measured by the number of children.

Income is an essential variable in this study because it examines the luxury axiom of Basu and Van (1998). However, to measure direct income presents an endogeneity due to the decision to send children to the labour market because the income earned by children when they work is integrated into the one of the household. Thus, directly use the income does not enable to appreciate the well-being of the household (Wahba, 2006) because generally, households do not reveal their income. We therefore evaluated income using household expenditure per capita (*dep_m*). For reasons of scale, we used the logarithm of these expenses. In the household questionnaire, the question, "*how much is a household expenditure for different item such as food, fuel preparation, lighting, rent, health*"? allowed us to takes into account this variable.

Characteristics of the head of household

Several variables were considered here. The importance of taking into account the "*variable sex*" was to see how it influences the development of child labour in the case of Côte d'Ivoire. The question, "*What is the sex of (name)?*" in the household questionnaire identifies this variable. It is a dummy variable and takes the value 1 if it is a man (*man*) and 2 for a woman (*woman*). Modality "man" served as a basis of reference. The level of education of the household head is also important. Its advantage is its important explanatory power on the decision of the choice of children's activity. In the household questionnaire, the question,"*what is the highest educational level that (name) has reached?*" identifies this variable. It takes the value 0 if the household head is uneducated (*none*), 1 if the primary (*primary*), 2 if the secondary level (*second*) and 3 if the higher level (*sup*). In our model, the modality "uneducated" was used as a basis of reference.

The employment of household head can affect the choice of the child's activity. Its effect is sometimes ambiguous to the different alternatives. If we consider the vulnerability of the household and that employment of the head covers the responsibilities, then children

should not be put on labour market. Rather, they must be in school. However, a household head with permanent employment in the agriculture sector can send children to the labour market to participate in improving the well-being of the family. This employment is either poorly paid or the child must learn the business of the father. Under these conditions, when the household head has permanent employment, the children work. This means they are not in school. This variable is identified by the questions, *"which of the following best describes your type of employment during the twelve (12) months?"* for the child questionnaire and, *"which of the following best describes the type of employment (Name) during the twelve (12) months"?* for the household questionnaire. It is a dummy variable and takes the value 1 if the employment is permanent (*permn*) and 0 if not (*npermn*). Taking into account the type of employment will allow a response to the concern that agricultural employment of parents promotes child labour. It takes the value 0 in the case of non-agricultural employment (*nagri*) which will use a basis of reference;1 if agricultural employment is permanent (*agriperm*); 2 if agricultural employment is casual (*agrio*); and 3 if the employment is seasonal and temporary (*agrist*).

Area of residence and spatial localization

Considering the disparity observed between rural and urban areas and between different regions of the country is necessary. Indeed, an urban environment can offer more opportunities for access to school, but factors such as economic crises, household poverty and rural exodus can promote child labour or a combination of school and work. This variable was coded 1 if the urban area (*urban*) and 2 in the case of rural areas (*rural*) which will serve as a reference point. The spatial location is divided into four regions. These are grouped according to their geographical location (Map A in appendices) and characteristics such as the level of poverty (INS, 2008) and level of education. Thus, this variable was coded 1 for the southern region (*sud*) outside Abidjan (sud Comoé, sud Bandaman and Agneby). This will be used as a point of reference in our analysis. This area is near Abidjan city, but the incidence of poverty was 44.6% and level of education was 57.12% (INS, 2008). The area of the lagoons region (sud_abj) is made up of Abidjan, the economic capital of the country which offers better prospects for good school infrastructure. It was coded 2. In 2008 this region had an incidence of poverty of 21% and a level of education of 72.59% (INS, 2008). The Centre-South-West region (*Sudoc*) made up of the regions of Bas Sassandra (Fromager; Marhaoué; Haut Sassandra and Montagnes) is one of the agricultural areas and it offers many employment opportunities for children. The average incidence of poverty was 57.2% with a level of education of 48.05% (INS, 2008). In our analysis, it took the value 3. The North-East-Centre Region (*ctrne*) groups together the region of Zanzan, Lac, N'zi Comoé and Moyen Comoé. In 2008 this had an incidence of poverty of 55.33% and a level of education of 44.14% (INS, 2008). It took the value of 4. From the characteristics of the identification of the household, all the information on the region and the area of residence were identified.

Characteristics of children

Children become increasingly active as age (*age*) increases. Thus, the probability that children will work increases with age. It takes into account the square of the age with the quadratic aspect of the function essentially linking age to participation in the

labour force, which is not necessarily linear. We divided age squared by 100 to avoid the inconveniences linked to the effects of scale. This variable is measured in past years. The question, *"what was the age of (name) at his/her last birthday?"* from the household questionnaire enables us to have the age of all the members of the household. Besides age, sex of the child affects child labour differently. The question, "*what is the sex of (name)"*? from the household questionnaire identifies this variable. It takes the values 1 for "boy" (*garçon*) which will be used as a basis of reference and 2 for "girl" (*fille*). We also assumed that being an orphan is positively linked to child labour. To identify this variable, we refer to the questions, "*is the biological mother of (name) alive?* and *"is the biological father of (name) alive?* in the household questionnaire to identify this variable. It is a dummy variable and takes the value 1 if the child is an orphan (*orph*) and 0 if not. "Non-orphan" modality (*norph*) is the basis of reference. Côte d'Ivoire is an immigration country. The idea is that children whose parents came from neighbouring countries are more likely to be sent to the labour market as nationals. The question, *"what is the nationality of (name)"?* allowed us to identify this variable. It takes the value 1 if the child is Ivorian (*ivoir*) and 0 if not (*nivoir*) to be considered as the reference basis.

Cost of schooling

In our database, the education expenditures of the household exist. However, this variable is potentially endogenous to child labour because households only commit to expenditure for children whose decision of schooling has been made, but children could work to finance their schooling. This is what happens in poor countries. Consequently, this study did not use this variable directly. We calculated the household expenditure by school children and then considered the average in the cluster to obtain an acceptable measurement. We used this measurement as an explanatory variable in our model. The idea is that the cost of schooling is a burden for poor households. The higher this cost is the more the children from poor households work to finance their schooling.

Overall, the descriptive statistics (Table 2) show that households spend an average CFAF 204,440 per year (US$410). This amount is below the poverty line (CFAF 241,145 or about US$482 per year) calculated by INS (2008). These households spend an average of CFAF 56, 190 (US$112 per year) of their income on education spending. In addition,53.8%of household heads are uneducated. Only 5.6% have reached a higher level of education. A significant proportion (30.7%) of these households are permanently employed in agriculture. This is probably the fact that most working children are in agriculture (69.80%) compared to those in commerce (21.30%), industry (4.90%) and other services (3.90%) as shown in Figure A1 in the appendixes.

Table 2: Descriptive statistics 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	0.861	1.029	0.856	1.052	0.866	1.006
	Number of children aged 5–13	2.399	1.535	2.419	1.561	2.381	1.510
	Number of children aged 5–14	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
	0= non agricultural employment	0.341	0.474	0.339	0.473	0.343	0.474
Type of employment	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

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.

4. Results and discussion

As indicated in Table 3, 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 3: Hausman and McFadden IIA test

Modalities	Results	Conclusion
School only	Chi2(50) = −0.0027 < 0	Accepted
School and work	Chi2(50) = −4.13 < 0	Accepted
Work only	Chi2(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 in appendices). Indeed, Prob>chi2=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 appendices.

Effect of household characteristics

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 (Table A3 in appendices) and increases the one of combined school and work (Table A3 in appendices). In addition, the probability of enrolment of boys decreased significantly (Table A3 in appendices) and the work increased Table A3 in appendices). This result is similar for boys aged 5–13 (Table A3 in appendices). 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 (Dumas and Lambert, 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 (Table A3 in appendices) and decreased those of working (Table A3 in appendices). However, income significantly affects only the work of boys (Table A3 in appendices). Indeed, the probability of attending school increases and decreases significantly among boys. This result thus shows that the luxury axiom of Basu and Van (1998) is confirmed (Blunch and Verner, 2000; Goulart and Arjun, 2008; Lachaud, 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 (Table A3 in appendices), the result among the girls agrees with the luxury axiom of Basu and Van (1998), 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 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. Grootaert (1998) with survey data on the living standards of households found a significantly positive effect between household poverty and the work of girls in Côte d'Ivoire. Our result could be due to the crisis during the study. New estimations with post crisis data will therefore redirect the discussion.

Effect of characteristics of the household head

In our study, being a woman promoted child labour when she was the head of household. Indeed, the probability of child labour increased significantly (Table A3 in appendices). Specifically, the probability of girls working increased significantly (Table A3 in appendices,). In addition, the chances that these girls would attend school decreased (Table A3 in appendices). These results show that women and their daughters work together (Grootaert, 1998; Ray, 2000b) to support some negative shocks such as the household vulnerability during the crisis (INS, 2008). 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 (Dumas and Lambert, 2008; Lachaud, 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 (Table A3 in appendices) significantly increased the probability of enrolment of children. Moreover, these increased levels significantly decreased the probability of child labour (Table A3 in appendices). This is a fundamental result that shows the importance of education of the household head in the explanation of child labour (Ray, 2000a; Tzannatos, 2003; Cockburn, 2005; Abou, 2006; Nkamleu, 2009, Zapata et al., 2011). At a high level of education, the household head takes into account the child's future well-being (Baland and Robinson, 2000). Taking into account 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 boys work (Table A3 in

appendices). At this level, only the secondary level of the head of household significantly reduces the probability of girls' work; (Table A3 in appendices). However, the primary level and the higher level do not give significant results even if they negatively affect girls' work.

In this study, the permanent employment of the household head positively and significantly affected the probability of child labour (Table A3 in appendices). 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 (Table A3 in appendices). 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 (Table A3 in appendices). However, when the permanent employment is agricultural, the probability of child labour decreased significantly and especially for girls (Table A3 in appendices). In other words, parents with permanent agricultural employment do not use children particularly girls. In fact, given the crisis, parents used in expensive 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).

Effect of area residence and spatial localization

This paper shows that urban areas promote children's schooling. Indeed, in these areas, the odds of children attending school increased significantly (Table A3 in appendices). Similarly, regardless of sex, the probability increased with a more significantly robust result among girls (Table A3 in appendices). Urban areas also significantly reduced the probability of child labour (Table A3, in appendices). Our results agree with those of some authors (Grootaert, 1998; Diallo, 2001) 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 (Table A3 in appendixes). The probability of combining work and school decreased (Table A3 in appendices). However, the likelihood of boys' work rose (Table A3, in appendices) while it declined among girls (Table A3 in appendices). 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 (Table A3 in appendices). These results show that the North-East-Centre of the country (savannah) promotes child labour less than other regions do (Grootaert, 1998). In addition, the Centre-South-West region is the agricultural zone. This significantly facilitates the work of boys significantly (Table A3 in appendices). This result maybe due to the paradox of wealth (Bhalotra and Heady, 2003). 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.

Effect of child characteristics

As expected, age and age squared were significant for all categories of activity (Table A3 in appendices). Thus, on the whole, the probability of school enrolment increased in the first instance and strongly decreased the second time (Table A3 in appendices). In addition, the likelihood of work only increased slightly in the first instance and decreased the second time (Table A3 in appendixes). These results reflect the fact that children perform manual tasks thus increasing age, the more they are able to work. In other words, households send older children to the labour market and the youngest to school (Blunch and Verner, 2000; Dumas and Lambert, 2008). According to gender (Table A3 in appendices), 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 (Dumas and Lambert, 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 (Table A3 in appendices). 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 non-Ivorian children, parents are self-employment in the informal sector. They must 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 (Table A3 in appendices) than other children are. However, the likelihood of combining school and work decreased significantly among all children (Table A3, in appendices). This probability also declined strongly and significantly among girls (Table A3 in appendices). 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.

Effect of cost of schooling

As indicated in Table A3 in appendices, 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 (Resen, 2010).

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.

5. Conclusion and political implications

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 girls from being used as substitutes for their mothers in household chores, awareness must be increased then. 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 programmes targeting poor households are necessary for the elimination of child labour.

Notes

1. This convention cites household chores carried out a) for long hours; b) in an unhealthy environment, involving the use of unsafe equipment or overloaded transport; c) in dangerous places, etc., as being general criteria of danger.

2. The information gathered through the questionnaire can be found in INS (2008).

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Appendices

Table A1: Decree No. 2250 of 14 March 2005 on the determination of the list of dangerous work prohibited for children below 18 years

Sector of study	Dangerous work
Agriculture and Forestry	Felling trees Burning fields Spreading chemicals (insecticide, weed killer, fungicide, dewormer, 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 Working in underground mines
Trade and the Domestic Urban Sector	The sale of pornography Working in bars Recovery of objects in refuse dumps
Craft Industry	Fitting, grinding, draining, sharpening, rolling, engine overhaul, etc. Manufacturing and repair of firearms Producing charcoal and logging; Motorized leather sand papering 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.

Map A: Zone of the study
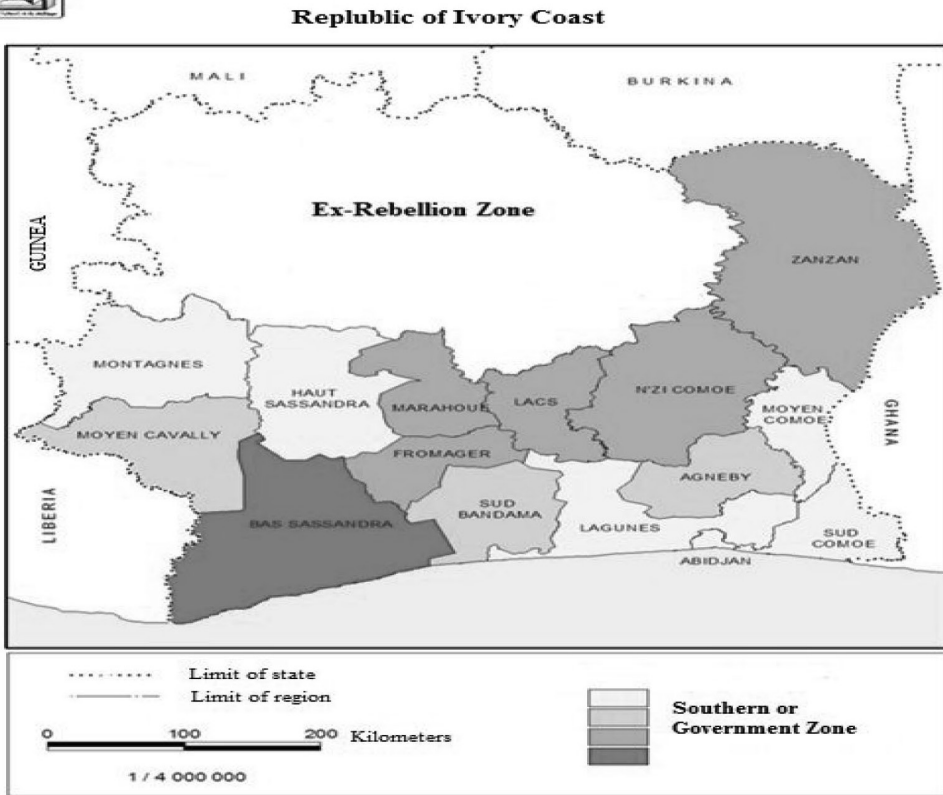
Source: National Survey on Child Labour (2005).

Figure A1: Sectorial distribution of child labour

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

Table A2: Regression coefficients of the multinomial logit of determinants of child labour of aged 5–17 years

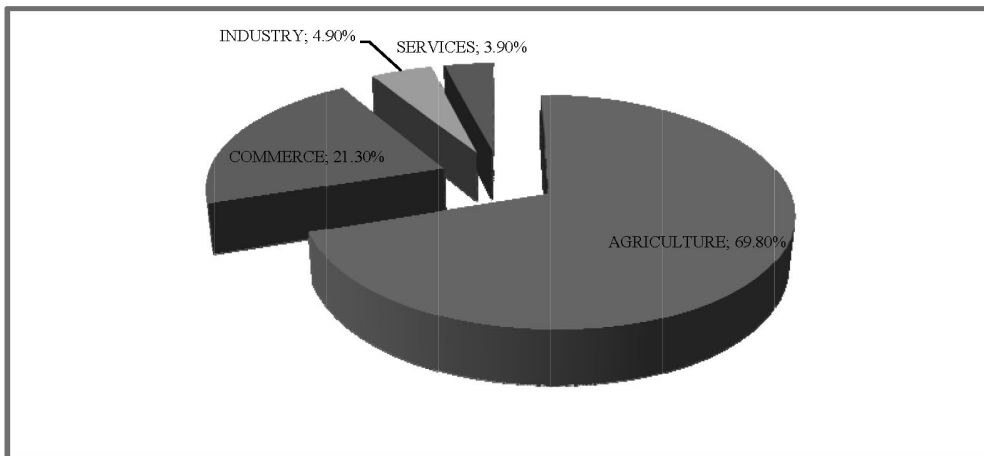| Variables	All children			Girls			Boys		
	School only	School and work	Work only	School only	School and work	Work only	School only	School and work	Work only
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
Characteristics of household									
nbrefts	-0.034** (-2.29)	0.050*** (2.62)	0.033 (1.54)	-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)
primaire (*)	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)
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)

Table A2: Continued

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)

Table A2: continued

Cost of schooling									
dep_ed	0.134*	0.434***	0.689***	0.041	0.392**	0.479***	0.204*	0.519***	0.987***
	(1.68)	(3.74)	(5.67)	(0.35)	(2.36)	(2.93)	(1.69)	(3.13)	(5.27)
_cons	-6.749***	-13.956***	-7.880***	-5.923***	-14.877***	-7.848***	-8.159***	-15.585***	-8.786***
	(-10.51)	(-14.49)	(-8.32)	(-6.68)	(-10.51)	(-6.05)	(-8.52)	(-11.29)	(-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
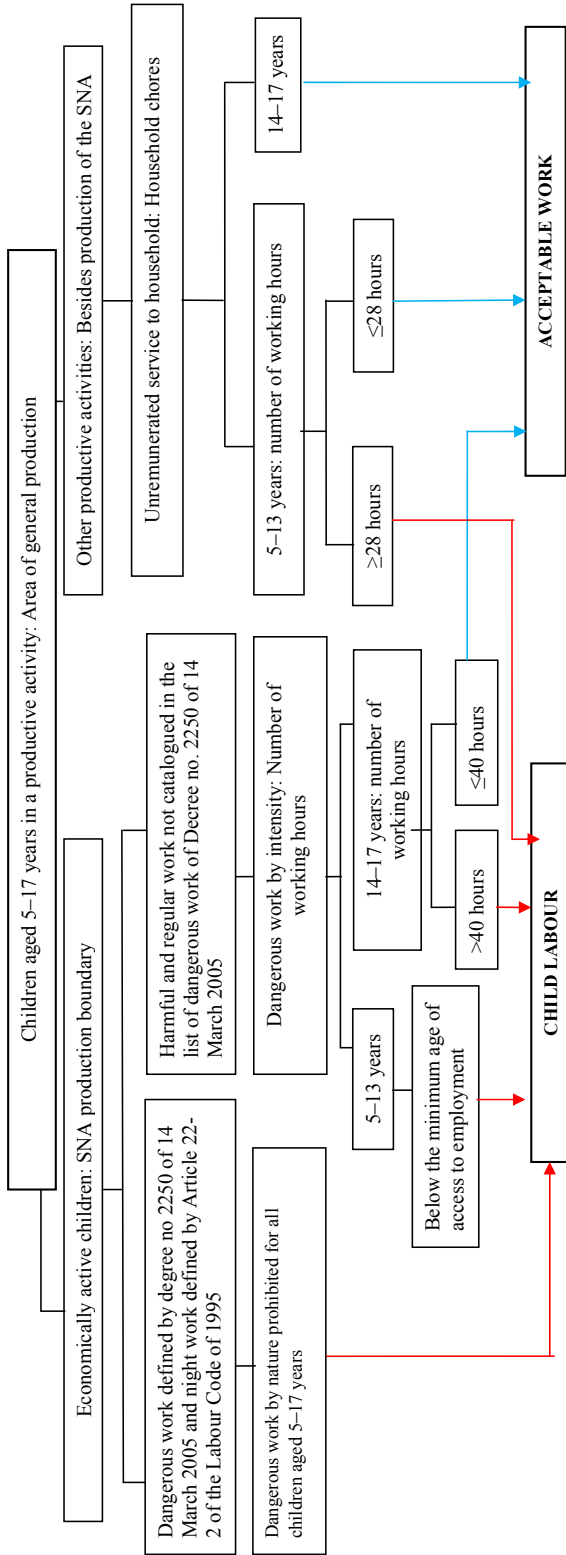
Explanatory variables	All children			Girls			Boys		
	(1) School only	(2) School and Work	(3) Work only	(4) School only	(5) School and Work	(6) Work only	(7) School only	(8) School and work	(9) Work only
Characteristics of household									
nbrefts	-0.010**	0.006***	0.003	-0.008	0.005*	0.001	-0.013*	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
primaire (*)	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
agrio (*)	-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*						

Table A3: continued

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.

Figure A2: Framework of statistical measurement of child labour in Côte d'Ivoire

Children aged 5–17 years in a productive activity: Area of general production

Economically active children: SNA production boundary

Other productive activities: Besides production of the SNA

Unremunerated service to household: Household chores

Dangerous work defined by degree no 2250 of 14 March 2005 and night work defined by Article 22-2 of the Labour Code of 1995

Harmful and regular work not catalogued in the list of dangerous work of Decree no. 2250 of 14 March 2005

Dangerous work by nature prohibited for all children aged 5–17 years

Dangerous work by intensity: Number of working hours

5–13 years

14–17 years: number of working hours

Below the minimum age of access to employment

>40 hours

≤40 hours

5–13 years: number of working hours

≥28 hours

≤28 hours

14–17 years

CHILD LABOUR

ACCEPTABLE WORK

Source: On the basis of the 18th International Conference of Labour Statisticians, resolution concerning the statistics of child labour and of Côte d'Ivoire's laws concerning the minimum age of employment and dangerous work.

Table A4: Some results of the literature review

Authors	Data	Country	Definition of child labour	Type of model	Basic results	Review of publication
Grootaert (1998)	Living Standards Survey of Households (1988)	Côte d'Ivoire	International Labour Organization (ILO)	Sequential probit and separate multinomial logit model for rural and urban areas	Rural areas are more sensitive to the hypothesis of Basu and Van (1998); high cost of schooling favours child labour	Policy Research Working Papers no.1905, World Bank.
Ray (2000a)	Pakistani integrated households survey of 1991 (Pakistan) and Living Standards Survey of Households 1994 (Peru)	Pakistan and Peru	International Labour Organization (ILO)	Logit	Luxurious axiom of poverty of Basu and Van (1998)not verified for Pakistan; relation reverses between the level of parents' education and child labour in the two countries	*Journal of Population Economics* 13(1): 3–19
Diallo (2001)	Living Standards Survey of Households (1995)	Côte d'Ivoire	International Labour Organization (ILO)	Bivariate Probit	Luxurious axiom of poverty of Basu and Van (1998) verified	Working Paper No 55, Development Economics Centre
Edmonds and Turk (2004)	Living Standards Survey of Households 1992/1993 and 1997/1998	Vietnam	Economic character and its intensity	Linear probability model and non-parametric regression	Poverty hypothesis of Basu and Van (1998) verified	Research Paper, Number 2774, World Bank

Ersado (2005)	Zimbabwean Survey on Income, Spending and Consumption (1991), Survey Measurement of Living Standards 1994 (Peru) and Living Standards Survey of Households (Nepal) 1995	Zimbabwe; Peru and Nepal	Non-schooling and non-leisure activity	Separate Multinomial logit for rural and urban areas	Poverty hypothesis of Basu and Van (1998) verified for rural areas of Nepal and Zimbabwe; a high cost of schooling favours child labour in the three countries	*World Development* 33(3): 455–480
Najeeb (2007)	Household income and expenditure (2000)	Bangladesh	Activities harmful to children aged 6–15	Separate multinomial logit model for girls and boys	According to gender, girls are more sensitive to the poverty hypothesis of Basu and Van (1998)	*Journal of Asian Economics* 18:946–966
Guarcello et al. (2010)	Living Standards Survey of Households (2000)	Guatemala	Work orientated towards the market and household chores	Multinomial Logit Model	Credit rationing favours child labour and disadvantages their schooling	*Journal of Population Economics* 23: 169–198
Zapata et al. (2011)	National households survey (2002)	Bolivia	Work orientated towards the market and household chores	Bivariate Probit	Hypothesis of Van and Basu (1998) verified; relation reverses between the parents' level of education and child labour	*World Development* 39(4): 588–599

Source: The author; based on the literature review.

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