Eradicating the Crime of Child Labour in Africa: The Roles of Income, Schooling, Fertility, and Foreign Direct Investment

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ERADICATING THE CRIME OF CHILD LABOUR IN AFRICA: THE ROLES OF INCOME, SCHOOLING, FERTILITY, AND FOREIGN DIRECT INVESTMENT

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ABSTRACT

African continent has the highest rate of child labour in the world. In this empirical study, we examined the impacts of income per capita, primary school enrolment, fertility rate, and the inward foreign direct investment (FDI) stock on the rate of child labour in Africa. We used the panel data on child labour that comprises of 44 African countries for the period 1980–2003 to assemble the largest number of observation on the variables employed. By employing the Panel Estimated Generalized Least Squares (EGLS) with cross-section weights method, the results of regression analysis showed that the raising of income per capita, FDI, and the percentage of school enrolment were highly significant in reducing the rate of child labour in Africa. Furthermore, a decrease in fertility rate was highly significant to curb the incidence of children employment in the labour market. The weighted-R^2 of the panel regression was reported at 95.1%. Following the results, the role of government in implementing public policies was discussed.

Keywords: *child labour; Africa; income; schooling; fertility; globalization; foreign direct investment*

JEL: I3, J13, O55

INTRODUCTION

The International Labour Organization (ILO) defines child labour as work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development[1]. The ILO reported that in 2012, approximately 168 million children were engaged in economic activity, globally, and this figure excludes the child domestic labour [2,3]. In particular, one of six children aged 5–17 years were trapped in hazardous work. The ILO has estimated that children represent 40–50 percent of the victims of forced labour. Furthermore, there were more boys than girls who were economically active, but girls who were engaged in household chores and sibling childcare are not accounted for in these statistics [3]. Boys are more subjected to employment than girls, with 18.1% and 15.2% for boys and girls, respectively [2]. Children who were working in household of a third party or 'employer' are particularly at risk to abuse and exploitation. The ILO has estimated that more girls below age 16 were in domestic service than in any other category of child labour.

African continent has the highest percentage of economically active children. In 2012, 30.3% of children in Africa were engaged in the employment. This percentage is slightly lower than that in 2008, which was 32.8% [3]. Most of the child workers were employed in the sectors of agriculture, fishing, hunting, and forestry. In countries that produce raw materials, children are exploited to work in cocoa, coffee, and cotton productions. Moreover in Africa, the incidence of child labour varies across the continent. Child labour represents most of the adolescents in countries of Central Africa. Children are deprived schooling, and they are forced to work in environments that are physically,

mentally, and morally harmful and dangerous to them. An example is the child trafficking in Togo, where the smuggled children were forced to work in other countries of the Western Africa. The majority of these children were trafficked to neighbouring countries, such as Burkina Faso and Mali. Girls were sold to work at night as prostitutes, and during the day as baby-sitters, where at the same time the victims were subjected to physical violence and psychological abuse[4]. Based on these, the exploitation of children as labourers has been regarded as a human rights violation by developed countries. Child labour is a serious crime because it involves the impairment and endangerment of the children. The developed countries considered that child labour is resulting from opportunistic capitalism seeking for cheap labour, and cruel parents who live off the earnings of their children[5].

Nowadays, child labour is diminishing in most of developing countries, and it is almost absent in the leading economies of Western Europe and North America. However, across the African countries, this phenomenon is still predominant and, it seems, culturally accepted as desirable (see Figure 1). Despite the fact that Asia holds the largest population of child labour, the rate is highest in the African continent [3,6]. In this paper, we attempt to understand the causes of child labour, and empirically examine the impacts of major socioeconomic factors on the frequency of child labour across the African countries. In this way, it will be possible to discuss on the role of government in implementing public policies in order to eradicate the crime of child labour in the continent.

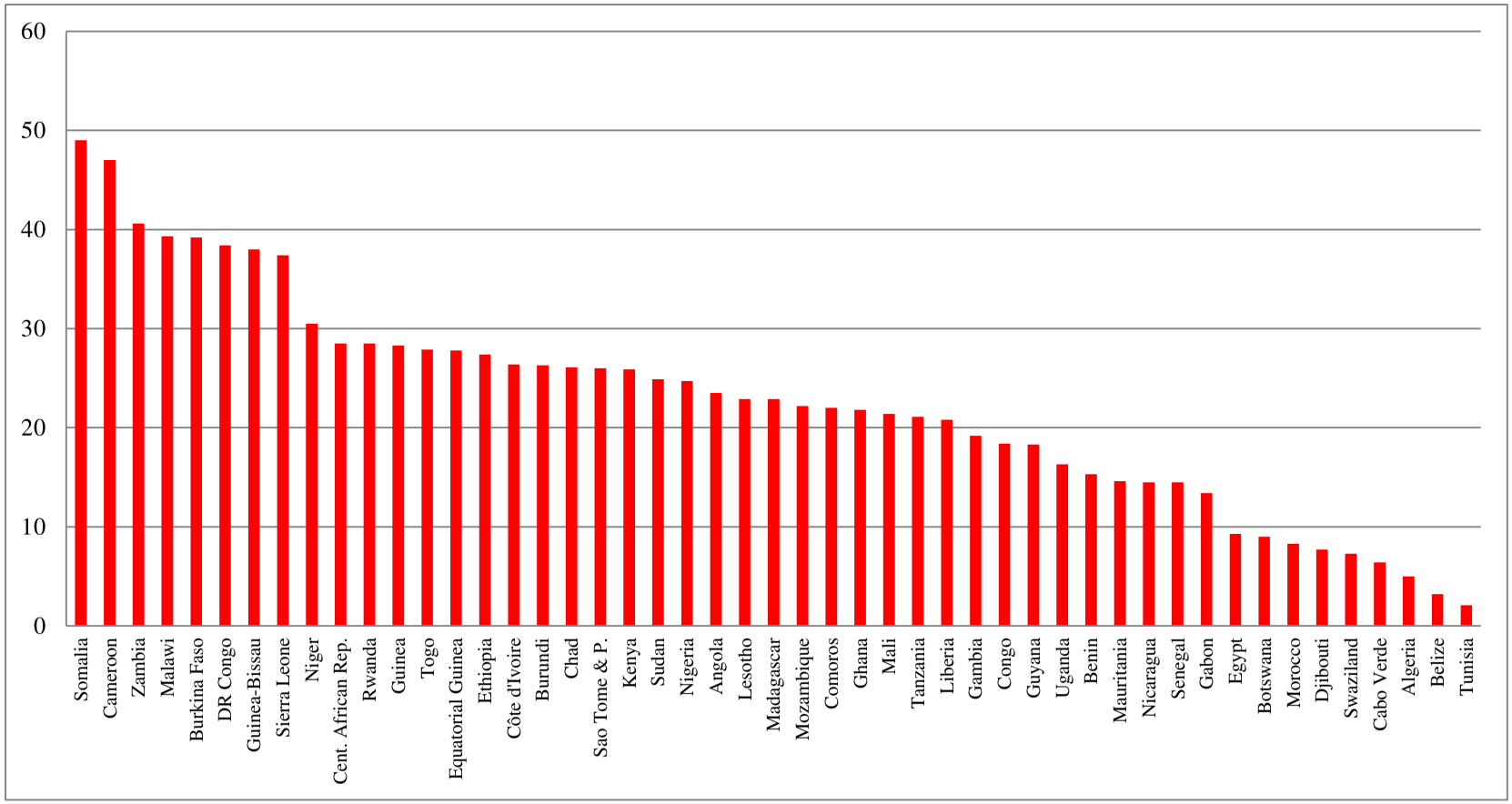

Figure 1: Percentage (%) of the children working in African countries for the year 2015.
(Source: UNICEF (2016). Child labour global databases, November 2015. Available at http://data.unicef.org/child-protection/child-labour.html)

LITERATURE REVIEW

Determinants of child labour are many. One of the major causes of child labour is poverty or low household income. In most cases, child labour is a parental decision, where parents send their children to work only because they are trapped in poverty. Mahmood Maann, Tabasam, and Niazi (2005) in a survey on 200 child employees in the automobile and engineering workshop in Pakistan found that majority of them came from low income families in rural areas, and the children have to work to solve financial difficulties[7]. Basu and Van (1998) suggested that when parents' income surpasses a certain threshold, they tend to withdraw their children from the labour market [8]. Therefore, an increase in adults' wage is expected to decrease the percentage of children in the employment. A study on 10,000 households in Egypt conducted by Wahba (2006) had empirically found that a 10% increase in adults' wage had reduced the probability of child labour by 13% for girls and 22% for boys [9]. The decline of child labour through a rise in income was supported by Cunningham (2000), who established that a decline of child labour in Europe and North America since 1830 was highly associated with a rise of married women's participation in the labour force, which has caused their children's income to the household become less significant[10]. The issue of poverty had also been discussed by Jensen and Nielsen (1997) in their study which investigated the causes of child labour and school attendance among 6,372 families in Zambia [11]. In similar, they found that poverty has compelled the parents to pull their children out of schools. Jensen and Nielsen suggested that cutting down the direct costs of schooling is a good approach to improve the income of the head of the family. They found that parents had deliberately abused the education of their children as a replacement for the inefficient capital markets. Parents who were not eligible to borrow from the capital market for smoothing their income were more likely to borrow from their generations by sacrificing the children's schooling.

Jafarey and Lahiri (2005) suggested that when the supply of credit is elastic, governments have to increase their spending to improve the quality of schooling. However, subsidizing food for the poor is a better policy to curb the child labour when the supply of credit is inelastic. This shows that once people have fulfilled their basic needs, they attempt to achieve a better quality of education and life [12]. Therefore, the educational policies should aim at improving the quality of schooling, and the subsidies on education should be more impressive to encourage parents sending their children to schools rather than employment [13,14,15]. The primary school enrolment is compulsory for the children to learn the basic intellectual skills before they enroll in higher educational levels. Moreover, people with higher levels of education, especially through compulsory education system are more likely to gain higher earnings in adulthood than those with lower educational levels [16].

It has been verified that government subsidy for education is better than banning the child labour for the long-term economic development [17]. Banning the child labour is not the best way to resolve their problem of illiteracy, high mortality, and underdevelopment. Compulsory schooling policies and the ban of child labour are welfare-reducing. For instance, Cigno and Rosati (2002) had empirically demonstrated that among the very poor households, full-time working children were inclined to have better nutritional status than those who attended school. Compulsory schooling would end up with more human capital, but children are deprived of good health and nutrition [18]. During 1920s in the United States, for example, children with working brothers and sisters were more likely to attend schools, and they were less likely to be engaged in the employment, because the income of working children was redistributed among their siblings, instead of being exploited by parents [19]. Thus, it has been proposed that the society needs a large-scale poverty alleviation program and target income support to keep their children away from labour market [6]. Reduction of poverty and costs of schooling are better tools to cut the child labour and raise the school attendance. Boas and Hatloy (2008) in their study on the child labour in West African countries (i.e., Ghana, Liberia, Mali and Sierra Leone) had concluded that the child labour phenomenon in Africa was the consequences of poverty and high school fees, in which the households needed for the income of children [20]. The school attendance in these countries was very low. Other than direct school fees, the indirect schooling costs of books, school uniforms, and food kept the children away from school. For that reason, Mahmood et.al (2005) corroborated the need to provide free education for the poor, enhance

educational facilities in schools, and provide employment opportunities for parents in the rural areas to curb child labour [7].

During the initial periods of economic development, most of developing economies were stuck in development traps where child labour was abundant, fertility rate was high, and productivity per capita was very low. The household income gained from the child labour had reduced the net cost of raising the children, which had triggered the fertility rate to increase substantially [21]. The household structure is an important aspect for parents when deciding whether a child must work or attend school, or both. Cigno et al. (2002) suggested that family members can be divided into three groups: adults, school-aged children, and pre-school children [15]. The larger the number of working adults in a family will reduce the possibility that a child have to work. In contrast, the larger number of pre-school children will increase the likelihood that a school-aged child has to engage in the labour market. This has been a reason why children of larger families are more susceptible to child labour [22].

When the parents of a poor family get old, it becomes increasingly hard to sustain the household because of their declining productivity and increasing demand from their growing number of children owing to high fertility rate [23]. An increase in the number of pre-school children is more likely to decrease the per capita income of the family because the young children need a lot of care, which is costly especially because they don't contribute to the family's income. Consequently, the school-aged children must engage themselves in the labour market in order to support their parents' income. Edmonds (2006) and Dammert (2008) in their studies had found that children of these families differ in comparative advantage in household production. Elder girls are more likely to work more than their younger brothers, where the amount of working hours is greater for elder girls than younger brothers. For girls, the additional working hours increases with the number of younger siblings and the spacing between the siblings. The additional work would include the household chores such as cooking, cleaning, and child-minding. The older brothers spend more time in both labour market and domestic work, while the older sisters spend more time engaged in the domestic work compared to their younger siblings [24,25].

In most developing countries, the major characteristic of their labour markets is the large proportion of informal sectors that employ unskilled labour in their workforce. This has encouraged the recruitment of more children to become labourers [5,26]. For example, Eaton and Goulart (2009) found that in the Portuguese labour market, a decrease in the labour costs owing to the employment of unskilled labourers and the exploitation of the productive capacity of children hindered the eradication of child labour [27]. Along with the same line, Neumayer & Soysa (2005) and Braun (2006) proposed that it is possible to curb the prevalence of child labour through the acceptance of forces or pressures of economic globalization. In particular, international trade policies through the inflow of foreign direct investment (FDI) into the modern economic sectors will cut the demand for child labour in the host countries. Modern economic sectors employ skilled adult labour, which is in contrast to the low-productivity traditional sectors that utilize the unskilled or child labour [28,29]. The traditional sectors with informal working customs can only be achieved by utilizing the cheap labourers, which persuades the employers to exploit more children into the production. Hence, it has been suggested that economic globalization supported by the FDI inflow from the developed economies will force the host countries to accept the competitive pressures of globalized market, which are demanding for high-skilled labour in the production, and thus discourages further exploitation of children [30].

In the long-term, the inflow of FDI improves the overall economic growth and benefits to the society by inhibiting the incidence of poverty-induced child labour [31,32]. Based on the historical analysis of industrialized countries, the technological improvements overtime had substantially increased the wage disparity between parents and child labour, which made the income from the children become less significant to the family, and because of this, parents were to spend more on their children's education and decrease their fertility[21]. The rate of return to education depends on the intensity of modern technology in the production that utilizes the high-skilled labour [33]. This determines both levels of supply and demand for child labour. The children's enrolment in school

increases because parents understand the need for formal education in order to fulfill the escalating demand for high-skilled labour, thereby preventing them from submitting their children into the employment[15]. From the technological perspective, it should be noticed that children's participation in the workforce is really unnecessary because the child labour does not improve the total human capital stock within the process of industrialization. Modern technologies employed in the developing countries would replace the tasks performed by the child workers, which reduces the children employment in the productivity [34]. Therefore, economic globalization is capable of resolving the global crisis of child labour.

METHODOLOGY

To investigate the impact of socioeconomic indicators on the child labour, we employed a following econometric model:

$$childlabor_{it} = \beta_0 + \beta_1 income_{it} + \beta_2 schooling_{it} + \beta_3 fertility_{it} + \beta_4 fdi_{it} + e_{it}$$

where the dependent variable is *childlabour*, which denotes the percentage of the children aged 10–14 working in the labour market for country *i* and year *t*. The data are available for 44 out of 54 African countries. The time-series data for *childlabour* were obtained from Dorling's (2006) dataset, which is an expanded version of the World Bank's World Development Indicators database [35]. Dorling's dataset is limited until the year 2003 only. However, to our knowledge, it is the most complete database on the child labour with both time-series and cross-sectional dimension, with a total of 1056 observations for the 44 African countries. This is the best practice to assemble the largest number of countries on the variables employed. The *income* is the log-transformed gross domestic product (GDP) per capita (constant 2005 US$), which measures the standard of living. The *schooling* is the gross (%) primary school enrolment, which is the rate of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education. Primary education provides children with basic reading, writing, and mathematics skills along with an elementary understanding of such subjects as history, geography, natural science, social science, art, and music [36]. The *fertility* is the total fertility rate in the population, which represents the number of children who would be born per woman if she or they were to pass through the childbearing years bearing children according to a current schedule of age-specific fertility rates. The *fdi* is the log-transformed inward foreign direct investment (FDI) stock, which is employed as a proxy for the levels of economic globalization and high-skilled labour of a country, because a higher level of inward FDI stock indicates the employments of superior technology and high skilled-labour in an economy. The data on *fdi*, *income*, *schooling*, and *fertility* are covered from the year 1980 until 2003, and were obtained from the World Development Indicators (WDI) database [36]. Finally, β_0 and e are respectively the constant and error term. Our dataset is an unbalanced because the data are missing for many years on the variables employed. The regression equation was estimated using Panel Estimated Generalized Least Squares (EGLS) method with cross-section weights.

FINDINGS

Figure 2 shows the average percentage (%) of children aged 10-14 working in the labour market from the year 1980 until 2003 in Africa. We found a decreasing trend of children employment over the 24 years, but the percentage is still very high, which is nearly 25% at the end of the period.

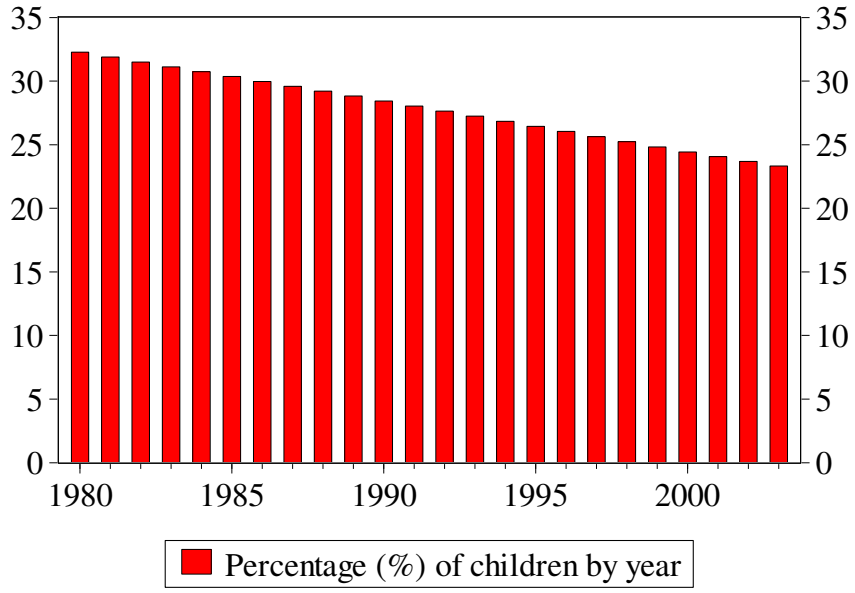

Figure 2: Decreasing rate of child labour in Africa

Table 1 presents descriptive statistics for all variables employed. We found that the average rate of *childlabour* and *fertility* were at their highest at 70.88% and 8.25 births per woman, respectively. The highest and lowest rates for *schooling* were respectively at 16.5% and 169.4%. This shows that there were a large percentage of children enrolled in the primary school with their ages were more or less than the official ages for primary schooling. The values of both *income* and *fdi* are in the log-transformed, where the maximum values of *income* and *fdi* are about two and three times of their corresponding minimum values. The observation values (*N*) are different among the variables because the data are missing for many years, especially for *schooling* and *fertility*.

Table 1: Descriptive statistics

	childlabour [a]	*income* [b]	*schooling* [c]	*fertility* [d]	*fdi* [e]
Mean	27.81	2.690	84.492	5.544	2.976
Median	28.26	2.572	87.164	5.860	2.823
Maximum	70.88	3.825	169.413	8.250	4.717
Minimum	0.000	2.010	16.512	1.000	1.525
Std. Dev.	14.808	0.416	28.654	1.505	0.468
Skewness	-0.106	0.710	-0.010	-0.869	1.110
Kurtosis	2.489	2.579	2.752	3.116	4.554
Observations (*N*)	1056	1020	438	463	1045

Note:

[a] Percentage (%) of the children aged 10–14 working in the labour market.
[b] Log-transformed gross domestic product (GDP) per capita (constant 2005 US$).
[c] Percentage (%) of primary school enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education.
[d] Total fertility rate in the population, number of birth per woman.
[e] Log-transformed inward foreign direct investment (FDI) stock.

Table 2 shows the correlation matrix for all variables employed. We found that all variables were highly correlated at $p<.01$ level. The *childlabour* was positively correlated with *fertility* ($r=.82$), but negatively correlated with *schooling* ($r=-.44$), *income* ($r=-.77$), and *fdi* ($r=-.56$). The correlation was lowest for *schooling* and *fdi*, with a positive relationship ($r=.359$).

Table 2: Correlation (*r*) matrix for all variables

	childlabour [a]	*income* [b]	*schooling* [c]	*fertility* [d]	*fdi* [e]
childlabour	1.000				
income	-0.773***	1.000***			
schooling	-0.439***	0.489***	1.000		
fertility	0.817***	-0.749***	-0.388***	1.000	
fdi	-0.555***	0.455***	0.359***	-0.486***	1.000

Note:

*** $p<.01$, ** $p<.05$, * $p<.10$

[a] Percentage (%) of the children aged 10–14 working in the labour market.
[b] Log-transformed gross domestic product (GDP) per capita (constant 2005 US$).
[c] Percentage (%) of primary school enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education.
[d] Total fertility rate in the population, number of birth per woman.
[e] Log-transformed inward foreign direct investment (FDI) stock.

Figures 3(a) to 3(d) are scatter diagrams for the relationships between *childlabour* and each of the four variables, particularly *income*, *schooling*, *fertility*, and *fdi*. The red line is the regression line that represents the positive or negative slope of their relationships. Based on the slopes, we verified that *income*, *schooling*, and *fdi* were negatively associated with *childlabour*, while the relationship between *childlabour* and *fertility* was positive. These findings are consistent with the correlation between *childlabour* and the corresponding variables we presented in Table 2.

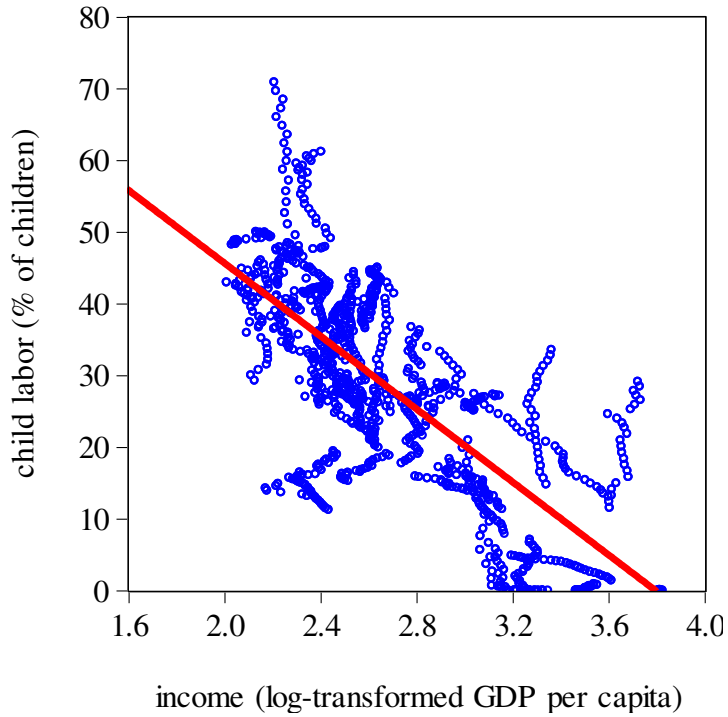

Figure 3(a): Negative relationship between child labour and the income per capita.

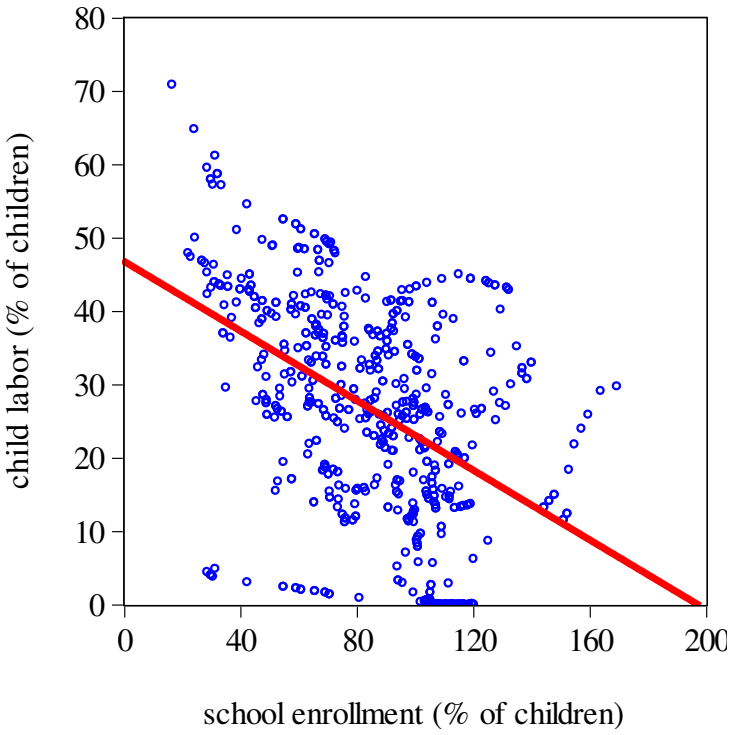

Figure 3(b): Negative relationship between child labour and the children's school enrolment

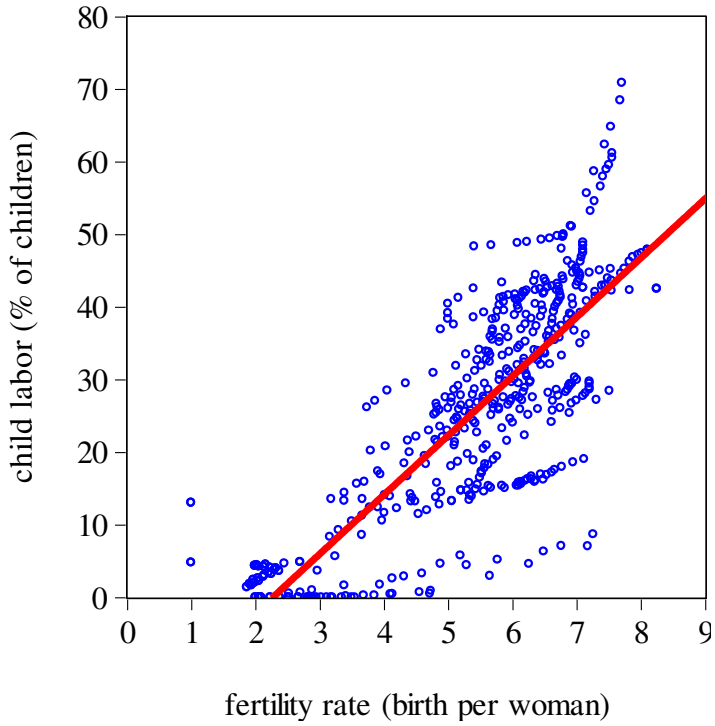

Figure 3(c): Positive relationship between child labour and the fertility rate

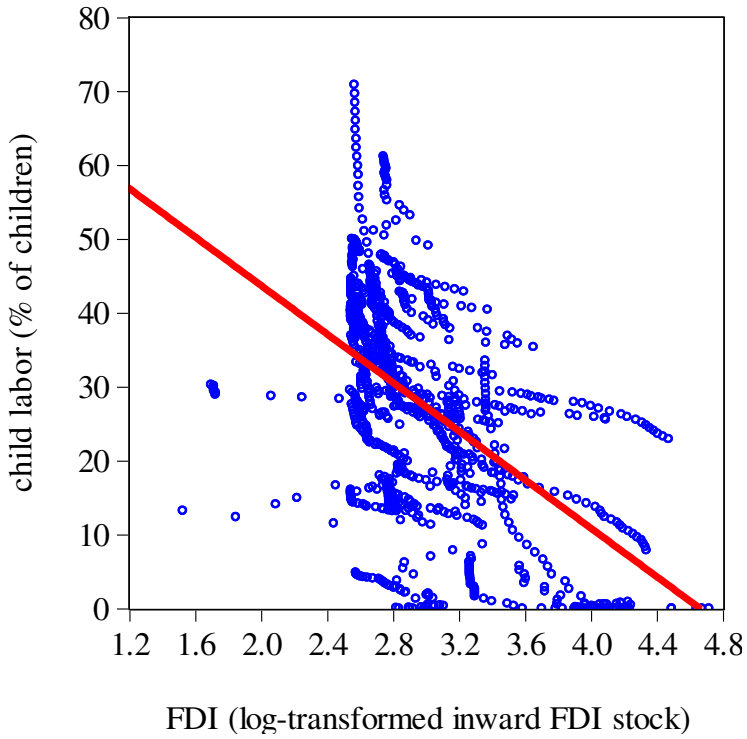

Figure 3(d): Negative relationship between child labour and the inward foreign direct investment (FDI) stock

Table 3 presents a summary of regression results when regressions are estimated using the Panel EGLS with cross-section weights. We found that *income* (Model 1), *schooling* (Model 2),

fertility (Model 3), and *fdi* (Model 4) alone were significant at $p<.01$ level on the *childlabour*. The *income* and *schooling* alone could explain the variation in *childlabour* for more than 90% with the weighted-R^2s of .938 and .927, respectively. According to Model 5, when all independent variables were incorporated in the regression, all variables were still significant at $p<.01$ level, with a total unbalanced-panel observations of $N=250$, and a weighted-R^2 of .951. This indicates that 95.1% of the variation in *childlabour* could be explained by *income*, *schooling*, *fertility*, and *fdi*. The value of weighted-R^2 is substantially higher than unweighted-R^2, which demonstrates that the regression has performed significantly better using the Panel EGLS (with cross-section weights) than pooled ordinary least squares (OLS). The F-statistic was significant at $p<.01$ level, showing that independent variables are jointly significant in explaining the *childlabour* across the 44 African countries. According to Model 5, controlling for the effects of *schooling* and *fertility*, a 1% increase in the GDP per capita and inward FDI stock will result into a reduction in child labour by .103% and .047%, respectively. Likewise, a 10% increase in the GDP per capita and inward FDI stock will reduce the rate of child labour by .986% and .449%, correspondingly [37]. Moreover, a 1% increase in the primary school enrolment will decrease the incidence of child labour by .0193%. Finally, a reduced fertility by one birth per woman is associated with a decrease in child labour by 5.197%, on controlling for other factors.

Table 3: Summary of regression analysis

Method: Panel Estimated Generalized Least Squares (EGLS) with cross-section weights					
Independent Variables	Dependent Variable: *childlabour* [a]				
	Model 1	Model 2	Model 3	Model 4	Model 5
income [b]	-25.05*** [.2981]				-10.35*** [.7656]
schooling [c]		8.034*** [.1332]			-.0193*** [.0048]
fertility [d]			-.2247*** [.0083]		5.197*** [.2431]
fdi [e]				-16.54*** [.4995]	-4.712*** [.5328]
N (unbalanced)	1020	463	438	1045	250
R^2(weighted)	.938	.927	.547	.662	.951
Adjusted R^2	.937	.927	.546	.662	.950
R^2 (unweighted)	.528	.627	.210	.267	.747
F-statistics	15336.6***	5892.5***	527.5***	2046.2***	1180.1***

Note:

Linear estimation after one-step weighting matrix; White cross-section standard errors & covariances (d.f. corrected) in brackets; *** p<.01, ** p<.05, * p<.10

[a] Percentage (%) of the children aged 10–14 working in the labour market.
[b] Log-transformed gross domestic product (GDP) per capita (constant 2005 US$).
[c] Percentage (%) of primary school enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education.
[d] Total fertility rate in the population, number of birth per woman.
[e] Log-transformed inward foreign direct investment (FDI) stock.

DISCUSSION

This paper examined the effects of income (GDP) per capita, children's school enrolment, fertility rate, and the foreign direct investment (FDI) on the rate of child labour in Africa. We found that all child labour predictors employed in this study were highly significant in reducing the incidence of child labour across the 44 African countries. In particular, the impact of fertility rate on child labour was positive, while the impacts of GDP per capita, primary school enrolment rate, and the inward FDI stock on child labour were negative.

The results of our study are consistent with those found by previous researchers such as Jensen and Nielsen (1997), Cigno and Rosati (2002), Admassie (2002), and Sakellariou and Lall (2000), who established a negative association between income per capita and the incidence of child labour [11,18,34,38]. In most cases, child labour is a parental decision, where parents send their children to work only when they are trapped in poverty [39], and thus, an increased in adults wage is likely reduce the number of children engaged in the labour market [8]. When parents' income increases to a certain level, there is a significant decline in poverty, which encourages the parents to pull their children out of the labour market because children's contribution of income to their family becomes less significant [10]. Therefore, it is worth to suggest that the governments of African countries need to implement the minimum wage policy for the adults, so that fewer children are subject to exploitation. Additionally, the government must put efforts to raise the employment opportunities for parents especially in the rural areas, so that they are able to generate more income. The credit market should be made more lenient to help the poor families to start their own small business activities. These are some of the large scale poverty alleviation program that can be implemented to save the African children from the labour market.

The low primary school enrolment rate has encouraged the parents to submit their children to the labour market. Our study corroborates the literature, in which the rise in school enrolment are likely to reduce the frequency of child labour [14,20,40,41]. The poor economic development of Africa has persuaded their societies to leave school for income-generating activities to support their basic needs. In contrast, children's engagement in school reduces the time they need to spend working at home and in the labour market [34]. Ray's (2002) and Admassie's (2002) suggestions are worth listening to, where the quality of education should be improved in order to make schooling become more attractive and valuable for parents to send their children [13,34]. In conjunction with this, we suggest that government policies must center on improving the quality of schooling and school infrastructures especially in the rural areas. At the same time, the costs of schooling for the poor should be alleviated, for instance, by providing them with free school uniforms and meals to make schooling become more of an interest to both parents and children.

Moreover, the high fertility rate had raised the rate of child labour in Africa. As the number of younger siblings in a family escalates, there is a rise in their living cost, especially because the infants need a lot of care but at the same time they don't contribute to the household income. Consequently,

in order to raise the family's income, the school-aged siblings will have to leave schools and get employed [22,23,24,25]. As pointed out by Cigno, Rosati and Tzannatos (2002), a growing number of pre-school children will increase the possibility that school-aged children have to engage in the labour market [15]. We suggest that in African countries, their government need to implement the population control policy on their people to decrease the level of fertility rate. For example, the policy can be implemented so that the first three children in a family will benefit more than the rest in terms of public facilities, and education and health subsidies.

Our finding that FDI was negatively associated with the child labour in Africa is supported by Neumayer and Soysa (2005), Dinopoulos and Zhao (2007), Davies and Annie (2009), and Eaton and Goulart (2009) who established that the forces of globalization will curb the prevalence of child labour [26,27,28,32]. This occurs because the international trade policies favor the modern economic sectors, and therefore, an increase in the FDI inflow into the African countries will cut the local demand for unskilled child labour. We perceive that in the long term, globalization will raise the demand for education among the local people, since the international corporations are demanding for knowledgeable, high-skilled workers. Through FDI, the most sophisticated modern technologies are introduced and utilized in the industrial and agricultural sectors, which then substitutes the role of manual labour in the production [21,33,34]. This downgrades the relevance of employing the unskilled child labour, and hence, deters the exploitation of children in the economies.

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[37] The *childlabour* is measured in the unit of percentage (%), while both measures of GDP per capita and FDI stock are in log-transformed. We calculate the individual effect of *income* and *fdi* on the *childlabour* by using the following formula:

$$\textit{childlabour}\ (\%) = \beta^{*}(\log_{2.718281828459} 1.01) = -10.35^{*}(\log_{2.718281828459} 1.01) = -0.102985924\%$$

$$\textit{childlabour}\ (\%) = \beta^{*}(\log_{2.718281828459} 1.01) = -4.712^{*}(\log_{2.718281828459} 1.01) = -0.046885959\%$$

or,

$$\textit{childlabour}\ (\%) = \beta^{*}(\ln 1.01) = -10.35^{*}(\ln 1.01) = -0.102985924\%$$

$$\textit{childlabour}\ (\%) = \beta^{*}(\ln 1.01) = -4.712^{*}(\ln 1.01) = -0.046885959\%$$

and,

$$\textit{childlabour}\ (\%) = \beta^{*}(\log_{2.718281828459} 1.10) = -10.35^{*}(\log_{2.718281828459} 1.10) = -0.986460361\%$$

$$childlabour\ (\%) = \beta^{*}(\log_{2.718281828459} 1.10) = -4.712^{*}(\log_{2.718281828459} 1.10) = -0.449101567\%$$

or,

$$childlabour\ (\%) = \beta^{*}(\ln 1.10) = -10.35^{*}(\ln 1.10) = -0.986460361\%$$

$$childlabour\ (\%) = \beta^{*}(\ln 1.10) = -4.712^{*}(\ln 1.10) = -0.449101567\%$$

where $\ln(X) = \log_{2.718281828459} X$.

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