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Impact of Trade Openness and Foreign Direct Investment on Child Labor; Evidence from Sub-Saharan African Countries

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Abstract:
The purpose of this paper is to examine the impact of Trade Openness and Foreign Direct Investment on Child Labor; Evidence from Sub-Saharan Africa countries using a panel data from 1990 to 2017 for 32 countries. Using Generalized Methods of Moments (GMM) as the main estimating technique with robustness checks using two-stage least squares (2SLS) regression analysis to address the endogeneity that could cause the direction of the bias to be either positive or negative. This paper seeks to examine the underlying link between FDI, Trade Openness and child labor, which suggest essential implications for eradicating child labor's policies for Sub-Saharan African Countries. This study found that trade openness is positively and significantly related to child labor. The possible explanation is that trade openness raises the output of the exportable sector and upsurges the demand for child labor as well as the child-wage. The openness of market amalgamation argues that globalization may increase the wages paid to increase the earnings opportunities of children in poor economies, thereby increasing child labor. As far as FDI is a concern, Foreign investors seem to be less interested in exploiting unskilled labor than is presumed by the conventional wisdom due to the fact that market size and market growth, political stability, and infrastructure are often as important, if not more important than low wages. The results fail to find that countries with low labor standards in general and a high incidence of child labor attract a greater inflow of Foreign Direct Investment. The study provides several implications for the policymaker on Trade openness and FDI on child labor and end by suggesting that rich countries should restrict the sale of goods from developing countries that lack or do not enforce child labor laws, effective policy against child labor is to promote the development of functioning credit markets in Sub-Saharan African countries and to facilitate access to these markets for poorer households.

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1. Introduction

The involvement of children in activities carried out within and outside their households for income, family gain, or profit, including unpaid work, referred to as economically active children, which is prevalent in practically every society. However, the phenomenon of child labor that is described by the International Labor Organization as work that is inconsistent with the principles set under the relevant International Labor Organization Conventions and recommendations is of great concern to International Community, national governments, human rights bodies as well as civil society, professionals, academics and researchers. The International Labor Organization (ILO, 2016) estimates for the year 2016 showed worldwide there are 218 million children between 5-17 years in employment. Among them, 152 million are victims of child labor, almost half of them; 73 million work in hazardous child labor. In absolute terms, nearly half of child labor (72.1 million) were found in Africa; 62.1 million in the Asia and the Pacific; 10.7 million in the Americas; 1.2 million in the Arab States, and 5.5 million in Europe and Central Asia. The International Labor Organization estimates further indicated that approximately one in seven of the world's children participates in child labor but with regional variations.

Among 152 million children in child labor, 88 million are boys (58%), and 64 million are girls (42%). 58 % of all children in child labor and 62% of all children in hazardous work are boys. Boys appear to face a greater risk of child labor than girls do, but this may also be a reflection of an under-reporting of girls work, particularly in domestic child labor. Boys appear to face a greater risk of child labor than girls do. There are 23 million more boys than girls in child labor are, and 17 million more boys than girls are in hazardous work. The gender gap increases with age. The difference in child labor incidence is less than one percentage point for 5-11 year olds, rising to three percentage points for 12-14 year-olds and to five percentage points for 15–17-year-olds. However, it is possible that these figures understate girls' work relative to that of boys. As pointed out in previous global reports, girls may be present in less visible and therefore, under-reported forms of child labor such as domestic service in private households (ILO, 2016). In recent years the impact of globalization on the incidence of child labor has started to spark both public and academic debate and has become an issue that invokes passion because it brings together people concerned about the exploitation of children on moral and ethical grounds and organized labor interested primarily in protecting jobs (Basu 1999; Grote, Basu, and Weinhold 1998; Srinivasan 1998). We will argue that theoretically globalization, defined as increased trade openness and penetration by foreign direct investment, can have both positive and negative effects on the incidence of child labor in developing countries. Like most researchers, we will focus on these countries since child labor takes place mainly within them (ILO, 2002b). However, we will also present strong and robust evidence that more globalized developing countries also have a lower incidence of child labor than those that are less open to trade and less penetrated by foreign direct investment.

This paper makes the main contributions to the literature:- First, it attempts to separate the determinants of the supply of child labor from the demand for child labor. Basu et al. (2003) state that 'the demand-side factors of child labor are not observable and have earlier been ignored,' all the data available to previous researchers as well as those used in earlier empirical studies on this topic relate to the supply side of child labor. Second, the study establishes the empirical relevance of a significant strand of both theoretical and empirical literature on child labor. Thirdly, this paper gives the flood of research and writing about

child labor that has dramatically increased understanding of the phenomenon and the consequences of alternative policy interventions. It points to a policy mechanism that might help alleviate the problem of child labor globally. The paper is structured as follows: Section 2 discusses reviews of the existing empirical literature. Section 3. Reviews of theoretical framework evidence. Section 4. Methodology, Empirical Specification and data. Section 5 describes the empirical results of the study and section 6. Provides conclusions and Recommendations.

2. Literature reviews

The phenomenon of child labor has been viewed as an epidemic of the global economy that must be eventually eliminated (Shelbourne, R. 2001). Thus, analyzing the economic effects of globalization on the incidence of child labor constitutes high research and policy priorities. The successful elimination of child labor throughout the world is probably one of the most important policy objectives of our time. The bulk of the literature on child labor focused on the determinants of child labor, supposedly because knowing the determinants is essential for establishing policy targets and instruments to combat child labor. Ranjan, P. (2001). The empirical indications of trade openness and child labor do not provide a unified picture. Shelburne (2001) founds a negative correlation between trade openness and the prevalence of child labor. Another empirical study by Edmonds and Pavenik (2006) implies a negative correlation between trade and child labor. Edmonds and Pavenik (2005b) found results that the reaction of child labor due to an increase in the price of exported goods ‘‘rice’’ depends on household capacity as ‘‘producer’’ and ‘‘consumer’’ and on the magnitude of income and substitution effects. Similarly, Edmonds et al. (2005c) empirically explore the effect of tariff reduction policy on the decline in child labor, and an increase in schooling rate is smaller in rural areas than in the urban areas. Another micro empirical study is contrary to the expected results. It shows that during the coffee sector boom in Nicaragua, there is a significantly increase in child labor in urban areas as well as in rural areas (Kruger 2001). Trade sanctions may affect child labor (Chaudhuri and Gupta, 2010) glance at the impact of a reduction in tariff rate of imported goods on the supply of child labor, which depends critically on the relative factor intensity (import and export commodity sector). Gupta (2002) execute the same study by analyzing the economy that suffers from child labor problem and adult unemployment problem. In Jafarey and Lahiri (2002), Ranjan (2001), the impact of trade sanctions on child labor depends on the availability of credit markets and credit constraints. Grossmann and Michaelis (2007) build up a model of trade sanctions and child labor in a small open economy that indicates firm-specific tariff is effective than a uniform tariff.

Despite the trade liberalization and child labor, other reasons may affect it. Tanaka (2003) considers that the unequal distribution of income leads to higher child labor and less school attendance rate. On the other hand, Blunch and Verner (2000) empirically finds a positive relationship between poverty and child labor. Ranjan (2001) evaluates the same results in the presence of adequate borrowing opportunities, which satisfy the Jafarey and Lahiri (2002) analysis. In other studies, Cigno (2003) determines that in countries that have a comparative advantage in educated workers, a decrease in trade barriers raises the skill premium and create the incentive for parents to send their children to school. Furthermore, there is a significant body of literature on the economics of child labor; the international economics of child labor remains in its infancy. Only a few studies have formally addressed the link between globalization and child labor; much of the recent policy debate and controversy surrounding globalization and the WTO, which has been focused on the issue of child labor in

emerging countries. On the one hand, opponents of market integration argue that globalization may increase the wages paid to work children or increase the earnings opportunities of children in poor economies, thereby increasing child labor (Bhatwati, 1995; Maskus, 1997). Trade liberalization in a developing country that is abundant in unskilled labor will have not only a substitution effect but also an income effect, which will raise the relative rate of return of unskilled labor (Rodriguez and Rodrik, 2000). This income effect can be expected to reduce the incentive for parents with little skills to send their children to work, if we assume that child leisure and child education are normal goods and second is the incentive or substitution effects arise from changes in the present and future wages of a child that change the opportunity costs and returns to education (Grote and Weinhold, 1998; Ranjan, 2001; Jafarey and Lahiri, 2002). Edmonds and Pavcnik (2004) conclude that trade openness might lower child labor but only via its positive effect on per capita income. Basu and Chau (2004) analyze the effects of trade openness in a dynamic model of child labor and debt bondage. Trade openness increases the short-run supply of child labor but does not affect the long-run incidence of child labor. The existing empirical work in a cross-country setting documents a negative association between Openness and child labor (Shelburne, 2001; Cigno et al., 2002). Child labor is more prevalent in rural than in urban areas. In rural areas, there is more agricultural activity, which is one of the main sectors of child employment, often on commercial plantations and without any form of payment (Ahmed, 1999; ILO, 2002b).

3. Theoretical Framework

In light of the existing literature, the researcher evaluates the impact of globalization on child labor. Trade is a valuable tool that increases the income of a country (Frankel and Romer, 1999). A theoretical study by Baland and Robinson (2000) illustrates that when child labor is good in parental preferences, an increase in income can lower child labor by overcoming liquidity constraints. However, contrary to that of Basu and Van (1998) concludes that if child labor is bad in parental preferences, an increase in income stimulates child labor. In another theoretical study, Edmonds and Pavenik (2005a) conclude that child labor can be reduced by improving the living standard of the individual through trade liberalization. Basu (1999) partitions the theoretical literature into two groups, papers that examine intra-household bargaining (between parents, or parents and children) and those that examine extra-household bargaining (where the household is a single unit and bargains with employers). Both frameworks are potentially valid for our analysis and suggest different factors that might influence child labor. In the intra-household bargaining framework, child labor is the outcome of a bargaining process between members of the household, for example, parents and children or the father and the mother (Bourguignon and Chiappori, 1994 and Moehling, 1995).

The weight that each member receives can depend upon his or her contribution to the family's resources. Collectively, child labor may be desirable because it contributes to the family income, and it may be desirable to the child because it increases his or her weight in the family decision function (Galasso, 1999). Within this framework, the key variables are those that determine the relative bargaining strength of different members of the household. This could include wealth, the number, age, and gender of children and earnings (wages) if an individual were to work. The extra-household bargaining framework considers each household as a unitary entity, according to Becker (1964) and Gupta (1998). The motivation behind this approach is that children's bargaining power is inherently very limited so that

parents determine to what extent a child works without necessarily considering the child's welfare. The parents and the employer bargain the child's wage and the fraction of that wage to be paid as food to the child. Within this framework, the key variables are those that determine the relative bargaining strength of the household vis à vis the employer. These also include household wealth variables as well as access to credit. Trade openness recognized both as one of the child labor dilemmas and a solution for them. Globalization critics had confirmed that international trade is unique intensive to employ more child labor but many economists are against this episode and demonstrate that international trade is a source to reduce child labor (Cigno et al. 2002). However, the average income effect also causes to lessen child labor; reduction in inequality can also raise child labor (Rogers and Swinnerton 2001). Theory work on child labor emphasizes the importance of poverty (Basu and Van, 1998) or phenomena associated with poverty such as credit constraints (Baland and Robinson, 2000; Ranjan, 2001) as determinants of high levels of child labor and low schooling rates in developing countries. Labor demand conditions also play a role (Basu and Van, 1998; Maskus, 1997; Brown, 2000; Dixit, 2000; Ranjan, 2001). Shelburne (2001) identifies a negative relationship of child labor with country size, per capita GDP, and a country's openness. (Cigno et al. 2002) also, propose a static estimate and identify a significant negative impact of country trade openness on child labor. Growth with trade liberalization and Foreign Direct Investment penetration increases the demand for child labor and their wages (Edmonds and Pavcnik, 2006). It increases the cost of opportunity for children to go to school. This situation supports the decision of the parents about directs their child to the school or to work, and parents are more likely to send their children to work (Ranjan, 2001), and this is called the "substitution effect" (Davies and Voy, 2009). It is known that the substitution effects of globalization are most likely expected to increase the supply of child labor.

4. Methodology

4.1 Empirical Specification

Apart from the theoretical model of a generic Becker type of household decision model (1981) such as the one articulated by Rosenzweig and Evanson (1977), Portent (2001), Cignati and Rosato (2000), and summarized by Schultz (1997) assumes that the household acts to maximize utility, which is a function of the number of children, the schooling per child, the leisure time per child, the leisure of the parents and a composite consumption good as discussed in the previous chapter. The researcher also follows the model developed by Edmonds and Pavcnik (2006) and Cigno et al. (2002) to specify the empirical model of child labor. In the regression work, the researcher relies on a linear form for the data presented in Table 1. The researcher estimates three central equations to test the effect of Trade Openness, FDI, and economic growth on the child labor participation rate 5-14 years of age. Each equation estimated with and without instrumental variables developed to control for endogeneity of Foreign Direct Investment[1], Trade Openness, and per capita income. The first central equation models the relationship between child labor and the log of the level of FDI. The log of Gross Domestic Products per capita is also included to control for country size[2].

$$Childlabor_{it} = \beta_0 + \beta_1 \ln(fdi_{it}) + \beta_2 \ln(gdppc_{it}) + \beta_3 tradeop_{it} + \varepsilon_{it} \quad (1)$$

[1] FDI data are highly skewed towards the wealthy countries Therefore, using logged FDI helps to avoid spurious correlations in many circumstances. (Blonigen & Davies 2004)

[2] An alternative, Using the ratio of FDI to GDP, thereby restricting the coefficients on these to be equal but opposite (sometimes the data clearly rejects). The primary reason for not doing so however was to draw from the literature estimating the level of FDI when constructing the instrument.

The problem is that FDI is endogenous to child labor. This would cause the coefficient estimates to be biased. For instance, by not controlling for the endogeneity of FDI, the model developed by Neumayer and DeSoysa (2005) assumes causality flows from FDI to child labor. In reality, causality probably goes both ways. In addition to FDI having a negative effect on child labor, it may be the case that child labor affects FDI as well. For example, countries with high levels of child labor are also typically low skilled. Typically, studies find that FDI avoids such low-skilled countries despite the inexpensive labor. This relationship would cause the coefficient of Foreign Direct Investment in equation (1) β_1 to be biased. If the estimates of β_1 and β_3 are simultaneously significant (without instruments), then each variable is independently correlated with child labor. If the parameter estimates remain significant after instrumenting for FDI and Trade Openness to control for endogeneity, then each variable independently affects child labor. The researcher is interested in how the coefficient estimates change when income is added to the model. The natural log of per capita income square is added to a non-linear term into the model

$$Childlabor_{it} = \beta_0 + \beta_1 \ln(fdi_{it}) + \beta_2 \ln(gdppc_{it}) + \beta_3 tradeop_{it} + \beta_4 \ln(gdppc^2{}_{it}) + \varepsilon_{it} \quad (2)$$

Just as the researcher is concerned about the endogeneity of Foreign Direct Investment, per capita income is also potentially endogenous to child labor. As a check for robustness, the researcher created an instrumental variable for per capita income based on lagged values of income and capital investment. If after the inclusion of per capita income square β_1 and β_3 are no longer significant, then it is likely the case that the effect of FDI and trade openness on child labor is channeled through income. For the U-shape hypothesis to realize, $\beta 1 < 0 \; and \; \beta 2 > 0$ must be true. The condition for both the validity of the literature findings in developing countries according to the hypothesis explaining the possible effects of globalization on child labor is expected as $\beta 1 < 0 \; and \; \beta 2 > 0$. In developing countries according to the hypothesis that explains the relationship between Trade Openness and FDI penetration via child labor and according to the literature that interrogates this hypothesis $\beta 3 < 0 \; and \; \beta 4 < 0$ is expected. For controlling the endogeneity of openness and Foreign Direct Investment, Davies and Voy (2009), use an instrumental variable (IV) based on a trade instrument created by Frankel and Romer (1999) related to the geographical features of countries. In the economic model, the researcher compare the findings of the instrumental variable rural area ratio that is a geographical determinant of Openness and FDI. However, it is not necessarily correlated with income because the income is highly correlated with child labor. The paper added the rural area variable as an instrumental variable and expected to increase the model's explanatory power. Lastly, the study control for other geographical, political, and social characteristics that might influence child labor by integrating a vector of country attributes into the model that is intended to show that the results are not driven by omitted variables that are correlated with child labor and included independent variables.

$$Childlabor_{it} = \beta_0 + \beta_1 \ln(fdi_{it}) + \beta_2 \ln(gdppc_{it}) + \beta_3 tradeop_{it} + \beta_4 \ln(gdppc^{\,2}{}_{it}) + \beta_5 rural_{it} + \boldsymbol{\alpha} \mathbf{X_{it}} + \varepsilon_{it} \quad (3)$$

$\mathbf{X_{it}}$, is a vector of country $i's$ attributes and $\boldsymbol{\alpha}$ is a vector of coefficients. Among the variables included a year of schooling in the population, landlocked country and a dummy variable indicating whether the country ratified the International Labor Organization's Convention

138 agreeing to set minimum working ages of 14 years is 1 and 0 otherwise if the country ratified the International Labor Organization's Convention 138 agreeing to set minimum working ages above 14 years (ILO, 1973). Regional dummy variables are also added, Institutional variables (Government effectiveness, the rule of law, political stability, Voice and Accountability, Control of corruption) and poverty rate. The inclusion of the variables is intended to show that results from estimating equations (1 to 3) are not driven by the omission of country characteristics affecting child labor that are correlated with income, trade openness and foreign direct investment. The development level is explained with Gross Domestic Product Per Capita by considering global economic integration degrees of developing countries. In this econometric equation, the effect of trade openness and FDI on child labor is explained by setting up a relationship between Gross Domestic Product Per Capita (GDPPC), Gross Domestic Product Per Capita Square ($GDPPC^2$). The Trade Openness and FDI ratios through income, if the Trade Openness varies simultaneously with the income, exclusion of square of income term may bias the coefficient on Trade Openness because of its endogeneity. While Edmonds and Pavcnik (2006) analyze the relationship between International Trade and Child Labor by considering a cross-country approach, they emphasize the endogeneity of Openness. Firstly, they look at the relationship between child labor and the trade of developing countries[3].

4.2 Data and Empirical Strategy

This paper presents the variables explaining the child labor participation rates and proposes a reduced form of the econometric equation to interrogate the validity of this relationship. The study utilized GMM system on the results findings based on the panel of 32 countries, and the data were from 1990-2017. The countries were chosen based on the incidence of child labor in the Sub-Saharan African countries. The data for child labor participation rate was from the International Labor Organization (ILO) and Human Development Index, (2017). According to the International Labor Organization (2016), the most common measure of child labor is the labor force participation rate of 5-14 years of age were economically active. Trade Openness data from World Development Indicators (2019), World Bank, and OECD (2019). The Trade Openness is calculated by (X+M) divided by Gross Domestic Product (GDP). Here X is the export, and M is the import amount for the year 2019. The volume of imports and exports increases through free trade. These promote more investments both internally and externally, Trade Openness accelerates market expansions, and competition among business entities hence stimulates technological innovation and productivity, which leads to economic growth. A country is considered open if it passes each one of five tests. First, it must not have an average tariff rate above 40%. Second, non-tariff barriers must not cover more than 40% of trade. Third, any existing black market premium for the exchange rate must be below 20%. Fourth, the country must not have a socialist economic system. Fifth, there must not-exist an extractive state monopoly on major exports Cigno et al. (2002). Rodriguez and Rodrik (2000) have questioned this measure of trade openness. They argue that the strength of this variable in growth regressions mainly stems from two of its components referring to the black market premium and state monopoly of exports, which are a proxy for a wide range of policy and institutional differences rather than a proxy for liberal trade policy itself. The more direct measures of trade policy, namely tariffs and non-tariff barriers, have comparatively little statistical power. Sachs and Warner's measure is also a very crude and simple black or white

[3]Edmonds and Pavcnik (2006) study on the relationship between International Trade and Child labor by considering cross-country approach

measure that does not reflect actual existing variation, instead simply categorizing all countries as either open or closed.

FDI is the net inflow of investment. FDI data was from World Development Indicators updated, World Bank, and OECD (2019). FDI determines the Foreign Direct Investment variable over Gross Domestic Product (GDP), and it is the average value of FDI that enters into the selected developing countries averaging over the years, (1990-2017). The rural area ratios data was from World Development Indicators (2019) and United Nations Population Division's World Urbanization Prospects (2018), and it is the ratio of the countries' rural population to the total population. The ILO (2016) reports states that 84.27% of child workers are in rural areas. 88.8% of rural child workers are employed in agriculture, while only 49.4% of urban child workers are employed in agriculture. A reasonable hypothesis is that rural areas tend to have more child labor because rural areas have a relatively low quality of education and more agricultural industries. Therefore, the rural population was controlled for in the model. Government expenditure on education is a better measurement to describe the quality of education in the broader education range since the data of pupil-teacher ratio, in general, is not available. Therefore, in developing countries, the government mainly finances the development of the education system. Primary and secondary educations are a priority for governments compared to higher education in developing countries. Therefore, government expenditure on education would be a better measurement in this study, the Government expenditure on education as a percent of Gross Domestic products (% GDP). Data is from the Human development index (2017). When government expenditure on education increases, the cost of sending children to school is reduced, for instance, there will be high costs of paying a child to government school unless the household can get a subsidy from the government, which may motivate parents to send their children to school relatively than to work. Therefore, government expenditure on education might influence the child labor rate.

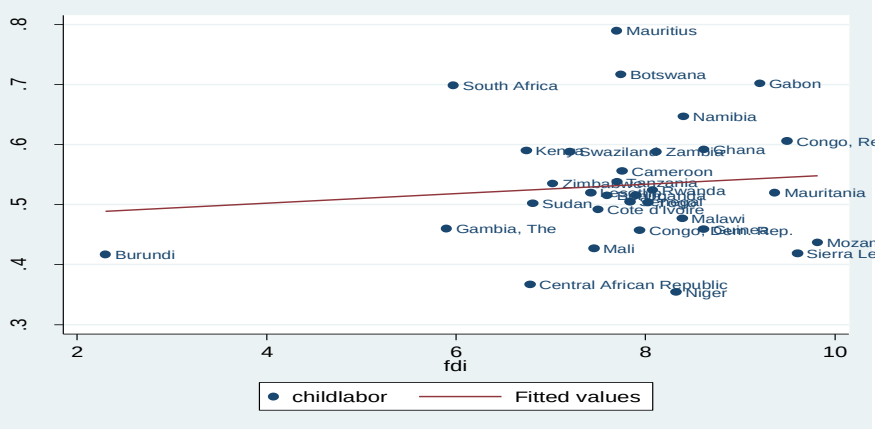
For control variables, this thesis follows Neumayer & Soysa's (2005) study and uses Government expenditures on education as one of the control variables. A dummy variable taking a value of 1, if the country is landlocked zero otherwise (Matt Rosenberg, 2019), and for country's attributes among the variables included years of schooling in the population, data from International Labor Organization and Human Development Index (2017) and a dummy variable indicating whether the country ratified the International Labor Organization Convention 138 agreeing to set minimum working ages of 14 years is 1 or 0 otherwise if the country ratified the International Labor Organization Convention 138 agreeing to set minimum working ages above 14 years (ILO 1973). Data regarding Gross Domestic Products Per Capita (GDPPC) are from World Development Indicators (2019). The Gross Domestic Product Per Capita data, which is represented by Gross Domestic Products Per Capita, belongs to the year 2019. The data is constantly in U.S. dollars. The study also include institutional variables in the model. Since the pioneering work of Acemoglu, Johnson & Robinson (2001 & 2002), the role of institutions has been given significant attention. Many indices tend to use among different authors. The paper adopt the rule of law, which is the most recent and most universally accepted proxy of institutions provided by the World Bank World Governance Indicators (WGI 2019). Institutions are the rules of the games in society, including all socio-economic activities of the country undertaken within the institutions' environment. In this sense, the quality of institutional promotes investments, notably private investments and efficient allocation of resources leading to economic growth. Therefore, the

study expect the quality of institution variables (Government effectiveness, political stability, and Voice and Accountability) to provide a positive impact on child labor. Therefore, the quality of institutions affects economics growth through Foreign Direct Investment inflows by creating conducive macroeconomics environment which facilitates investments, trade, and businesses, reduce transactions cost which lowers the cost of production hence accelerate productivity and growth. Other variables included include the African region and poverty ratio. Countries in Africa are categorized in five different geographical regions, namely: North Africa, East Africa, Central Africa; West Africa; and Southern Africa. In all these respective geographical regions, respective countries belong to various regional economic communities.

5. Empirical Results and Discussions of the findings

This section presents the empirical findings of this study using different approaches. The main results are presented in tables 3 and 4. The study show the relationship between child labor and FDI; child labor and trade openness and child labor and income in the sample. The study use the values in natural logarithms. The study observed a positive relationship between child labor and FDI in figure 1

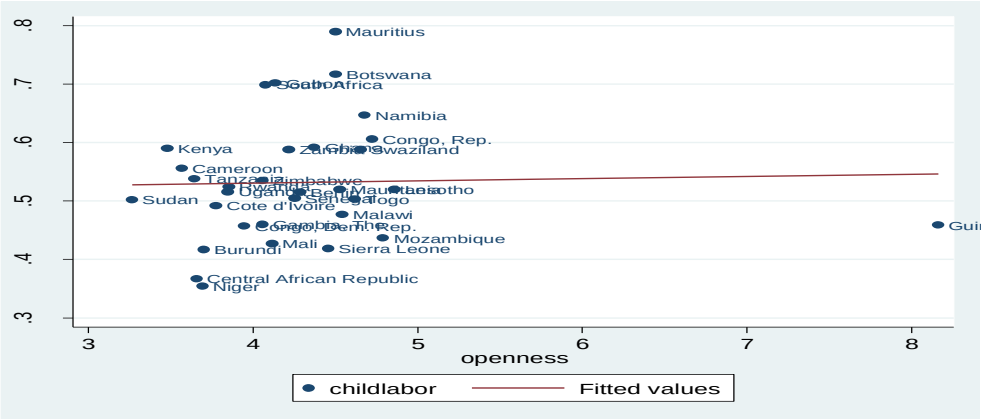
Figure 1: Scatter plot child labor Vs FDI.



Source: Author's compilation from ILO, HDI, World Bank Data (2020)

The researcher plotted a scatter diagram for child labor and trade openness for the sample for values reported in 2017, according to WDI, ILO and UNDP data. Similarly, the researcher also use natural logarithms on all the values. The study also observe a positive relationship, as reported in Figure 2 below.

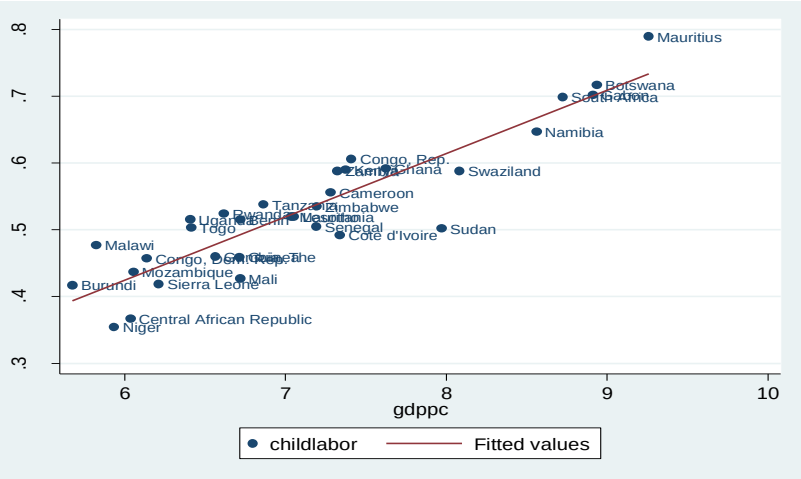
Figure 2: Scatter plots child labor versus Trade Openness



Source: Author's compilation from ILO, HDI, World Bank Data (2020)

The study also produced a scatter diagram to plot the relationship between child labor and GDP per capita with all values in natural logarithms obtained for the year 2017, according to WDI, ILO and UNDP. The study observed a strong positive relationship between child labor and GDP per capita, as reported in Figure 3 below.

Figure 3: Scatter plots child labor versus GDP Per Capita



Source: Author's compilation from ILO, HDI, World Bank Data (2020)

5.1 Summary Statistics

Table 1: Showing summary statistics of the variables used in the study. The total number of observations was 896 for 32 Sub Saharan African countries for the period from 1990-2017. The main endogenous variable was child labor, which had a mean value of 0.453 and the highest value of 0.790. These are the child labor participation rate of children between 5-14 years of age who were economically active (ILO, 2006). The explanatory variables included GDP per capita (GDPPC), Trade Openness, FDI, geographical value of landlockedness, government expenditure on education, average years of schooling, five regions of the African continent namely: East Africa, North Africa, Southern Africa, Central Africa, and West Africa as well as several indicators of governance and institutions which include the rule of law, corruption index, voice, and accountability index, political stability and absence index, government effectiveness index and regulatory quality index. The average value of GDP per capita for the sample countries was 1370, with the lowest value of 102.6 registered in 1999 and the highest value of 10716 reported for 2011. Trade openness, measured as a summation of exports and imports as a ratio of GDP in current values, was highest at 170.4 recorded for 2003, while the lowest value for 2017. FDI measured as net inflows, had a mean value of 363 million. The lowest was a minus 489.1 million suggesting high levels of disinvestment by foreign firms, while the highest value was recorded at USD 9.885 trillion for in 2008 as presented below.

Table 1: 1 Summary Statistics for the whole sample data, 1990-2017

Variables	(1) N	(2) Mean	(3) SD	(4) Min	(5) Max
Childlabor	896	0.453	0.115	0	0.790
Gdppc	896	1,370	1,880	102.6	10,716
Rural population	896	61.23	18.32	2.039	94.58
Landlocked	896	0.375	0.484	0	1
Schooling	896	8.713	2.757	2.100	15.30
ILO Convention 138	896	0.563	0.496	0	1
Trade Openness	896	70.30	32.64	0	170.4
Govt expenditure	896	0.455	0.118	0.199	0.790
FDI	896	363.0	965.6	0.0103	50,018
Poverty gap	896	2.817	8.642	0	63.60
Corruption	896	-1.047	0.768	-1.723	1.217
Government effectiveness	896	-1.289	0.986	-1.884	1.049
Political stability, and absence	896	-1.497	1.539	-2.845	1.200
Regulatory Quality	896	-1.295	1.114	-2.298	1.127
Rule of Law	896	-1.325	1.083	-2.130	1.077
Voice and Accountability	896	-1.165	1.026	-1.859	1.007
Africa region	896	2.375	1.193	1	5

Source: Author's compilation from World Bank Data (2020)

5.2 Correlation Matrix

Table 2: Showing correlation matrix of variables used in the study. The main endogenous variable was child labor. Simple correlation shows a positive relationship between child labor and GDP per capita, FDI, trade openness, Schooling, government expenditure on education, and institutions (the rule of law). In contrast, a negative relationship is observed between child labor and rural population, landlockedness and ratification of ILO convention 138. This shows that the relationship between child labor cannot be properly explained using simple correlation and requires a robust econometric methodology. This study rely on the GMM methodology, which is strong and robust to endogeneity, heteroscedasticity and autocorrelation.

Table 2: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) CLB	1.000									
(2) GDP	0.784	1.000								
(3) FDI	0.135	0.030	1.000							
(4) RP	-0.351	-0.423	-0.026	1.000						
(5) TO	0.394	0.293	0.277	0.032	1.000					
(6) GE	0.988	0.795	0.128	-0.359	0.398	1.000				
(7) LD	-0.206	-0.159	-0.078	0.233	-0.026	-0.177	1.000			
(8) SC	0.877	0.616	0.163	-0.266	0.383	0.874	-0.058	1.000		
(9) ILO	-0.158	-0.209	-0.028	0.199	-0.188	-0.134	0.033	-0.130	1.000	
(10) ROL	0.002	-0.004	0.050	0.007	-0.020	0.005	0.095	0.059	0.086	1.000

Source: Author's compilation from World Bank Data (2020)

In this study, the main estimating technique was the Generalized Methods of Moments (GMM) methodology, which fits perfectly well for panel data. The starting point for the GMM estimator is the analogy principle, which says we can estimate a parameter by replacing a population moment condition with its sample analogue. GMM fits efficiently and consistently

linear and interactive variables in the presence of endogeneity, heteroscedasticity, and serial correlation and where the variables are jointly interrelated. Heteroscedasticity and autocorrelation are mainly controlled through VCE robust standard errors. The study performed additional measures such as calculating and using economic growth rates, the growth rate in Trade Openness and lagged values of FDI to remove any bias resulting from these variables being endogenous with other explanatory variables. The paper emphasize that the question of the direction of the relationship is indefinite and is a matter of an empirical nature. In this section, this study provides estimation results and explanations for the estimation of the various steps taken in the estimation process. The study use GMM econometric methodology because of its power to control for endogeneity and deliver efficient and consistent results in the face of endogeneity, and the results are reported in Table 3 below;

Table 3: 2 Main Results from Generalized Methods of Moments (GMM)

Variables	(1) GMM	(2) GMM	(3) GMM
Openness	0.130*** (0.00893)	0.0260*** (0.00540)	-0.00303 (0.00314)
Gdppc		0.0976*** (0.0306)	0.0267*** (0.00692)
gdppcax2		-0.000337 (0.00215)	-0.00164*** (0.000467)
FDI			0.000870 (0.00112)
Rural pop			0.000161 (0.00103)
Govexp			0.816*** (0.0255)
Ldlocked			-0.00693*** (0.00153)
Schooling			0.00390*** (0.000520)
ILO Convention 138			-0.00622*** (0.00110)
Rule of law			-0.000292* (0.000163)
Region = 2, East Africa			0.000865 (0.00253)
Region = 3, North Africa			-0.00840*** (0.00202)
Region = 4, Southern Africa			-0.00658** (0.00315)
Region = 5, West Africa			-0.00468 (0.00312)
Poverty gap			-0.00450*** (0.000922)
Constant	-0.0916** (0.0372)	-0.285*** (0.0983)	-0.0312 (0.0228)
Observations	864	864	864
Country FE	Yes	Yes	No

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

***, **, and * denote respectively statistical significance at 1%, 5%, and 10% levels. Robust standard errors are presented in parentheses. Country fixed effects are included for the first two regression results in columns (1) and (2). The inclusion of fixed effects in column (3) was

not possible as this lead to the dropping of key variables of interest; these fixed effects were not included in the regression analysis of column (3).

The interaction of trade openness and child labor has received considerable theoretical attention. Still, empirical evidence in general on the topic is scarce and in particular empirical literature using panel data. Column (1) represents results from GMM after controlling for endogeneity and using lagged values of growth in trade openness as an instrument variable. In column (1) the paper found a positive and significant correlation between trade openness and child labor with a trade openness coefficient of 0.130, such that a 10-percentage point increase in Openness is associated with 1.3 percentage point increase in child labor. The present study found that trade openness is positively and significantly related to child labor. The possible explanation is that trade liberalization raises the output of the exportable sector and increases the demand for child labor as well as the child-wage. The Openness of market integration argues that globalization may increase the wages paid to increase the earnings opportunities of children in poor economies, thereby increasing child labor. Column (2) also provides results after controlling for income levels. In column (1), the positive association may drive the relationship between trade and income. This could be apparent from the many calls globally on the need to change demand for the labor associated with a trade-induced increase in product demand. To check whether this is the main channel, through which trade can influence child labor, the study include income variable; this means that the focus on estimating the relationship between child labor and trade openness conditional on income level. Column (2) provides the relationship between trade openness and child labor after controlling for variation in income across countries with the second-order polynomial in log Gross Domestic Products per capita. The coefficients on income terms suggest that higher income is associated with higher child labor. The coefficient of (for instance, the coefficient on ln (income) is positive and significant) at 1% level of significance in poorer nations while the impact is negative and not significant in richer African countries shown by the coefficient of (ln (income))^2. Theory tells us to expect a correlation between income and child labor under a couple of different circumstances. On the one hand, if a quality child is a normal good, then there should be a straightforward negative correlation between income and child labor. While, if credit-constrained, then parents used their children as a source of transfer income from the future into the present. In this case, the desire to re-allocate income backward through time will occur only, if current income is lower than expected future income. Thus, child labor responds not to the level of income today, but rather to the level of income today relative to future income.

The empirical results find positive but insignificant impact of the Gross Domestic Product per capita on child labor as argued by Baland and Robinson (2000) child labor is a device for transferring resources from the future into the present. Children who work do not invest in human capital that would make them more productive in the future. A family will choose to make this inter-temporal shift in household resources when current income is low relative to future income. Thus, it is not the absolute level of family income that matters for the child labor decision but, rather, the current level relative to future income. After controlling for income, any remaining association between child labor and Openness may reflect changes in Foreign Direct Investment(FDI), rural population, government expenditure on education, average years of schooling in total population, a country's ratification of the ILO Convention 138, institutions, landlockedness, and as well the region the particular African countries belongs to. Therefore, controlling these variables turns the trade openness variable negative

and insignificant while income effects in richer countries are reduced as shown by the change in the sign of the coefficient of (ln(income))^2 and now significant at 1% while ln(income) remains the same 1% level of significance.

FDI and percentage of the rural population in the total population are positive but insignificant, suggesting a 10 percent increase in rural population raises the incidence of child labor by a negligible amount of 0.001 while a 10% increase in FDI raises child labor by a negligible 0.008. As far as FDI is a concern, foreign investors seem to be less interested in exploiting unskilled labor than is recognized by the conventional wisdom due to the fact that market size and market growth, political stability, and infrastructure are often as important, if not more important, than low wages. The results are consistent with the findings of earlier studies conducted by (Kucera, 2002), which also fails to find that countries with low labor standards in general and a high incidence of child labor attract a greater inflow of FDI. The explanation is that some incidence of child labor has shifted from rural to urban areas due to huge urbanization and trade liberalization, which gives the most favorable wages and employment opportunities to the unskilled child labor. This study suggests that families in urban areas found more opportunities to put their children to work than families in rural areas. It is also the case that many of the children that worked in rural areas were initially pauper apprentices with little say in how much they worked or what compensation they received. Government expenditure on education and average years of schooling in the total population was found to be both positive and significant at 1% level of significance, suggesting an increase in government expenditure on education has not yet translated into any meaningful reductions in child labor. As the government increases its spending in education, the expectations are that the incidences of child labor will be reduced. Being landlocked and ratification of ILO Convention 138 were found to be negative and significant at 1% level of significance. Institutions were found to be negative at 10% level of significance.

The regional grouping dummy, which consists of five regions in Africa, namely East Africa; Central Africa, North Africa; West Africa, and Southern Africa, overall was found negative and significant. In respective regions, North Africa, Southern Africa, and West Africa were found to be negative and significant at varying levels. North Africa was significant at 1% level of significance; Southern Africa at 5% level of significance, while West Africa and East Africa were insignificant. These points to the fact that in respective regions, there are regional communities. In North Africa, there is the Maghreb Arab Union (AMU); in Southern Africa, there is the Southern African Development Community (SADC), and in West Africa, there is the Economic Community for West African States (ECOWAS). These suggest that belonging to these regions, which guarantees to belong to these regional groupings with strong institutions against child labor, actually reduced the incidences of child labor. While the regions aim at mobilizing sub-regional policymakers and improving sub-regional cooperation for the elimination of the worst forms of child labor. The study also found the poverty gap to be negative and significant at 1% level of significance, suggesting that the more the population is in poverty, the more widespread is child labor. Poverty is also found to be supporting the view that to take advantage of higher income opportunities and parents send their children to work. However, as more people in various countries move out of poverty, the rate of child labor decreases.

5.3 Robustness checks

In this section, the paper provide robustness check results using Two-Stage least squares (2SLS) regression analysis. The results are shown in Table 4 below.

Table 4:3 Robustness check with Two-Stage Least Squares (2SLS) regression Analysis

Variables	(1) 2SLS	(2) 2SLS	(3) 2SLS
Openness	0.111***	0.0160***	-0.000528
	(0.00904)	(0.00459)	(0.00121)
Gdppc		0.0629***	0.0190***
		(0.0146)	(0.00374)
Gdppcax2		0.00228**	-0.00111***
		(0.00101)	(0.000232)
FDI			0.000868
			(0.000780)
Rural pop			0.000131
			(0.00139)
Govexp			0.817***
			(0.0261)
Landlocked			-0.00702***
			(0.00152)
Schooling			0.00385***
			(0.000528)
ILO Convention 138			-0.00568***
			(0.000944)
Rule of law			-0.000379**
			(0.000162)
Region = 2, East Africa			0.00108
			(0.00311)
Region = 3, North Africa			-0.00575**
			(0.00257)
Region = 4, Southern Africa			-0.00688**
			(0.00292)
Region = 5, West Africa			-0.00459*
			(0.00246)
Povertygap190			-0.00438***
			(0.000834)
Constant	-0.00949	-0.131***	-0.0147
	(0.0374)	(0.0501)	(0.0138)
Observations	864	864	864
R-squared	0.176	0.794	0.981
Country FE	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: ***, ** and * denote respectively statistical significance at 1%, 5% and 10% levels. Robust standard errors are presented in parentheses. Country fixed effects are included for the first two regression results in columns (1) and (2). In this regard, these fixed effects were not included in the regression analysis of column (3). The results found using Two-Stage least squares (2SLS) regression analysis are very comparable with the results we obtained using Generalized Methods of Moments (GMM) methodology approach.

6. Conclusion

This paper is to examine the impact of Trade Openness and Foreign Direct Investment on Child Labor; Evidence from Sub-Saharan Africa countries using a panel data from 1990 to

2017 for 32 countries, while addressing this problem, the study focused on income levels of countries by considering their trade openness and FDI penetration ratios. Additionally, the paper stresses the importance of some variables such as GDPPC2, institutional quality, ILO Convention 138, poverty gap, landlocked country, and Government expenditure on education, rural area population, and average years of schooling in the total population. The study found a positive relationship between child labor, trade openness for the sample using scatter diagrams, while child labor and FDI shown a positive relationship, and finally, there was a strong positive relationship between child labor and GDP per capita, this is consistent with the study of Eric V. Edmonds & Nina Pavcnik (2006). In explaining the findings results from GMM after controlling for endogeneity and using lagged values of growth in trade openness as an instrument variable. The study found a positive and significant correlation between trade openness and child labor with a trade openness coefficient of 0.130, such that a 10-percentage point increase in openness is associated with 1.3 percentage point increase in child labor. The present study found that trade openness is positively and significantly related to child labor. The possible explanation is that trade openness raises the output of the exportable sector and increases the demand for child labor as well as the child-wage. The openness of market integration argues that globalization may increase the wages paid to increase the earnings opportunities of children in poor economies, thereby increasing child labor. Findings after controlling for income levels, the positive association may drive the relationship between trade and income. This could be manifest from the many calls globally on the need to change demand for the labor associated with a trade-induced increase in product demand. The coefficients on income terms suggest that higher income is associated with higher child labor. The coefficient of (the coefficient on ln (income) is positive and significant) at 1% level of significance in poorer nations while the impact is negative and not significant in richer African countries shown by the coefficient of (ln (income))^2. Theory tells us to expect a correlation between income and child labor under a couple of different circumstances. On the one hand, if a quality child is a normal good, then there should be a straightforward negative correlation between income and child labor. While, if credit-constrained, then parents used their children as a source of transfer income from the future into the present.

Foreign Direct Investment and percentage of the rural population in the total population are positive but insignificant, suggesting a 10 per cent increase in rural population raises the incidence of child labor by a negligible amount of 0.001 while a 10% increase in Foreign Direct Investment raises child labor by a negligible 0.008. As far as FDI is a concern, foreign investors seem to be less interested in exploiting unskilled labor than is presumed by the conventional wisdom due to the fact that market size and market growth, political stability, and infrastructure are often as important, if not more important, than low wages. Our results are consistent with the findings of earlier studies conducted by (Kucera, 2002) which also fails to find that countries with low labor standards, and a high incidence of child labor attract a greater inflow of FDI. The study found that poverty gap was negative and significant at 1% level of significance, suggesting that the more the population is in poverty, the more widespread is child labor. Poverty was to be supporting the view that to take advantage of higher income opportunities and parents send their children to work. However, as more people in various countries move out of poverty, the rate of child labor decreases. The results found using Two-Stage least squares (2SLS) regression analysis as robustness checks are very comparable with the results obtained using Generalized Methods of Moments methodology approach. The paper recommended an effective policy against child labor is to promote the

development of functioning credit markets in Sub-Saharan African countries and to facilitate access to these markets for poorer households. With access to capital markets, parents will arguably allocate more of their children's time to education, since they will be able to shift wealth from the future to the present by borrowing against future income. The paper suggests that rich countries should restrict the sale of goods from developing countries that do not enforce child labor laws. The major limitation of this research was high-quality data; most of the variables had missing values, which presented limited timelines as a well-limited sample. The researcher dropped some countries because of missing data, which could have significantly provided more insight into research. Until recently, existing child labor data were not gender-specific, and failed to differentiate between the 'economic' and 'non-economic' activities of children is an important distinction, particularly in the context of gender. There is no specific data on economics sectors hence finding it hard to ascertain the sectors with higher child labor.

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Appendices

Appendix I: Countries in sample are sub-Saharan Africa (SSA).

1. (Angola)	25. (Madagascar)
2. Benin	26. Malawi
3. Botswana	27. Mali
4. (Burkina Faso)	28. Mauritania
5. Burundi	29. Mauritius
6. Cameroon	30. Mozambique
7. (Cape Verde)	31. Namibia
8. The central African Republic	32. Niger
9. (Chad)	33. (Nigeria)
10. (Comoros)	34. Rwanda
11. Republic of the Congo	35. Sao Tome and Principe
12. Democratic Republic of the Congo	36. Senegal
13. Cote d'Ivoire	37. (Seychelles)
14. Eswatini	38. Sierra Leone
15. (Equatorial Guinea)	39. (Somalia)
16. (Eritrea)	40. South Africa
17. (Ethiopia)	41. (South Sudan)
18. Gabon	42. Sudan
19. The Gambia	43. Swaziland
20. Ghana	44. Tanzania
21. Guinea	45. Togo
22. (Guinea-Bissau)	46. Uganda
23. Kenya	47. Zambia
24. (Liberia)	48. Zimbabwe

The countries in brackets have no complete dataset for child labor (5-14 years). The period of the study from 1990-2017, the researcher dropped (16 countries) and continue with countries with a complete dataset for the dependent variable (32 countries) of Sub-Saharan Africa Countries.

Appendix II: List of Variables and Description

Variables	Description
Child labor	Child labor is the labor force participation of children aged 5-14 years, data from the ILO and HDI 2017.
GDPPC	The Gross Domestic Product Per Capita, data that is represented by GDPPC belongs to the World Development Indicators 2019. The data is constantly in U.S. dollars.
FDI	FDI is the net inflow of investment. FDI determines the FDI variable as the percentage of Gross Domestic Product (GDP), and it is the average value of FDI that enters into the Sub-Saharan African countries. Data from WDI, WB and OECD 2019.
Trade Openness	Trade Openness is calculated by (X+M)/ GDP. Therefore, X is the export, and M is the import amount for the year. (Exports and imports (% of GDP)) Data from WDI World Bank National Accounts Data and OECD National Accounts Data Files 2019
Rural Area Population	Rural Area is the ratio of the countries Rural Population to the total population. Data is from WDI, United Nations Population Division World Urbanization Prospects 2018.
Government Exp. on Education	Data on Government Expenditure on Education as a per cent of Gross Domestic products (% GDP) from HDI 2017
Landlocked country	A dummy variable taking value 1, if the country is landlocked 0 otherwise Data from United Nations Conference on Trade and Development and World Population Review 2019
Schooling	Schooling: Average Years of Schooling in Total Population, Data from the ILO and HDI 2017
ILO Convention 138	ILO Convention 138: A country is a signatory of ILO convention 138. This variable is coded as one, if the country ratified minimum working ages of 14 years and 0 otherwise, data from the ILO 2019
Poverty gap	The study captured the poverty rate using the poverty gap at US$1.90 a day (2011 PPP) as a percentage of the population, which is the mean shortfall in income or consumption from the poverty line. Data from WDI 2019.
Governance and Institution Variables	The control of corruption index which captures perceptions of the extent to which public power is exercised for private gain as well as the capture of the state by elites and private interests
	The government effectiveness index captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures. Data from WDI 2019.

Source: Author's compilation (2020).

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