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The Impact of Economic Growth on Child Labour in Developing Countries

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Abstract

Child labouring in developing countries constitutes an alarming proportion of the entire workforce and international organizations and NGOs have suggested ways to curb this problem. This study empirically investigates the relationship between child labour and economic growth in a cross-section of (67) countries over time. A dynamic system GMM approach was adopted and the growth child labour Kuznet curve as presented by Kambhampati &Rajan, (2005) was established. The results shows that economic growth initially increase child labour but as growth is sustained over time, child labour tend to decline in developing countries. This findings suggest serious commitment by governments of the developing countries to promote long term growth in order to curtail the menace of child labour.

Keywords: Child Labour, Economic growth, system GMM

1. Introduction

The phenomenon of child labouring is today seen as a global syndrome and is wide spreading across world developing countries Ranjan, (1999). Throughout many developing countries, children constitutes an alarming proportion of the entire workforce. These children are deprived their childhood so as to provide an alternative source of income to their families Tauson (2009). It was estimated that about 211 million children between the ages of 5-14 years are involved in economic activities across the globe (Edmonds & Pavcnik, 2005). Several studies were conducted on cross country as well as single country basis analyzing the determinants of child labour. These studies concluded that there exist a positive relationship between child labour and poverty (Dayioglu 2006; Jayaraj & Subramanian 2007). The importance of remittance inflow on child labour was emphasized by (Ebeke,2012); the relevance of remittance and migration in explain ng child labour, (Dimova, Epstein &Gang,2008). Globalization (through trade openness) and foreign direct investment FDI were viewed as factors leading to reduction in child labour (Neumayer & De Soysa,2005; Edmonds & Pavcnik,(2006). To the best of our knowledge, only by Swaminathan (1998) and Kambhampati & Rajan (2005) empirically studied the impact of economic growth on child labour. This paper contribute to literature in the following ways:

It analyses the impact of child labour labour on economic growth in developing countries based on a panel framework; it attempt to investigate the relationship in a dynamic framework and considers the possibility of a U-shaped relationship between economic growth and child labour based on the study by Ebeke,(2012).

2. Literature review

Various studies indicated that increase in child labour leads to high economic growth, while others contravened. Economic growth is associated with increase in the number of child labourers but not sufficient to eliminate child labour (Swaminathan, 1998). Edmonds, (2005) established that 80% of the reduction in child labour is explained by an increase in per capita expenditure among Vietamese households. Using a bivariate probit model, Kambhampati & Rajan (2006) suggest that economic growth increases instead of decreasing child labour since it increases the demand for child workers. The only situation when economic growth might help to decrease the supply of child labour sufficiently to offset the impact of increase in demand is when there is sustained economic growth.

Tesfay (2003) asserts that evidence in favor of an inverted-u Kuznet like relationship between child labour force participation rate and GDP per capita existed. The relationship indicated is significant to all total samples most especially those samples whose per capita GDP is above $1000. He suggested that for countries on the upward sloping part of the curve, child labour is a problem which persist for many years.

Considering FDI flows into a country and child labour, Nadia et al, (2013) reveled that there exist variation on different sectors of the economy regarding the effects on child labour. For instance In Europe and Central Asia in agricultural sector it was indicated that FDI aggravate child labour, whereas in manufacturing sector in south and east Asia as well as mining in Latin America FDI is said to be negatively related to child labour.

Cigno, Rosati, & Guarcello, (2002), examined the correlation between child labour and trade exposure. They show that trade reduces or at least has no significant effect on child labour. Using an unbalance panel regression analysis for 106 countries between 1990-2003, Masuhama, (2006) found that Economic development is necessary to reduce child labour. Increase trade openness and foreign direct investment (FDI) increase the cost of labour and reduce child work in developing countries (Neumayer, 2004).

3. Theoretical Framework

3.1 The Growth Child Labour Relationship: A Child Labour Kuznet Curve

The impact of economic growth will be on the demand for and the supply of child labour. The impacts it has to supply is through its effects on household income, regional infrastructures and facilities relating to schooling, all of which has influence on households motivation to send children to work. In order to separate the effect of supply from the effect of growth on the demand for labour, a variable such as village wages, state NDP percapita and household income which have directly affected the supply side should be included, once the effect of these variables has been separated, it may be expected that any residual impact of economic growth will be through its impact on demand for child labour rather than the supply.

Economic growth is expected to increase household incomes, either because of its influence on increasing wage rate or because it leads to the creation of more employment opportunities for adults and children as well. However, this effect will only hold when growth is pro-poor and when children are mandated to partake in child labouring due to poverty. So long as these two conditions hold, economic growth is expected to decrease the supply of child workers to the labour market, an effect that will be mediated through household wages/ income.

It is possible that growth exert two further influences on the decisions of family to send children to school rather than work. Firstly, high economic growth could imply a higher return to education which signifies increasing the incentive for parents to send their children to school. Secondly, sustained economic growth may also signify that future generation will be better off than the present generation. As the economy grows, the labour demand curve will shift to the right both for adult and children. Initially, the jobs that become available, especially in the rural sector, will be low skilled ones. Eventually, however, as the economy continues to grow, the supply of the low skilled job dries off and sustained economic growth will lead to an increase in high skilled jobs both in Agriculture and industrial sector, as a result of which there will be an increase in the demand for schooling and a decrease in child employment. Therefore, it is expected that the impact of growth on demand for child labour shall be quadratic, which depict the initial rise in demand for child labour and a subsequent long term goal.

The growth child labour relationship could be termed “the child labour kuznet curve – an inverted u-shaped relationship where growth initially leads to increase child labour by increasing the opportunities for low skilled employment, but will eventually result to a shift toward highly skilled labourers, Possibly, the initial impact of growth will be in increasing demand for child labourers, most especially in the context of acute poverty. However, a sustain increase in economic growth over time will be reflected in a decrease in demand for child labourers who are no longer sufficiently skilled as well as a decrease in the supply of such workers considering the fact that households income and the regional prosperity improves. The net effect will also be quadratic, resulting to an initial rise in child work and subsequently followed by a decrease in the long run.

The growth child-labour Kuznet theory proposed by Rajan, (2005) will be utilized in this study to test the child labour growth nexus for developing countries. The choice of this theory becomes necessary because theories on child labour and growth relationship are handful or non-existence to the best of my knowledge. This theory is relevant because scholars, policy makers and actors whose efforts are geared towards the eradication of child labour have adopted various approaches and strategies with little progress. In this study, a quadratic function which is a form of a quadratic equation will be used to verify the above theory, using the system GMM. This is to ascertain whether child work will be propelled by growth in the short run or reduced by economic growth in the long run when labour become more skilled.

3.2 Empirical specifications

There are many variations of empirical growth model which are basically grouped in to two; viz; the human capital augumented-solow empirical growth model of (Romer & Mankiw, 1992; Slesman, 2014) which is strictly derived from Solow growth theory and the Barro-type growth model Barro, (1991).The "Barros Regression" included various potential determinants of growth. It is evident that growth regression is an open-ended context considering the fact that there are as many growth potentials determinants as available number of countries for the analysis Durlauf, Johnsonand & Temple, (2005). Similarly, the robustness of the inclusion of the right-hand-side variables in growth regression are still under serious debate, Levine and Renelt,(1992); Sala-i-Martin, (1997) ; Hoover & Perez, (2004). Hence, there is not yet consensus as regards to the set of variables that should be incorporated in the growth regression.

In view of the aforementioned uncertainties, this study derives a simple child labour augmented neoclassical theoretical based model of growth from Romer, Mankiw(1992), to augment the impact of child labour in this frame work. The human capital model using the Cobb-Douglas production function share parameters of Physical capital (K) and human capital(H) as given by the α and β respectively and A_t as the level of broad labour-augmenting technology. The production technology is described as:

$$Y_{it}= K^{\alpha}_{it} H^{\beta}_{it} \left(A_t L_{it}\right)^{1-\alpha-\beta} \qquad \alpha, \beta \in [0,1]; \alpha+\beta \in [0,1] \qquad (1)$$

Assuming exogenous labour growth rate and technological progress, the law of motion described each of the factors as follows:

$$\dot{K}_{it}= sK_{it}Y_{it}-\delta K_{it}$$

$$\dot{H}_{it}=sH_{it}Y_{it}-\delta H_{it}$$

$$\dot{L}_{it}=L_{it}' \Leftrightarrow n_{it}=\frac{\dot{L}_{it}}{L_{it}}$$

$\dot{A}_{it}= gA_{it} \Leftrightarrow g=\frac{\dot{A}_{it}}{A_{it}}$ the per effective labour of equation (1) can be written as $\hat{y}_{it}=\hat{K}^{\alpha}_{it}\hat{h}^{\beta}_{it}$

Where $\hat{y}_{it}=\frac{Y_{it}}{A_{it}L_{it}}$; $\hat{K}_{it}=\frac{K_{it}}{A_{it}L_{it}}$; $\hat{h}_{it}=\frac{H_{it}}{A_{it}L_{it}}$

Then, from the per effective labour definitions, the following motion equations can be obtained:

$$\dot{\hat{K}}_{it} = sk_{it}\hat{y}_{it} - (\delta+g+n_{it})\,\hat{K}_{it} \equiv^{ss} 0 \qquad (2)$$

$$\dot{\hat{h}}_{it} = sh_{it}\hat{y}_{it} - (\delta+g+n_{it})\,\hat{h}_{it} \equiv^{ss} 0 \qquad (3)$$

The steady state per effective labour income given Eq.(2) and Eq.(3) can be expressed as:

$$\hat{y}^{*}_{it}=sk_{it}^{\frac{\alpha}{1-\alpha-\beta}} sh_{it}^{\frac{\beta}{1-\alpha-\beta}} (n+g+n_{it}) - \frac{\alpha+\beta}{1-\alpha-\beta} \qquad (4)$$

If the natural log of Eq. (4) is taken we arrived at:

$$ln\hat{y}^{*}_{it}= \frac{\alpha}{1-\alpha-\beta} lnsk_{it} + \frac{\beta}{1-\alpha-\beta} lnsh_{it} - \frac{\alpha+\beta}{1-\alpha-\beta} ln(n+g+n_{it}) \qquad (5)$$

Let $\hat{y}^{*}_{it}$ be the value for steady state while $\hat{y}_{it}$ be actual value at any time t for country$i$, approximation around steady state or transitional path towards steady state for output per effective worker Ishise and sawada, (2009) is given as:

$\frac{dln\hat{y}_{it}}{dt} = \lambda\,[ln\hat{y}^{*}_{it} - ln\hat{y}_{it}]$

Where $\lambda= (\delta+g+n_{it})(1-\alpha-\beta)$ is the expressed speed of convergence signifying

$ln\hat{y}_{it2} = (1\text{-}e^{-\lambda\Psi})\, ln\hat{y}^{*}_{it} + e^{-\lambda\Psi}\, ln\hat{y}_{it1}$ Where $\hat{y}_{it1}$ described the income per effective worker at the initial point of time or ($t-1$period) and $\Psi=t_2\text{-}t_1$. By subtracting $ln\hat{y}_{it1}$ from each side of the equation we arrived at:

$$ln\hat{y}_{it2} - ln\hat{y}_{it1} = (1\text{-}e^{-\lambda\Psi})\, ln\hat{y}^{*}_{it} - (1\text{-}e^{-\lambda\Psi})\, ln\hat{y}_{it1} \Leftrightarrow ln\hat{y}_{it2} - ln\hat{y}_{it1} = (1\text{-}e^{-\lambda\Psi})\,(ln\hat{y}^{*}_{it} - ln\hat{y}_{it1})$$

By substituting $\hat{y}^{*}_{it}$, we arrived at the transitional path towards steady state for output per effective worker or convergence equation as:

$$ln\hat{y}_{it2} - ln\hat{y}_{it1} = (1\text{-}e^{-\lambda\Psi})\frac{\alpha}{1-\alpha-\beta}\, lnsk_{it} + (1\text{-}e^{-\lambda\Psi})\frac{\beta}{1-\alpha-\beta}\, lnsh_{it} - (1\text{-}e^{-\lambda\Psi}) - \frac{\alpha+\beta}{1-\alpha-\beta}\, ln\,(\delta+g+n_{it}) - (1-e^{-\lambda\Psi})ln\hat{y}_{it1} \quad (6)$$

Adopting the model of Romer & Mankiw,(1992) to augment the impact of child labour in this framework. Using Equation (5) and pulling lny_{it1} we can therefore write equation (4) to arrive at growth equation as follows:

$$lny_{it2} = (1\text{-}e^{-\lambda\Psi})\frac{\alpha}{1-\alpha-\beta}\, lnsk_{it} + (1\text{-}e^{-\lambda\Psi})\frac{\beta}{1-\alpha-\beta}\, lnsh_{it} - (1\text{-}e^{-\lambda\Psi})\frac{\alpha+\beta}{1-\alpha-\beta}\, ln(\delta+g+n_{it}) + e^{-\lambda\Psi} lny_{it1} + \theta(1\text{-}e^{-\lambda\Psi})lnchl_{it1} + \theta(1\text{-}e^{-\lambda\Psi})lnchl^{2}_{it}\theta\left(1-e^{-\lambda\Psi}\right) + ln\,uem_{it} + \theta(1\text{-}e^{-\lambda\Psi})lngdp_{it} \quad (7)$$

Eq. (7) can be written as:

$$lny_{it} = \Psi y_{i,i-1} + \lambda lnchl_{it} + \beta lnchl^{2}_{it} + \sum_{j-1}^{2} T_j X^{j}_{it} + n_t + n_i + \mu_{it} \quad (8)$$

More specifically, the final model can be written as:

$$RGDP_{it} = \beta_1 lnRGDP_{t-1} + \beta_2 lnGCF_{it} + \beta_3 lnIHC_{it} + \beta_4 lnCHL_{it} + \beta_5 POP + \beta_6 TRD_{it} + n_i + n_t + \mu_{it} \quad (9)$$

Where:

RGDP=Real Gross Domestic Product.

GCF=Gross Capital Formation.

IHC= Investment in Human capital (School enrollment)

TRD=Trade openness

POP=Population growth

n_i =Country specific effect

n_t =Time effect

μ_{it} =Error term

Eq.(9) indicated that the growth rate of per capita income depends on other determinants of steady state income such as investment (Growth capital formation), human capital investment(School enrollment),initial income per capita and the fundamental factors of Child labour.

4. Data and Empirical Strategy

We utilized GMM system to estimate equation (9) based on the panel of 86 countries. The countries were chosen based on incidence of child labor in the developing countries. The data convers period 2009 – 2013 and the dependent variable in the sample is logged value of real Gross Domestic Product; obtained from World Development Indicators. The variables used as explanatory variables are based on the theoretical model presented in the Cobb Douglass production function and the growth model by Romer & Mankiw, (1992). The regressors are: School enrolments which represent human capital development, Gross Capital Formation representing capital, Population growth controls for the size of a country, and trade openness controls for cross border trade in goods and services and child labor represent the incidence of children engaged in any form of

work. The child-labor kuznet theory proposed by Rajan (2005) to test the child labor growth nexus for developing countries was used in this paper, the child labor squared which is a form of quadratic equation was used to verify the above theory.

4.1 Empirical Results

This section presents the empirical findings of this study using different approaches. The main results are presented in tables 1 and 2. The tables contain the estimates of child labor and economic growth regression results using the dynamic S-GMM estimation technique. The moment condition utilize lag of the dependent variable. Table 2 present the results using the developing country data set with real gross domestic product as dependent variable.

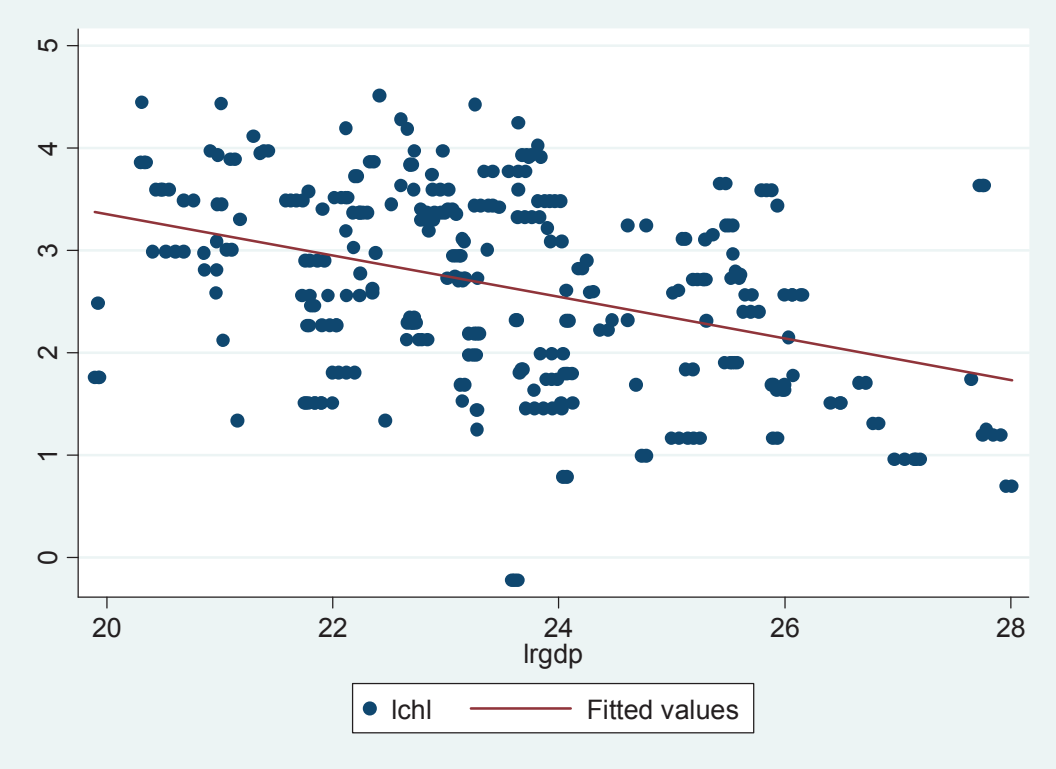

Fig 1: Scatter plot of child labor VS Economic growth

The above fig 1 shows child labor and real gross domestic product for the sampled countries averaged over period 2009 – 2013. The fitted line displays a weak negative relationship between child labor and economic growth.

Table 1 reports the descriptive statistics and correlation matrix of the variables used in this study. The table shows the variance and mean of the variables. From the correlation result, child labor and economic growth have a weak negative relationship.

Table 1: Summary Statistics & Correlation matrix: Child Labor & Economic Growth in Developing

Variable	Source	Unit of Measurement	Observations	Mean	Standard Deviation	Minimum	Maximum
Trade Openness	WDI		342	8.12e+06	1.28e+07	0	6.32e-07
Real GDP	WDI		342	8.62e+10	2.20e+11	4.38e+08	1.46e+12
Gross Capital Formation	WDI		343	24.4768	9.5876	0.3311	69.268
School Enrolment	USL		321	77.4651	18.9680	0.8108	97.8
Child Labor	USL		324	20.587	17.1208	0.8	91.6
Population Growth	WDI		344	1.8095	1.058	-1.007	4.938

Correlation Matrix

	Trade Openness	Real GDP	Gross Capital Formation	School Enrolment	Child Labor	Population Growth
Trade Openness	1.0000					
Real GDP	-0.2346	1.0000				
Gross Capital Formation	0.0748	0.0106	1.0000			
School Enrolment	-0.2083	0.0629	-0.0327	1.0000		
Child Labor	0.3062	-0.1964	-0.0361	-0.6267	1.0000	
Population Growth	0.1206	0.0674	-0.0821	-0.1631	0.1012	1.0000

Countries, annual data (2009 –2013)

Table 1 present the regression results of the system GMM. The dependent variable is real gross domestic product and the main explanatory variable is the child labor and child labour squared which are used to verify the existence of child-labor kuznet curve as proposed by Kambhampati and Rajan, (2005).

Table 2: Dependent Variable: Ln RGDP

INDEPENDENT VARIABLE	ONE STEP	TWO STEP	ROBUST
Ln RGDP (-1)	0.136***	0.171***	0.136***
Ln LCHL2	-0.0052	0.0292	-0.0052
Ln SCE	0.840***	0.758***	0.840***
Ln POP	-0.160	-0.098**	-0.116
Ln CHL	0.109	-0.0303	0.109
Ln OPEN	-0.957***	-0.940***	-0.957***
Ln GCF	-0.011	-0.044	-0.0111
SARGAN	80.962 (0.000)	22.38 (0.0043)	
AR1		0.3462	0.3505
AR2		0.1687	0.2799
OBS		193	193

Note: The method used is the dynamic system GMM. Values in parenthesis represent p-value for sargan test. Also, ***,

** & * represent level of significance at 1%, 5% & 10% respectively.

Table 2 above report the system GMM results with one step, two step and system GMM with robust standard errors. The one step and two step approaches failed the test for over identification but the AR 1 and AR 2 test for autocorrelation for both test shows the absence of autocorrelation. The child labor kuznet curve is supported if the coefficient of the child labor as presented in the model is positive and the child labor squared is negative.

From the table, using the result of the robust standard error, the child labor kuznet curve holds because the expected signs are noticed. However, the speed towards arriving at the equilibrium varies. For the positive relationship, the rate of change is 1.09% while the negative side is only 0.052%. This shows that the contribution of child labor to economic growth in the short run is positive and very rapid. However, the rate at which child labor reduce economic growth in the long run is very slow.

5. Conclusion

Based on the result (table 2), it is evident that the growth child labour relationship "child labour kuznet curve" as proposed by Rajan, (2005) is established in developing countries. The child labour regression coefficient for both one step and two steps approaches indicated positive results (0.109). Similarly, the child labour squared result shown a negative coefficient in both instances (-0.0052) which signifies that at the initial stage of economic growth, child labour tends to increase and subsequently, sustained increase in economic growth decreases child labour, proving the existence of an inverted U relationship between growth and child labour in developing countries. This is an indication that developing countries should put machineries in place to promote sustained economic growth to reduce the menace of labour.

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