INTERNATIONAL TRADE AND CHILD LABOUR

An econometric analysis

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INTRODUCTION

Through this study **we examine the cross-country data to see whether the data provide any support for the relationship between trade and child labour.**

Child labour refers to the employment of children in any work that deprives children of their childhood, interferes with their ability to attend regular school, and that is mentally, physically, socially or morally dangerous and harmful.

Some 60 percent of the child labour was involved in agricultural activities such as farming, dairy, fisheries and forestry. Another 25 percent of child labourers were in service activities such as retail, hawking goods, restaurants, load and transfer of goods, storage, picking and recycling trash, polishing shoes, domestic help, and other services. The remaining 15 percent laboured in assembly and manufacturing in informal economy, home-based enterprises, factories, mines, packaging salt, operating machinery, and such operations. Child labour predominantly occurs in the rural areas (70%) and informal urban sector (26%). Child labour accounts for 22% of the workforce in Asia, 32% in Africa, 17% in Latin America, 1% in the US, Canada, Europe and other wealthy nations. India is home to the largest number of children who are working illegally in various industrial industries.
Worldwide agriculture is the largest employer of child labour. Vast majority of child labour is found in rural settings and informal urban economy. International Labour Organisation (ILO) suggests poverty is the greatest single cause behind child labour. Lack of meaningful alternatives, such as affordable schools and quality education, according to ILO, is another major factor driving children to harmful labour. Children work because they have nothing better to do.

The role international trade plays in this pervasive child labor has recently drawn substantial political attention. Activists have been quick to blame child labor on the effects of trade on local labor markets and have suggested trade sanctions as tools to coerce policy changes aimed at mitigating child labor. Others have argued that by improving incomes, trade reduces child labor.

RESEARCH QUESTION

In the study, we have assumed three models- *Model 1*, *Model 2* and *Model 3.*

Model 1 looks at the relationship between Child Labour (*child*) and Trade Openness (*openess*) with *child* being dependent variable and *openess* being independent variable. Openness is measured as sum of exports and imports as a proportion of the national income (GDP).

$$\text{Model 1: } (\text{child})_I = \alpha + \beta_1(\text{openess})_i + \mu_i$$

Model 2 looks at the relationship between Child Labour (*child*) and Trade Openness (*openess*) and a proxy for national income (login) with *child* being dependent variable and *openess* being independent variable. Openness is measured as sum of exports and imports as a proportion of the national income (GDP).

$$\text{Model 2: } (\text{child})_I = \alpha + \beta_1(\text{openess})_i + \beta_2(\text{login})_I + \mu_i$$

Model 3 looks at the relationship between Child Labour (*child*), Trade Openness (*openess),* a proxy for national income *(login) (=log(GDP per Capita))* and *squarelogin* with *child* as dependent variable and *openess, login* and *squarelogin* as independent variables. In both the cases α is intercept, β is regression coefficient and μ_i is the error term.

$$\text{Model 3: } (\text{child})_I = \alpha_i + \beta_1(\text{openess})_i + \beta_2(\text{login})_i + \beta_3(\text{squarelogin})_i + \mu_i$$

DATA COLLECTION

We collected cross sectional data of nationwise child labour rates from ILO data library, Export and Import, as well as National Income (GDP) data from the World Bank website. We took the data for 88 countries for the sake of the regression analysis after accounting for data inconsistencies.

OBJECTIVE AND HYPOTHESIS

Model 1: Our first objective was to test the individual significance and the overall significance of the model using t and f statistic. Our null hypothesis (H_0) was $\beta = 0$ and alternate hypothesis (H_1) was β not equal to 0.

$$H_0: \beta = 0$$
$$H_1: \beta \text{ not equal to } 0$$

We have also tested this model for heteroskedasticity and multicollinearity through the White's Test and the Variation Inflating Factor respectively.

Model 2: In case of *model 2,* we wanted to include income of the nation as a factor in explaining the child labour rates. We use a proxy for the national income in the form of *login* because it gives a better goodness of fit as compared to using the GDP of the country itself. (R-squared of 0.46 instead of 0.25).

Model 3: During our review, we found that Pavcnik (2006) used this model in explaining the link between child labour and openness and income. Thus, we used the model but did not test for heteroskedasticity and multicollinearity.

ANALYSIS AND DISCUSSION OF THE RESULTS

Model 1

Estimation using OLS Method

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reg child openess
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Source	SS	df	MS	Number of obs =	88
				F(1, 86) =	5.57
Model	696.483823	1	696.483823	Prob > F =	0.0205
Residual	10755.1412	86	125.059781	R-squared =	0.0608
				Adj R-squared =	0.0499
Total	11451.625	87	131.627874	Root MSE =	11.183

child	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
openess	-.0851516	.0360825	-2.36	0.021	-.1568812	-.013422
_cons	22.23158	3.238746	6.86	0.000	15.79317	28.66999

The low R^2 value (which stands for goodness of fit) indicates that *Model 1* is able to explain 6.08% of the model which is significant as can be seen by the P>F value. Essentially this would mean that trade openness is not a good explanatory variable for explaining the difference in child labour. The negative value of the regression coefficient shows that for every unit increase

in openness, the child labour decreases by 8%. The p>t value indicates that this value is not significant as well.
Thus *Model 1* displays both overall significance and individual significance for the independent variable.

Model 2

Estimation using OLS method

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. reg child openess gdppc
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Source	SS	df	MS	Number of obs =	88
				F(2, 85) =	15.54
Model	3065.56124	2	1532.78062	Prob > F =	0.0000
Residual	8386.06376	85	98.6595737	R-squared =	0.2677
				Adj R-squared =	0.2505
Total	11451.625	87	131.627874	Root MSE =	9.9328

child	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
openess	-.0590733	.0324873	-1.82	0.073	-.1236667	.0055202
gdppc	-.0009972	.0002035	-4.90	0.000	-.0014018	-.0005926
_cons	25.04652	2.93345	8.54	0.000	19.21403	30.879

In *Model 2*, the low R^2 value (which stands for goodness of fit) indicates that *Model 2* is able to explain 26.77% of the model which is significant as can be seen by the P>F value. This is better than *Model 1* but is still quite low. This means that as the National Income is included in the model, the goodness of fit of the model increases. Essentially this would mean that trade openness alone is not a good explanatory variable for explaining the difference in child labour. The negative value of the regression coefficient shows that for every unit increase in openness, the child labour decreases by 6%. The p>t value indicates that this value is not significant as well.
Thus *Model 1* displays both overall significance and individual significance for the independent variable.

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. reg child openess login
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Source	SS	df	MS	Number of obs =	88
				F(2, 85) =	35.86
Model	5240.64656	2	2620.32328	Prob > F =	0.0000
Residual	6210.97844	85	73.0703346	R-squared =	0.4576
				Adj R-squared =	0.4449
Total	11451.625	87	131.627874	Root MSE =	8.5481

child	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
openess	-.0405358	.0281552	-1.44	0.154	-.0965158	.0154441
login	-6.21072	.7875635	-7.89	0.000	-7.776607	-4.644833
_cons	67.67555	6.27189	10.79	0.000	55.20535	80.14575

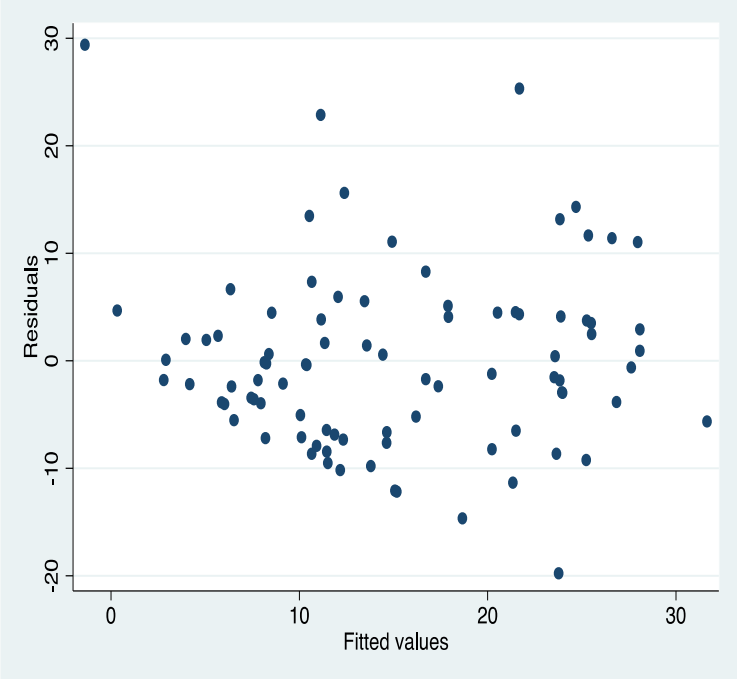
The model is able to explain 45.76% of the total change from mean for the dependant variable in question. Like seen in the earlier model, openness has a negative impact on child labour rates. Even income has a negative impact on the child labour rates, with every percentage increase decreasing the latter by 6.21. This variable is also significant at 1% level.

This result is commonsensical as one would assume child labour rates to go down with increase in per capita income. However, this variable doesn't account for inequality in distribution of income which is hidden from us here.

The model also maintains overall significance.

Test for Heteroskedasticity

RVF Plot



White test

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. imtest, white

White's test for Ho: homoskedasticity
          against Ha: unrestricted heteroskedasticity

          chi2(5)      =     12.46
          Prob > chi2  =    0.0291

Cameron & Trivedi's decomposition of IM-test
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Source	chi2	df	p
Heteroskedasticity	12.46	5	0.0291
Skewness	7.90	2	0.0192
Kurtosis	2.46	1	0.1169
Total	22.82	8	0.0036

Here we take our null hypothesis to be homoskedasticity and alternate hypothesis to be unrestricted heteroskedasticity. The resultant chi2 value 12.46 is significant at 1% level and this is corroborated by the P>chi2 value as well.

Since calculated chi2> tabulated chi2, we reject the null hypothesis, and thus the model suffers from heteroskedasticity at 1% significance.

Test for Multicollinearity

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. vif
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Variable	VIF	1/VIF
login	1.04	0.959622
openess	1.04	0.959622
Mean VIF	1.04	

The mean VIF value is very close to one and less than 10, hence we can claim that the sample doesn't suffer from multicollinearity.

OLS Estimation using Robust Standard Errors

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. reg child openess login, robust

Linear regression                               Number of obs =      88
                                                F(  2,    85) =   40.03
                                                Prob > F      =  0.0000
                                                R-squared     =  0.4576
                                                Root MSE      =  8.5481
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child	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
openess	-.0405358	.0323148	-1.25	0.213	-.1047863	.0237146
login	-6.21072	.7095668	-8.75	0.000	-7.621529	-4.799911
_cons	67.67555	7.041235	9.61	0.000	53.67569	81.67541

We find negligible change even after accounting for heteroskedasticity.

Conclusion

The econometric analysis questions the theoretical claims of the link between child labour rates and openness to trade. This finding is very relevant especially in the world today, where there is increased awareness and heightened public interest in this issue. The role that increasing per capita incomes play in reducing child labour, overshadows the effect of international trade.

As far as the regression analysis is concerned, both Model 1 and Model 2 are successful in explaining a large part of the deviation from mean of the dependant variables. The addition of log of per capita income (*login*) in Model 2 as seen above makes the model better as the individual test statistic of *login* is significant, there is a significant increment to the model and the overall significance of the model is retained.

Hence Model 2 while suffering from heteroskedasticity can be preferred to Model 1, as it helps us to better assess the link between income, international trade and child labour rates as well.

The model might suffer from misspecification due to omitted variables otherwise.

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