

# **Trade, Foreign Direct Investment and Child Labour**

by

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## **Abstract**

The effect of trade openness and FDI on the incidence of child labour is ambiguous because the substitution effect and income effect are considered to work in the opposite direction. This study uses a panel of 120 developing countries and gross enrolment rates of primary and secondary school as the proxy to measure the extent of child labour. The empirical results show that trade openness is statistically positively related to this proxy for child labour, while the effect of FDI on child labour is negative. The study also suggests that the effects of household income on the child labour are varied depending on the age groups and the levels of household income.

## **List of Abbreviations Used**

ILO	International Labour Organization
FDI	Foreign Direct Investment

## **Chapter 1 Introduction**

Although the population of children in child labour declined from 245 million in the year 2000 to 168 million in 2012, detailed regional studies show that there were increases in the incidence of child labour with in regions which experienced economic growth (ILO, 2016). Child labour is generally considered to be exploitative and detrimental to the development of the child (Busse and Braun, 2004). The International Labour Organization (ILO) reported that 168 million children in the world aged 5 to 17 are child labourers, accounting for 10.6 percent of the child population as a whole (ILO, 2016). In the whole population of child labourers, about 77 million are in Asia and the Pacific, about 59 million are in Sub Saharan Africa, about 12 million are in Latin America and the Caribbean, and about 9 million are in the Middle East and North Africa. Asia has the largest number of child workers because it has the largest population, while Sub Saharan Africa has the highest percentage of child labour as a whole, namely 21.4%. Although the number of child workers may vary, ILO estimates that over ten percent of the workforce is child labour in extremely poor nations.

Children in employment are those engaged in any economic activity for a least one hour per week (ILO, 2016). Permissible light work for children who are above the minimum age (12 years old in developing countries) is not necessarily bad. Children can learn skills and knowledges from working while do not prejudice their attendance at school.

Child labour is a subset of children in employment. Based on the definition by ILO Convention, child labour can be divided into three categories: children aged 5 to 14 years who take any hazardous work; children aged 5 to 11 years who were engaged in any economic activity; and children aged 12 to 14 years old who take any non-hazardous work more than 14 hours in a week (ILO, 2016). The data from ILO shows that more than half of all child labourer are in hazardous work that endangers their health, safety and moral development (ILO, 2016). Child labour which this paper discusses is based on the definition by ILO.

The effect of trade openness and foreign direct investment on the incidence of child labour is a hot debate topic. The supporters of globalization argue that an increase in international trade and foreign direct investment (FDI) reduces the incidence of child labour (Basu & Van, 1998; Baland & Robinson, 2000; Ranjan, 2001). An increase in international trade and FDI leads to higher household income and wage rates, therefore, education becomes more affordable and children are not required to work. This is often referred to as the income effect (Cigno et al., 2002; Edmonds and Pavnik, 2005; Kis-Katos, 2007; Davies and Voy, 2009). On the other hand, opponents of globalization argue that international trade and FDI increase the demand for cheap, unskilled labour leading to higher incidences of child labour. This is called the substitution effect (Cigno et al., 2002; Edmonds and Pavnik, 2005; Kis-Katos, 2007; Davies and Voy, 2009). The theories suggest that the net effect of globalization on child labour is ambiguous.

Trade theories suggest that an increase in trade openness and FDI could either increase or decrease child labour depending on the magnitudes of the substitution and income effects. Some studies attempt to determine the relationship between trade openness, FDI and the incidence of child labour. Most of these studies suggest that FDI and the incidence of child labour are negatively related (Busse and Braun, 2004; Neumayer and Soysa, 2005; Iram and Fatima, 2008; Davies and Voy, 2009). However, with respect to the relationship between trade openness and child labour, the arguments are varied. Some suggest that an increase in trade openness leads to a beneficial effect on child labour (Shelburne, 2001; Edmonds and Pavnik, 2005; Neumayer and Soysa, 2005; Kis-Katos, 2007), while the opposite arguments are also presented (Busse and Braun, 2004; Krueger 1996; Iram and Fatima, 2008). These studies suggest that the effect of trade openness and FDI on the incidence of child labour might be opposite (Busse and Braun, 2004; Krueger 1996; Iram and Fatima, 2008). The different attitudes and preferences of multinational enterprises and domestic firms towards to worker rights could be the main factor that results in the difference between the effects of trade openness and FDI on the incidence of child labour.

The purpose of this study is to answer two questions: what is the relationship between trade openness and the incidence of child labour, and what is the relationship between FDI and the incidence of child labour. The empirical results show that trade openness and child labour are positively correlated while FDI is negatively associated with the incidence of child labour.



I make four contributions to the research about child labour. First, most of the empirical work about the relationship between trade openness, FDI and child labour came out before the year 2010 and the data applied in those studies were usually collected in the 20<sup>th</sup> century. In this study, the data for all variables are collected in the 21<sup>th</sup> century. I use a recent panel data set of 120 developing countries to re-examine the arguments of previous work. Second, instead of using the labour force participation rate of children aged from 10 to 14 as in previous work, I use gross enrolment rates of primary and secondary school as a proxy to measure the incidence of child labour indirectly. In this way, the study overcomes the problems of missing data and the exclusion of children younger than 10. I also use the labour force participation rate of children aged from 7 to 14 to measure the incidence of child labour directly in a reference group to understand why labour force participation rate of children is not a proper measurement in a panel data setting. When the labour force participation rate is applied, variables are poorly statistically correlated because of large amounts of missing data. Third, I find that trade openness and FDI, which are often described as the phenomenon of globalization, have opposite effects on the incidence of child labour. I provide strong support for the studies by Busse and Braun (2004) and Iram and Fatima (2008). Furthermore, I find that the relationship between household income and the incidence of child labour can be described as an inverted U-shaped curve for the younger age group. An initial increase in household income increases the incidence of child labour, but when household income continues to increase in the long

run, it helps to reduce child labour. This finding supports the result from Kambhampati and Rajan (2005).

The thesis is structured as follows. Section 2 discusses household behaviour and economic theories with respect to child labour. The existing quantitative studies of child labour are reviewed. Section 3 describes the search design and data. Section 4 shows the empirical results and presents the discussion. The conclusions are shown in Section 5.

## **Chapter 2 The Theoretical Framework and the Literature Review**

### **2.1 Household Decisions**

Child labour is normally a result of parental decisions. Grootaert and Kanbur (1995) indicate that most parents are altruistic and not willing to send their children to work when the family can otherwise survive. Most studies regarding child labour are based on this assumption. However, parents can be forced to send children to work as sources of family income (Basu & Van, 1998). A large number of children work in family businesses, including family chores, farm work and so on (Cigno et al., 2002). Therefore, household economics is an important part of economic theory to study.

Parents do not want to send their children to work unless they are hit by an economic crisis. Poor households often have difficulty in borrowing money (Baland & Robinson, 2000). If household income is below the survival level, the additional income from child labour is significant to help families to overcome the economic crisis. Children who are sent to work temporarily might not be back to school due to losing their right to attend school, losing interest in school, or losing even their capability to pursue education (Nuemayer & Soysa, 2005).

So long as parents care about their own as well as their children's consumption, the

decision whether to send a child to work or to school depends on essentially three things: the cost (including the opportunity cost, such as work the child does on the family farm) of education, the expected return on education, and the extent to which parents are able to finance educational investments (Cigno et al., 2002). Schooling costs and conditions and the availability and quality of education options have an impact upon the demand for child labour in changing the opportunity costs of sending children to work rather than to school (Nuemayer & Soysa, 2005). Primary school enables the entrance to higher levels of schooling. Higher public expenditures on education lower the costs for the poor, in particular for sending their children to school, and should therefore lower the incidence of child labour. Higher school quality raises the return from education. Many studies show that parents who have achieved a higher level of education are also more likely to ensure that their children similarly receive a good education (Basu & Tzannatos, 2003). However, parents who have a higher level of education usually have higher household income compared to parents who have a lower level of education.

Child labour is more prevalent in rural than in urban areas for three reasons, as follows. First, there are more agricultural activities in rural areas, which is the main sector in which child labour occurs (ILO, 2002). Second, the poorer quality of education in rural areas reduces the return to households that send their children to school. Furthermore, social and cultural norms are more traditional in rural areas, leading to a higher social acceptability of child labour (Lopez-Calva, 2011).

## 2.2 Economic Theories

In economic theories, globalization could either increase or decrease child labour incidence. Globalization could have both a substitution effect and an income effect on child labour. The effect of globalization on child labour depends on the respective magnitudes of the substitution and income effects.

Anything that lowers the return to education or raises the opportunity cost of education will promote the incidence of child labour. When the additional income comes from child labour, the opportunity cost of education increases. As a result, the returns to child labour increase with a substitution effect toward the increased supply of child labour (Grootaert & Kanbur, 1995).

The proponents of globalization argue that child workers mainly work in non-traded sectors so that trade openness doesn't affect child labour. However, Maskus (1997) shows that children who work outside the traded sector can also be affected by trade liberalization. As long as they work in a sector, formal or informal, which supplies inputs to the export sector, increased trade can lead to a greater child labour incidence.

Trade liberalization in a developing country, which is abundant in unskilled labour, will not only have a substitution effect, but also an income effect. Trade liberalization can

reduce child labour incidence by raising the relative rate of return of unskilled labour and increasing household income. If the income effect is strong enough, then increased globalization will help to reduce child labour. Neumayer and Soysa (2005) indicate that trade liberalization might change the economic structure of a developing country to a high skilled capital-intensive market from unskilled and labour-abundant production in the long run. The employment of child labour will be less with that sectoral shift. Globalization proponents suggest that countries have an incentive to invest in education and skills in order to spur economic development and their long-run competitiveness (Becker, 1997). Some studies also show that countries with higher levels of trade openness are likely to have lower interest rates and easier credit accessibility (Ranjan, 2001; Jafarey & Lahiri, 2002). Ranjan (2001) shows that opening up to trade has two implications for the incidence of child labour in an unskilled-labour-abundant country in a simple Heckscher-Ohlin framework. However, an increase in trade openness will fail to reduce child labour in aggregate terms if the economy is extremely poor and gains from trade are not large enough. This possibility arises if trade liberalization moves relatively better-off families towards subsistence while the favorable income effect reduces child labour by less at the lower end of the income distribution (Kis-Katos, 2007).

Market size and market growth, political stability, infrastructure and high labour skills are also important for reducing child labour (Kucera, 2001, 2002; Noorbakhsh, Paloni, & Youssef, 2001). If child labour is officially banned, but continues to exist due to a lack of

enforcement, then as Aggarwal (1995) has noted, violations of labour standards are more common in the non-traded and less export-oriented sectors.

Developing countries with lax labour standards, low wages and an abundant supply of unskilled labour, including child labourers, are regarded as a haven for foreign investors (Dagdemiir and Acaroglu, 2010). High-profile cases such as Nike, Reebok and Adidas show that multinational corporations do at times subcontract to enterprises that employ children. However, foreign investors might also find it more difficult to circumvent anti-child labour laws as they are possibly under higher scrutiny of regulators and definitely more exposed to the supervision of trade unions, the media, consumers, human rights and other activist groups (Spar, 1998). Multinational corporations often have adopted voluntary codes of conduct, which commit a corporation to limit or ban child labour from its operations and often that of its suppliers. Some studies argue that multinational corporations tend to hire relatively skilled workers. Graham (2000) provides evidence showing that multinationals pay higher than average wages where the wage premium increases as the average income of countries falls. This indicates that multinationals in developing countries are likely to employ skilled workers, which means increased FDI would decrease the relative wage of unskilled child workers and lower the opportunity cost of work.

Although trade openness and FDI are often used to describe globalization, the effect of trade openness and FDI on the incidence of child labour might be different. Busse and

Braun (2004) point out that multinational enterprises are highly sensitive to country characteristics such as basic union rights, democratic rights and the abandonment of child labour. On the other hand, domestic firms can use child labour to strengthen their comparative advantage in unskilled-labour-intensive goods. Doepke and Zilibotti (2008) suggest that when child labour is banned in the international labour market but legal in the domestic labour market, there is an increased chance that unskilled adult workers will not send their children to school, which means an increase in child labour. Udry (2004) argues that completely banning child labour by international trade sanction would result in making the child labour issue worse. Gonzalez and Rosales (2014) suggest that enforcing blanket child labour restrictions can harm children in developing countries even in the long term.

### **2.3 Review of Existing Quantitative Studies**

Studies based on micro empirical data, which are generally better suited to investigate the relative strengths of income and substitution effects, show that the overall effect of trade liberalization on child labour differs across countries. Edmonds and Pavcnik (2005) use microdata from the 4,000 household panel Vietnam Living Standards Survey. They utilize rice prices from 1993 to 1998, a period in which they rose due to trade liberalization. They find that a 32% price increase is associated with a 9 percentage point decrease in child labour. Furthermore, households that were net producers of rice decreased their reliance on child labour during the period, while some net consumers of rice increased their



levels of child labour. They conclude that trade liberalization in Vietnam led to an increase in the price of rice so that the incidence of child labour fell due to the income effect. Iram and Fatima (2008) work out a multivariable vector autoregression (VAR) model for investigating the causal links between FDI, trade openness and child labour. They find a negative relationship between FDI and child labour. Contrastingly, the evidence they provide also shows that a higher level of trade openness increases the demand for child labour. Kambhampati and Rajan (2005) use microdata from the National Sample Survey of India and state-level macro data to estimate the relationship between economic growth and child labour on both the demand and the supply side. They argue that economic growth decreases the supply of child labour sufficiently to offset the impact of increased demand. They also describe the relationship as a child labour-Kuznets curve, which is an inverted U-shaped relationship wherein growth will initially increase child labour by increasing the opportunities for low-skilled employment but will eventually lead to a shift toward more skilled workers to reduce the child labour participation rate. Krueger (2004) finds that child labour increased significantly among rural areas during a coffee sector boom in Nicaragua.

In a cross-country setting, some studies show that child labour is negatively correlated with measures of trade openness. Shelburne (2001) uses a data set of 70 developed and developing countries in the early 1970s to investigate the relationship between child labour and trade openness, which is measured by the sum of imports and exports normalized by GNP, finding that more open economies tend to have lower levels of child labour. Unlike

in other empirical studies, Kis-Katos (2007) focuses on the differential impacts of changes in trade openness on changes in child labour over time. The percentage point change in variables over a decade are used to avoid missing data. The study provides empirical evidence that increases in trade openness are associated with a significantly smaller decline in the incidence of child labour among the poorest food exporters than among food exporters on average. The number of sectors in which child labour is apparent is used as an alternative dependent variable in the study from Neumayer and De Soysa (2005). They also find that countries with higher levels of FDI as well as trade openness are associated with a lower level of child labour. However, Cigno et al. (2002) use the nonattendance rate in primary schooling as a complementary indicator of child labour in addition to the labour force participation rate because data on the child labour participation rate do not include the child workers aged under 14. Both the trade ratio (exports plus imports, divided by GDP) and the Sachs-Warner index (a dummy taking value one if the country is open) are used to measure trade openness. Skill composition is measured by the share of the workforce aged 25 or over that completed only primary education, and the share that attained secondary or higher education. Skill composition is used to reflect the cumulated effects of educational policies in past years in the model. When skill composition is not controlled for, Cigno et al. find trade has a significant effect on child labour. However, after controlling for skill composition, all variables lose significance except for the interaction terms. Busse and Braun (2004) use three variables to describe child labour, which are the child labour participation rate from ILO, the gross secondary school

enrolment rate and the indicator for the degree of child labour suggested by Rodrik (1996). FDI is the dependent variable in the model. The empirical evidence shows that child labour is negatively associated with FDI. Contrastingly, there is a statistically significant positive relationship between child labour and comparative advantage in labour-intensive goods. Dagdemir and Acaroglu (2010) analyze the effects of globalization on child labour by using cross-country data. The square of GDP per capita is added in their OLS model to capture the nonlinear effect of income. They find the relationship between the child labour supply and gross domestic product per capita can be described as a U shape, which is contrary to the conclusion from the study by Kambhampati and Rajan (2006). The study shows that the net effect of globalization on child labour is negative in the developing countries whose gross domestic product per capita levels are below 7500 USD, while the net effect is positive in the developing countries whose gross domestic product per capita levels are above 7500 USD (in 2005 dollars).

Edmonds and Pavcnik (2006) analyze the effect of trade openness on child labour with the help of instrumental variable estimation due to endogeneity concerns. Their study suggests that there is a negative relationship between trade openness and child labour. They argue that the effect of trade openness is channeled through per capita income. Davies and Voy (2009) use instruments for openness and FDI to measure the effect of FDI on child labour. They find that an increase in FDI and trade leads to a decrease in child labour. However, the instrumental variable technique allows them to support the argument that the

effects of both FDI and international trade on child labour are channeled through their impact on per capita income. Bonnal (2007) employs a fixed effects instrumental variables panel data model. Bonnal finds that both trade openness, investments in human capital and technology, and financial development are negatively associated with the incidence of child labour. However, the purpose of my study is to understand the relationship between trade, FDI and the incidence of child labour rather than investigating how trade and FDI affect on child labour. Therefore, the instrumental variable technique is not applied in my study.

As the economic theories suggest that the effect of trade openness on the incidence of child labour is ambiguous, the empirical studies also give various conclusions. Studies based on a micro-data setting or a cross-country setting have different arguments. Some suggest that trade openness and the incidence of child labour are positively correlated, while some argue that a higher level of trade openness is associated with less child labour. Some studies even indicate that if there is an effect of trade openness on child labour, it works through per capita income. Different dependent variables are used, such as school enrolment rates and the percentage point change in the child labour participation rate, to avoid the weakness of the commonly used dependent variable measured by the child labour participation rate. However, most of these studies suggest that FDI and the incidence of child labour are negatively related.

## **Chapter 3 Data Description and Empirical Framework**

As discussed above, economic theories suggest that the effect of international trade on child labour could be either positive or negative, while the effect of foreign direct investment is likely to be negative. The purpose of my empirical work is to understand the relationship between trade openness, FDI and child labour suggested by cross-country evidence. Panel data are applied.

### **3.1 The Dependent Variables**

Child work is mainly in the non-traded and services sectors, such as domestic work, catering, transportation, construction and family businesses; these are generally considered informal sectors which are less likely to be subject to government regulation and legislation. It is difficult to obtain a reliable estimate of child labour or a clear picture of child workers' living conditions because the sectors they work in are informal. Some institutions like the ILO devote themselves to understanding child labour and providing data that can be used as tools for study. Any measure has its own weakness (Neumayer and Soysa, 2005). The labour participation rate of children aged 10-14 years old is the most widely used measurement to capture the incidence of child labour from the literature review. However, the child labour participation rate is not reliable due to the following reasons. First, statistically, in many countries the rate is based on estimates and projections by ILO rather

than reliable surveys (Edmonds and Pavcnik, 2006). Even in surveys, children working in a domestic household, unofficially, or illegally are not included. For example, in Indian surveys, the household is the place in which children are commonly reported to work (Cigno and Rosati, 2002). Second, the labour participation rate of children aged 10-14 excludes children younger than 10, which is an age group involved in economic activities in many developing countries (Cigno and Rosati, 2002; Davies and Voy, 2009). Third, data on the labour participation rate of children are incompletely collected due to the low frequency of collection. Data are only collected roughly every 10 years. Therefore, previous studies often have a small number of observations (Cigno and Rosati, 2002; Edmonds and Pavcnik, 2006; Kis-Katos, 2007).

In this study, I use the gross enrolment rate in primary and secondary school as the dependent variables. They are defined as the ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. The value of the gross enrolment rate might be greater than 100% due to its definition. To show the weakness of commonly used child labour participation rate, I also set a reference group which has labour participation rate as the dependent variable to compare with other two groups that use school enrolment rates as the dependent variable. Instead of using the 10-14 age group, I use the labour participation rate of children aged 7-14 because it has a wider age range. It is defined as the proportion of 7-14 years old children involved in child labour. Schools are assumed to be the natural place for children who are not working,

so the school enrolment rate and the child labour participation rate are negatively correlated with each other across countries and years of observation (Cigno and Rosati, 2002; Neumayer and Soysa, 2005). The gross enrolment rates in primary and secondary school are not perfect measures for the incidence of child labour, because those not attending schools do not necessarily work. However, compared to the child labour participation rate, it has three advantages. First, child workers in informal sectors or household chores are difficult to monitor, while it is much easier to monitor school enrolment. Although school enrolment rates may be not perfectly accurate, they are more reliable than the child labour participation rate in theory. Second, comparing to the commonly used labour participation rate of children aged 10-14, both gross enrolment rates in primary and secondary school are included, which means wider age groups are covered in this study. Third, the frequency of data collection is higher. Most countries report the data every year. This allows me to apply panel data techniques to analyze larger samples in this study. The gross enrolment rates in primary and secondary school are represented by PRIMARY and SECONDARY. The labour participation rate of children aged 7-14 is represented by PARTICIPATION.

### **3.2 The Independent Variables**

Poverty is considered to be a key factor that leads to child labour. Parents are assumed to send their children to school unless they are hit by an economic crisis. When a family struggles to survive with a low income, children are often sent to work in order to generate

more income. Therefore, gross domestic product per capita is used to capture the household income and is represented by GDPPC. The data are in thousands of constant 2010 US dollars.

Since there is a continuous debate over whether globalization increases or decreases the incidence of child labour, this study aims to understand the relationship between globalization and child labour; the commonly used measurements for globalization, FDI and trade openness, are included in my model. FDI is measured by the net inflows of investment. The FDI variable is calculated as the ratio of FDI to Gross Domestic Product (GDP). Trade openness is measured by the sum of imports and exports divided by GDP.

The decision that parents choose to send their children to work or to school depends not only on the cost of education, but also on the expected return to education. A better school quality should raise parents' estimate of the returns to schooling. An increase in education expenditure reduces the cost of education and improves the returns to education (Neumayer and Soysa, 2005). In existing empirical studies based on a cross-country setting, the percentage of GDP devoted to government education expenditure and the pupil-teacher ratio are two commonly used measurements to estimate education quality. Neither of these two measurements are perfect measures of educational quality. However, in the reference group which has the labour force participation rate of children aged 7-14 as the dependent variable, it is difficult to decide which education level of pupil-teacher ratio should be used.



Government expenditure on education is a better measurement to describe the quality of education in a wider education range since the data of pupil-teacher ratio in general is not available. Furthermore, in developing countries, the development of the education system is mainly financed by government. Primary and secondary education are a priority for governments compared to higher education in developing countries. Therefore, government expenditure on education would be a better measurement in this situation because only developing countries are included in my model. The variable EXPENDITURE is used to represent the share of government expenditure relative to the GDP.

82.6% of total child workers aged 5-17 are employed in agriculture (ILO, 2016). ILO (2016) reports 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 labour because rural areas have relatively a poor quality of education and more agricultural industries. Hence, rural population is controlled for in my model. RURAL is the ratio of the countries' rural population to total population.

The OECD countries are excluded in this study. Some countries with a large number of missing data points are also excluded. A list of included countries is shown in Appendix A. The data are from the year 2000 to the year 2014 and are collected from World

Development Indicators (WDI, 2016). Descriptive statistics are reported in Table 1.

Table 1. Descriptive Statistics for the Variables Employed in the Regressions

Variable	N	Mean	SD	Min	Max
PRIMARY(%)	820	103.25	16.77	31.12	149.95
SECONDARY(%)	820	69.83	27.86	6.83	120.33
PARTICIPATION(%)	99	20.98	16.60	1.10	62.00
TRADE(%)	820	84.41	39.19	20.96	324.50
FDI(%)	820	5.71	18.51	-43.46	451.72
EXPENDITURE(%)	820	4.39	1.72	1.15	11.99
RURAL(%)	820	49.82	21.71	1.19	91.54
GDPPC(thousands of USD)	820	5.91	9.43	0.31	63.27

Table 1 shows the descriptive statistics for the variables in the model. Primary school presumably has a higher enrolment rate than secondary school, so it is not surprising that the mean of the primary school enrolment rate is higher than the mean of the secondary school enrolment rate. The labour participation rate of children aged 7-14 distributes from 1.1% to 62% and its average is 20.98%. Trade openness distributes from 20.96% to 324.50% and its average is 84.41%. The average of FDI is 5.71%. Only 99 observations of child labour participation rate are included in regression due to the missing data in the dataset from WDI.

Appendix B shows correlations between variables. The primary and secondary school enrolment rates are negatively correlated with the child labour participation rate at 5% and 1% significance level, respectively. The secondary school enrolment rate is correlated with every other variable except FDI at 1% significance level. Trade openness is positively correlated with secondary school enrolment rate but has no correlation with the child labour participation rate and primary school enrolment rate. There is no correlation between FDI and three dependent variables. It is surprising that there is no correlation between GDP per capita and primary school enrolment rate.

### **3.3 Empirical Model**

I try to answer two questions: what is the relationship between trade openness and the incidence of child labour, and what is the relationship between FDI and the incidence of child labour. I also want to examine the non-linear relationship between per capita GDP and the incidence of child labour. First, I analyze the reference group with the child labour participation rate; then I show the main estimations with school enrolment rates to compare the difference between three equations.

I use the labour force participation rate of children aged 7-14 as the dependent variable in the reference group. The model is shown as follows.

$$PARTICIPATION_{it} = \beta_0 + v_i + \beta_1 TRADE_{it} + \beta_2 FDI_{it} + \beta_3 EXPENDITURE_{it} + \beta_4 RURAL_{it} + \beta_5 GDP_{it} + \beta_6 GDP_{it}^2 + \varepsilon_{it} \quad (1)$$

In equation 1,  $PARTICIPATION_{it}$  indicates the labour participation rate of children aged 7-14 of country  $i$  in year  $t$ .  $\beta_0$  is a constant term.  $v_i$  represents the fixed effect of country  $i$ . The coefficients  $\beta_1$ ,  $\beta_2$  and  $\beta_5$  capture the effect of international trade openness, foreign direct investment and GDP per capita on the child labour participation rate.  $\beta_6$  assumes a quadratic form between GDP per capita and the incidence of child labour. If the hypothesis is correct that education expenditure and the incidence of child labour are negatively related;  $\beta_3$  is expected to be less than zero. According to previous studies,  $\beta_4$  is expected to be greater than zero, which means rural areas tend to have a larger number of child workers than urban areas. The economic theories and the existing studies fail to give clear suggestions as to the value of  $\beta_1$ ,  $\beta_2$ ,  $\beta_5$  and  $\beta_6$ . In equation 1, 56 countries in 15 years are included in the regression.

Table 2. Results from the reference group

	PARTICIPATION			
TRADE	0.189 (1.582)		0.186 (1.215)	0.198 (1.254)
FDI		-0.047 (-0.116)	0.640 (0.917)	0.579 (0.802)
EXPENDITURE	1.210 (0.756)	0.700 (0.420)	2.310 (1.214)	2.294 (1.192)
RURAL	1.323* (1.851)	1.015 (1.433)	1.171 (1.465)	1.067 (1.254)
GDPPC	-1.995 (-0.701)	-1.316 (-0.451)	-1.565 (-0.494)	-4.612 (-0.552)
GDPPC2				0.205 (0.395)
Constant	-62.231 (-1.347)	-32.022 (-0.733)	-61.573 (-1.165)	-51.209 (-0.860)
N	137	137	99	99
r2	0.089	0.055	0.132	0.135
F	1.632	0.974	1.154	0.966

Notes: t statistics in parentheses, \* p < .10, \*\* p < .05, \*\*\* p < .01.

Table 2 shows the results of the regression in which the child labour participation rate is the dependent variable. The number of observations in the reference group is 99. When FDI is excluded from the regression, the rural population is positively correlated with the child labour participation rate at a 10% significance level. When both trade openness and FDI are included in the regression, the results show that both trade openness, FDI, total government expenditure on education and rural population are positively related to the child labour participation rate. The household income is negatively related to the child labour participation rate. However, no coefficients are statistically significant at any significance level in the reference group. When the child labour participation rate is applied in the regression, the results fail to provide any evidence to show the relationship between the dependent and independent variables because the dataset has a large number of missing data of child labour participation rate. Consistent with my results, the previous cross country setting studies which use child labour participation rate often have relative smaller sample size and choose not to use panel data (Cigno and Rosati, 2002; Busse and Braun, 2004; Neumayer and Soysa, 2005; Davies and Voy, 2009; Dagdemir and Acaroglu, 2010).

To solve the problem of missing data, I use primary and secondary school enrolment rates as the proxy to measure the incidence of child labour. I modify the equation 1 to the equation 2 and 3.

$$PRIMARY_{it} = \beta_0 + v_i + \beta_1 TRADE_{it} + \beta_2 FDI_{it} + \beta_3 EXPENDITURE_{it} + \beta_4 RURAL_{it} + \beta_5 GDP_{it} + \beta_6 GDP_{it}^2 + \varepsilon_{it} \quad (2)$$

$$SECONDARY_{it} = \beta_0 + v_i + \beta_1 TRADE_{it} + \beta_2 FDI_{it} + \beta_3 EXPENDITURE_{it} + \beta_4 RURAL_{it} + \beta_5 GDP_{it} + \beta_6 GDP_{it}^2 + \varepsilon_{it} \quad (3)$$

In equations 2 and 3,  $PRIMARY_{it}$  and  $SECONDARY_{it}$  indicate the gross enrolment rates in primary and secondary school, respectively, of country  $i$  in year  $t$ . Because child labour participation rate is negatively correlated with the school enrolment rate, all the coefficients are expected to be contrary to the coefficients in equation 2 and 3. In equation 2 and 3, data from 116 countries over 15 years between year 2000 and year 2014 are included in the regression. The results from equation 2 is presented in Table 3.

Table 3. Main estimation results from equation 2

	PRIMARY			
TRADE	0.030 (1.568)		0.014 (0.764)	0.014 (0.789)
FDI		0.023 (1.274)	0.016 (0.936)	0.016 (0.949)
EXPENDITURE	1.318*** (4.090)	1.389*** (4.340)	1.351*** (4.234)	1.408*** (4.432)
RURAL	-1.170*** (-8.673)	-1.179*** (-8.672)	-1.124*** (-8.311)	-1.243*** (-8.872)
GDPPC	-1.275*** (-3.984)	-2.286*** (-4.011)	-1.400*** (-4.355)	-2.636*** (-5.077)
GDPPC2				0.031*** (3.020)
Constant	160.605*** (19.826)	163.227*** (20.628)	160.335*** (20.108)	169.449*** (19.976)
N	948	954	820	820
r2	0.119	0.116	0.124	0.135
F	27.999	27.190	19.722	18.146

Notes: t statistics in parentheses, \* p < .10, \*\* p < .05, \*\*\* p < .01.



Comparing to equation 1, the number of observations in equation 2 is much higher and the values of the R-squared are also higher. A larger number of observations help to capture the relationships between dependent and independent variables better.

Table 3 shows the results of the regression in which the gross enrolment rate in primary school is the dependent variable. The third column shows that the value of R-squared becomes higher when trade openness and FDI are included in the regression together. The coefficients on trade and FDI are positive but not statistically significant at any level. The coefficient on government expenditure on education is positive and statistically significant at the 1% significance level. The coefficient is 1.351, which means that when government expenditure on education of GDP increases by 1%, the gross enrolment rate of primary school will increase by 1.351%. It shows that government expenditure on education has a negative relationship with the proxy for the incidence of child labour. It supports the theoretical hypothesis that an increase in government expenditure on education raises the returns to education, which means households are more willing to send their children to school. The coefficient on rural population is negative and statistically significant at the 1% significance level. It demonstrates a positive relationship with the proxy for the incidence of child labour. As previous studies and statistical reports indicate, rural areas tend to have more child labour working in the agricultural sector and have lower school enrolment rates compared to urban areas. The coefficient on GDP per capita is negative and statistically significant at the 1% significance level, while the coefficient on the square of GDP per

capita is positive and statistically significant at the 1% significance level. It describes the relationship between GDP per capita and the primary school enrolment rate as a U-shaped curve. The inflection point of this U-shaped curve is 42,516 in constant 2010 US dollar. Primary school enrolment rate decreases when the household income increases in the first income stage (less than 42,516 USD). Primary school enrolment rate starts to increase when the household income continues to increase in the second income stage (greater than 42,516 USD). It should be noticed that 42,516 USD is a high average income level (see Table 1), which suggests that the dominating substitution effect harms primary school enrolment in general for poor and middle income countries. This finding supports the argument from Kambhampati and Rajan (2005) that the relationship between growth and child labour is an inverted U-shaped curve.

Gross enrolment rate in secondary school is the dependent variable in equation 3. The results from equation 3 is presented in Table 4.

Table 4. Main estimation results from equation 3

	SECONDARY			
TRADE	-0.030*** (-2.086)		-0.036*** (-2.767)	-0.036** (-2.765)
FDI		0.034** (2.493)	0.034*** (2.770)	0.034*** (2.768)
EXPENDITURE	0.979*** (3.902)	1.007*** (4.069)	1.205*** (5.209)	1.205*** (5.197)
RURAL	-1.975*** (-19.537)	-1.873*** (-18.320)	-2.125*** (-21.673)	-2.125*** (-20.786)
GDPPC	1.132*** (-4.362)	1.102*** (4.278)	0.994*** (4.265)	0.991*** (2.615)
GDPPC2				0.000 (0.011)
Constant	160.929*** (26.533)	153.423*** (25.583)	167.390*** (28.952)	167.413*** (27.043)
N	858	864	820	820
r2	0.426	0.409	0.497	0.497
F	137.783	128.719	138.130	114.944

Notes: t statistics in parentheses, \* p < .10, \*\* p < .05, \*\*\* p < .01.

Table 4 shows the results of the regression in which the gross enrolment rate in secondary school is the dependent variable. The value of the R-squared is higher in equation 3 than in equation 2. Similar to equation 2, the coefficients on government expenditure on education and rural population are remain statistically significant at the 1% significance level. Higher government expenditure on education is associated with a lower incidence of child labour. The relationship between rural population and incidence of child labour is negative. The coefficients on trade openness and FDI are found to be statistically significant at the 1% significance level, respectively. The results show that although trade openness is negatively related to the gross secondary school enrolment rate, FDI is positively related to the gross secondary school enrolment rate. The coefficient on GDP per capita is positive and statistically significant at the 1% significance level. It suggests a negative relationship between household income and child labour. The coefficient on GDP squared is insignificant. No non-linear relationship between GDP per capita and secondary school enrolment rate is found.

## Chapter 4 Discussion

The results suggest that school enrolment rates are the better variables to measure the incidence of child labour than the child labour participation rate. The results from equation 2 and 3 show different pictures of the relationship between the dependent and independent variables. There are three main findings that I will discuss in this section. First, the effects of household income on the child labour are different depending on the age groups and the levels of household income. Second, in the younger age group (equation 2), there is no evidence showing a linkage between trade openness, FDI and child labour, but these relationships are found in the older age group (equation 3). Furthermore, in comparison to previous work, the effects of trade openness and FDI on the incidence of child labour are different.

Table 1 shows that the average gross enrolment rate in primary school is higher than the average gross enrolment rate in secondary school. This is not surprising because primary school is required for secondary school admission; a child is usually allowed to attend secondary school only after completing primary education. At a counting level, secondary education is able to be developed only after primary education is widespread. Primary education is more likely to be mandatory than secondary education in developing countries. Furthermore, because the body of size of primary school aged children does not qualify them for heavy manual work, the return from work is relatively low. If the gross

enrolment rate of primary school is relatively high (the mean of this rate is 103.25%, as shown in Table 1), the families that choose to send their children to work are presumably extremely impoverished. The priority for these impoverished families is subsistence. Economic growth in developing countries creates the demand for child labour (Kambhampati and Rajan, 2006). Edmonds (2005) argues that the child labour in the most impoverished household doesn't change no matter what income per capita is. Kis-Katos (2007) also points out that children might have to work despite the favorable income effects in very poor families. When the additional income comes from an increase in wages of child labour, the opportunity cost of schooling is high, so households are more willing to send children to work and treat children as a source of income. Therefore, household income is negatively related to the gross enrolment rate of primary school, which means the substitution effect outweighs the income effect. However, Kambhampati and Rajan (2006) suggest that the increasing income decreases the supply of child labour to offset the impact of increased demand when growth is sustained. Therefore, in my study, when the GDP per capita is greater than 42,516 USD and continues to increase, the income effect begins to outweigh the substitution effect. The gross enrolment rate in secondary school is relatively low (the mean is 69.83%, as shown in Table 1), which means that a large number of families choose to send their children to work. A family that sends a child who is qualified for secondary school to work is not necessarily extremely impoverished. When household income increases, the demand for unskilled child workers decreases and the demand for skilled workers increases. The favorable income effect might offset the

substitution effect, so that higher incomes allow families to invest in education. As the regression results show, the relationship between GDP per capita and the gross secondary school enrolment rate is positive.

I find no evidence for a relationship either between trade and the gross enrolment rate in primary school, or between FDI and the gross enrolment rate in primary school. As I discussed above, the families that send their children to work are presumably extremely poor. An increase in trade or FDI is unable to help to decrease child labour in the extremely poor families. It is noticed that when Cigno et al. (2002) use the primary school nonattendance rate as the dependent variable, they also find no evidence to show the linkage between trade openness and child labour.

For the families that are not assumed to be extremely poor, the empirical results with respect to trade openness and FDI are of opposite direction since the incidence of child labour is negatively associated with FDI. This finding supports the argument by Busse and Braun (2004). Busse and Braun point out that multinational enterprises are highly sensitive to country characteristics such as democratic rights or child labour. Some studies show that multinational enterprises tend to invest in countries that can ensure other fundamental human and worker rights, such as basic union rights, the abandonment of child labour and no discrimination in employment (Busse and Braun, 2004). Some studies find no evidence to show that FDI goes to countries with low labour standards and a large amount of child

labour (Rodrik 1996, Kucera 2001, Iram and Fatima 2008). Therefore, an increase in FDI might not lead to an increase in the demand for child labour; on the contrary, the effect of FDI on child labour might be negative by leading to the overall economic development. On the other hand, domestic firms can use child labour to strengthen their comparative advantage in unskilled-labour-intensive goods. Doepke and Zilibotti (2008) suggest that when child labour is banned in the international labour market but legal in the domestic labour market, unskilled adult workers will choose to not send their children to school, which means an increase in child labour.



## Chapter 5 Conclusion

In this paper, I try to answer two questions: what is the relationship between trade openness and the incidence of child labour, and what is the relationship between FDI and the incidence of child labour. I use a panel data set of 120 developing countries from 2000 to 2014 in my empirical model. Instead of the more commonly used variable of the labour participation rate of children aged 10-14, the gross enrolment rates of primary and secondary school are set to be the dependent variables. I also use the labour force participation rate of children aged from 7 to 14 to measure the incidence of child labour directly in a reference group. Household income, rural population and government expenditure on education are controlled for in the model. As the theories suggest, rural population and child labour are found to be positively correlated, and the relationship between government expenditure on education and child labour is negative. I argue that an increase in household income increases the incidence of child labour in extremely poor countries in the younger age group. However, when household income continues to increase in the long run, the incidence of child labour decreases because the favorable income effect might offset the substitution effect. The empirical results show that trade openness and child labour is positively correlated, while FDI is negatively associated with the incidence of child labour. International trade and FDI, which are often used to describe globalization, have the opposite effect on child labour. One possible explanation is that multinational enterprises tend to invest in countries where worker rights are able to be

ensured while domestic firms tend to use unskilled child labour to improve their comparative advantage in labour-intensive goods. This suggests that labour law, political stability and effective enforcement could be the key factors to reduce child labour.

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## Appendix A: A List of Developing Countries

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Afghanistan	Costa Rica	Lao PDR	Russian Federation
Albania	Croatia	Lebanon	Rwanda
Algeria	Cyprus	Liberia	Samoa
Angola	Djibouti	Lithuania	Saudi Arabia
Antigua and Barbuda	Dominican Republic	Macedonia, FYR	Senegal
Argentina	Ecuador	Madagascar	Serbia
Armenia	Egypt, Arab Rep.	Malawi	Seychelles
Azerbaijan	El Salvador	Malaysia	Sierra Leone
Bangladesh	Eritrea	Maldives	Solomon Islands
Barbados	Ethiopia	Mali	South Africa
Belarus	Fiji	Malta	Sri Lanka
Belize	Gambia, The	Mauritania	St. Kitts and Nevis
Benin	Georgia	Mauritius	St. Lucia
Bhutan	Ghana	Moldova	St. Vincent and the Grenadines
Bolivia	Grenada	Mongolia	Sudan
Botswana	Guatemala	Morocco	Swaziland
Brazil	Guinea	Mozambique	Tajikistan
Brunei Darussalam	Guinea-Bissau	Namibia	Tanzania
Bulgaria	Guyana	Nepal	Thailand
Burkina Faso	Honduras	Nicaragua	Timor-Leste
Burundi	India	Niger	Togo
Cabo Verde	Indonesia	Oman	Tonga
Cambodia	Iran, Islamic Rep.	Pakistan	Tunisia
Cameroon	Jamaica	Palau	Uganda
Central African Republic	Kazakhstan	Panama	Ukraine
Chad	Kenya	Paraguay	Uruguay
Colombia	Kiribati	Peru	Vanuatu
Comoros	Korea, Rep.	Philippines	Venezuela, RB
Congo, Dem. Rep.	Kuwait	Qatar	Yemen, Rep.
Congo, Rep.	Kyrgyz Republic	Romania	Zimbabwe

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**Appendix B. Correlation Matrix**

	PRIMARY	SECONDARY	PARTICIPATION	TRADE	FDI	EXPENDITURE	RURAL	GDPPC
PRIMARY	1.000							
SECONDARY	0.2967***	1.000						
PARTICIPATION	-0.3214**	-0.5489***	1.000					
TRADE	-0.0575	0.2322 ***	0.1039	1.000				
FDI	-0.0341	0.0846	0.2413	0.3579***	1.000			
EXPENDITURE	0.0717	0.1508***	-0.0914	0.3434***	0.0895	1.000		
RURAL	-0.1116**	-0.5987***	0.4553***	-0.1062*	-0.1269***	-0.0262	1.000	
GDPPC	0.0226	0.4473***	-0.5426***	0.1736***	0.0965	0.0380	-0.5466 ***	1.000