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Master's Thesis

Trade, FDI and Child Labour in developing countries: does parental education matter?

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Abstract

This paper analyses how the level of parental education can influence the effect of FDI on child labour in developing countries. The central hypothesis presented is that the effect of FDI has a higher impact on child labour for families with less educated parents. The hypotheses are derived from an analysis of the model of Basu and Van (1998), Maseland and de Vaal (2011) and an extensive literature review. This study employed a panel data analysis, which included a sample of 99 developing countries for a period from 2006 to 2016. The child labour is represented by two proxies: the first and second school enrolment rate. The results of the study demonstrate that in the immediate impact of FDI on child labour, the income effect prevails, where the importance of the FDI effect is higher for families with less educated parents. However, after a few years, the effect changes towards a prevailing of the substitution effect, which has a more significant impact on families with better-educated parents.

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1. Introduction

One of the Sustainable Development Goals of our world is to "take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms" (UN, n.d.). According to the International Labour Organisation (ILO), in 2016, there were 152 million children in the world engaged in child labour. This is almost one in ten of total amount of children in the world. Additionally, around half of all working children (73 million in absolute terms) are employed in hazardous jobs (ILO, 2017). It is possible that the real number is even higher as countries and firms do not want to publish any statistics on this issue as it can effect their reputation.

The elimination of the worst forms of child labour is recognized as extremely important for sustainable socio-economic development. 186 countries had ratified Convention No. 182 on the worst forms of child labour by 2018. The Convention recognises that such forms of child labour, which are defined as dangerous to the well-being of the child or unconditionally contrary to the fundamental human rights of the child, should be prohibited by anyone under the age of 18 (ILO, 2002, p. 11).

In the literature, there are two different opinions on weather trade and foreign direct investments (FDI) have a negative or positive effect on child labour, either the substitution or income effect. The first respectively represents the following. Some authors argue that trade liberalisation is likely to raise the relative rate of return to the use of unskilled labour in a developing country which most likely results in the increase of the employ of child labour. Moreover, it decreases the incentive to invest in education and skills (Neumayer and Soysa, 2004, p.45).

On the other hand, based on income distribution impact of trade, FDI will generate a higher salary for working families that will lead to reducing employment of children (Davies and Voy, 2007; Neumayer and Soysa, 2004) and encourage alternative use of time, including schooling (Maseland and de Vaal, 2011). Consequently, the long term effect of trade openness can be a shift from a low-skilled, labour abundant industry towards a higher skilled capital-intensive production, making the child labour less attractive (Neumayer and Soysa, 2004).

Previously, the authors that studied the influence of FDI on child labour did not take into account the influence of the parents on the decision of sending their children to work or school. This decision is based on several reasons. Firstly, in the case of insufficient family income that leads to poverty, working children are just another source of money (Neumayer and Soysa, 2004, p.44). Moreover, for such families, the schooling costs are hardly affordable, and the availability of educational options are consequently low. Secondly, parents may exhibit selfish behaviour and send their children to work instead of school because they prefer regular income now than possibly greater but uncertain revenue in the future (Neumayer and Soysa, 2004; Bachman, 2000). Equally, in some families, it is believed that children will accumulate more general life skills or specific work skills from employment than from school (Bachman, 2000). In addition, there is a high influence of cultural prejudice such as in India, where there is a division of society in castes. People believe that low-status castes do not need an education there. From birth, such children learning the job of their parents, and it is hard to change. (Bachman, 2000).

Sufficient parental education can shift the opinion in favour of child education and not work as they better appreciate its advantages. It was studied by Davis-Kean (2005) whose finding indicates that parents may make a better psychological balance of stimulating education of their children as "co-teachers" when they themselves were successful in academics, and economic difficulties do not necessarily constrain this process. Parents' education could also help to overcome cultural prejudices, consequently, increasing child education and reducing child labour. The study of Mukherjee and Das (2008) prove these statements by examining the reasons for the reduction of school drop-out rate in India. They say that "parents' level of education plays an important role in establishing the linkage between social and human capital outcomes in the family"(Mukherjee and Das, 2008, p.322).

Based on that, in my research, I would like to answer the question: How does parental education moderate the effect of FDI on child labour in developing countries? The sample consists of developing countries because nine out of ten children are involved in child labour there (ILO, 2017).

In order to answer the above research question, this study starts by examining previous literature on the topic of FDI and child labour, going into a more detailed explanation of the role of parents in this process. Further, on the basis of theoretical models of Kaushik Basu and

Pham Hoang Van (1998), Robbert Maseland and Albert de Vaal (2011), the various options for the joint influence of FDI and parents on child labour are considered.

In support of the theory derived, an empirical analysis is conducted to test the main hypotheses. These hypotheses are tested using a panel data analysis, specifically using a fixed effects model. Due to the problem of lack of data, child labour is represented by two different proxies: first and secondary school enrolment rate. When using either one or the other dependent variable, the main independent variables are amount of FDI, parental education and an interaction term between them in a given country. Additionally, in order to create a more accurate model, several control variables have been added to the analysis. The selected control variables are Gross Domestic Product (GDP) per capita, the indicator of trade openness, urbanization and agriculture indexes and the percentage of poor population. Lastly, several robustness checks are implemented.

This paper is structured as follows: section two presents a review of previous literature on relevant topics such as FDI and child labour and the importance of parents and parental education. The following section then discusses the theoretical framework used in the analysis. Sections four and five describe the data and methods used in the analysis and discuss the empirical results. Finally, section six presents a summary of the research and discusses some conclusions derived from the work.

2. Literature Review

Many factors, such as economic, cultural, social, political and others, can explain the phenomenon of child labour. This chapter covers a number of literature studies that examine economic factors with a special focus on the impact of FDI and trade on the problem of child labour and the role of parents in the decision of sending their children to work.

2.1 FDI, trade and child labour

In the literature, globalization, including FDI and trade, can either promote child labour or decrease it. Initially, scientists in classical theory support the idea of FDI promoting child labour. They claim that international trade is based on the comparative advantage of the countries. The competitive advantage of developing countries is in abundant unskilled-labour sectors. According to the Heckscher-Ohlin framework, these countries export goods which were made by the excessive use of unskilled labour (Dagdemir and Acaroglu, 2010). Consequently, a substitution effect may occur, that is, "trade liberalisation in a developing country which is abundant in unskilled labour is likely to raise the relative rate of return to use unskilled labour" and, consequently, decreasing the incentive to invest in education and skills (Neumayer and Soysa, 2004, p.45). As a result, the higher returns to child labour also lead to a higher supply of child labour (Dagdemir and Acaroglu, 2010).

In addition, in order to obtain a competitive advantage of cheap labour over others, countries start to reduce cost by higher employment of children. Besides, the situation is aggravated by the fact that global competition among developing countries makes it necessary to reduce costs more and more in order to maintain the competitive advantage (Neumayer and Soysa, 2004; Dagdemir and Acaroglu, 2010).

This situation is beneficial to FDI since international companies are continually looking for ways to reduce production costs and increase revenue. For this reason, FDI penetration and liberalisation of trade could raise the demand for child labour (Edmonds and Pavcnik, 2006), which increases the opportunity costs of children who attend school (Davies and Voy, 2009). Maskus (1997) argues that the demand for child labour can also increase in manufacturing firms that supply inputs to the export sector, meaning that children can be employed in firms involved in global value chains.

Nevertheless, some economists argue that trade liberalisation reduces child labour due to an income effect. This effect means that growing inflows of FDI improve productivity, create

jobs, and accelerate growth, which forces national incomes to increase (Davies and Voy, 2007; Neumayer and Soysa, 2004). In this case, parents start to have higher wages and fewer incentives to use the labour of their children, especially, those who did not have sufficient income. Consequently, they are more likely to reduce their children's workload (Edmonds and Pavcnik, 2002).

Moreover, with a more open economy, developing countries change from low-skilled labour-intensive operations to more capital intensive. Because of the inflow of more foreign capital, the rate of return to a human capital raises, which causes parents sending their children to schools rather than to work (Dagdemir and Acaroglu, 2010). As a result, the increase of FDI lowers the incidence of child labour and raise the schooling rate (Neumayer and Soysa, 2004). This argument is completely opposed to the substitution effect where the rate of return to unskilled labour increases.

Edmonds and Pavcnik (2006) say that the degree of reducing child labour depends on parental preferences and the reason why children were sent to work. If poverty is the cause of using child labour, the effect of the income will have a higher impact. Consequently, this can lead to a reduction of using child labour among the poor, since households do not need children's help to raise their earnings above the subsistence minimum. As a result, higher salaries will lead to encouraging alternative use of time, including schooling (Maseland and de Vaal, 2011). All of these factors reduce the incentive of supply for child labour.

Additionally, an indirect effect is possible in case of trade and FDI, meaning that the parents of the children are forced to take more working hours and they transfer their household and family duties to their children. The study of Webbink, Smits and de Jong (2012) investigate the conditions of children's domestic and family business labour applying data from more than 150,000 children from 180 areas in 13 developing countries in Africa and Asia. The research shows that the majority of children spend time on household chores. However, in some countries, most of the girls are spending more than ten hours a week. For example, in Somalia, about 30% of boys and half of the girls spend more than 20 hours a week on housework. These numbers suggest that this form of hidden child labour could be more significant than work in production.

The majority of empirical evidence of economic openness and use of child labour presents some proof of a negative correlation between trade indicators, FDI and child labour. The example is the study of Neumayer and Soysa (2004) where a possible link between trade

openness represented by FDI, trade and child labour are empirically analysed. In this research, they use cross-sectional data with indicators obtained from the 1990s for approximately 117 countries. The main conclusion is that open developing countries that trade more and have higher FDI inflow have less incidence of child labour. Moreover, using South Asia as a reference category, they demonstrate that child labour is lower in Eastern Europe and Central Asia. They conclude with the idea that the income effect dominates the substitution effect

Furthermore, Davies and Voy (2009) have also empirically investigated the correlation between FDI and child labour using data from 145 countries for 1995. The authors applied the treatment of the problem of endogeneity between FDI and child labour by instrumental variables developed in the previous study of Edwards and Pavnick (2006) based on geographical determinants. These types of instrument variables would affect FDI, but should not touch the indicators of child labour in the country. The authors discovered that FDI is statistically negatively associated with the prevalence of child labour. However, the significance of this correlation disappeared once the level of income was included. Researchers claimed this was proof that the main impact of FDI on child labour goes through the income effect.

Besides, Eric Edmonds and Nina Pavcnik (2006) investigate the link between trade openness indicator and child labour in cross-country analysis taking into account that trade flows are endogenous to labour standards, including child labour. They find a negative correlation indicating that countries which trade more have less child labour (a 10% rise in openness is correlated with a 7% decline in child labour). The trade is more beneficial for low-income countries with high-income countries where the same increase in openness decreases child labour by 9%. These relationships appear to be mainly related to the growing income effect.

Nevertheless, there are studies in which FDI leads to increased child labour in specific industries and regions. For example, Doytch, Mendoza and Thelen (2013), working with data on 100 countries for the period 1990-2009, came to the conclusion that various economic sectors create different effects on child labour. They find that in Europe and Central Asia, FDI in agriculture sector leads to increase child labour, whereas, in East and South Asia, FDI in manufacturing tends to have a negative correlation with a number of working children.

Additionally, Iram and Fatima (2008) in their research study the link between child labour and FDI, trade openness and agriculture sector using the annual data in Pakistan. They conclude that trade openness raises the demand for child labour because of the increase of output of the

export sector in the long-run future. However, FDI is discovered to lower the rate of child labour, Pakistan is not trying to attract a higher inflow of FDI by low labour standards and a high number of the child labour force.

The last result of Iram and Fatima (2008) reminds that not only FDI can affect child labour, but as mentioned earlier, and child labour can attract FDI with its low price. Busse and Braun (2004) made such a reverse analysis using FDI inflows per capita during the period 1995 to 2000 as the dependent variable and child labour, including gross secondary school enrolment rate as an independent variable. The results reveal that multinational companies are extremely sensitive regarding the location of their operations, and they chose countries with lower levels of child labour and higher education. These findings mean that FDI sustains a particular level of child labour, and, consequently, because of it, the child labour rate could go down. However, the authors find a statistically significant positive relationship between child labour and comparative advantage in labour-intensive goods, thereby confirming the theory of promoting child labour in countries' specific industries. This interdependence of FDI and child labour can create statistical issues and, therefore, should be taken into account in the empirical study.

Overall, combining the presented empirical studies, it can be noted that the question of which particular effect prevails is not resolved. In most studies at country level, FDI and trade do not increase the use of child labour. However, empirical evidence shows that this relationship is different at the industry level. Every author tried to overcome the problem of endogeneity (FDI could impact on child labour, whereas child labour could also affect FDI levels) by using different methods. Besides, the authors used data from the 1990s, which at the moment may seem outdated information. All these comments are considered in this study.

2.2 Role of parents in child labour

In all reviewed studies, the authors do not attribute to the parents' role, but it is them who are taking the main decision for the child to send him to work or not. The main reason why parents need their children working is the case of insufficient family income that leads to poverty. In this unfortunate monetary situation, children are just another source of money that sometimes is extremely crucial "in order to survive as a family" (Neumayer and Soysa, 2004, p.44). Thus, even altruistic parents that worry about the well-being of their children may be forced to send them to work. The situation is worsened during economic crises as poor parents often suffer from credit restrictions and, consequently, they cannot borrow money and

send their children for temporary jobs (Neumayer and Soysa, 2004). Nevertheless, temporary employment could turn to more permanent if children lose their freedom and interest to attend school.

John Cockburn (2001) in his research attempts to explain the decision between schooling and child labour by integrating the role of household asset profiles using data of rural Ethiopian families. Applying a simple agricultural household model, he demonstrates "how the extent and composition of household asset portfolios simultaneously determine household income and demand for child labour" (Cockburn, 2001, p.1). As results, he obtained that small area of land ownership and small livestock leads to increasing of child labour. This effect is similar to the case of the indirect influence of trade considered by Webbink, Smits and de Jong (2012) in which parents must work in order to have an income and children take care of the household including care for animals and family farming. John Cockburn (2001) concludes that with an increasing income of a family, parents prefer to invest more in their children's education, consequently, reducing the supply of child labour and raising the school enrolment rate supporting income effect.

However, as it can be seen from the reports of the National Sample Survey of India, about 25 per cent of children did not attend school because they were not interested and not because of insufficient income. Among those employed in the child labour market, 10 per cent worked not because they had to gain money, but to obtain relevant skills or spend time (Mukherjee and Das, 2008).

Secondly, parents may exhibit selfish behaviour and send their children to work instead of school because they prefer regular income now than possibly higher but uncertain revenue in future due to better education of a child (Neumayer and Soysa, 2004; Bachman, 2000). However, without rejecting that such parental behaviour occurs, the empirical evidence shows that most of the parents behave altruistically. For example, Schluter and Wahba (2010) did an experiment in Mexico attempting to answer the question if parents are selfish or altruistic. They found strong evidence for altruistic behaviour and against parental selfishness. Moreover, they showed that, at least for a focus group in Mexico, aid programmes of cash benefits intended for children actually reach them supporting the result.

Equally, in some families, it is believed that children will accumulate more general life skills or specific work skills from employment than from school (Bachman, 2000). In addition, the existence of high influence of cultural prejudice can play a role such as in India. Due to a

division of society in castes, people believe that low-status castes do not need an education there. From birth, such children learning the job of their parents and it is hard to change. (Bachman, 2000).

Bachman (2000) also find the evidence that large families with a higher number of children are more likely to send them to work, not to school. However, this conclusion should be applied to specific situations with a careful study of local conditions and culture. He provides an example of Botswana where the study showed that children from large families more frequently attend primary school.

Overall, it is difficult not to note that the major decision to send a child to work or school belongs to the parent that weighs the current and future benefits and considers child interests. As it is mentioned, the main reason is insufficient income for the survival of a family, but many other factors presented above are affecting this decision.

2.3 The importance of parental education

Sufficient parental education can change the choice of parents in favour of children education and not work as they better appreciate the advantages of schooling. Several empirical types of research in developing countries can prove this statement. For example, Ersado (2005) use a multinomial logit framework to examine child labour and schooling decision. He shows that educational levels of both man and woman in the family, "significantly improve child education and decrease the likelihood of child labour and intensity of work" in three countries: Nepal, Peru and Zimbabwe (Ersado, 2005, p.469). Moreover, he finds this correlation significant for both urban and rural areas.

Another study of Glick and Sahn (2000) similarly tries to explain the relationship between education of parents and schooling of their children in Guinea, Westen Africa. Using data from surveys conducted in 1990, they perform an empirical analysis and conclude that there is a positive correlation. However, the effects of parental education differ depending on the gender of the child. The mother's education has a strong positive effect on girls' schooling and no impact on boys' education, while the father's education has an impact on both girls' and boys' schooling. The authors explain these differences by a collective household model in which preferences of fathers and mothers vary and they are involved in a cooperative bargaining game that leads to Nash equilibrium. Each partner's power over resources is a function of his or her level of education. Consequently, higher education of both parents

increases the possibility of children getting a higher education in developing countries that leads to a decrease in the incidence of child labour.

Additionally, the study of Mukherjee and Das (2008), using the data of the 55th (1999-2000) and 61st (2004-05) rounds of the National Organization for Sample Surveys of India, shows empirical evidence that "parents' level of education plays an important role in establishing the linkage between social and human capital outcomes in the family", and this is valid also for the families with a lower family income (Mukherjee and Das, 2008, p.322). Nevertheless, with a weaker income impact on child labour, the importance of parental education in the child labour decision is growing. Moreover, the results demonstrate that a mother's education is a more important determinant in limiting the cases of manual labour by children.

The mechanism for transmitting intergenerational relationships has never been well-defined. There is an opinion that children of better-educated parents will have higher education both because of the direct impact regarding having parents with higher levels of education and because of the indirect effect of a higher ability (Black et al., 2003). Black, Devereux and Salvanes (2003) divide the underlying mechanisms of the direct impact of parental education on children's education in the following manner. Firstly, they say that more educated parents tend to have a more substantial income that can affect the education level of a child and his achievements. Secondly, parental education can influence the distribution of parental time and the productivity of parents in activities aimed at the development of children. Lastly, education can change the negotiating power within a family. Mothers with higher education could be more successful in managing the spending on activities and investments targeted at children.

Besides, Hertz et al. (2007) provide an analysis of the correlation coefficient of parental education as a predictor of schooling in the next generation for a sample of 42 countries. They find that this relation differs across regions. At the top list of parent-child education, correlation is Latin America's countries with an average level of 0.6. On the second place, there are eight Eastern nations (0,41). Western Europe, the USA and Asia with the result of 0.39 have a third place. Africa has the lowest coefficient that is equal to 0.36. However, as the authors used a limited amount of countries from each region, especially from Africa, due to the limitation of necessary data, the results can be biased. Nevertheless, this study shows that there is a correlation between parental education and children schooling and this impact is almost the same for Western Europe, USA and Africa.

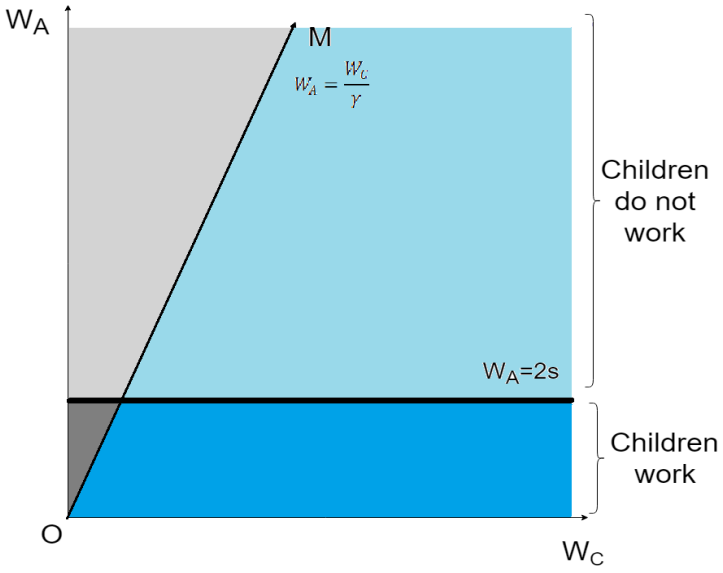
Summing up, according to the literature presented, it is shown that the level of education of parents influences the household decision on account of child labour. This effect is particularly evident in children's education. However, there are no studies whether their decisions could change with increasing FDI, how more open trade and parental education levels are related to child labour. In my research, I would like to find the answer to the following question: How does parental education moderate the effect of FDI on child labour in developing countries?

3. Theoretical framework

In order to answer the research question, the theoretical background of the problem should be investigated. One of the first simple theoretical models was created by Kaushik Basu and Pham Hoang Van (1998). They show the interaction of the child and adult labour in the market and how adults make decisions to send the children to work based on their income. In their model, the authors assume altruistic behaviour of parents. Such behaviour, as discussed above, is more representative of better-educated parents as they better appreciate the importance of education. There are two main assumptions in the article. Firstly, the Luxury Axiom which means that being altruistic, parents will send their children to work only if without the child income the family income falls below some sustainable level. Secondly, the Substitution Axiom intends that for a firm, children's and adults' labour are substitutable.

There is an unspecified number of families in the country which is presented as N. Each family consist of one parent and one child for simplicity. The salaries of adults in the market are equal to W_A, while W_C is the wages of children. These indicators represent the coordinate system in Figure 1. Due to Luxury Axiom, there is no supply of children labour if the wages of parents are above the horizontal line $W_A=2s$ from a Figure 1 where s is "a certain exogenously fixed sustainable level" (Basu and Van, 1998, p. 416). This level indicates the minimum amount of income necessary for the survival level of the consumption of a family consisting of two people. In this case, the family has sufficient income and do not need to use a child in order to survive.

Figure 1. Equilibrium in the Child- and Adult-Labour Markets. Part 1



Source: based on Basu and Van (1998)

Due to the Substitution axiom, children can replace adults, but they are less productive. For this reason, there are adults-equivalent scaling represented by γ which takes value from 0 to 1. The firm will employ both children and adults when $W_A = \frac{W_C}{\gamma}$. This case is represented by the line OM that is also called "ridge". A firm will employ only adults when their wages are less than market child wage per adult equivalent ($W_A < \frac{W_C}{\gamma}$). This area is below the ridge represented by the light and dark blue colour in Figure 1. Here the demand for child labour equals to zero. A firm will employ just children when the wages of adults are more than market child wage per adult equivalent ($W_A > \frac{W_C}{\gamma}$). This area is above the ridge represented by the light and dark grey colour in Figure 1. Here the demand for the labour force of parents equals to zero.

Summing up two axioms together, the Figure 1 is divided into four parts:

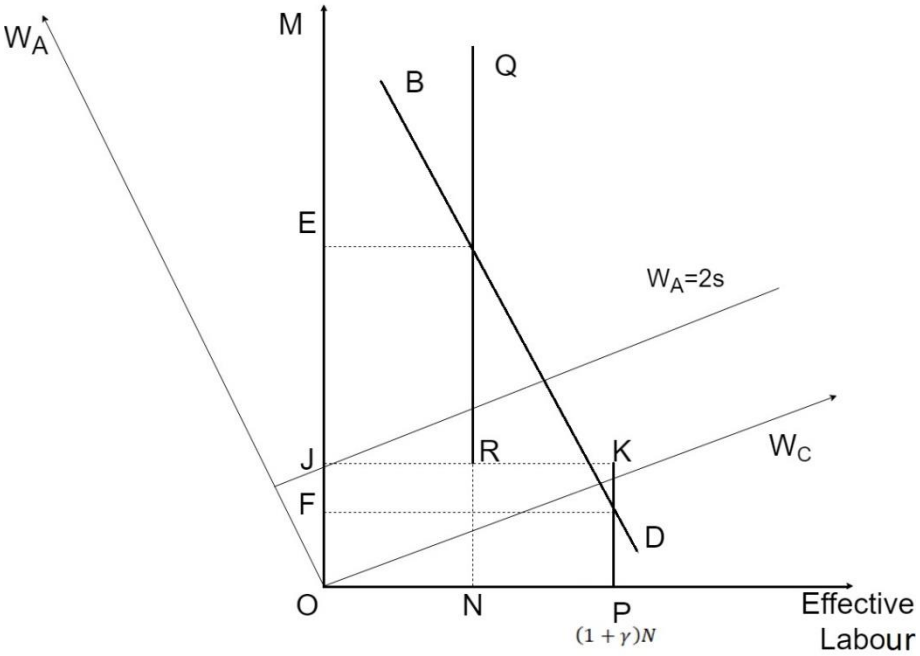
- Light blue - children do not work for both reasons: the demand for child labour is 0 and income is higher than the sustainable level.
- Dark blue - children do not work because the demand for child labour is 0, although there is a supply of child labour.
- Light grey - children do not work due to the sufficient salary of the parents; therefore the offer consists only of parents even if the demand for adults is 0.
- Dark grey - children work as the demand for adults is zero and there is a lack of family income.

The analysis becomes more complicated when the pair of market wages is located on the ridge. First of all, a new line "Effective Labour" appears that shows "total amount of labour measured in adult-equivalents being used or demanded by the firm" (Basu and Van, 1998, p. 418). The line of "effective labour" with the line OM creates a new coordinate system as seen in Figure 2. In case when the company employs Y number of adults and Z number of children, effective labour is equal to Y+γZ. However, as it is said, the economy has N families with one child and one parent. Consequently, if just parents without any child are employed, effective labour is equal to N that is the maximum. In case when just children work without any adults, effective labour is equal to γN.

Secondly, the BD line describes "the firms' aggregate effective demand for labour for wage pairs lying on the ridge" (Basu and Van, 1998, p. 419). If wages are rising in an economy, the

employer will be forced to reduce the number of employees and, consequently, the demand for labour force decreases by rising the BD line.

Figure 2. Equilibrium in the Child- and Adult-Labour Markets. Part 2



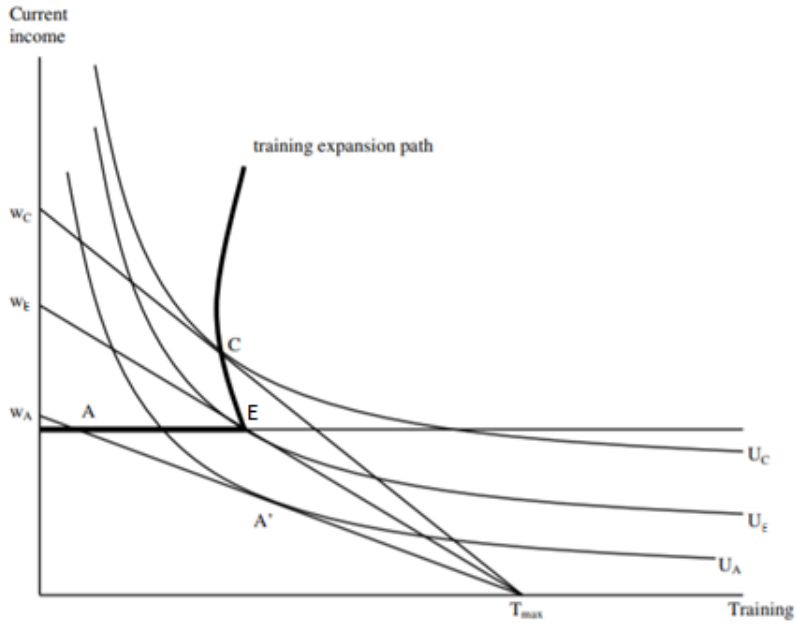
Source: based on Basu and Van (1998)

The authors illustrate two "ridge equilibria". On the one hand, if the wage ratio for children and adults is in E, the aggregate effective demand for labour is represented by ON line. As the income of adults is more than sufficient (above the W_A=2s line), the firm's demand for labour is satisfied by N adults, hence children do not need to work spending time for other activities including education. For this equilibrium, the supply of labour is presented by QR line. On the other hand, in the F point that is below the fixed sustainable level, the adults' and children's income is low, and both of them have to work in order to survive. Consequently, the firm's demand and market supply of labour are in P calculated as N+γN. As it is seen from Figure 2, the supply line is interrupted in point J which is located at the intersection of MO and W_A=2s.

In order to perform the following analysis, it is also needed to understand the importance of the sustainable level of income for the child education decision as opposed to the decision to send a child to work. For this purpose, the study of Robert Maseland and Albert de Vaal (2011) is considered. Even if it does not directly address child labour issue, the results still can be interpreted with regard to children.

This study confirms the Luxury axiom developing a two-sector model. Figure 3 presents a graphical explanation of the work/training choice. In this graph, U-curves demonstrate utility curves describing all possible combinations between training and current income that allow the worker to have the same level of utility. Usually, the employee chooses the optimal combination of training and income so that "the marginal costs of training are equal to the marginal benefits" (Maseland and de Vaal, 2011, p.156). Point A', E and C show this optimal solution. However, the horizontal line represents exactly the sustainable level under which people do not have a choice, and they have to provide labour all the time to reach an income that is needed to survive. For this reason, with wage w_A, the spent time for training will be at point A and not A'. Consequently, if a family of a child earns less than a certain level, he is forced to work and the time spent on education will be lower than optimal until point E, where the optimal position is on the sustainable line.

Figure 3. The training decision under poverty.



Source: Maseland and de Vaal (2011)

However, from point E to point C, the line is bent in the direction of decreasing of training. The authors say this happens because a salary slightly higher than the subsistence minimum is not high enough to lead to a reduction in the number of hours worked. That is, even wages slightly above the necessary minimum lead to an increase in child labour. Only if family income is higher than w_C, the learning curve starts to grow, which also means that child labour is needed less for the family to survive. Consequently, Maseland and de Vaal (2011)

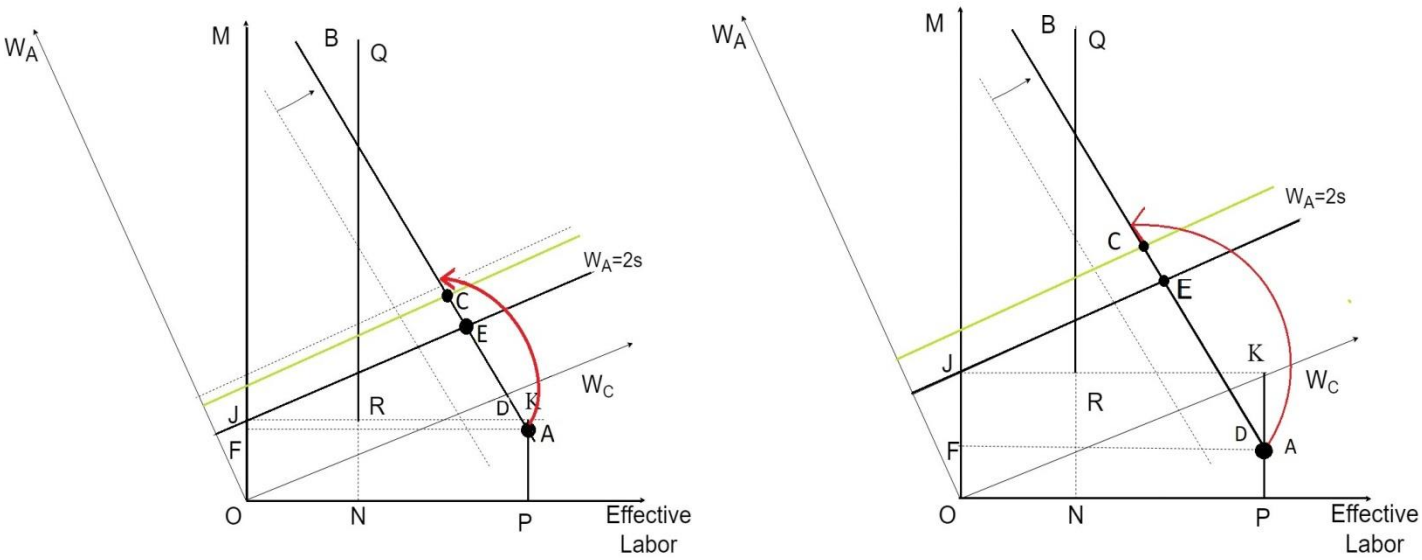
by their analysis demonstrate that when untrained labour wages go up, the incentive to train decreases what is comparable to the substitution effect.

Now the analysis of the changes associated with the arrival of more FDI and influence of parental education can proceed. For this analysis, there is an assumption that the family income is below the sustainable level since just in this case there is child labour in the country by the model of Basu and Van (1998).

The effect of FDI is complicated to distinguish as, even in the literature, the authors cannot decide which of two effects (substitution or income) prevail. In general, with the increase in FDI inflows, the firms' demand for labour force increases and this shift the demand line BD to the right. However, there is a difference in how this demand will be satisfied. It worth comparing two cases, shown in Figure 4: cases for high[1] and low[2] skilled labour in the economy.

Figure 4. Changes in the Child- and Adult-Labour Markets due to increasing FDI and parental education.

Case 1 for high-skilled labour. **Case 2 for low-skilled labour.**



Source: based on Basu and Van (1998)

The first case is if there is a demand for a more educated population. To begin, I need to explain the changes in the right graph of Figure 4. As it is said in the literature review, Black et al. (2003) find evidence that better-educated parents know how to manage the spending

1 with more educated parents
2 with less educated parents

better and allocate resources more effectively. Consequently, initially, higher wages were required, for less-educated parents to maintain their sustainable life level. However, more educated parents can reach 2s level with lower wages. For this reason, the line of sustainable level can go down, reducing the area where children are forced to work[3].

Moreover, Black et al. (2003) say that better education of parents leads to greater income in the family that makes the wages higher on the axis. For example, point F on the right graph is above point F on the left, where the case for low-skilled labour is considered. As it is stated in the model of Maseland and de Vaal (2011), due to higher earnings, the amount of time for training among high-skilled people will be longer, but since the wages are still below the required level, this time is not optimal. Overall, the separate effect of higher education of parents is negative to child labour.

Due to the assumption, the family's income is below the sustainable level like at point A on the right graph of Figure 4. This point also corresponds to w_A from Figure 3. With such income, the maximum training that children can afford is minimal and is not optimal. With the increase of the demand of FDI on more skilled population, their income will go up along the BD line on the right Figure 4. The opportunity to spend more time on the study will also grow. At some moment, the wages will go up to point E, where wages are equal to the sustainable level. As suggested by Basu and Van (1998), after this point, child labour should disappear. However, from the study of Maseland and de Vaal (2011), until wage w_C, the level of education will fall, increasing child labour. A green line represents the level of w_C. Only after crossing this line child labour will disappear.

Moreover, in this case, the wages of the less trained adults, which already have lower wages compared to the more educated population, may either decrease or not change. In any case, the use of child labour in such families does not change.

Secondly, on the left Figure 4, it is assumed that FDI demand is directed to a less educated and skilled population, the cost of which is less. Their line of survival is higher and initial wages A' are lower than that of more educated adults. Therefore, they immediately have less available for training time. Increased demand increases the wages of such workers, which start to go up along BD line of left Figure 4. As in the previous case, from point E to point C,

[3] The decrease is due to higher efficiency of parents' allocation of resources. The line still equals to 2s because there is an assumption that a family consists of 2 people.

with the growth of wages, the time for studying decreases, which will lead to an increase of child labour. Only when income is above point C, child labour will disappear.

However, such firms' demand can reduce the income of more educated adults. It happens because more skilled adults have a higher initial salary, but FDI demand is directed to a less skilled population. For this discrepancy, higher skilled people will be forced to change the job and start the work of less-skilled adults that decrease their wages. Moreover, the value of education will begin to fall, as work can be found without training. Therefore, parents will be less interested in sending children to school and more to work.

Comparing the two graphs, it should be noted that with the arrival of FDI, the parents' income will grow which will lead to a decrease in child labour. Moreover, this effect will be more significant for less-educated parents, since the rise from the initial wages point A should be greater for them than the jump in wages for more educated parents. The red arrows represent both necessary changes in Figure 4.

However, the model of Basu and Van (1998) is considerably general. The family is considered to be just of one adult and a child, and their consumption is equal, that is not always true in real life. It is obvious why the authors applied such a generalist model. Due to the probability of the appearance of many different options, it would be impossible to analyse each case individually. Through their theoretical explanation, it is possible to perceive a simplified view of the mechanisms through which parental education will have a real impact on the decision of child activity.

Moreover, there is a possibility that even educated parents demonstrate selfish behaviour thinking just about their lifetime consumption. For this case, Dinopoulos and Zhao (2006) made a standard two-sector model of a small open economy where selfish parents make a decision about the use of child labour. The two sectors are modern and agrarian. Both of them produce a homogeneous good, but first uses just skilled adult labour and the second employs child, skilled and unskilled adults labour force. Studying the effect of FDI, the authors find that FDI increases the endowment of capital employed and generates an increase in employment in the modern sector without changing the wages of skilled adults in the agrarian sector[4]. As a result, there is a flow of skilled workers from the agrarian to the modern sector. The output of the last is expanding, while another is reducing the production and the number of hired people, including children. They conclude that "the arrival of multinationals does not

[4] These results are close to the analysis in this research of income effect.

affect the structure of wages or the value of effort, but reduces the incidence of child labour" (Dinopoulos and Zhao, 2006). Consequently, this study proves that FDI and more educated adults in the economy lead to a decrease in the incidents of child labour.

Based on the analysis above, the following hypothesis can be derived:

H1: Increasing parent education has a negative effect on child labour and positive effect on child education in a developing country.

Due to the fact that the income effect prevails in the literature, and my analysis demonstrates the trend of reducing child labour, the following hypothesis was accepted:

H2: FDI has a negative effect on child labour and positive effect on child education in a developing country.

H3: The effect of FDI has a higher impact on child labour for families with less educated parents.

4. Data and method

4.1 Model specification

For reason of unavailability of data, the analysis is performed on an aggregate level. The sample consists of developing countries as more than 90% of child labour in the world occurs in this region (ILO, 2017). Developing countries for investigation are selected based on the classification of the United Nations of the regions (United Nations Statistics Division, 2018). Comparing this table of countries and available data for the dependent variable, a list of 99 developing countries emerged. This list of countries used can be found in Appendix A. The time frame is applied from 2006 to 2016.

Because the data set represents cross country indicators for 11 years, a panel data method of study is used. Based on the research question and the hypothesis, the baseline specification equation is as follows:

$$CL_{c,t} = \beta_1 + \beta_2 FDI_{c,t} + \beta_3 PE_{c,t} + \beta_4 FDI_{c,t} * PE_{c,t} + \varepsilon_{c,t}$$

The dependent variable, $CL_{c,t}$, represents the child labour in a developing country c in year t; $FDI_{c,t}$ demonstrates the stock of foreign direct investment in a developing country c in year t, $PE_{c,t}$ represents parental education, and $FDI_{c,t}$* $PE_{c,t}$ represents the interaction term between FDI and parental education being the most significant independent variable and $\varepsilon_{c,t}$ describes the error term.

However, as it was discussed in the literature review, the researchers have shown that other determinants could influence child labour in developing countries. That is why it is necessary to add to the basic model other variables that have been proved to be significant to this relationship. For example, the factor of country openness for a trade is frequently applied (Neumayer and Soysa, 2004; Edmonds and Pavcnik, 2006; Davies and Voy, 2007).

Moreover, some indicators of household income are commonly included in the model (Neumayer and Soysa, 2004; Edmonds and Pavcnik, 2006; Davies and Voy, 2007; Doytch et. al., 2013). Some authors use indicators of rural areas and agriculture sectors since it is proved that child labour is mostly used there (Neumayer and Soysa, 2004; Edmonds and Pavcnik, 2006). Other factors, such as the signing of ILO convention, the level of democracy or the quality of institutions are also applied (Busse and Braun, 2004; Edmonds and Pavcnik, 2006; Doytch et. al., 2013).

Taking into account previous studies and the availability of the data, the selection of control variables was implemented in order to make the model more complete. First of all, the indicator of trade openness ($tradeopen_{c,t}$) is included as it provides supplementary information about the country's trading relations. Secondly, as a measure of the household's income, most authors mentioned above use GDP per capita, which is also added in the equation ($GDP_{c,t}$). For the fact that in 2016, 70.9% of child labour is used in the agriculture sector, the index of agricultural activities of the country will be presented ($Agric_{c,t}$) (ILO, 2017). The indicator of the urban population ($Urban_{c,t}$) demonstrates the difference between the urban and rural area. Lastly, in order to include the population that have a sustainable level of income, the percentage of poverty $(Poverty_{c,t})$among the population is applied.

The final equation, including the selected controls, is as follows:

$$CL_{c,t} = \beta_1 + \beta_2 FDI_{c,t} + \beta_3 PE_{c,t} + \beta_4 FDI * PE + \beta_5 tradeopen_{c,t} + \beta_6 GDP_{c,t} + \beta_7 Agric_{c,t} + \beta_8 Urban_{c,t} + \beta_9 Poverty_{c,t} + \varepsilon_{c,t}$$

The indicators of the signing of ILO convention, quality of institutions and democracy are not presented in the model because they have not been significant in previous studies. This may be due to various reasons. For instance, ILO provides the programmes of development of labour standards in the form of both conventions and recommendations. The first is international treaties that are legally binding for the states that ratify them, and the second is non-binding guidelines. However, the ILO does not have significant enforcement tools, such as penalties for non-compliant countries (ILO, 2017). Alternatively, it just has soft enforcement mechanisms which incorporate a monitoring system that improves agreement through information distribution and transparency. These facts create some distrust over the effectiveness of ILO standard-setting (Boockmann, 2003).

4.2 Data description

Dependent variable

The incidence of child labour is challenging to measure reliably as countries and enterprises prefer not to disclose this type of information since they are worried about criticism from society. In the literature, most of the authors used the traditional and most popular measure of the child labour rate that is the labour force participation rate of children aged 10-14 years. However, this index has some problems. Firstly, in most of the countries, the level is based on

predictions rather than surveys which do not demonstrate truly the child labour (Neumayer and Soysa, 2004). Besides, this measure excludes children younger than ten years old, which leads to the elimination of a significant part of children from the analysis. However, the measure includes 12-14 years old children who, by Minimum Age Convention 138, under certain conditions, are allowed to have light work in developing countries (ILO, 2004). Moreover, work in a domestic household or unofficially is not included.

For this reason, as the main dependent variable, I apply the net primary school enrolment rate obtained from the World Bank as the representation of child labour (World Bank, n.d). The logic is that children who are not attending school are considered as working and who do attend school are presumed not having any job. This measure covers the age of children from 5 to 11 years old, so until the moment when ILO allows to have light work. Moreover, as it is said in the literature review, the influence of parental education on child labour go through child education.

Nevertheless, I will also do an analysis using the net secondary school enrolment rate obtained from the World Bank, even though the secondary education concerns children of age from 12 to 16 that could work under certain conditions. The reason for that is the study of the World Bank Group (2005). It notes that in many countries, there is an increasing demand for workers with completed secondary education due to skill-oriented technological change, where FDI plays an important role.

The indexes of both primary and secondary enrollment rate is calculated by dividing the number of children enrolled in primary/secondary education that has official school age by the population of this age group which corresponds to primary/secondary education correspondently and multiplied by 100. Primary data for the indexes are compared with the International Standard Classification of Education to guarantee the comparability of education programs at the international level (World Bank, n.d). The importance of primary education is that it gives children basic knowledge such as reading, writing, and math skills, as well as an elementary understanding of subjects such as geography, history, social studies, science, music, and art. Secondary education completes the basic education, which began at the primary level and aims to lay the foundation for lifelong learning and human development (World Bank, n.d).

However, these indicators have also limitations. On the one hand, there are some issues in collecting and comparison of data such as all enrollment rates are based on annual school

surveys, but they do not necessarily represent actual attendance during the year. Moreover, the period of study varies from country to country and may affect enrollment rates, although the International Standard Classification of Education is trying to reduce the difference. In addition, age at enrollment may not be accurately estimated, especially in countries where birth registration is not strictly observed (World Bank, n.d). On the other hand, authors state that children that attend school may work part-time after it (Neumayer and Soysa, 2004) or, as it is written in the ILO (2004) book, some children have to work in order to attend school, and they can do it on weekends or holidays. I have taken into account that these facts may affect the results.

Independent variables

The first independent variable is FDI, which is used differently among authors according to the goal of the paper. Busse and Braun (2014) use FDI inflows rather than stocks, as FDI stocks correspond to flows during a more extended period, while the indicators for child labour are comparatively recent. Moreover, in the robustness check, they found that the results of their study do not differ to a large extent if stocks are applied instead of flows. The same indicator was taken into account by Davies and Voy (2007) because of the data limitations. Doytch et al. (2013) use sectoral FDI flows since, in their study, they hypothesise that FDI across different economic sectors generates various outcomes. Instead, Neumayer and Soysa (2004) apply the stock of FDI rather than flows because it displays stronger the lasting influence of such kind of investment than volatile short-term inward investments flow.

Since in this study, panel data is used which consist of time series changing for 11 years, FDI stock includes FDI inflow changes. For this reason, as an independent variable in the model, I will use the stock of FDI obtained from the World Investment Report in open UNCTAD statistic source because it better reflects the accumulation of foreign capital. Nevertheless, FDI inflows are presented in robustness check describing the impact of new investments in the country. Finally, as some researchers say that the FDI may have a delayed impact on child labour and it is needed a time to notice it, FDI stock as main independent variable is lagged for one and five years.

Based on the hypothesis, FDI should have a negative effect on child labour, which means that it will increase the school attendance rate. Therefore, the expected sign of the FDI stock in the model should be positive.

The second independent variable is related to the education of parents. Statistical data determining only the level of parent education does not exist. Moreover, there is a significant difference between the countries at which age people become parents. According to demographic and health survey from 2010, the average age for a first child is 20,9 years in Eastern and Southern Africa and Middle and Western Africa, while it is 22,2 and 22,8 years in Latin America, the Caribbean and in Asia, Northern Africa, respectively (Bongaarts, 2017). Some authors like Mukherjee and Das (2008) create dummies for each level of education, which varies from 0 - not literate until 5 - graduate and higher. However, the author has used data from the National Sample Survey Organization in India, but this kind of data is not available to all developing countries. For these reasons, parental education is represented by the indicator of mean years education of adults aged 20+. With this indicator, there is the following logic: the more a year of study, the higher the adult is educated. I expect that the adult learning years and the participation rate of children education will have a positive correlation and, therefore, will lead to the reduction of child labour.

Control variables

The next indicators are included:

- Trade openness: the most popular index in literature is calculated as the average of imports plus exports as a percentage of the GDP of a country. For this index, there is data available for the required years and countries, which gives it a significant advantage over others. The data is obtained from the open source of UNCTAD statistic. Neumayer and De Soysa (2004) wrote that this measure of openness to trade could be admitted imperfect for the reason that it includes both trade policy and natural openness to trade. In this study, like in research of Neumayer and De Soysa (2004), the differentiation on the determinants of the trade openness is not significant. What is relevant is the extent to which a country is open to trade and not the reasons behind it. Neumayer and Soysa (2004), Edmonds and Pavcnik (2006), Davies and Voy (2007) find a negative correlation between child labour and trade openness. Therefore, in my research, I expect to get a positive interaction between this indicator and the children's education participation rate.

  However, it is essential to control for the multicollinearity problem between FDI and trade indicators. The empirical research demonstrates that a 10% rise in the trade openness results in an 8.43% FDI and these findings validate for both the vertical and

horizontal FDI (Gray, 2014). The issue of finding multicollinearity and solving it is considered in the methodology part.

- GDP per capita: this index shows the gross domestic product per capita of a country, and it is extensively used in the literature (Neumayer and Soysa, 2004; Edmonds and Pavcnik, 2006; Doytch et al., 2013). Developing countries tend to have non-diversified economies that is one of the main criteria of the least developed countries where the income level is low. Consequently, GDP per capita represents the household income as it is one of the main reasons for the existence of child labour. However, it has also characteristics of the size and/or level of development of a country. Following the logic of the income effect, the higher the available amount of revenue in a family, the lower is child labour. Therefore, with an increase of this independent variable should increase the attendance of children in schools. All the data is used from the UNCTAD statistics resource.

  This variable is also needed to be controlled for the multicollinearity problem because as mentioned above, increasing FDI has an impact on household income, which in turn affects child labour. Moreover, for this reason, I expect this indicator to lower the significance of FDI.

- Agricultural activities: indicator is presented by the percentage of value added of the agriculture sector to GDP of a country. Agriculture includes hunting and fishing, forestry and cultivation of crops, livestock production. Data on this variable is retrieved from the World Bank. I assume that the larger the agricultural sector is, the more child labour is used; therefore, fewer children attend school.

  The indicator is not perfect. Among the problems is the degree of unregistered economic activity in the secondary or informal economy. A significant share of agricultural products is either consumed by households or not exchanged for money, and this is where children work hides most. For this reason, agricultural production often needs to be assessed indirectly using a different combination of methods. This approach sometimes leads to rough approximations, which may differ from the actual values.

- Urban population: this is the percentage of the number of people living in an area defined as “urban” per 100 population. Unicef (2012) defines an urban area as “

administrative criteria or political boundaries, a threshold population size, population density, economic function or the presence of urban characteristics such paved streets, electric lighting, sewerage" (Unicef, 2012, p. 11) However, more accurate characteristics, such as the number of population needed to become a city, are determined in each country separately. Because of this issue, cross-country comparisons should be made with more attention. It is estimated that in large cities, incidents of child labour are fewer, hence, with the growth of this indicator, child labour will decrease, increasing school attendance. Since agricultural activities are usually arranged outside the urban areas, this indicator may be correlated to the previous factor.

- Poverty: this indicator has not been taken into account in the literature before. However, as stated in the literature review by Maseland and de Vaal (2009) and within the theoretical framework part, there is a sustainable income line under which adults are forced to send their children to work no matter what. World Bank estimates the global poverty line set at 1,9$ per day using the prices of 2011 (World Bank, 2015). The data available on the World Bank website is very scanty and cannot be used. Therefore, I prefer to use the International Wealth Index (IWI) as a proxy to measure the economic situation of families. The advantages of this indicator that it covers all the developing world. It ranges from 0 (the percentage of households with no assets and low-quality housing) to 100 (the percentage of households with all assets and top-quality housing). Smits and Steendijk (2015) demonstrate that the line of 50 percentiles strongly correlates with the World Bank poverty global line. Hence, in my research, I use IWI 50 in order to demonstrate the population of a county living below a poverty line. It is expected that with an increase in the population of living in poverty, the use of child labour is increasing and school attendance is declining.

  The indicator may have a multicollinearity problem. Firstly, near 84% of all poor are living in rural areas (Alkire et al., 2014). Secondly, poverty is closely related to the income represented by GDP per capita. The lower the GDP is, the higher the proportion of the population living in poverty.

Even if all used countries in the sample belong to a developing type, there are still significant variations between them as it is shown in the summary statistics presented in Table 1. This fact is not unexpected since the majority of countries belonging to this type and they are

highly heterogeneous. For instance, the first dependent variable, primary school rate enrolment, varies from 35.19% to 99.9%, indicating a substantial difference among countries. An even greater difference in attendance is observed in the second dependent variable from 7.22% to 99.44%. Comparable situations occur for parental education, stock of FDI, GDP per capita, trade openness, agriculture and urbanization indexes and percentage of poor population, indicating a diverse range of values among the countries. In addition, after checking all variable on density in graphs, GDP per capita, FDI stock and the indicator of trade openness showed a concentration on the left side of the diagram. To improve the sample for the analysis, these three variables were transformed with the logarithm. The graphs before and after transformation are presented in Appendix B.

Table 1: Summary Statistics

	Mean	Std. Dev.	Min	Max
CE1 (% of official school age population)	86.82608	12.36178	35.18651	99.9103
CE2(% of official school age population)	59.38853	23.27044	7.225051	99.43953
PE (years)	6.959007	2.715602	.98	13.5
FDIs (millions of dollars)	31556.11	80628.86	1.32311	731175
GDP (dollars)	4166.013	5672.866	165.9048	55566.13
Trade (% of GDP)	78.24112	35.28657	14.14936	270.6227
Agri (% of GDP)	16.46025	12.54667	.1600202	65.59815
Urb (% of population)	49.47482	20.3628	9.617	100
Poor (scale 0 to 100)	39.34183	32.95473	.01	97.8
N	845			

CE1: net primary school enrolment rate; CE2: net secondary school enrolment rate; PE: mean years education of adults aged 20+; FDIs: foreign direct investment stock; GDP: gross domestic product per capita; Trade: index of trade openness; Agri: agriculture index; Urb: urbanization index; Poor: International Wealth Index

As it is mentioned above, the data is presented for 99 countries and 11 years, which provides the maximum number of observations equal to 1089. However, due to the lack of data in variables, the maximum number of observations is 845, which is represented as N in Table 1.

These gaps are presented mostly in variables of child school enrolment rate because not all countries maintain these statistics for different reasons.

In order to look at the combined impact of FDI and adult education, the interaction term is involved. If a model contains a term for the interaction between two variables, the coefficients of the main effects of these variables represent their value for the situation in which the other variable has value zero. In order to make it more comparable to each other before entering the interaction, both variables must be centred. It means that their means are set to zero.

Finally, in Appendix D, correlation matrixes of the variables are presented. A careful check of both matrixes for both models with different dependent variables indicates some cases of correlation. Firstly, the correlations between explanatory variables and the first dependent variable (primary school enrolment rate) are significant for all of them except the trade. However, for another model with secondary school enrolment rate, all of the independent variables are highly significant. For example, parental education has correlation values for primary child education rate equals to 0.58 and for secondary child education rate equals to 0.87. These correlations suggest that the independent variables will be able to explain the participation of school by children.

Between some independent variables, there is also correlation. The highest negative value, in this case, belongs to the relation between poor population and parental education that proves the statement that, with better education, parents have a higher income. As it was expected, the relationship between the independent variables is a sign that there is a multicollinearity problem in the model that needs to be solved.

4.3 Methodology

In this research, a panel data method of analysis is used. Hsiao (2007) describes some advantages of this type of method over other models. Firstly, panel data includes two dimensions: a cross-sectional and time series dimensions. Consequently, it can demonstrate the difference between countries and allow studying dynamic relationships during the time. Even if this seems complicated, due to the availability of a large amount of data, some problems inherent in other methods disappear. The second advantage of panel data over cross-sectional data is that it provides more degrees of freedom and more sampling variations, “increasing the efficiency of econometric estimates” (Hsiao, 2007, p.3). Lastly, this method has a higher capacity for controlling the impact of omitted variables.

Panel data can be two types: balanced or unbalanced. In order to distinguish which type a dataset is, observations must be made both in cross section and in time series. A balanced panel data is when the number of observations in a time series is the same for each unit of the cross-section. In case when the numbers differ, the data is not balanced (Park, 2011). In this study, the dataset is considered to be unbalanced since there are missing data points in the time series. For research, strongly balanced data are preferable, but in this case, Stata can still do an unbalanced date analysis (Williams, 2018).

In panel data, there is a possibility to have a specific individual effect per country. These effects can be either fixed or random. Fixed effect examines the relationship between predictor and outcome variables within a country. Each country has its specific characteristics that might or might not affect the predictor variables. Fixed effect approach assumes that some characteristics may impact or bias the predictor or outcome variables and this is needed to be controlled by removing the effect of those time-invariant characteristics. Consequently, there is the net effect of the predictors on the outcome variable. Moreover, another assumption of the fixed effect is that time-invariant characteristics are unique to each country and must not be correlated with other individual characteristics (Hsiao, 2007).

In the random effects model, the variation across countries is expected to be random and uncorrelated with the predictor or independent variables included in the model. The advantage of random effect is that it allows parameters to stay constant with the expanding sample, so this "allows derivation of efficient estimators that make use of both within and between (group) variation" and "allows the estimation of the impact of time-invariant variables" (Hsiao, 2007, p.11). On the other hand, it consists of the disadvantage that, when effects are related, or there is a difference among entities, the resulting estimator is biased (Hsiao, 2007).

For the identification of fixed effects, F-test should be applied, while for random effects, the Lagrange multiplier test should be used. If in any of the tests, the null hypothesis is not rejected, the pooled OLS regression is preferable. Most researchers use the Hausman specification test that compares the random effect model with the fixed. If the null hypothesis that individual effects are not related to other regressors is not rejected, the random effects model is preferable to its fixed counterpart (Park, 2011). Since I have two indicators of child labour (primary and secondary school enrolment rate), two Hausman tests are provided which results are presented in Appendix E. As it is possible to visualize, in both models, the null hypothesis of random effects model is rejected ($p<0.05$) in favour of a fixed-effects model.

The opportunity of having a problem of multicollinearity repeatedly arises in the analysis of statistical data. If this issue exists in this model, it can lead to serious problems in interpreting the results. Multicollinearity can increase the variance of the coefficient estimates and make the estimates very sensitive to minor changes in the model. In order to detect this problem, the VIF test is performed. In case if VIF is more than five, this variable has a multicollinearity issue. The results of this test for this research can be found in Appendix F.

For the first model with primary school enrolment rate, such indicators as GDP per capita and the poverty of population are close to five levels but do not exceed this threshold. However, in the second case with the secondary school enrolment rate, GDP per capita exceeds the limit of five, referring to the multicollinearity of indicator. Moreover, the variable of population poverty with value 4.99 is also considered as indicator creating such issue.

The solution to this problem may be deleting the variables that have multicollinearity. However, Yu et. al. (2015) find evidence that "all the estimators of fixed effects coefficients are almost unbiased as no matter what magnitude of multicollinearity is present" (p.129). Since there is a fixed effect in this study, multicollinearity does not have a significant impact on the research results and deleting a variable is not needed. In order to be more confident in this and to demonstrate that results are not changing, in robust check, two independent variables (GDP per capita and the level of poverty) are removed.

As it is shown above, there is a high variance in the statistics among the countries. For this reason, the next step for this type of data, some critical issues such as heteroskedasticity and autocorrelation should be taken into account. Regression of OLS model is applicable when statistics are homoscedastic and without autocorrelation. Firstly, to satisfy the regression assumption of homoscedasticity and be able to trust the results, the residuals should have a constant variance. In order to control for these, some diagnostic tests should be performed. The presence of heteroskedasticity is examined by a modified Wald test for groupwise heteroskedasticity. This test is a simple way to identify heteroskedasticity and studies the null hypothesis of homoscedasticity.

The second issue is autocorrelation that tends to be present in larger panels which generally have over 20 - 30 years. Autocorrelation occurs when the error term observations in regression are correlated. It is checked for as a preventive measure since it can cause the estimates of the regression coefficients to be consistent but less efficient, and may create an underestimation of the standard errors rendering hypothesis testing no longer valid.

(Wooldridge, 2000). In order to perform this, a Wooldridge test for autocorrelation in panel data should be applied, which examines the null hypothesis of no serial correlation (first order autocorrelation) (Hoechle, 2007).

Both tests for heteroskedasticity and autocorrelation can be found in Appendix G. In both models of primary and secondary school enrollment rate, it is confirmed the presence of heteroskedasticity and autocorrelation. There are several solutions. First, it is possible to use feasible generalized least squares (GLS). However, this model is used in the case when the panel's time dimension T is smaller than its cross-sectional dimension N that is more applicable for microeconomics studies. In this case, a "robust" option to receive heteroskedasticity-robust standard errors is added to solve the heteroskedasticity issue. In the case of autocorrelation, it is necessary to cluster the sample, which groups the standard errors by country, and then solves the problems of autocorrelation.

In the end, robustness checks are conducted to guarantee that other options are considered. Firstly, as it is said already, in order to confirm non-significance of multicollinearity problem, GDP per capita and the index of poverty is removed from the model. The second one is merely changing FDI stocks by the inflow of FDI. FDI stocks represent the overall presence of FDI in the country, and it is less volatile, while some authors use FDI inflows that represent the impact of new investments in the country. Moreover, it is essential to understand how the impact of FDI on child labour is mitigated in different ways by parental education by both the measure of the presence of FDI in the country and new investments in it. Thirdly, the stock of FDI is lagged for one and five years, as it is believed that the influence of FDI does not begin immediately but after a certain amount of time. Lastly, the population under the poverty line represented by the IWI 50 is changed with IWI 35 and IWI 70. This will show the difference between people living in even poorer conditions (IWI 35) and people living in less poor (IWI 70).

5. Empirical research

5.1. Primary school enrolment rate as a proxy of child labour

Having resolved the problems of heteroskedasticity and autocorrelation, it is possible to proceed with the statistical analysis. The first main research is to exam a model with the primary school enrolment rate as the dependent variable. In Table 2, six different results are presented. Model (1) CE1 is the version of the basic model, which includes the key independent variable, the interaction term and the elements of this interaction: FDI stock and parental education. The following models describe the same correlation, but with gradually added control variables, better demonstrating the impact of each of them.

In the first base model, all independent variables appear to be highly significant. Parent education has a positive sign and does not lose its significance in all six models. This means that the higher the parents' education is, the higher is the enrolment at primary schools and, consequently, the lower the level of child labour. At the same time, the t value of parental education increased from model 1 to 6, expressing the growing importance of this indicator. The result confirms the first hypothesis.

FDI stock is also positive and significant in all models. However, the level of significance is fluctuating, such as in the second model, FDI drops in the level of significance with the addition of GDP per capita. This may be due to the fact that FDI stock and GDP per capita are interrelated, and GDP has taken on specific explanatory characteristics. Overall, the significance of FDI confirms the income effect and the hypothesis 2 that with an increase in this variable, the rate of children attending primary school is growing, which reduces the number of working children.

Lastly, in all models, the interaction term has a highly significant negative sign of dependence of parental education and FDI stock on the dependent variable. Even if with including trade indicators, the significance of the interaction term is slightly reduced. This negative sign proves the hypothesis 3, confirming that the effect of FDI is more significant for less educated parents.

The first control variable added to the model was GDP per capita that has a positive sign, saying that it increases school attendance. The results can be explained by the fact that with the income increase parents can overcome the economic obstacles and send their children to

school. With the introduction of this indicator, the importance of parental education and FDI stock has decreased since the family income took on some analytical effect, but this indicator is not significant. It explains the low explanatory power of this indicator for child participation in primary school.

Table 2: Estimation results using the first school enrolment rate as representative of child labour

	(1) CE1	(2) CE1	(3) CE1	(4) CE1	(5) CE1	(6) CE1
PE	2.126***	2.016**	2.023***	2.124***	2.486***	2.780***
	(3.55)	(3.23)	(3.46)	(3.64)	(3.92)	(4.52)
lFDIs	1.954***	1.452*	1.638**	1.527**	1.806***	2.156***
	(3.80)	(2.32)	(3.17)	(3.02)	(3.46)	(3.74)
FDIPE	-0.373***	-0.403***	-0.347**	-0.324**	-0.338**	-0.339**
	(-3.60)	(-3.69)	(-3.17)	(-2.99)	(-3.26)	(-3.29)
lGDP		1.836	1.470	0.926	1.206	1.609
		(1.33)	(1.25)	(0.75)	(0.95)	(1.26)
lTrade			2.632*	2.913*	2.874*	3.052*
			(2.07)	(2.27)	(2.21)	(2.29)
Agri				-0.116	-0.101	-0.0929
				(-1.01)	(-0.90)	(-0.80)
Urb					-0.243	-0.118
					(-1.19)	(-0.62)
Poor						0.115*
						(2.08)
cons	55.39***	46.32***	36.13***	41.38***	46.53***	26.93
	(11.75)	(5.45)	(3.56)	(3.75)	(4.03)	(1.82)
R-squared	0.3098	0.3405	0.3362	0.3627	0.3189	0.2674
N	845	845	844	836	836	826

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

CE1: net primary school enrolment rate; PE: mean years education of adults aged 20+; lFDIs: natural logarithm of foreign direct investment stock; FDIPE: interaction term between natural logarithm of foreign direct investment stock and mean years education of adults; lGDP: natural logarithm of gross domestic product per capita; lTrade: natural logarithm of index of trade openness; Agri: agriculture index; Urb: urbanization index; Poor: International Wealth Index with 50 value

The next indicator added to the model is the indicator of trade openness. As it was expected, it has a significant positive sign that demonstrates the trend to reduce child labour. Consequently, the more open for trade a country is, the higher the enrolment of primary

schools. Moreover, with the introduction of this variable, the significance of the interaction term is falling, but the significance of parental education and FDI stock increasing.

Both agriculture and urbanization indexes have a negative sign. In the case of agriculture, this was expected as it was demonstrated in the studies of Neumayer and Soysa (2004) or Edmonds and Pavcnik (2006). Result confirms that a higher percentage of agriculture leads to a decrease in enrolment and an increase in child labour. However, urbanization index usually has a positive sign in the literature, reducing child labour. Nevertheless, both indexes are not significant.

The poverty indicator is the last added variable to the model. Contrary to expectations, this index has a significant positive influence on the primary school enrolment rate. It means that with the increase in the poor population, the number of pupils in primary schools is growing.

The unpredictability of signs of indexes of urbanization and poor population and the insignificance of GDP per capita can also be related to the fact of the high correlation between independent variables. This issue is discussed above and demonstrated in the correlation matrix in Appendix D, even if for the fixed-effect model, this should not have a statistical effect. The same problem can also influence in main variables.

5.2. Secondary school enrolment rate as a proxy of child labour

The next model includes the dependent variable with the enrolment rate for secondary school. As in the previous case, in Table 3, six different models are presented with Model (1) CE2 as the version of the based model. The following models describe the same correlation with gradually added control variables. The results of this study are demonstrated in Table 3.

In the base model, the level of education of parents has a positive sign meaning that it increases the enrolment of the secondary school and reduces child labour. This confirms hypothesis 1. However, the level of significance is low, and with the advent of new explanatory variables, t value is reducing. In the point when the index of urbanization is used, parental education loses the significance.

The second important variable is the level of stock of FDI, which, as in the first case, has a positive effect on secondary school education. In the base model, this variable shows high significance confirming the second hypothesis and prevailing of the income effect. However,

as with parental education, with the addition of other explanatory variables, the significance of this variable decreases and disappears in the last model.

Table 3: Estimation results using the secondary school enrolment rate as representative of child labour

	(1) CE2	(2) CE2	(3) CE2	(4) CE2	(5) CE2	(6) CE2
PE	3.275*	2.769*	2.775*	2.739*	1.593	1.097
	(2.58)	(2.56)	(2.56)	(2.57)	(1.61)	(1.14)
lFDIs	4.256***	2.365**	2.587**	2.613**	1.537*	1.297
	(5.46)	(2.98)	(3.36)	(3.40)	(2.16)	(1.90)
FDIPE	-0.368	-0.446**	-0.421**	-0.425**	-0.386**	-0.404**
	(-1.95)	(-3.01)	(-2.77)	(-2.82)	(-3.07)	(-3.11)
lGDP		7.893**	7.230**	7.733**	5.357*	4.207*
		(3.27)	(3.27)	(3.33)	(2.56)	(2.08)
lTrade			1.264	1.526	1.311	1.353
			(0.60)	(0.70)	(0.67)	(0.72)
Agri				0.124	0.0158	0.0198
				(0.84)	(0.13)	(0.17)
Urb					1.118***	0.860**
					(3.62)	(2.69)
Poor						-0.218*
						(-2.45)
cons	-0.853	-42.36**	-44.53**	-51.40*	-70.04***	-34.98
	(-0.10)	(-2.72)	(-2.76)	(-2.47)	(-3.45)	(-1.62)
R-squered	0.6229	0.7318	0.7285	0.7239	0.5469	0.6276
N	555	555	554	550	550	543

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

CE2: net secondary school enrolment rate; PE: mean years education of adults aged 20+; lFDIs: natural logarithm of foreign direct investment stock; FDIPE: interaction term between natural logarithm of foreign direct investment stock and mean years education of adults; lGDP: natural logarithm of gross domestic product per capita; lTrade: natural logarithm of index of trade openness; Agri: agriculture index; Urb: urbanization index; Poor: International Wealth Index with 50 value

The last independent variable in the base model is the interaction term. In this case, as well as with primary education, since the coefficients in all models are negative, the interaction of FDI and parental education is more significant for less educated parents that leads to confirmation of hypothesis 3. It should be noted that when a separate effect of FDI and parental education lose importance, on the contrary, in the case of the interaction, its t value is increasing and variable becomes significant. Consequently, the interrelationship of these

variables better explains the secondary school enrolment rate and, therefore, child labour.

The first control variable added to the model is the level of GDP per capita representing the income of the family. Compared to the results from the enrolment of the primary education, this variable is significant in all analysis as it was expected after the literature review. It proves that with a higher income in the family, the secondary school enrolment rate is also greater, that leads to a decrease of child labour. This variable reduces the significance value of the FDI stock indicator since they are interlinked.

As shown in Table 3, the trade index is positive with a small value of coefficients. Consequently, with an increase in the openness of the economy, the dependent variable also slightly grows. However, compared to the previous model with another dependent variable, trade index is not significant in any studied model.

An unexpected result was for the index of agriculture. If in model with primary school enrolment rate, it has a promoting effect on child labour, then, in this case, it has a negative by increasing the secondary school enrolment rate. Nevertheless, the index of agriculture is not significant.

Both of the last control variables, added to the model, were predicted by the literature. First, the urbanization index is positive and highly significant. Consequently, the second school enrolment rate is higher in the urban population than in the settlements more distant from the city. As already mentioned, with the introduction of this variable, parental education loses its significance. Secondly, the index of the percentage of poor people proves that with the increase in population living below two dollars per day line, the secondary school enrolment rate decrease. In the model with this indicator, FDI is no longer significant.

In general, the effects of parental education and FDI on the school enrolment rate are positive in both cases. Their interaction demonstrates the importance of FDI effect on families with less educated parents. However, both models differ at the level of significance of these variables. Therefore, it can be assumed that these variables have different degrees of influence on different levels of education, and, hence, on different children’s age.

5.3 Robustness checks

In order to verify the validity of the study, additional robustness checks are implemented. Table 4 presents additional tests for the model with the primary school enrolment rate. The (1) CE1 is the original test model.

The first carried out test is to confirm the assertion that the multicollinearity problem does not influence the results of the study. For this purpose, two variables, which showed a VIF test greater than five, are removed from the last model: GDP per capita and percentage of the population living below the sustainable level. The results of the check are shown in (2) CE1 of Table 4. As it can be seen, the coefficients of the variables slightly decrease, except for the interaction term, whose coefficient increase. However, the signs of the variables and their significance have not changed, and, therefore, the direction of the effect. Consequently, multicollinearity does not have a significant statistical impact on the research results, but it can affect interpretation regarding some of the correlated independent variables.

The next robustness check is the replacement of the poverty indicator with International Wealth Index of 35 and 70 values instead of 50 in the main model. The models (3) CE1 and (4) CE1 of Table 4 demonstrate that IWI35 and IWI 70 are positive as in the main model. However, they are not as significant as IWI 50. This means that, in this case, only IWI 50 is significant because it is better represents the number of household assets needed to send a child to school and not to work.

The last robustness check in this table consists of replacing the independent variable FDI stock with FDI flows. It is a more volatile indicator, but it shows clearly the impact of the arriving FDI in the country rather than its accumulation. Before introducing FDI flows, this variable was also checked graphically for the density. As shown in Appendix H, FDI flows do not have a normal distribution, and, therefore, it is needed to be logarithm. Moreover, the interaction term should be replaced by a new interaction that includes FDI flows and parental education.

The model (5) CE1 of Table 4 shows the results of this check. When replacing FDI stock by FDI flows, the coefficient remains positive. New interaction term also does not change its sign and remains negative. Nevertheless, both new indicators are not significant. This suggests that the stock of FDI has a better explanatory power on first school enrolment rate and, consequently, child labour.

Table 4: Check of results for the primary school enrolment rate

	(1) CE1	(2) CE1	(3) CE1	(4) CE1	(5) CE1
PE	2.780***	2.512***	2.822***	3.078***	2.625**
	(4.52)	(4.02)	(4.52)	(4.45)	(3.34)
lFDIs	2.156***	2.069***	2.253***	2.322***	
	(3.74)	(4.02)	(3.64)	(3.51)	
FDIPE	-0.339**	-0.321**	-0.393**	-0.258*	
	(-3.29)	(-3.19)	(-3.31)	(-2.07)	
lGDP	1.609		0.946	0.813	2.655
	(1.26)		(0.64)	(0.56)	(1.91)
lTrade	3.052*	2.666*	2.584	2.328	4.773**
	(2.29)	(2.07)	(1.91)	(1.78)	(3.39)
Agri	-0.0929	-0.124	-0.0716	-0.0759	-0.0929
	(-0.80)	(-1.14)	(-0.64)	(-0.67)	(-0.81)
Urb	-0.118	-0.215	-0.127	-0.197	0.0224
	(-0.62)	(-1.10)	(-0.67)	(-0.95)	(0.11)
Poor	0.115*				0.0409
	(2.08)				(0.74)
IWI35			0.0977		
			(1.31)		
IWI70				0.0976	
				(1.80)	
lFDIf					0.489
					(1.32)
FDIPEf					-0.173
					(-1.78)
cons	26.93	53.23***	34.83*	35.06*	23.18
	(1.82)	(5.78)	(2.24)	(2.23)	(1.52)
R-squered	0.2674	0.3085	0.2689	0.2511	0.3486
N	826	836	786	794	795

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

CE1: net primary school enrolment rate; PE: mean years education of adults aged 20+; lFDIs: natural logarithm of foreign direct investment stock; FDIPE: interaction term between natural logarithm of foreign direct investment stock and mean years education of adults; lGDP: natural logarithm of gross domestic product per capita; lTrade: natural logarithm of index of trade openness; Agri: agriculture index; Urb: urbanization index; Poor: International Wealth Index with 50 value; IWI35: International wealth index with 35 value of extra poor; IWI70: International Wealth index with 70 value for less poor population; lFDIf: natural logarithm of foreign direct investment flows; FDIPEf: interaction term between natural logarithm of foreign direct investment flows and mean years education of adults.

The same following checks are made for the model with the second school enrolment rate as a proxy of child labour. As in the previous case, the (1) CE2 of Table 5 is the original test model.

The check of multicollinearity shows some differences between the main model and checked model (2) CE2. Firstly, FDI became more significant. However, this can be explained by the fact that with the deletion of GDP and indicator of poverty of the population, FDI has taken on the explanatory effect. In addition, the index of agriculture has changed its sign. However, this indicator in both cases is not significant, which indicates its weak explanatory ability. Nevertheless, as in the case with the primary school enrolment rate, the signs of the variables and has not changed, and, therefore, multicollinearity does not have a significant statistical impact.

Considering the replacement of IWI 50 with IWI 35 and IWI 70 in models (3) CE2 and (4) CE2 of Table 5, it can be said that all indices have the same negative signs. However, only IWI 50 and IWI 70 are significant. This means that it is enough to have the necessary minimum and more of household assets for the family to send the child to secondary school and not to work.

In the model (5) CE2, FDI flows changes its sign to a negative one, which indicates the predominance of the substitution effect. This is the opposite to result with FDI stock. However, like the stock, the flow is not significant, referring to the weak explanatory power of this variable on the second school enrolment rate. The effect of the interaction term remains the same with a slight increase of coefficient and t value.

Table 5: Check of results for the second school enrolment rate

	(1) CE2	(2) CE2	(3) CE2	(4) CE2	(5) CE2
PE	1.097	1.698	1.488	0.894	0.972
	(1.14)	(1.57)	(1.60)	(1.11)	(0.92)
lFDIs	1.297	2.299***	1.620	1.324	
	(1.90)	(3.46)	(1.96)	(1.35)	
FDIPE	-0.404**	-0.336*	-0.270	-0.506**	
	(-3.11)	(-2.54)	(-1.76)	(-2.83)	
lGDP	4.207*		4.116	4.297	5.692**
	(2.08)		(1.65)	(1.90)	(2.72)
lTrade	1.353	0.376	0.863	1.178	3.554
	(0.72)	(0.19)	(0.47)	(0.66)	(1.68)
Agri	0.0198	-0.164	-0.0210	0.00782	-0.0585
	(0.17)	(-1.54)	(-0.18)	(0.06)	(-0.39)
Urb	0.860**	1.335***	0.934**	1.051**	1.055**
	(2.69)	(4.10)	(2.82)	(3.21)	(2.91)
Poor	-0.218*				-0.241*
	(-2.45)				(-2.44)
IWI35			-0.148		
			(-1.84)		
IWI70				-0.194*	
				(-2.03)	
lFDIf					-0.514
					(-1.87)
FDIPEf					-0.248**
					(-3.12)
cons	-34.98	-40.10*	-43.92	-38.75	-37.89
	(-1.62)	(-2.25)	(-1.72)	(-1.61)	(-1.61)
R-squered	0.6276	0.5086	0.6083	0.5722	0.6261
N	543	550	512	520	530

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

CE2: net secondary school enrolment rate; PE: mean years education of adults aged 20+; lFDIs: natural logarithm of foreign direct investment stock; FDIPE: interaction term between natural logarithm of foreign direct investment stock and mean years education of adults; lGDP: natural logarithm of gross domestic product per capita; lTrade: natural logarithm of index of trade openness; Agri: agriculture index; Urb: urbanization index; Poor: International Wealth Index with 50 value; IWI35: International wealth index with 35 value of extra poor; IWI70: International Wealth index with 70 value for less poor population; lFDIf: natural logarithm of foreign direct investment flows; FDIPEf: interaction term between natural logarithm of foreign direct investment flows and mean years education of adults.

Since some authors believe that the FDI effect begins with time, the next two checks include lag of FDI stocks for one, two, three, four and five years. Besides, for all these variables, new interaction terms are used that also includes the lags of FDI.

The first step is to consider the results of such check for model with primary school enrolment rate that are presented in the Table 6. FDI with a lag of one year change its sign to negative, and the interaction term's sign changes to positive. However, both indicators are not significant. The low significance of the interaction term comes to FDI lagged for two years. From the third year onward, FDI and interaction term are highly significant, but with the exact opposite effect that in the main model.

The difference in signs can be explained as follows. The immediate effect of FDI is positive due to various reasons, such as capital inflows or increased demand. Consequently, the income effect prevails that affects more on families with less educated parents. However, after three years, the FDI effect is changing, and the substitution effect, which has a greater influence on families with more educated parents, begins to prevail.

The next step is to analyze the results of model with secondary school enrolment rate that are presented in the Table 7. In this case, FDI stock was not significant in the main model. Only after four years lagged FDI is negatively significant. It means that the substitution effect of FDI prevails for children's age of the secondary school.

However, the significance of interaction term just in main model says that immediate effect of FDI, as in the previous case, is more important for families with less educated parents. In other cases, this indicator is not significant.

Table 6: Check of results for the first school enrolment rate with FDI lag

	(1) CE1	(2) CE1	(3) CE1	(4) CE1	(5) CE1	(6) CE1
PE	2.780***	2.500**	2.498***	2.584***	2.552***	2.475***
	(4.52)	(3.39)	(3.42)	(3.67)	(3.68)	(3.59)
lFDIs	2.156***					
	(3.74)					
FDIPE	-0.339**					
	(-3.29)					
lGDP	1.609	2.834*	2.452	2.658*	2.638*	2.855*
	(1.26)	(2.11)	(1.82)	(2.05)	(2.06)	(2.25)
lTrade	3.052*	4.854***	4.531**	4.198**	3.777**	3.850**
	(2.29)	(3.49)	(3.24)	(3.07)	(2.65)	(2.77)
Agri	-0.0929	-0.155	-0.187	-0.169	-0.167	-0.151
	(-0.80)	(-1.32)	(-1.55)	(-1.54)	(-1.55)	(-1.42)
Urb	-0.118	0.147	0.131	0.0760	0.0342	0.0148
	(-0.62)	(0.77)	(0.70)	(0.41)	(0.18)	(0.08)
Poor	0.115*	0.0472	0.0371	0.0441	0.0448	0.0451
	(2.08)	(0.83)	(0.66)	(0.80)	(0.81)	(0.82)
FDIslag1		-0.0111				
		(-0.05)				
FDIPE1		0.0693				
		(0.89)				
FDIslag2			-0.252			
			(-1.55)			
FDIPE2			0.126*			
			(2.48)			
FDIslag3				-0.406**		
				(-2.85)		
FDIPE3				0.132***		
				(3.40)		
FDIslag4					-0.405**	
					(-2.74)	
FDIPE4					0.141**	
					(3.09)	
FDIslag5						-0.344**
						(-2.77)
FDIPE5						0.138***
						(3.40)
cons	26.93	19.52	27.61	30.45	34.72*	33.49*
	(1.82)	(1.22)	(1.63)	(1.83)	(2.02)	(2.04)
R-squered	0.2674	0.3284	0.3394	0.3472	0.3559	0.3577
N	826	825	824	823	822	821

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Check of results for the second school enrolment rate with FDI lag

	(1) CE2	(2) CE2	(3) CE2	(4) CE2	(5) CE2	(6) CE2
PE	1.097	1.027	1.055	1.203	1.225	1.211
	(1.14)	(0.99)	(1.00)	(1.14)	(1.19)	(1.21)
lFDIs	1.297					
	(1.90)					
FDIPE	-0.404**					
	(-3.11)					
lGDP	4.207*	5.317**	5.103*	4.996*	4.636*	4.538*
	(2.08)	(2.72)	(2.56)	(2.53)	(2.36)	(2.38)
lTrade	1.353	2.530	2.598	2.169	1.641	1.512
	(0.72)	(1.29)	(1.25)	(1.06)	(0.76)	(0.70)
Agri	0.0198	-0.0610	-0.0705	-0.0640	-0.0701	-0.0714
	(0.17)	(-0.39)	(-0.42)	(-0.40)	(-0.45)	(-0.48)
Urb	0.860**	1.122**	1.145**	1.141**	1.114**	1.084**
	(2.69)	(2.95)	(2.98)	(3.10)	(3.19)	(3.25)
Poor	-0.218*	-0.217*	-0.219*	-0.209*	-0.206*	-0.200*
	(-2.45)	(-2.13)	(-2.14)	(-2.12)	(-2.21)	(-2.23)
FDIslag1		0.0405				
		(0.17)				
FDIPE1		-0.124				
		(-1.69)				
FDIslag2			-0.165			
			(-0.76)			
FDIPE2			-0.0346			
			(-0.55)			
FDIslag3				-0.385		
				(-1.87)		
FDIPE3				-0.00452		
				(-0.07)		
FDIslag4					-0.468*	
					(-2.17)	
FDIPE4					0.0323	
					(0.45)	
FDIslag5						-0.506*
						(-2.38)
FDIPE5						0.0532
						(0.70)
cons	-34.98	-50.30*	-48.54	-45.36	-38.45	-35.35
	(-1.62)	(-2.08)	(-1.91)	(-1.85)	(-1.64)	(-1.58)
R-squered	0.6276	0.6024	0.6003	0.6010	0.6024	0.6038
N	543	543	543	543	543	543

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6. Conclusions

This paper analyses how the level of parental education moderates the effect of FDI on child labour in developing countries. The first step of this research was a study of literary sources. Most of the literature finds that FDI and trade do not increase the use of child labour on the country level. However, empirical evidence shows that this relationship is different at the industry level. Nevertheless, the authors used data from the 1990s, which at the moment may seem outdated information. Moreover, the literature shows that the major decision to send a child to work or school belongs to the parent that weighs the current and future benefits and considers child interests. At the same time, more educated parents prefer school to work more as they better understand the importance of education. The main reason for sending a child to work is insufficient income for the survival of a family, but many other factors can also affect this decision.

Three main hypotheses were examined. Firstly, a higher parent education leads to a reduction in the use of child labour. One of the reasons is that more educated people tend to gain a higher income. Secondly, the effect of FDI on child labour has not yet been proven. There are two main theories. The income effect reduces child labour through the increase of income in a country. The substitution effect, on the contrary, increases the number of working children due to the growth of demand for cheap labour. For my hypotheses, I took the income effects. The last hypothesis was that the effect of FDI has a higher impact on child labour for families with less educated parents.

These hypotheses were derived from an analysis of the model of Kaushik Basu and Pham Hoang Van (1998) and Maseland and de Vaal (2011). They show the interaction of the child and adult labour in the market and how adults make decisions to send the children to school and not to work based on their income. Based on this model analysis, I tried to suggest how the combined influence of FDI and parental education can affect child labour. This study employed a panel data analysis, specifically a fixed effect model, which included a sample of 99 developing countries for a period from 2006 to 2016 and which use more updated data.

Summarizing all the results, the following was found in this study. As expected, parental education has a positive effect on enrolment rate of both secondary and primary schools. Consequently, in this study, the results showed that the more educated parents tend to send their children to a school, which reduces child labour.

However, the results of the analysis of FDI demonstrate the complexity of this process. The immediate separate effect of FDI is positively significant. This proves the idea of the income effect. Hence, incoming FDI brings capital to a country that indirectly increases the school enrolment rate by increasing the wages of the parents. However, for a more extended period, such as three, four and five years, FDI has a negative sign that supports the prevail of substitution effect which increases the number of working children by increasing the rate of return on cheap labour.

Analysis of the interaction term also demonstrates variance. The immediate effect of the interaction term proves the importance of FDI effect on families with less educated people confirmed by the negative sign. Consequently, this interaction proves that FDI increases incomes for less-educated parents, whose children stop to work and start to spend more time on education. However, after four and five years, the effect is becoming more important for families with more educated parents.

The results of this study should be considered in light of several limitations. Firstly, the sample is not considering all developing countries due to the missing data. Based on the United Nations Statistics Division (2018), in the world, there are 139 developing countries. Ninety-nine of them are used in this analysis that is just 71%. Other 40 countries can influence the results of this research. Moreover, since statistics on child labour is very scarce, researchers have to approach alternative uses such as school enrolment rate. This is not a real indicator of child labour, as some children can work and study at the same time. Besides, the school enrolment rate does not prove the physical attendance of school by children. It shows that children must attend school by documents, but this may be different in real life.

Secondly, this study is implemented on an aggregate level. However, child labour is most often used in the agricultural sector, and FDI is aimed at the development of manufacture. Consequently, studying the effect of parental education and FDI at the industry level might better explain the results.

Thirdly, just major control variables were used in the study. Many other factors affecting child labour can be considered in future researches. For example, restricting child labour and increasing school enrolment rate is the main goal of many international non-governmental organizations as UNICEF that has the goal of the millennium: to achieve universal primary education, which makes this level of education more accessible (UNICEF, 2004).

In addition, this work is not looking for an answer to the question of who has more influence: FDI on child labour or vice versa. As stated in literature review, countries can use cheaper child labour to attract international companies by low-cost production. This reverse causality issue may affect the results of this research.

Moreover, this study assumes that more educated parents have altruistic behaviour. However, even adults with higher education could behave more selfishly since their desires might be higher than those of less educated. Few studies are made on the selfish behaviour of parents. A more detailed study of both behaviours and the difference in their effects on child labour can change the interpretation of the results of this study.

Lastly, the advantage of this research is that it shows the different results for various categories of children: age of primary education – from 5 to 11 years and age of secondary education – from 11 to 16 years old. This is especially noticeable on the difference in the effects of agriculture and urbanization indexes and the level of poor population in a country. However, a more in-depth investigation of the reasons for this difference will also help to interpret these results better.

7. Appendix

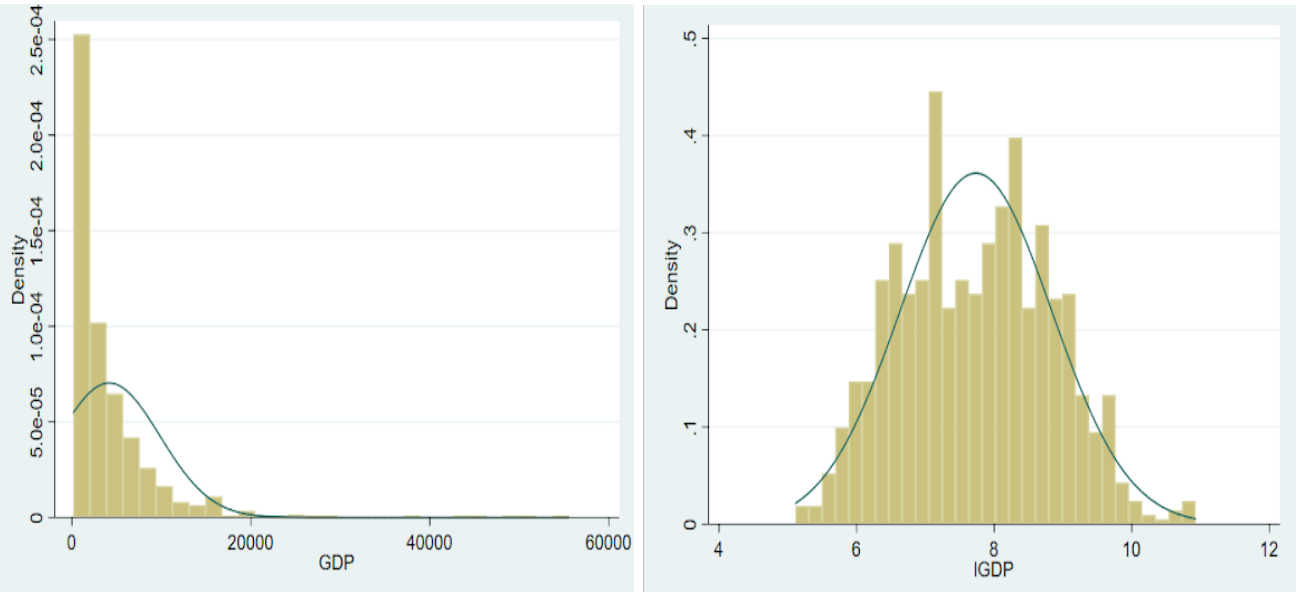
Appendix A

The sample of countries for research

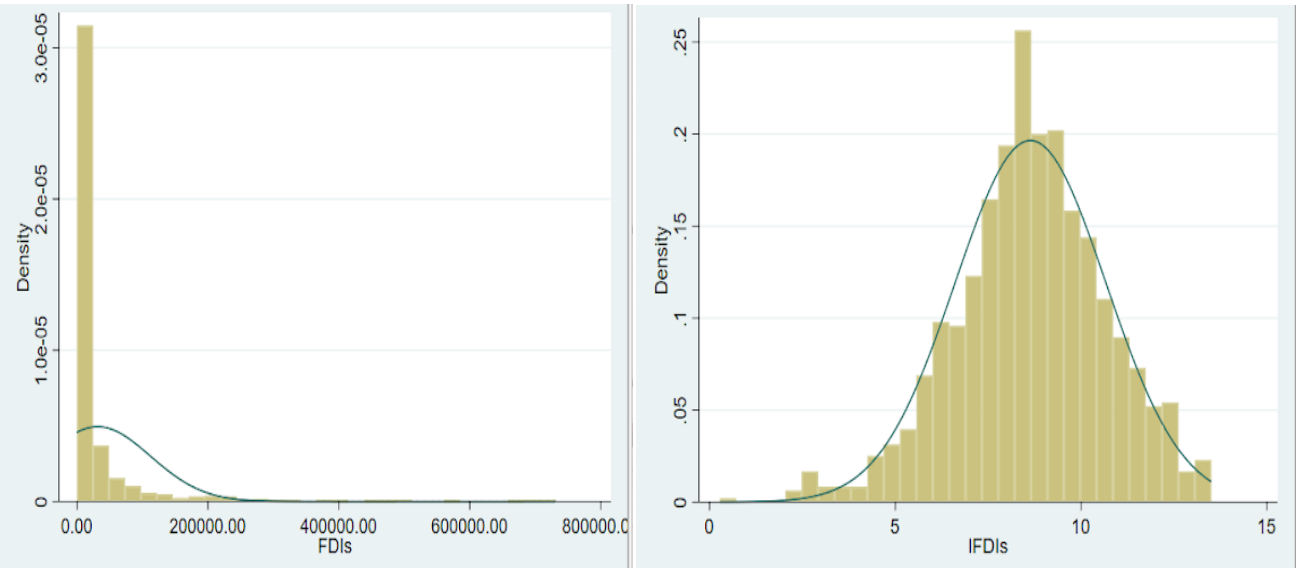
Albania	Chile	Honduras	Mongolia	Sudan
Algeria	Colombia	India	Montenegro	Suriname
Armenia	Comoros	Indonesia	Morocco	Syrian Arab Republic
Azerbaijan	Congo	Iran	Mozambique	Tajikistan
Bangladesh	Costa Rica	Iraq	Myanmar	Thailand
Barbados	Cote d'Ivoire	Kazakhstan	Namibia	Timor-Leste
Belarus	Djibouti	Kenya	Nepal	Togo
Belize	Dominican Republic	Kuwait	Nicaragua	Trinidad and Tobago
Benin	Ecuador	Kyrgyz Republic	Niger	Tunisia
Bhutan	Egypt	Lao PDR	Nigeria	Uganda
Bolivia	El Salvador	Lebanon	Pakistan	Ukraine
Botswana	Ethiopia	Lesotho	Panama	Uruguay
Brazil	Fiji	Liberia	Paraguay	Uzbekistan
Burkina Faso	Gambia	Malawi	Peru	Vanuatu
Burundi	Georgia	Malaysia	Philippines	Venezuela
Cambodia	Ghana	Maldives	Rwanda	Vietnam
Cameroon	Guatemala	Mali	Sao Tome and Principe	Yemen
Cape Verde	Guinea	Mauritania	Saudi Arabia	Zambia
Central African Republic	Guinea-Bissau	Mauritius	Senegal	Zimbabwe
Chad	Guyana	Mexico	Sierra Leone	

Appendix B

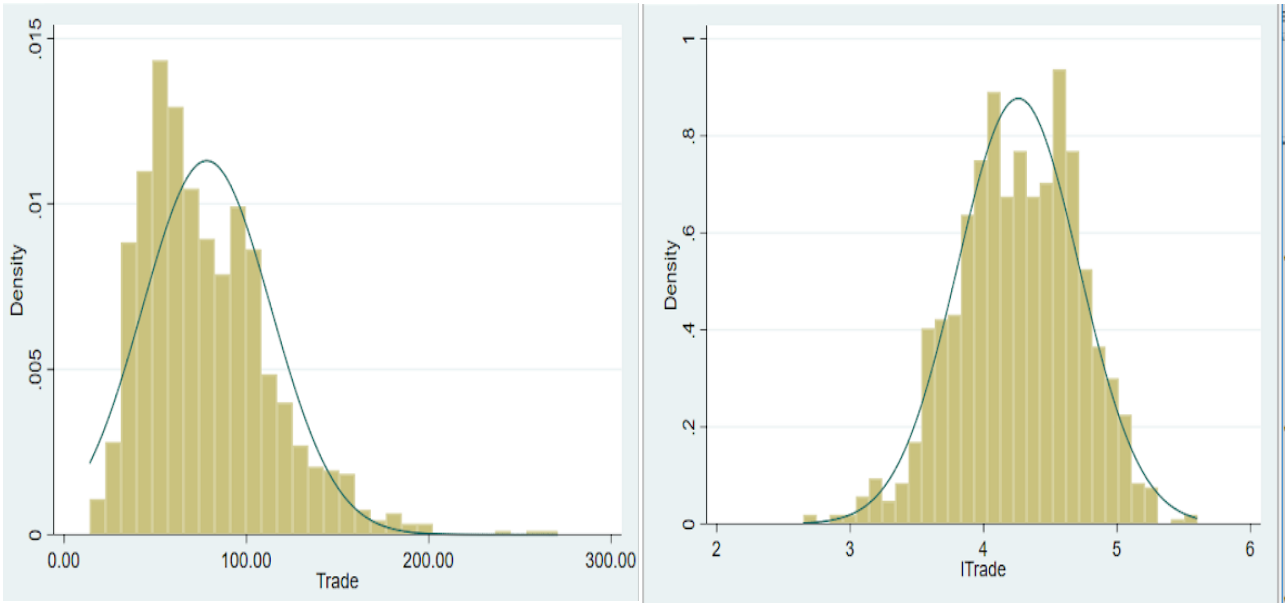
GDP density before and after the transformation.



FDI stock density before and after the transformation.



Trade density before and after the transformation.



Appendix C

Variables definition

Variable	Definition	Source
CE1	The net primary school enrolment rate (in % of official school-age population). Higher score indicates higher participation school rate.	World Bank data
CE2	The net secondary school enrolment rate (in % of official school-age population). Higher score indicates higher participation school rate.	World Bank data
PE	Mean years education of adults aged 20+. The more a year of study, the higher the adult is educated (in ages).	Global Data Lab
FDIs	Foreign direct investment stock in an economy (in millions of dollars).	UNCTAD stat
GDP	GDP per capita is gross domestic product divided by midyear population (in dollars).	UNCTAD stat
Trade	Trade openness as the sum of exports and imports of goods and services measured as a share of Gross Domestic Product (in % of GDP).	UNCTAD stat
Agri	The percentage of value added of the agriculture sector to GDP of a country (in % of GDP).	World Bank data
Urb	The percentage of the number of people living in an area defined as “urban” per 100 population (in % of population).	World Bank data
Poor	The International Wealth Index (IWI) as an instrument to measure the economic situation of families (in a scale from 0 to 100).	Global Data Lab

Appendix D

Correlation matrix with primary education enrollment rate as dependent variable

	CE1	PE	FDIs	lGDP	Trade	Agri	Urb	Poor
CE1	1.0000							
PE	0.5723***	1.0000						
lFDIs	0.3382***	0.4713**	1.0000					
lGDP	0.5168***	**0.7008****	0.5236***	1.0000				
lTrade	0.1411***	0.3121***	0.0053	0.2118***	1.0000			
Agri	-0.5696***	**-0.6420****	-0.4552***	**-0.7756****	-0.2004***	1.0000		
Urb	0.2927***	0.5558***	0.5032***	**0.7309*** **	0.0987	-0.5744***	1.0000	
Poor	-0.5952***	**-0.7634****	-0.2846**	**-0.8085*** **	-0.2371**	**-0.7342****	**-0.6545****	1.0000

*ρ<0.05, **ρ<0.01, ***ρ<0.001

Correlation matrix with secondary education enrollment rate as dependent variable

	CE2	PE	FDIs	lGDP	Trade	Agri	Urb	Poor
CE2	1.0000							
PE	**0.8721*** **	1.0000						
lFDIs	0.5232***	0.4713**	1.0000					
lGDP	**0.7758*** **	**0.7008****	0.5236***	1.0000				
lTrade	0.1699***	0.3121***	0.0053	0.2118***	1.0000			
Agri	**-0.6828*** **	**-0.6420****	-0.4552***	**-0.7756****	-0.2004***	1.0000		
Urb	**0.6367*** **	0.5558***	0.5032***	**0.7309*** **	0.0987	-0.5744***	1.0000	
Poor	**-0.8734*** **	**-0.7634****	-0.2846**	**-0.8085*** **	-0.2371**	**-0.7342****	**-0.6545****	1.0000

*ρ<0.05, **ρ<0.01, ***ρ<0.001

Appendix E

Hausman test for model with first school enrolment rate

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
PE	2.780092	2.227105	.552987	.2225026
lFDIs	2.156116	1.597853	.558263	.2103458
lGDP	1.608594	1.631921	-.0233273	.3025861
lTrade	3.052357	2.956633	.0957238	.2813487
Agri	-.0928736	-.1133123	.0204387	.0262324
Urb	-.1184661	-.1285548	.0100887	.0950047
Poor	.1145131	.0452674	.0692457	.0168563
FDIPE	-.3386249	-.3018332	-.0367917	.0183187

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 34.54
Prob>chi2 = 0.0000

Hausman test for model with secondary school enrolment rate

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
PE	1.097147	2.457243	-1.360096	.2906091
lFDIs	1.297425	1.466369	-.1689443	.2417869
lGDP	4.206995	5.015869	-.8088741	.4994053
lTrade	1.352649	1.264908	.0877409	.4489047
Agri	.0197866	.0862173	-.0664307	.0558561
Urb	.8597795	-.0107558	.8705353	.1383478
Poor	-.217545	-.3079908	.0904458	.0267202
FDIPE	-.4041237	-.4227473	.0186236	.0255914

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 67.47
Prob>chi2 = 0.0000

Appendix F

Multicollinearity test for model with first school enrolment rate

Variable	VIF	1/VIF
lGDP	4.83	0.206838
Poor	4.08	0.245133
PE	3.01	0.332383
Agri	2.59	0.386056
Urb	2.44	0.409587
lFDIs	1.52	0.659692
lTrade	1.20	0.834933
FDIPE	1.13	0.887672
Mean VIF	2.60	

Multicollinearity test for model with second school enrolment rate

Variable	VIF	1/VIF
lGDP	6.19	0.161649
Poor	4.99	0.200374
PE	3.21	0.311240
Urb	3.09	0.324049
Agri	3.05	0.328203
lFDIs	1.79	0.557740
lTrade	1.21	0.825361
FDIPE	1.09	0.917360
Mean VIF	3.08	

Appendix G

A modified Wald test of heteroskedasticity for model with first school enrolment rate

```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (99)   =     6.0e+28
Prob>chi2 =       0.0000
```

A Wooldridge test of autocorrelation for model with first school enrolment rate

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,       91) =    104.752
           Prob > F =      0.0000

.
```

A modified Wald test of heteroskedasticity for model with second school enrolment rate

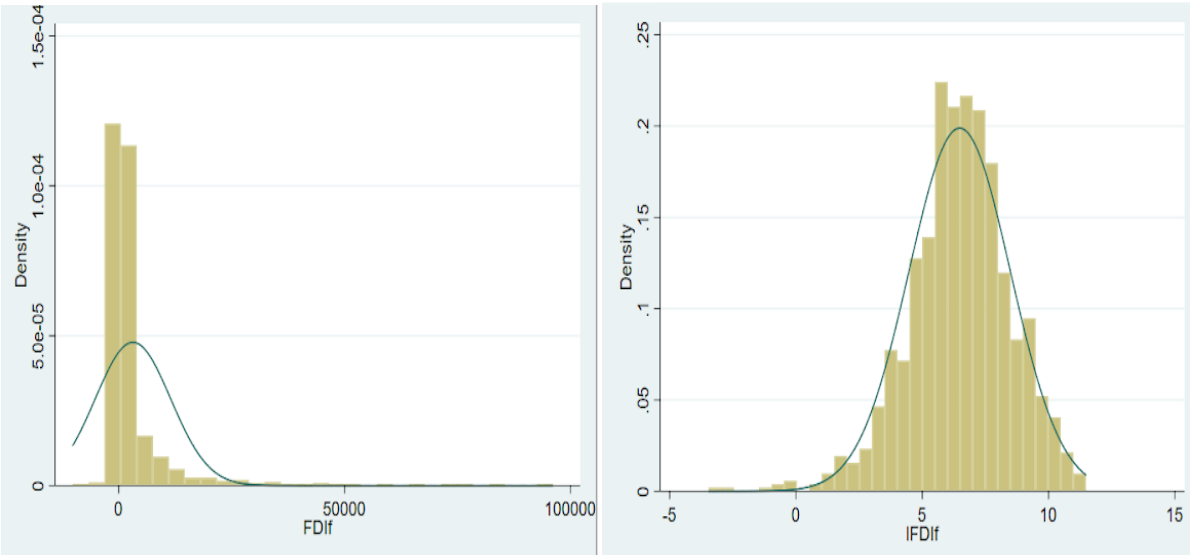
```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (85)   =     9.2e+31
Prob>chi2 =       0.0000
```

A Wooldridge test of autocorrelation for model with second school enrolment rate

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,       64) =     61.346
           Prob > F =      0.0000
```

Appendix H

FDI inflows density before and after the transformation.



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