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## FDI and child labor in the EU: An panel data analysis

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# FDI and child labor in the EU: An panel data analysis

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## Περίληψη

Οι πολυεθνικές επιχειρήσεις στοχεύουν στη μείωση του λειτουργικού κόστους και στην επένδυση των κεφαλαίων τους σε χώρες με χαμηλό κόστος εργασίας. Ωστόσο, αν και το χαμηλό κόστος εργασίας θεωρείται κρίσιμος παράγοντας των εισροών άμεσων ξένων επενδύσεων, συχνά σχετίζεται με παράνομες δραστηριότητες, όπως την παιδική εργασία. Λαμβάνοντας υπόψη ότι υπάρχουν περιορισμένα εμπειρικά στοιχεία για τη συσχέτιση μεταξύ της παιδικής εργασίας και των εισροών Άμεσων Ξένων Επενδύσεων, σκοπός της παρούσας μελέτης είναι η διερεύνηση της παιδικής εργασίας στις χώρες της Ευρωπαϊκής Ένωσης ως προσδιοριστικός παράγοντας των εισροών Άμεσων Ξένων Επενδύσεων από το 2002 έως το 2021 μέσω ανάλυση δεδομένων πάνελ. Η έρευνα συμβάλλει στην υπάρχουσα γνώση επεκτείνοντας ένα εμπειρικό μοντέλο και παρέχοντας εμπειρικά στοιχεία για μια ομάδα ανεπτυγμένων χωρών. Η μελέτη καταλήγει στο συμπέρασμα ότι οι εισροές Άμεσων Ξένων Επενδύσεων στις χώρες της Ευρωπαϊκής Ένωσης επηρεάζονται από τις κοινωνικοοικονομικές συνθήκες και τους θεσμικούς παράγοντες.

**Λέξεις κλειδιά:** Παιδική εργασία, Άμεσες Ξένες Επενδύσεις, Ευρωπαϊκή Ένωση, ανάλυση πάνελ.

## Abstract

Multinational enterprises try to reduce operating costs and invest their capital in countries with low labor costs. However, although low labor cost is considered a determinant for foreign direct investment inflows, it is often associated with illegal activities, namely child labor. Motivated by the limited empirical evidence on the association between child labor and foreign direct investment inflows, the present research aims to investigate child labor in the European Union countries as a determinant of foreign direct investment inflows from 2002 to 2021 through a panel data analysis. The research contributes to the existing knowledge by extending an empirical model and providing empirical evidence for a group of developed countries. It is observed that the Foreign Direct investment inflows in the countries of the European Union are affected by socioeconomic conditions and institutional factors.

**Keywords:** Child labor, Foreign Direct Investment, European Union, panel analysis.

## 1. Introduction

Socioeconomic and political conditions influence foreign investors' decisions when expanding abroad. Multinational enterprises (MNEs) and foreign investors often choose to invest their capital in low-labor cost countries, which, however, in several cases present high rates of illegal activities, namely child labor. The issue of minor employees remains a top priority for several international organizations, namely the International Labor Organization (ILO), the UNICEF, the United Nations (UN), etc. Similarly, the European Union (EU) countries have a certain legal framework to prevent and reduce the problem of child labor; however, increasing inflows of minor migrants from Asian countries could deteriorate the problem.

Although the problem of working children in a group of developed economies, namely the EU country members, could raise doubts, it is observed that nowadays 8.3 million children work in several European and Central Asian countries. Among them, 0.8 million children work in Northern, Southern, and Western Europe and 2,8 million in Eastern Europe (ILO-UNICEF, 2020). The present research focuses on the specific region, arguing that both the European countries and the members of the Union received increased inflows of unaccompanied or undocumented migrant children and adolescents over the past years (Menjívar & Perreira, 2019). As a result, several underaged migrants who live in the EU countries often engage in working activities in transit countries (Docquier et al., 2017; Mishra et al., 2020). For instance, according to the International Organization for children's rights Save the Children (2023) it is estimated that in Italy 336,000 children between 7-15 have had work experience, while 58,000 adolescents between 14-15 work to support family income.

Based on the above, an empirical analysis to examine the association among Foreign Direct Investment (FDI) inflows, child labor, and FDI determinants is conducted and presented. Motivated by the eclectic approach and Dunning's theory on labor-seeking investment, the purpose of the present research is to empirically examine the role of child labor in attracting FDI inflows in the EU countries from 2002 to 2020 using a panel data analysis.

The paper is structured as follows: Section 2 includes the theoretical grounds, while Section 3 presents the methodological approach. In Section 4 the results of the empirical analysis are presented, and Section 5 includes the discussion of the findings, suggestions for future research, and implications for policymakers.

## **2. Theoretical framework**

According to the Ownership, Location, and Internalization (OLI) framework, also known as the eclectic paradigm of Dunning (1973, 1977), multinational enterprises invest abroad to gain advantages from market imperfections and to reduce operating costs. Dunning followed the approach of Hymer (1960), who argued that multinational companies that operate overseas face higher operating costs and therefore they should gain some benefits to overcome the arising costs.

Among these advantages, as suggested by Dunning (1977) and the OLI paradigm, the present research focuses on location advantages, which include the institutional characteristics of the recipient country, namely the legal and cultural environment, as well as tangible assets, among which are natural resources and labor. Dunning (1993) argued that labor-seeking investment is performed by multinational companies that operate in high labor costs countries to economies with lower labor costs. It is observed that multinational enterprises are motivated to invest their capital in low-wage economies and to take advantage of lower production costs (Feenstra & Hanson, 1997; Eckel, 2003). Cheap labor attracts multinational companies (Donges, 1976; Eckel, 2003; Konings & Murphy, 2006) and low wage competition among the recipient economies threatens the well-being of the employees (Bayraktar-Sağlam & Sayek Böke, 2017).

Therefore, the research contributes to the existing literature by examining child labor as a determinant of FDI inflows. In particular, the vast majority of previous studies that investigated the association between FDI inflows and child labor in developing countries used child labor as the dependent variable (e.g. Burhan et al., 2016; Fatima, 2017; Kechagia & Metaxas, 2023). On the contrary, it is observed that the study of Busse and Braum (2004) used FDI as the dependent variable and child labor as the independent one. Finally, the present research contributes to the existing knowledge by extending the empirical model of Busse and Braum (2004), examining child labor as an explanatory variable of FDI inflows and focusing on the case of the EU economies, using the latest available secondary data.

## 2.1. Literature review

Working children in MNEs attracted increasing research interest over the past years. Shareholders worldwide apply various initiatives to prevent and eliminate child labor in multinational corporations and to prevent basic human rights (Boersma, 2018). In addition, in developing countries that present increased abuse of human rights and low standards of living, multinational corporations and foreign investors shape their decisions to protect human rights (Li & Gaur, 2014). Nevertheless, despite the legal working age and institutional framework of the recipient countries, it is argued that MNCs that perform FDI could engage minor employees in working activities (e.g. Vogel, 2006).

The literature review revealed that previous studies reached to contrasting findings on the association between child labor and FDI inflows. Among them, Dagdemir and Acaroglou (2010) and Doytch, Thelen and Mendoza (2014) observed that FDI inflows lead to higher rates of child labor. On the contrary, Neymayr and de Soysa (2005) concluded that FDI reduces percentages of child labor in developing countries. It is noted that solely the study of Sundjo, Michael, Bessala, Grace and Aziseh (2018) concluded that FDI inflows do not influence child labor. Nevertheless, they focused on a sample of 25 Sub-Saharan African economies.

In summary, it is observed that these studies used different methodological approaches and examined different explanatory variables to examine the impact of FDI on child labor. On the contrary, among the empirical studies, solely Busse and Braun (2004) used FDI inflows as the dependent variable.

Therefore, the research contributes to the existing literature by examining child labor as a determinant of FDI inflows, arguing that the majority of previous studies examined child labor as the dependent variable. In particular, the vast majority of previous studies that investigated the association between FDI inflows and child labor in developing countries, used child labor as the dependent variable (e.g. Doytch et al., 2014; Burhan et al., 2016; Fatima, 2017; Sundjo et al., 2018; Kechagia & Metaxas, 2023). On the contrary, it is observed that the study of Busse and Braum (2004) used FDI as the dependent variable and child labor as the independent one. Nevertheless, the authors used a panel data approach and studied a sample of 132 developing and developing countries from 1995 to 2000. Finally, the present research contributes to the existing knowledge by extending the empirical model of

Busse and Braum (2004), examining child labor as an explanatory variable of FDI inflows and focusing on the case of the EU economies, using the latest available secondary data.

### **3. Methodology**

#### **3.1. Dependent and independent variables**

As mentioned earlier and following Busse and Braum (2004), FDI inflows in the EU from 2002 to 2020 are studied as the dependent variable. Previous studies reached contrasting results on the impact of FDI on child labor. Certain studies concluded a positive association between FDI and child labor attributed to a substitution effect (e.g. Neumayer & de Soyza, 2005; Davies & Voy, 2009), while other empirical studies observed a negative interaction between these variables arguing that FDI inflows increase income and therefore children do not drop out of school to enter the workforce (e.g. Kis – Katos, 2007; Mendola, 2016). Finally, the study of Busse and Braum (2004), which was the only one to investigate FDI as the dependent variable, concluded that multinational enterprises usually avoid investing in countries that present high rates of child labor and observed a negative association between FDI inflows and child labor in developing countries.

The main independent variable of the present empirical analysis is child labor rates in the EU. However, it is difficult to estimate with accuracy child labor percentages, and collect reliable data (Scanlon et al., 2002). To overcome this limitation and as suggested by previous studies (e.g. Kucera, 2002; Braum, 2006; Kechagia & Metaxas, 2023), working children do not complete school, arguing that working and attending school are incompatible activities (ILO, 2000; Heyman et al., 2013) and therefore child labor is expressed as follows:

$$\text{Child labor} = 100 - \text{Total School Enrolment secondary} \quad (1)$$

Additional explanatory variables are also examined in the present research, namely, GDP per capita is a traditional determinant of FDI and it is used as a proxy for market size (Kechagia & Metaxas, 2019). Previous studies concluded that there is a positive association between FDI and GDP (e.g. Bevan & Estrin, 2004; Powers & Choi, 2012; Asongu et al., 2018). Similarly,

GDP growth is examined as a proxy for economic growth and it is observed that higher GDP growth rates attract more FDI inflows (e.g. Arthur & Addai, 2022; Bazán Navarro & Álvarez-Quiroz, 2022; Wehncke et al., 2023).

Furthermore, trade openness is also studied as an explanatory variable of FDI inflows arguing that the abolition of restrictions and trade barriers contributes to a country's expansion worldwide (Seyoum, Wu & Lin, 2014). Several empirical studies observed a positive association between FDI and trade freedom (e.g. Busse & Hefeker, 2007; Ezeoha & Ugwu, 2015; Maryam & Mittal, 2020; Radmehr et al., 2022).

The last explanatory variable is institutional quality in the EU. Previous empirical studies concluded that poor institutions discourage FDI inflows in developing and developing economies (e.g. Buchanan et al., 2012; Erkekoglu & Kiliçarslan, 2016; Sabir et al., 2019; Qureshi et al., 2021; Kechagia & Metaxas, 2022). Institutions influence multinational enterprises' investment decisions (Jensen, 2008) and the recipient country's business climate (Busse & Hefeker, 2007).

Finally, it is noted that the following Table presents the variables, the acronyms, and the data sources.

**Table 1: Description of the variables**

<b>Acronym</b>	<b>Description</b>	<b>Data source</b>
FDI	Foreign direct investment, net inflows (% of GDP)	World Bank Database
GDP	GDP per capita growth (annual %)	World Bank Database
GDP per capita	GDP per capita (current US\$)	World Bank Database
Trade openness	Trade (% of GDP)	World Bank Database
School enrollment secondary	School enrollment, secondary (% gross)	World Bank Database
CC	Control of Corruption	World Bank Database
GE	Government Effectiveness	World Bank Database

PV	Political Stability and Absence of Violence/Terrorism	World Bank Database
RQ	Regulatory Quality	World Bank Database
RL	Rule of Law	World Bank Database
VA	Voice and Accountability	World Bank Database

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### 3.2. Research hypotheses and empirical model

Keeping in view the theoretical and empirical evidence and considering the purpose of the research, the research hypotheses are developed as follows:

H1: Child labor does Granger cause FDI inflows in the EU from 2002 to 2020.

H2: GDP does Granger cause FDI inflows in the EU from 2002 to 2020

H3: GDP growth does Granger cause on FDI inflows in the EU from 2002 to 2020.

H4: Trade openness does Granger cause FDI inflows in the EU from 2002 to 2020.

H5: Institutional quality does Granger cause FDI inflows in the EU from 2002 to 2020.

Based on the OLI paradigm of Dunning (1973, 1977, 1988, 2003) and following the empirical approach and model used by Busse and Braun (2004), the initial equation is developed as follows:

$$FDI_{it} = \beta_1 \text{Child labor}_{it} + X_{it} + \varepsilon_{it} \quad (2)$$

Where, X includes a variety of explanatory variables.

According to Busse and Braun (2004) the explanatory variables of the estimation are the countries' market size, their market growth, trade openness, and democracy as an index of institutional quality. The equation is therefore extended to:

$$FDI_{it} = \beta_1 \text{Child labor}_{it} + \beta_2 \text{GDP}_{i,t} + \beta_3 \text{GDP Growth}_{i,t} + \beta_4 \text{Trade Openness}_{i,t} + \beta_5 \text{Democracy}_{i,t} + \varepsilon_{i,t} \quad (3)$$

Additionally, to further investigate the role of institutions, the variable “Democracy” of the initial model (Busse & Braun, 2004) is replaced by a set of institutional indicators used as an explanatory variable.

$$FDI_{it} = \beta_1 \text{Child labor}_{it} + \beta_2 \text{GDP}_{i,t} + \beta_3 \text{GDP Growth}_{i,t} + \beta_4 \text{Trade Openness}_{i,t} + \beta_5 \text{Institutional Quality}_{i,t} + \varepsilon_{i,t} \quad (4)$$

#### 4. Results

The present Section includes the results of the empirical analysis. Firstly, as observed in Table 1, the descriptive statistics of the studied variables are presented.

**Table 1: Descriptive statistics**

	<b>Child labor</b>	<b>FDI (%)</b>	<b>GDP growth</b>	<b>GDP per capita</b>	<b>Trade openness</b>
Mean	-7.652	12.545	2.050	30872.15	120.582
Median	-3.158	3.292	2.291	2482.94	103.512
Std. Dev	15.809	41.508	3.887	21807.68	63.28
JB	408.525	53178.1	376.163	542.187	444.364
Obs.	513	513	513	513	513

**(Table 1 continued)**

	<b>CC</b>	<b>GE</b>	<b>PV</b>	<b>RL</b>	<b>RQ</b>	<b>VA</b>
Mean	0.987	1.096	0.774	1.086	1.169	1.106
Median	0.912	1.050	0.817	1.058	1.152	1.093
Std. Dev	0.789	0.601	0.396	0.613	0.342	0.322
JB	31.801	10.601	9.768	22.884	17.562	17.562
Obs.	513	513	513	513	513	

Secondly, to control for stationarity, the Augmented Dickey-Fuller (ADF) and the Phillips Perron (PP) were conducted, as presented in Table 2. It is

noted that both ADF and PP were applied for individual intercept and trend and intercept. The tests were applied under the null hypothesis that there is a unit root, which is tested at three levels of significance.

**Table 2a: Unit root test results (panel level series)**

	<b>LnFI</b>	<b>Ln Child labor</b>	<b>LnGDP</b>	<b>LnGDP growth</b>	<b>LnTrade</b>
ADF (Individual intercept)	-8011*** (0000)	-6819*** (0000)	-5719*** (0000)	-4801*** (0000)	-6010*** (0000)
ADF (Trend and intercept)	-9201*** (0000)	6910*** (0000)	-5718*** (0000)	-4719*** (0000)	-6910*** (0000)
PP (Individual intercept)	-11911*** (0000)	-12919*** (0000)	-5981*** (0000)	-4719*** (0000)	-6781*** (0000)
PP (Trend and intercept)	-11781*** (0000)	-12981*** (0000)	-5019*** (0000)	-4718*** (0000)	-6891*** (0000)

**(Table 2 continued)**

	<b>CC</b>	<b>GE</b>	<b>PV</b>	<b>RL</b>	<b>RQ</b>	<b>VA</b>
ADF (Individual intercept)	-16021*** (0000)	-17112*** (0000)	-16629*** (0000)	-15501*** (0001)	- 17910*** (0000)	- 18719*** (0000)
ADF (Trend and intercept)	-17011*** (0000)	17330*** (0001)	-14618*** (0000)	14369*** (0000)	- 17694*** (0000)	- 18710*** (0000)
PP (Individual intercept)	-24986*** (0000)	-26719*** (0000)	-15221*** (0000)	15919*** (0000)	- 17711*** (0000)	- 17851*** (0000)
PP (Trend and intercept)	-2588*** (0001)	-26191*** (0000)	16219*** (0000)	13808*** (0000)	- 18811*** (0000)	- 17981*** (0000)

Thirdly, a Hausman test (Hausman, 1978) was conducted, as presented in Table 3, to control the misspecification of random-effect analysis.

**Table 3: Hausman test results**

	<b>Chi-sq statistics</b>	<b>Chi-sq d.f.</b>	<b>Prob</b>
Correlated random effects	16110	7	0.0161

Therefore, the null hypothesis is not rejected and the Random effects model is applied. Finally, as presented in Table 4, the Granger test was applied to control the causality between the studied variables.

**Table 3: Hausman test results**

<b>Null hypothesis</b>	<b>Chi-sq statistics</b>	<b>Chi-sq d.f.</b>	<b>Prob</b>
D(lnFDI) does not Granger cause D(lnChild labor)	4619	0211	Do not reject
D(lnChild labor) does not Granger cause D(lnFDI)	4719	0178	Do not reject
D(lnGDP) does not Granger cause D(lnFDI)	0619	0061	Reject null at 5%
D(lnFDI) does not Granger cause D(lnGDP)	4719	0008	Reject null at 5%
D(lnGDP growth) does not Granger cause D(lnFDI)	0619	0011	Reject null at 5%
D(lnFDI) does not Granger cause D(lnGDP growth)	0819	0028	Reject null at 5%
D(lnTrade Openness) does not Granger cause D(lnFDI)	618	0001	Reject null at 5%
D(lnFDI) does not Granger cause D(lnTrade openness)	7891	0008	Reject null at 5%
D(RQ) does not Granger cause D(lnFDI)	0619	0061	Reject null at 5%
D(lnFDI) does not Granger cause D(lnRQ)	0719	0008	Reject null at 5%

D(RL) does not Granger cause D(lnFDI)	0749	0311	Do not reject
D(lnFDI) does not Granger cause D(RL)	0819	0028	Reject null at 5%
D(VA) does not Granger cause D(lnFDI)	0619	0011	Reject null at 5%
D(lnFDI) does not Granger cause D(VA)	0865	0028	Reject null at 5%
D(CC) does not Granger cause D(lnFDI)	0191	0011	Reject null at 5%
D(lnFDI) does not Granger cause D(CC)	0644	0027	Reject null at 5%
D(PV) does not Granger cause D(lnFDI)	0818	0121	Do not reject
D(lnFDI) does not Granger cause D(lnPV)	0101	0008	Reject null at 5%
D(GE) does not Granger cause D(lnFDI)	0179	0001	Reject null at 5%
D(lnFDI) does not Granger cause D(GE)	0191	0010	Reject null at 5%

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It is noted that p-values are lower than 0.05 and that the null hypothesis is not rejected in the causality between FDI and child labor, and vice versa.

## 5. Conclusions

The aim of the present study was to investigate the interaction among FDI, child labor, and FDI determinants among the EU country members for the period 2002-2021. The present research extends the empirical model of Busse and Braun (2004) and investigates the role of child labor in attracting FDI inflows in EU country members. The literature review on empirical studies revealed that the case of the EU country members has not been investigated till the present, despite the ongoing socioeconomic crises, namely the increasing inflows of migrants and employees in the region. Additionally, the vast majority of previous studies focused on child labor in developing countries, while the problem in the developed ones remains under-investigated.

Therefore, an empirical analysis is conducted and it is concluded that there is no evidence that child labor causes FDI inflows in the region and vice versa. Additionally, among the institutional indicators, it is observed that there is a unidirectional relation between FDI and PV, as well as between FDI and RL. In summary, H1 is rejected and it is argued that child labor does not Granger cause FDI inflows in the EU from 2002 to 2020. On the contrary, H2, H3, and H4 are accepted and it is concluded that GDP does Granger cause FDI inflows in the EU from 2002 to 2020, GDP growth does Granger cause on FDI inflows in the EU from 2002 to 2020 and that trade openness does Granger cause FDI inflows in the EU from 2002 to 2020. Finally, H5 is partially accepted and it is observed that certain institutional variables do Granger cause FDI inflows in the EU from 2002 to 2020, namely GE, CC, VA and RQ.

Contrary to the findings of Busse and Braun (2004) who concluded to a negative interaction between child labor and FDI, in the present research no association between child labor and FDI is observed. However, it is noted that Busse and Braum (2004) studied a sample of developing economies. The findings are in line with Sundjo et al (2018), who, however, investigated the case of Sub-Saharan African economies.

Nevertheless, it should be noted that the study is subjected to certain limitations. Firstly, one of the main limitations of the research refers to the difficulty in estimate with accuracy child labor rates worldwide. The problem of working children in both developed and developing countries remains a crucial social issue, and consequently, there is limited available data (Scanlon et al., 2022). Therefore, as mentioned above, to overcome this issue, the school non-enrollment percentages are used, which has also been used as an indicator for child labor by previous empirical studies. Secondly, another limitation of the study is associated with the sample and the time span. However, the sample was designed based on available secondary data.

In conclusion, future studies could extend to the role of additional factors that could influence child labor, such as infrastructure and conflicts. Moreover, it would be interesting to investigate the case of other groups of developed economies, considering that the ongoing migration crisis could increase child labor rates worldwide. Similarly, the effectiveness of the educational policies applied to reduce absenteeism and drop-out rates could also been studied, arguing that EU members apply different educational policies for minor migrants, leading to insufficient integration (Horgan et al., 2022; Jalušič & Bajt, 2022).

In summary, it is important to further investigate the policies applied by the EU countries to prevent child labor and promote schooling, focusing on minor employees, asylum seekers, etc. Although in the present research, no association and Granger causality between FDI and child labor was observed, it is crucial to further investigate the factors that contribute to child labor among EU country members. In other words, the protection of adolescents and children in the EU, including the vulnerable ones, should be a priority for the authorities and local governments to ensure social cohesion and sustainability.

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