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The Impact of Foreign Direct Investment on Sustainable Development

Marian Cătălin Voica[*], Mirela Panait[**], George Alin Haralambie[***]

* The Bucharest University of Economic Studies, 6, Piata Romana, 1st district, Bucharest, Romania
e-mail: ec_voicamariancatalin@yahoo.com

** Faculty of Economic Sciences, Petroleum-Gas University of Ploieşti, Bd. Bucureşti 39, 100680, Ploieşti, Romania
e-mail: mirematei@yahoo.com

*** Faculty of Economic Sciences, Petroleum-Gas University of Ploieşti, Bd. Bucureşti 39, 100680, Ploieşti, Romania

Abstract

The last two decades have been influenced by the growing concern regarding climate change and the ways that it will determine economic activities and human development. Many countries already took actions through international treaties to solve different problems like carbon emission reduction through certificate trade or low emission investments. The cost of the transition to a low carbon emission economy is too big for countries to support, so here, the private sector needs to help through a sustainable way of doing business. From this point of view, developed countries have a more sophisticated financing system than that of developing countries but, usually, developing countries have better competitive advantages that attract FDI. The main aim of the paper is to see how sustainable development is related to the flow and stock of FDI in the EU.

Keywords: *foreign direct investments; low carbon emission economy; sustainable development*

JEL Classification: *F21; O19; Q56*

Introduction

The UN is the world leader in terms of catalysing international efforts and establishing strategies for the development, protecting the environment and social matters. Year of reference for launching the concept of sustainable development is 1987 when World Conference on Environment and Development published the report "Our Common Future". This report defined the term *sustainable development* as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). So, this term has three dimensions: economic, environmental and social and there are many actors that could have important contribution to the promotion of sustainable development at national and international level. At the Millennium Summit of the United Nations in 2000, eight development`s goals were established (the so called Millenium Development Goals): to eradicate extreme poverty and hunger, to achieve universal primary education, to promote gender equality and empower women, to reduce child mortality, to improve maternal health, to combat HIV/AIDS, malaria, and other diseases, to ensure environmental sustainability and to develop a global partnership for development. These goals have as deadline the end of 2015.

The international community is aware of the need to fulfil the sustainable development`s goals (SDG), contributions to public authorities and the private sector are complementary. On the one hand, the public authorities must ensure the development of sectoral policies and strategies for sustainable development, but is also essential to the consistency of these policies especially in economic union. On the other hand, the private sector needs to integrate the ESG (environmental, social and governance) issues in their business and to make investments that strictly observe the principles of sustainable development and objectives.

To achieve post2015 SDG, the multiple funding mechanisms are available to international community. Given the evolution of foreign capital flows worldwide, UNCTAD experts believe that foreign investments have a major potential for achieving sustainable development (UNCTAD, 2014). After the decline in 2012, FDI flows increased by 9% in 2013 and forecasts for the coming years are optimistic.

Researchers showed that FDI are an important source of country development and lately they began to be seen as an important source for sustainable development There is a wide acceptance between researchers that FDI promotes economic growth in target country through a because of the increased rate of capital formation (Magnus Blomström, 1996) on one side and on the other side indirectly leading to human capital growth, technological transfers and increase competition (Kneller, 2007).

In their role of promoting economic growth FDI may have an influence on greenhouse gas emissions, also the results of studies conducted by other researchers shoved mixed results, but if we take into account the fact that in some countries more than 40% of FDI goes to industry there is an impact on the level of greenhouse gas emissions. Most of the time companies give priority to developing their business to the detriment of energy rationalization – as the latter reduces costs rather than generating turnover.

In the last years we have witnessed a switch of FDI to clean energy projects, energy efficiency that has a good environmental influence. The growth of new technologies has had a significant impact on the location preferences of multinational enterprises (MNEs) (R. Narula, Dunning, J. H, 2000). Many FDI enterprises adopts new technologies and promote innovations, achieving an increased efficiency and helping to create a low carbon economy (Tamazian, Chousa, & Vadlamannati, 2009).This fact is a big step forward because most of the time companies give priority to developing their business to the detriment of energy rationalization (Francoz, 2010).

MNEs are the main drive of FDI and through their operations they change the economic environment of host countries. Adequate policies would positively affect FDI and sustainability issues if these were addressed for each specific economic activity (Pazienza, 2011). In this sense researchers found that MNEs promote environmental friendly practices, in countries with weak regulations in this field, because of their implemented standards, like ISO 14001 (Zeng & Eastin, 2012), even though some studies found out that the laxity of environmental regulations has also been assessed as a potential source of comparative advantage(Chung, 2014).

The inward FDI had an ascendant trend in the analysed period with a decrease in the year 2008 because of the effects of the financial crisis. In Figure 1 we portrait the evolution of the cumulative inward FDI in EU and we see that between 2000 and 2012 the value of cumulative inward FDI registered a significant increase from 84 trillion USD in 2000 to 286 trillion USD in 2012, which means a 2.5 fold increase.

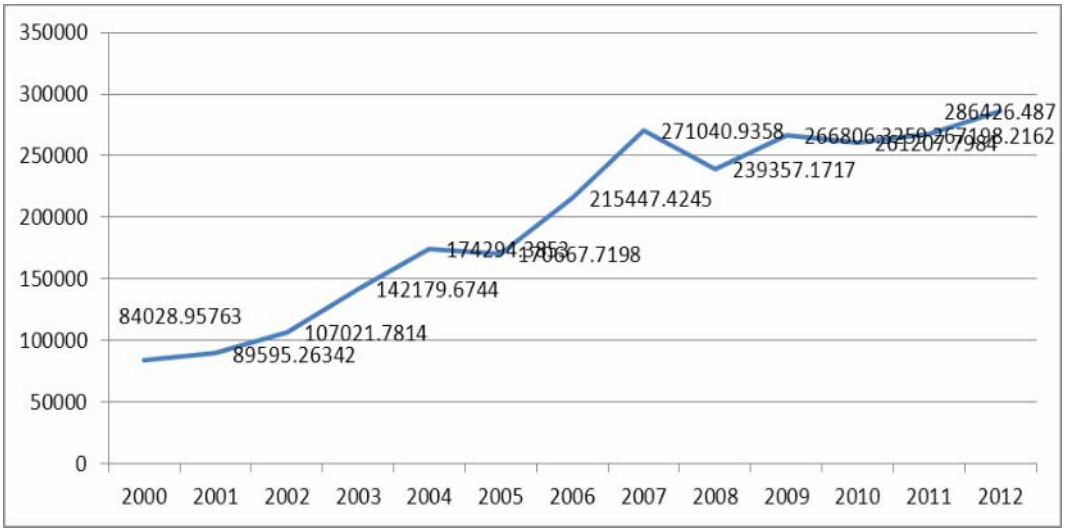

Fig. 1. Cumulative value of inward FDI in EU 2000-2012

Source: based on data from UNCTAD

If the financial crisis hadn't disturbed the flow of investments around the world, this increase would have been higher and I state this keeping in mind that between 2007 and 2012 the stock of inward FDI has been almost constant.

In Figure 2 we portrait the distribution of inward FDI in EU member states we see that, in the year 2000 almost 80% of the inward FDI is localized in the first eight countries, while in 2012 the same share is covered by nine countries. This means that countries that had a low level of inward FDI started to attract foreign investors.

The main target of FDI is the United Kingdom with almost 20% of all FDI of EU followed by France, Belgium, Germany and Netherlands. All of these are high developed countries with an important territory, population and an economy based on advanced industry.

The least performers of inward FDI are Latvia, Malta, Lithuania, Slovenia and Estonia. Excepting Malta, which is a small country and its level of FDI is normal, all the other ones are countries that became members latter and don't have overcome the differences between them and older members. Another important aspect can be observed here, namely the difference between Western Europe and Eastern Europe. We can see that the Western Europe countries take the most important share of inward FDI because of their high developed and highly competitive economies, while Eastern economies are still in the stage of searching for the optimum mix of economic policies to help them reach the status of developed country. Also we have to keep in mind that the Central and Eastern European countries are still influenced by the transition from communism to capitalism and their ascension to EU, so these structural shocks make comparisons with other developed or developing countries rather misleading(R. Narula & Guimón, 2010).A high volume of FDI inflows can sustain the economic growth of the Central and Eastern European countries but will not necessarily generate spillover effects, boosting the productivity and competitiveness of all firms, including domestic companies, and influencing, significantly and positively, their economic development(Iacovoiu, 2013).Also they have to acquire new forms of management of the enterprise implementing enterprise planning, consolidation and modelling capabilities (Gogoț, 2008).

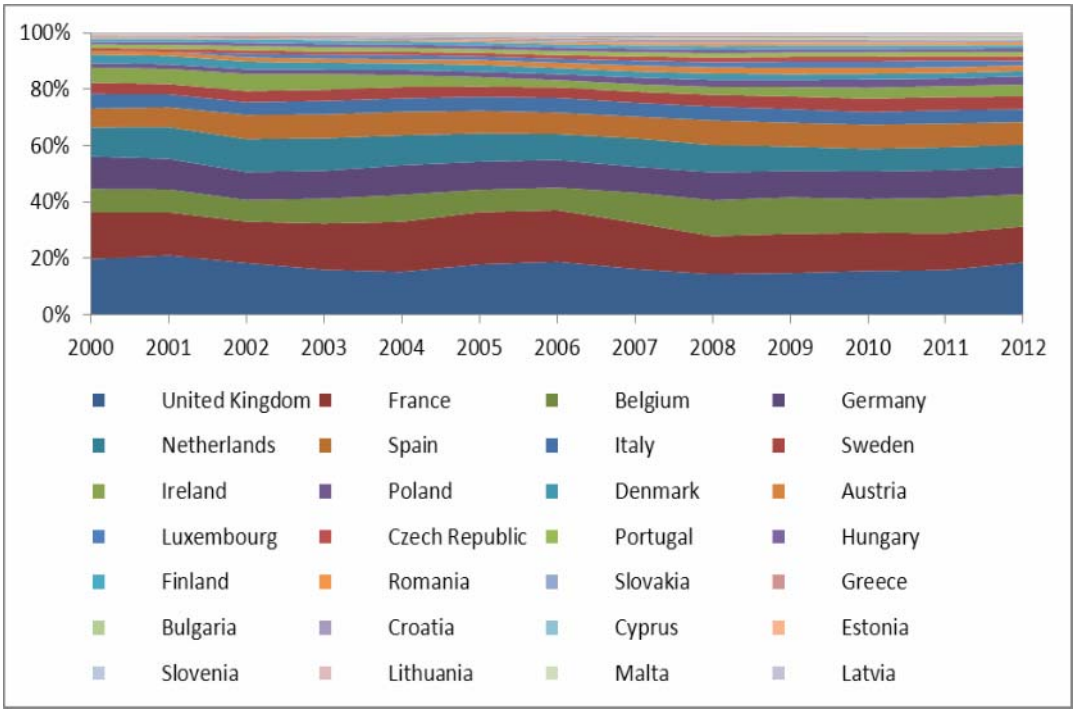

Fig. 2.Share of inward FDI of EU member states 2000-2012.

Source: based on data from UNCTAD

Countries from Western Europe are also the main FDI providers for Central and Eastern European countries and the lately outsourcing services seekers from Western Europe turned their eyes towards their neighbours in Central and Eastern Europe, especially to Poland, Romania, Czech Republic, Bulgaria, Hungary, Russia and Ukraine (Rădulescu, 2014).

The main drive to realize this research came from the latest evolutions in the field of sustainable development, especially regarding the environmental and climate change aspects. The FDI can be an important source for the transition to a greener economy with low carbon emissions. In order to see if there is a relation between FDI and sustainable development, we searched for suitable data, which can be used to measure sustainable development. We use, as the main tool to test this relation, the influence of EU sustainable development indicators and FDI. In order to do that, we evaluate the influence of the sustainable indicator on FDI separated on the three pillars of sustainable development: social, environmental and economic. Using an OLS panel data regression we found out that the most important influence comes from the environmental pillar followed by social and economic pillars.

Sustainable Development Indicators

As noted, the search for suitable indicators to measure sustainable development is one of the main goals for researchers. The first time that "sustainable development" has been used, was in 1980 at World Conservation Strategy under the IUCN (IUCN, 1980) and acknowledge we need to approach future development from three directions: social, ecologic and economic.

The search for a set of indicators to measure sustainable development is hard because of the difficulties on measuring sustainable aspects. Some of the most important moments with an important impact on sustainable development indicators are represented by:

- Our common future (WCED, 1987) where a new definition has been express where sustainable development "meets the needs of the present generation without compromising the ability of future generations to meet their own needs".
- Earth Summit in 1992 (UN, 1992) where there has been an extended discussion on sustainable development backed up by the release of more than 150.000 words grouped in 40 chapters for Agenda 21.
- World Summit on Sustainable Development (UN, 2002)where the three pillars – social, environmental and economic – have been set as fundaments of sustainable development.

Table 1. Sustainable development indicators of WDI/MDG and EU-SDI

WDI/MDG	EU-SDI
Eradicate extreme poverty	Socio-economic development
Achieve universal primary education	Sustainable consumption and production
Promote gender equality and empower women	Social inclusion
Reduce child mortality	Demographic changes
Improve maternal health	Public health
Combat HIV/AIDS, malaria, and other diseases	Climate change and energy
Ensure environmental sustainability	Sustainable transport
Develop a global partnership for development	Natural resources
-	Global partnership
-	Good governance

Source: EUROSTAT, MDGI, WDI

The most important resources for sustainable indicators are represented by Millennium Development Goals (MDG) indicators from United Nations, Word Development Indicators (WDI) from World Bank and Sustainable Development Indicators (SDI) from Euro stat. In Table 1 we have a comparative approach of the main goals and themes of WDI/MDG and EU-SDI.

Research Methodology

For our study we used the data from EURO Stat and UNCTAD. We made a collection of indicators based on the headline indicators of the EU Sustainable Development Indicators (EU SDIs). In our study we made three categories of indicators to see the dependence of FDI on three different influences: social effect, environmental effect and economic effect.

All indicators data has been collected from EUROstatdatabase excepting the foreign direct investment flows which have been collected from UNCTADstat. We study the indicators across the 28 EU member states for a period since 2000 to 2012.

For the estimation of the regression equations we use cross-data panel regression and before we begin to estimate the equations we must test the independent variable for unit root and see if some of the variables are better estimated as level 1 or level 2 difference.

In our study we will use Levin, Lin and Chu(Levin, Lin, & James Chu, 2002) (LLC) test, ADF Fisher-type test, Im, Pesaran and Shin(Im, Pesaran, & Shin, 2003) W-stat and PP Fisher-type test (Choi, 2001; Maddala, 1999). To have a better understanding we further present Kuzume`s(Kuzume, 2005) review of these tests.

Levin, Liu and Chu(Levin et al., 2002)tested the null hypothesis of $H_0: \delta = 0$ against the alternative hypothesis$H_1: \delta < 0$ using

$$\Delta q_{i,t} = \alpha_{mi} d_{mt} + \delta q_{i,t-1} + \sum_{k=1}^{p} \gamma_k \Delta q_{i,t-k} + \epsilon_{i,t}, \quad (1)$$

where d_{mt} denotes the deterministic parts, and $\epsilon_{i,t}$ is assumed to be independently distributed across i and t, with i=1,…,N and t=1,…,T. Once the normalized bias and the corresponding pseudo t-ratio of pooled OLS estimation of δ in (1) are appropriately normalized, convergence to a standard normal limit distribution is achieved as $N \to \infty$, $T \to \infty$ so that $\sqrt{N}/T \to 0$.

Im, Pesaran and Shin (Im et al., 2003) test is built on the estimation of (1), but changing δ with δ_i. The null hypothesis is $H_0: \delta = 0 \forall_i$, while the alternative hypothesis is $H_1: \delta < 0$, i=1,…,N_1 ;$\delta_i = 0$,i=$N_1 + 1$,…,N. So, the null hypothesis is rejected if there is a subset (N_1) of stationary individuals. The first test proposed is the standardized group-mean Lagrange Multiplier (LM) bar test statistic.

$$\psi_{\overline{LM}} = \frac{\sqrt{N}[\overline{LM} - N^{-1} \sum_{i=1}^{N} E(LM_i)]}{\sqrt{N^{-1} \sum_{i=1}^{N} Var(LM_i)}} \quad (2)$$

with $\overline{LM} = N^{-1} \sum_{i=1}^{N} LM_i$, where LM_i denotes the individual LM tests for testing $\delta_i = 0$ in (1), and $E(LM_i)$ and $Var(LM_i)$ are obtained by Monte Carlo simulation.

The next test is the standardized group mean t bar test statistic $\psi_{\bar{t}}$, with a similar expression of (2), replacing $\overline{LM}$ and LM_i with $\bar{t}$ and t_i.

We define $\bar{t} = N^{-1} \sum_{i=1}^{N} t_i$, where t_i denotes the individual pseudo t-ratio for testing $\delta_i = 0$ in (1), and $E(t_i)$ and $Var(t_i)$ are calculated using Monte Carlo simulation. In Im, Pesaran and Shin (2003), because $N \to \infty$, $T \to \infty$ and $N/T \to k$, both tests statistics limiting distribution is standard normal.

Fisher-ADF and Fisher-PP tests are an alternative approach to test for unit root in panel data that uses Fisher's(Fisher, 1932)results to test the combined p-values from individual unit root tests as it was proposed by Maddala and Wu (Maddala, 1999) and Choi (Choi, 2001).

If π_i is the p-value from any individual unit root test for cross-section i, then under the null of the unit root for all N cross-sections, we have the asymptotic result

$$-2 \sum_{i=1}^{N} \log(\pi_i) \to \chi^2_{2N} \quad (3)$$

Choi(Choi, 2001) demonstrates that:

$$Z = \frac{1}{\sqrt{N}} \sum_{i=1}^{N} \Phi^{-1}(\pi_i) \to N(0,1) \quad (4)$$

where Φ^{-1} is the inverse of the standard normal cumulative distribution function.

For the unit root tests we used Schwarz info criterion, Newey-West automatic bandwidth selection and Bartlett kernel. In the following tables we show the results for root tests for each group of variables and the difference level at which the data is stationary.

In order to estimate the regression equations we used ordinary least squares panel data linear regression of the form:

$$Y_{it} = f(X_{it}, \beta) + \delta_i + \gamma_t + \epsilon_{it} \quad (5)$$

Our specific case involves a linear conditional mean specification, so we obtain:

$$Y_{it} = \alpha + X'_{it}\beta + \delta_i + \gamma_t + e_{it} \quad (6)$$

where Y_{it} is the dependent variable, X_{it} is a *k*-vector of repressors and ϵ_{it} are the error terms for i=1, 2, …, M cross-sectional units observed for dated periods t=1, 2, …, T. The α parameter represents the overall constant in the model while δ_i and γ_t represent cross-section or period specific effects.

Results and Discussion

In the next part we will test the variables for unit root and search for the right level at which the variables are stationary. The null hypothesis is that the data series has unit root. In Table 2 we have the data for the first effect, the social one.

Table 2. Unit root tests to obtain stationary data for social effect

Variable	Test	Level		1st difference		2nd difference	
		Statistic	Prob	Statistic	Prob	Statistic	Prob
FDI_STOCK	ADF - Fisher Chi-square	1.72008	1.0000	160.228	0.0000	-	-
	PP - Fisher Chi-square	1.49513	1.0000	178.187	0.0000	-	-
	Im, Pesaran and Shin W-stat	9.69197	1.0000	-8.28499	0.0000	-	-
	Levin, Lin & Chu t*	4.24333	1.0000	-14.2613	0.0000	-	-
EMPL	ADF - Fisher Chi-square	35.0715	0.9872	66.0362	0.1688	214.331	0.0000
	PP - Fisher Chi-square	35.0715	0.9872	66.3092	0.1630	214.331	0.0000
	Im, Pesaran and Shin W-stat	0.43476	0.6681	-2.21291	0.0135	-11.5928	0.0000
	Levin, Lin & Chu t*	-6.63175	0.0000	-0.81409	0.2078	-15.7191	0.0000
LIFE	ADF - Fisher Chi-square	30.1265	0.9982	147.693	0.0000	-	-
	PP - Fisher Chi-square	16.0870	1.0000	168.045	0.0000	-	-
	Im, Pesaran and Shin W-stat	1.01497	0.8449	-5.67046	0.0000	-	-
	Levin, Lin & Chu t*	-5.47382	0.0000	-16.7628	0.0000	-	-

Table 2 (cont.)

OF_AS	ADF - Fisher Chi-square	102.614	0.0001	-	-	-	-
	PP - Fisher Chi-square	196.616	0.0000	-	-	-	-
	Im, Pesaran and Shin W-stat	-3.40447	0.0003	-	-	-	-
	Levin, Lin & Chu t*	-4.03167	0.0000	-	-	-	-
POVERTY	ADF - Fisher Chi-square	30.2402	0.9981	88.5999	0.0036	-	-
	PP - Fisher Chi-square	170.470	0.0000	172.124	0.0000	-	-
	Im, Pesaran and Shin W-stat	0.99293	0.8396	-2.48056	0.0066	-	-
	Levin, Lin & Chu t*	8.94819	1.0000	-1.67671	0.0468	-	-

Source: authors' own calculation

As we can see from Table 2, only Official development assistance as share of gross national income (OF_AS) is stationary at level, while foreign direct investment stocks as % of GDP (FDI_STOCK) became stationary at first difference for all four tests, healthy life years and life expectancy at birth (LIFE) became stationary at first difference for all four tests, even though LLC test showed that data was stationary at level, people at risk of poverty or social exclusion (POVERTY) are stationary after first difference with a statistical significance of 5%, even though the data was stationary according to PP-Fisher Chi-test, employment rate of older workers (EMPL) became stationary at second difference even though LLC showed that data was stationary at level and at first difference the statistical significance was 20%. In all the cases the null hypothesis is rejected by the entire test and the statistical significance is lower than 5%

In Table 3 we test for unit root the variables from the second effect, the environmental one.

Table 3. Unit root tests to obtain stationary data for environmental effect.

Variable	**Test**	**Level**		**1st difference**		**2nd difference**	
		Statistic	**Prob**	**Statistic**	**Prob**	**Statistic**	**Prob**
FDI_FLOW	ADF - Fisher Chi-square	85.2518	0.0071	-	-	-	-
	PP - Fisher Chi-square	93.0712	0.0014	-	-	-	-
	Im, Pesaran and Shin W-stat	-3.5939	0.0002	-	-	-	-
	Levin, Lin & Chu t*	-1.41981	0.0778	-	-	-	-
EL_RENEW	ADF - Fisher Chi-square	0.06652	1.0000	47.8807	0.7715	226.904	0.0000
	PP - Fisher Chi-square	0.02987	1.0000	47.8807	0.7715	414.798	0.0000
	Im, Pesaran and Shin W-stat	14.6358	1.0000	-0.29862	0.3826	-10.3765	0.0000
	Levin, Lin & Chu t*	16.8123	1.0000	-6.95546	0.0000	-17.8196	0.0000
GHG	ADF - Fisher Chi-square	4.82909	1.0000	141.899	0.0000	-	-
	PP - Fisher Chi-square	5.66833	1.0000	141.899	0.0000	-	-
	Im, Pesaran and Shin W-stat	6.98898	1.0000	-7.12398	0.0000	-	-
	Levin, Lin & Chu t*	7.26539	1.0000	-14.5582	0.0000	-	-

Table 3 (cont.)

RENEW	ADF - Fisher Chi-square	0.59914	1.0000	87.0595	0.0049	-	-
	PP - Fisher Chi-square	0.01509	1.0000	92.9257	0.0014	-	-
	Im, Pesaran and Shin W-stat	10.1146	1.0000	-2.59936	0.0047	-	-
	Levin, Lin & Chu t*	8.60040	1.0000	-10.7312	0.0000	-	-
TAX	ADF - Fisher Chi-square	71.8066	0.0758	68.2590	0.1261	149.488	0.0000
	PP - Fisher Chi-square	24.0644	0.9999	74.6944	0.0482	152.800	0.0000
	Im, Pesaran and Shin W-stat	-2.51798	0.0059	-2.37781	0.0087	-7.62881	0.0000
	Levin, Lin & Chu t*	-4.77604	0.0000	-1.44476	0.0743	-14.4951	0.0000

Source: authors' own calculation

As we can see from Table 3, foreign direct investment flows (FDI_FLOW) is stationary at level with a statistical significance of 5% for all test except LLC that has a statistical significance of 7%, while greenhouse gas emissions (GHG) and share of renewable energy in gross final energy consumption (RENEW) are stationary at first difference and electricity generated from renewable sources (EL_RENEW) became stationary at second difference even though LLC test showed that data became stationary at first difference. Shares of environmental and labour taxes in total tax revenues from taxes and social contributions (TAX) become stationary at second difference, even though PP and Im, Pesaran and Shint W-test showed that data became stationary at first difference. In all the cases the null hypothesis is rejected by all the test and the statistical significance is lower than 5%, except FDI flows which is 7% for LLC test

In Table 4 we test for unit roots the variables from the economic effect

Table 4. Unit root tests to obtain stationary data for economic effect

Variable	**Test**	**Level**		**1st difference**		**2nd difference**	
		Statistic	**Prob**	**Statistic**	**Prob**	**Statistic**	**Prob**
FDI_FLOW	ADF - Fisher Chi-square	85.2518	0.0071	-	-	-	-
	PP - Fisher Chi-square	93.0712	0.0014	-	-	-	-
	Im, Pesaran and Shin W-stat	-3.59392	0.0002	-	-	-	-
	Levin, Lin & Chu t*	-1.41981	0.0778	-	-	-	-
GDP_C	ADF - Fisher Chi-square	22.8417	1.0000	131.061	0.0000	-	-
	PP - Fisher Chi-square	42.7163	0.9043	132.427	0.0000	-	-
	Im, Pesaran and Shin W-stat	1.97471	0.9758	-6.47345	0.0000	-	-
	Levin, Lin & Chu t*	-4.81395	0.0000	-13.0146	0.0000	-	-
CONS_P	ADF - Fisher Chi-square	31.6316	0.9965	327.622	0.0000	-	-
	PP - Fisher Chi-square	36.5141	0.9797	304.114	0.0000	-	-
	Im, Pesaran and Shin W-stat	0.81676	0.7930	-18.3326	0.0000	-	-
	Levin, Lin & Chu t*	0.79090	0.7855	-23.3695	0.0000	-	-

Table 4 (cont.)

CONS_T	ADF - Fisher Chi-square	0.49899	1.0000	76.5861	0.0352	169.603	0.0000
	PP - Fisher Chi-square	0.17896	1.0000	62.8669	0.2462	220.538	0.0000
	Im, Pesaran and Shin W-stat	12.6829	1.0000	-2.97186	0.0015	-7.61072	0.0000
	Levin, Lin & Chu t*	14.9254	1.0000	-8.03026	0.0000	-13.6301	0.0000

Source: author`s own calculation

As we can see from Table 4 foreign direct investment flows (FDI_FLOW) is stationary at level with a statistical significance of 5% for all test except LLC that has a statistical significance of 7%, while real GDP per capita (GDP_C)) become stationary at first difference with a statistical significance of 5% even though LLC test showed that the data was stationary at level, primary energy consumption (CONS_P) become stationary at first difference with a statistical significance of 5% and energy consumption of transport relative to GDP (CONS_T) become stationary at second difference., even though, except PP-Fisher Chi-Square test, all the test showed that the data became stationary at first difference with a statistical significance of 5%, but the statistical significance of 24% that accepted the null hypothesis forced us to use second difference. In all the cases the null hypothesis is rejected by all the test and the statistical significance is lower than 5%, except FDI flows which is 7% for LLC test

After obtaining stationary data we estimate the regression equations to see the influence of the three effects on foreign direct investments. In the first set we have the social influence. To see this influence we have selected as FDI stock as % of GDP as dependent variable and employment rate of older workers, healthy life years and life expectancy at birth, official development assistance as share of GNI and people at risk of poverty or social exclusion as independent variables.

We propose the next regression equation to illustrate the social effect:

$$FDI\_STOCK = \beta_1 + \beta_2 \cdot EMPL + \beta_3 \cdot LIFE + \beta_4 \cdot OF\_AS + \beta_5 \cdot POVERTY \quad (7)$$

To estimate this equation we used the Panel Least Squares method with an adjusted sample from 2005 to 2012, including 8 periods, 28 cross-sections with a total of 224 observations. The results of the estimation are presented in Table 5.

Table 5. Statistic results for Least Square cross data regression for social effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.501218	3.820624	-1.439874	0.1513
EMPL	-0.129862	0.063572	-2.042733	0.0423
LIFE	2.532612	0.180740	14.01244	0.0000
OF_AS	42.15330	4.954823	8.507530	0.0000
POVERTY	-0.314286	0.094704	-3.318592	0.0011
R-squared	0.626767	Mean dependent var		3.041346
Adjusted R-squared	0.619950	S.D. dependent var		1.665029
S.E. of regression	1.026460	F-statistic		91.94133
Prob(F-statistic)	0.000000			

Source: authors' own calculation

As we can see from the null value of Prob(F-statistic) the model is viable, also the standard deviation of the dependent variable is higher than standard error of the regression, but from the value of R^2 we conclude that only 63% of the variation of FDI stock as % of GDP is explained by the independent variables included in the model. We see from Table 5 that all independent variables have a statistical significance of 5% or lower.

The final regression equation for the social effect is:

$$FDI\_STOCK = -5.501218 - 0.129862 \cdot EMPL + 2.532612 \cdot LIFE + 42.1533 \cdot OF\_AS - 0.314286 \cdot POVERTY \quad (8)$$

The influence of employment and poverty is negative to the stock of FDI, while life expectancy and official assistance have a positive influence on the dependent variable.

To interpret the correlation values we use the next intervals: 0-±0.3 no correlation; ±0.3-±0.7 moderate correlation; ±0.7-±1 strong correlation (Fassil, 2009), we consider to be adequate for our study. In Table 6 we present the correlations between variables of social effect and we can conclude that the dependent variable is not strongly correlated with any of the independent variables. The highest correlation is between FDI_STOCK and LIFE_S with a value of 0.67 which means a moderate correlation and the lowest value is -0.07 between FDI_STOCK and EMPL which means no correlation at all.

Table 6. Correlation of social effect variables

	FDI_STOCK	**EMPL**	**LIFE_S**	**OF_AS**	**POVERTY**
FDI_STOCK	1.000000	-0.068378	0.675035	0.288140	-0.329042
EMPL	-0.068378	1.000000	0.102345	-0.361440	-0.600725
LIFE_S	0.675035	0.102345	1.000000	-0.145196	-0.423692
OF_AS	0.288140	-0.361440	-0.145196	1.000000	0.197490
POVERTY	-0.329042	-0.600725	-0.423692	0.197490	1.000000

Source: authors' own calculation

In the second set we have the environmental effect. In order to highlight this influence we chose foreign direct investments inward flow as dependent variable and electricity generated from renewable sources, greenhouse gas emissions, share of renewable energy in gross final energy consumption, shares of environmental and labour taxes in total tax revenues from taxes and social contributions as independent variables.

We propose the next regression equation to illustrate the environmental effect:

$$FDI\_FLOW = \beta_1 + \beta_2 \cdot EL\_RENEW + \beta_3 \cdot GHG + \beta_4 \cdot RENEW + \beta_5 \cdot TAX \quad (9)$$

To estimate this equation we used the Panel Least Squares method with an adjusted sample from 2006 to 2012, including 7 periods, 28 cross-sections with a total of 196 observations. The results of the estimation are presented in Table 7.

Table 7. Statistic results for Least Square cross data regression for environmental effect

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-76918.38	19954.32	-3.854723	0.0002
EL_RENEW	18083.09	2197.987	8.227112	0.0000
GHG	2761.516	398.2793	6.933616	0.0000
RENEW	-13591.01	829.4245	-16.38608	0.0000
TAX	11322.69	2707.563	4.181877	0.0000
R-squared	0.668127	Mean dependent var		-1466.848
Adjusted R-squared	0.661176	S.D. dependent var		7311.311
S.E. of regression	4255.809	F-statistic		96.13016
Prob(F-statistic)	0.000000			

Source: authors own calculation

As we can see from the null value of Prob(F-statistic) the model is viable, also the standard deviation of the dependent variable is higher than standard error of the regression, but from the

value of R^2 we conclude that only 67% of the variation of FDI inward flow is explained by the independent variables included in the model. We see from Table 7 that all independent variables have a statistical significance of 5% or lower

The final regression equation for the environmental effect is:

$$FDI\_FLOW = -76918.38 + 18083.09 \cdot EL\_RENEW + 2761.516 \cdot GHG - 13591.01 \cdot RENEW + 11322.69 \cdot TAX \quad (10)$$

The share of renewable energy has a negative impact on the flow of FDI, while the rest of the independent variable has a positive effect.

In Table 8 we present the correlations between variables of environmental effect and we can conclude that the dependent variable is not strongly correlated with any of the independent variables. The highest correlation is between FDI_FLOW and RENEW with a value of 0.61 which means a moderate correlation and the lowest value is -0.11 between RENEW and TAX which means no correlation. There is a strong negative correlation between independent variables, GHG and EL_RENEW of -0.97.

Table 8. Correlation of environmental effect variables

	FDI_FLOW	**GHG**	**RENEW**	**TAX**	**EL_RENEW**
FDI_FLOW	1.000000	0.207345	-0.607616	0.436156	-0.132372
GHG	0.207345	1.000000	-0.405259	0.395146	-0.970698
RENEW	-0.607616	-0.405259	1.000000	-0.105605	0.469307
TAX	0.436156	0.395146	-0.105605	1.000000	-0.267968
EL_RENEW	-0.132372	-0.970698	0.469307	-0.267968	1.000000

Source: authors' own calculation

In the third set we have the economic effect. In order to see this influence we used foreign direct investments inward flow as dependent variable and real GDP per capita, primary energy consumption and energy consumption in transport relative to GDP as independent variables

We propose the next regression equation to illustrate the economic effect:

$$FDI\_FLOW = \beta_1 + \beta_2 \cdot GDP\_C + \beta_3 \cdot CONS\_P + \beta_4 \cdot CONS\_T \quad (11)$$

To estimate this equation we used the Panel Least Squares method with an adjusted sample from 2002 to 2012, including 11 periods, 28 cross-sections with a total of 208 observations. The results of the estimation are presented in Table 9.

Table 9. Statistic results for Least Square cross data regression for economic effect

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-5366.074	407.9357	-13.15421	0.0000
GDP_C	6.672187	0.410300	16.26173	0.0000
CONS_P	-1568.685	227.5193	-6.894733	0.0000
CONS_T	-513.7140	193.2006	-2.658966	0.0083
R-squared	0.476672	Mean dependent var		-554.7571
Adjusted R-squared	0.471508	S.D. dependent var		6701.598
S.E. of regression	4871.893	F-statistic		92.29920
Prob(F-statistic)	0.000000			

Source: authors' own calculation

As we can see from the null value of Prob(F-statistic) the model is viable, also the standard deviation of the dependent variable is higher than standard error of the regression, but from the value of R^2 we conclude that only 48% of the variation of FDI inward flow is explained by the independent variables included in the model. We see from Table 9 that all independent variables have a statistical significance of 5% or lower.

The final regression equation for the economic effect is:

$$FDI\_FLOW = -5366.074 + 6.672187 \cdot GDP\_C - 1568.685 \cdot CONS\_P - 513.7140 \cdot CONS\_T \quad (12)$$

Only the GDP per capita has a positive influence on the flow of FDI, which is in correlation with the theories regarding the influence of economic development on FDI, and the other variables have a negative impact, because we used sustainable development related indicators.

Table 10. Correlation of economic effect variables

	FDI_FLOW	CONS_T	CONS_P	GDP_C
FDI_FLOW	1.000000	-0.119934	0.064065	0.608936
CONS_T	-0.119934	1.000000	0.157405	0.057223
CONS_P	0.064065	0.157405	1.000000	0.531129
GDP_C	0.608936	0.057223	0.531129	1.000000

Source: authors' own calculation

In Table 10 we present the correlations between variables of economic effect and we can conclude that the dependent variable is not strongly correlated with any of the independent variables. The highest correlation is between FDI_FLOW and GDP_C with a value of 0.61 which means a moderate correlation and the lowest value is -0.06 between FDI_FLOW and CONS_P which means no correlation at all.

The results of this study show us that sustainable development has a significant influence on the flow and stock of FDI at EU level. As expected environmental related indicators have the most important influence on FDI explaining 63% of their evolution. Because we use the economic indicators available from the EU-SDIs, this field had a negative influence on the FDI evolution, even though the GDP per capita has a positive influence; this being the most important economic indicator that links the FDI evolution to economic growth and country development. We have to keep in mind that, even though the concept of sustainable development most than 25 years, the most important evolution in implementing its principles have been realized in the last years after the financial crisis of 2008. So, in order to see how the new policy influences the flow and stock of FDI, more time has to pass to gather the necessary data to see if the growth of sustainable development impact on FDI. Also there might be a different impact according to the development of the country.

Conclusions

The results showed us that the most important influence on FDI is made by environmental effect followed by social effect and economic effect of sustainable indicators.

Environmental effect is one of most important because of the need for investments in climate change reduction projects and a greener way of doing business. In the case of greenhouse gas emissions reduction goals, FDI can ease the burden of financing from the shoulders of governments.

Most important targets where FDI can go are green investments that generate an increase in clean energy production and clean tech innovation. Renewable energy development is one of the most important fields of nowadays and the reduction of costs and increasing efficiency of renewable sources generates an important flow of FDI to this field.

Social effect is closely related to economic growth which generates a dynamic economic system that can allocate financial sources to social sustainability projects like an increased employment because of the work force demand, increased years of life because of better medical assistance and an evolution in poverty eradication which is one of the main goals of our society.

The public authorities can shape the input and output flows of FDI through both public policies and the financing of investment vehicles such as state-owned companies or sovereign wealth funds. In addition, following the development of a country, we observe the transformation from a net receiver of FDI into a major supplier of foreign capital for various national economies.

Changing investment policies both in developed and in developing countries due to the changes that have occurred in several areas such as raising the importance of FDI, the emergence of new investors financed by public authorities, international financial crisis, the need to promote development principles sustainable. Developing countries are the main recipients of FDI, this trend can be observed since 2010. This year was the first year that FDI received by developing countries accounted for more than half of global flows, due, in a major part, to cut of investment flows in developed countries. Moreover, these countries have also become suppliers of FDI as their level of development has increased. This was validated by numerous econometric studies. Dunning launched in the literature the investment development path theory, a theory which was later developed by other specialists, among them being Narula.

Taking in account the results of the analysis made, there are many connections between the sustainable development and FDI and FDI are more important in the battle of achieving the SDGs because the private initiatives can replace the public efforts.

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