

## SEARCHING FOR HUMAN CAPITAL DETERMINANTS OF FOREIGN DIRECT INVESTMENT INFLOWS IN THE EU NEW MEMBER STATES

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*ABSTRACT: The specific levels and patterns of foreign direct investment in the Central and Eastern European countries could not be fully explained taking into account only the traditional economic determinants, as shown in the empirical studies undertaken so far. Hence, we search for some foreign direct investment determinants related with human capital, using panel data techniques, and show that some of the human capital measures are positively correlated with foreign direct investment inflows in Central and Eastern Europe.*

*Key words: foreign direct investment, human capital*

*JEL codes: F21, J24, C23*

### Introduction

The foreign direct investment (FDI) inflows into the Central and Eastern European economies have been a vital factor in the first stage of the privatization process during the transition period. As the privatization and restructuring process came to an end, the main reasons to pursue FDI in this region are to boost productivity, encourage employment, stimulate innovation and technology transfer, and to enhance sustained economic growth (see Mueller and Goic (2002)).

According to a survey by Ernst & Young (2008), Central and Eastern Europe is regarded by international executives as the third most attractive foreign investment locale after Western Europe and China and is the second most favoured place for investment in the manufacturing industries.

Analyzing the specific patterns of FDI inflows, a very recent study undertaken by Price Waterhouse Coopers (2010) found that FDI as a share of GDP was higher in Central and Eastern European countries with higher relative per capita incomes, lower relative labour costs in manufacturing, lower investor riskiness as measured by credit risk premia on investment and achieved or probable EU membership. But, the study also points out at country-level differences which did not change over time and could not be explained by the variables included in the tested model. So along traditional economic determinants of FDI there must be also others, of non-economical nature.

Having in mind this idea, we consider that a possible specific determinant of FDI inflows in Central and Eastern Europe could be human capital in the host country.

In order to empirically investigate this hypothesis, we selected as our sample the ten new member states of European Union. All these countries share common characteristics such as: all of them are developing countries and all of them experienced an economic transition to market economy, and as EU members are all inter-connected into a unique framework and also have inter-functional mechanisms.

So, using specific panel data methods we tested the statistical significance as determinant of FDI inflows for several measures of human capital, like the ones related to health (life expectancy

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at birth, breakdown by sexes, or fertility rate) and the ones related to education (rate of enrolment in secondary education, rate of enrolment in tertiary education, average number of foreign languages learned per pupil, literacy rate).

As expected, some of these human capital measures are positively related to FDI inflows at an acceptable statistical significance level.

### **Literature review**

The traditional view on FDI determinants take into account the exchange rates, taxes, institutions or trade protection.

We have to mention that while theoretical papers are generous in solid and consistent models, the empirical work is still inconclusive. For example, two of the most influential papers in this field, Campa (1993) and Goldberg and Kolstad (1995) have apparently contradictory hypothesis which both confirm using US datasets.

The effect of exchange rates on FDI has been examined both with respect to changes in the bilateral level of the exchange rate between countries and in the volatility of exchange rates. All of these models are firm level models of FDI decisions. First, Froot and Stein (1991) concluded that appreciation of host country currency may actually increase foreign investment. Other studies have generally found consistent evidence that short-run movements in exchange rates lead to increased inward FDI, including Grubert and Mutti (1991), Swenson (1994), and Kogut and Chang (1996).

Another important determinants of FDI highlighted in the literature are taxes. Most of the studies, starting with seminal paper of Hartman (1984), are dealing with the impact of corporate income tax from host countries on FDI inflows. While the main strand of the literature in this field focused on corporate income taxes, Desai et al. (2004) pointed to the impact of the indirect business taxes on FDI flows. Bilateral tax treaties pointed at FDI were shown to have a little impact on FDI flows in recent papers like Hallward-Dreimeier (2003) and Blonigen and Davies (2004).

Various studies pointed out the importance of institutions and their quality for FDI decisions of multinational firms. For example, Wei (2000) showed that a variety of corruption indices are strongly and negatively correlated with FDI.

The link between foreign direct investment and trade protection is very obvious: greater the trade protection in a country, greater will be the costs of a firm which exports in that country. So this is a good reason to make a FDI in that country. Despite this simple rationale, the empirical studies provide mixed results (see for instance Blonigen (1997)).

We also found in the literature some studies that tried to find some non-economic determinants of foreign direct investment. A consistent modelling of foreign direct investment flows needs to take into account not only the traditional determinants considered in the literature, but also variables linked to the institutional environment in which such investment is undertaken. Altomonte (2000) showed that the design of an efficient, transparent and enforceable legal and institutional framework is shown to be a crucial determinant of foreign direct investment by modifying investors' expectations. Using a relational approach, Bandelj (2002) showed that political, migration, trade and cultural relations between investor and host countries have strong positive effects on FDI flows.

Regarding Central and Eastern European Countries, using a panel dataset of bilateral flows of foreign direct investment, Bevan and Estrin (2004) showed that in choosing a location in Central and Eastern European for an international investment a set of economic factors such as unit labour costs, gravity factors, market size, and proximity are crucial. Carstensen and Toubal (2004) showed that market potential, low relative unit labour costs, a skilled workforce and relative endowments, the level and method of privatization and the country risk have significant and plausible effects on FDI inflows. Analysing the international investment decisions of the French multinational firms in Central and Eastern Europe, Disdier and Mayer (2004) found that institutional quality is the main determinant of the location decisions. Janicki and Wunnava (2004)

Human capital importance for FDI decisions is highlighted in papers such as Noorbakhsh Paloni and Youssef (2001), which showed that human capital is one of the most important determinants of FDI inflows for developing countries.

### **Research methodology**

The starting idea of our research is that along economic determinants of foreign direct investment another set of factors could play a significant role in attracting foreign direct investment inflows. The theoretical and empirical studies realized so far point out that social capital is a factor which is taken into account in multinational firms international investment decisions.

When we are referring to social capital existing in an economy, we have in mind its broader definition, including into discussion human capital features, cultural values, political rights and freedoms, religion beliefs and economic freedom characteristics.

We consider that human capital could be an important factor in attracting foreign direct investment inflows because multinational corporations which undertake such investment are looking for certain workforce skills levels and endowments.

Cultural values could also play a role in international investment decisions, because is more likely that firm to search for environments with similar cultural features as origin country when choosing a location for a foreign direct investment.

Political status in host country could also be a determinant of foreign direct investment, investor including in their decision function variables like the extension of political rights and freedoms, the stability of the political regime, and the existence of some bilateral political treaties between investor and host countries.

Even if it is less documented in the literature, religion could also play a role in international investment decisions undertaken by firms. It is more likely for a multinational corporation to choose as a location for its abroad investment a host country with the same dominant religion belief as in home country.

Economic freedom in host countries is likely to influence foreign direct investment inflows through the degree of markets liberalization, the level of trade restrictions the degree of freedom to operate on the market and so on.

From the diversity of social capital components which seem to have an impact on foreign direct investment inflows into a country we choose to restrict our empirical research only to human capital related factors. Of course, local human capital is required to absorb foreign direct investment and to achieve a successful technology transfer.

In order to test the hypothesis that human capital in the host economy plays a significant role in attracting foreign direct investment inflows, we choose a sample that consists in the ten European Union New Member States (Bulgaria – BG, Czech Republic – CE, Estonia – ES, Latvia – LE, Lithuania – LI, Hungary – UN, Poland – PO, Romania – RO, Slovenia – SN and Slovakia - SC), which fit very well together because all of them share common characteristics and historical background.

First of all, in order to highlight the long term induced effects of these human capital FDI determinants, the original data were “cleaned” by uni-periodic shocks, taking into account only their trend. The estimation methodology for the trend is based on weighted moving average (MMP), because such approach offers the possibility to take into account the possible structural breaks in the data sets and also reveals the long term trend:

$$MMP(X_t) = \sum_{i=1}^t \frac{i}{\sum_{j=1}^t j} X_i \quad (1)$$

Regarding the econometric techniques used, we processed the data in a “panel” system, combining time series and data corresponding to different countries. We propose the following simple “pool data” regressive model:

$$Y_{it} = \alpha + \beta_i x X_{it} + \varepsilon_{it} \quad (2)$$

where:

- $Y_{it}$  is the dependent variable;
- $\alpha$  is the free term coefficient;
- $\beta_i$  are the independent variables coefficients;
- $X_{it}$  are the independent variables;
- $\varepsilon_{it}$  is a stochastic variable;
- $i$  is the number of “sections” used to run the regression;
- $t$  is time period.

As a dependent variable we used foreign direct investment inflows as a percentage of GDP, and as independent variables we used several measures of human capital like: life expectancy at birth, differentiated by sexes, fertility rate, persons with lower secondary education attainment (as % of total population aged 15 to 64), persons with upper secondary education attainment (as % of total population aged 15 to 64), persons with tertiary education attainment (as % of total population aged 15 to 64), foreign languages learned per pupil and mathematics, science and technology enrolments and graduates (as % of all graduates).

We choose only these independent variables because our intention is not to build a comprehensive model of foreign direct investment, but only to highlight some possible determinants which express the quality features of the workforce. In a future research, using the insights depicted from this paper, we intend to extend our work in order to build a foreign direct investment model for developing countries.

We used data for all these countries from Eurostat, the official European Union statistical database, for a period of ten years, ranging from 1999 to 2008.

The obtained results for the pool data regressions are presented in detail in the Annexes. The synthesized form of these results is reported in the following table:

Table no. 1

**Estimation results**

<b>Independent Variable</b>	<b>Estimated Coefficient</b>	<b>Standard Error</b>	<b>t-Statistics</b>	<b>Probability</b>
Life expectancy at birth - Females	-0.280188	0.162737	-1.721730	0.0897
Life expectancy at birth - Males	0.157414	0.101776	1.546678	0.1266
Fertility rate	22.47266	3.311426	6.786401	0.0000
Persons with lower secondary education attainment (as % of total population aged 15 to 64)	-0.108641	0.036271	-2.995240	0.0036

<b>Independent Variable</b>	<b>Estimated Coefficient</b>	<b>Standard Error</b>	<b>t-Statistics</b>	<b>Probability</b>
Persons with upper secondary education attainment (as % of total population aged 15 to 64)	0.048506	0.039702	1.221744	0.2251
Persons with tertiary education attainment (as % of total population aged 15 to 64)	0.094938	0.045381	2.092036	0.0393
Foreign languages learned per pupil	-0.259073	0.543147	-0.476985	0.6349
Mathematics, science and technology enrolments and graduates (as % of all graduates)	0.132560	0.079001	1.677967	0.0966

*Source: Authors calculations using E-Views.*

As it could easily see, at a 5% significance level, only three out of eight independent variables have an adequate statistical relevance.

The fertility rate is positively correlated with foreign direct investment inflows: higher the fertility rate is, higher seems to be the foreign direct investment inflows, showing that one of the variables of the international investment decision function is the (potential) availability of the manpower.

At odds with the theoretical predictions, the percentage of persons with lower secondary education attainment is negatively correlated with the foreign direct investment inflows. This is a specific feature for Central and Eastern European countries, which individualizes these countries in the larger group of the developing countries.

Another specific feature which differentiates the Central and Eastern European countries from the rest of the developing countries is that foreign direct investment flows are positively correlated with the percentage of persons with tertiary education attainment. This situation could be explained if we remind that at the beginning of the transition period, comparative with other developing countries, the Central and Eastern European countries have both higher levels and higher quality of human capital. It seems that international investors took into account this situation and favored these countries for their foreign direct investment, having all the human capital prerequisites for a quicker technological transfer.

If one accepts a 10% level of statistical significance, the importance of the quality of the human capital for smooth technological transfer between investor and host countries is proved by the positive correlation between the percentage of mathematics, science and technology enrolments and graduates and foreign direct investment inflows.

Other explanatory variables used in estimations seem not to be related with foreign direct investment inflows: foreign languages learned per pupil, the percentage of persons with upper secondary education attainment and life expectancy at birth.

### **Conclusions**

Foreign direct investment inflows in Central and Eastern Europe have specific patterns and human capital determinants, different from the ones specific to the rest of the developing countries. Our estimations showed that for these countries the quality of the human capital matters in attracting foreign direct investment inflows. It seems that foreign investors in these countries are

seeking for quick and smooth technological transfer and, hence, value the most the level and the quality of the human capital.

This could be an indicator for public authorities from Central and Eastern Europe countries which are competing for attracting more foreign direct investment. In order to be a more attractive location for international investment it is necessary to invest in education, especially at tertiary level and in the math, science and technical fields.

Of course, our approach is a limited one, because we did not built and tested a comprehensive model of foreign direct investment, and only looked as several possible human capital determinants of the foreign direct investment inflows.

As directions for further research, we intend to broad our approach by taking into account in future research as possible determinants of foreign direct investment inflows: the influence of cultural specific characteristics (quantified by Hofstede's cultural dimensions or different measures of culture extracted from World Value Surveys), the impact of political status (political freedom, the degree of democracy, the stability of the political regime, the existence of some bilateral treaties between investor and host countries), the possible effects of religion (the investor country could or could not share the same dominant religion with the host country), or the economic freedom, especially the degree of liberalization of the internal markets in the host country. Also, it could be useful a breakdown of foreign direct investment inflows determinants by investor country or by economic sector.

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**Annexes**

**1. Estimation results for independent variable: Life expectancy at birth – Females**

Dependent Variable: ISD?

Method: Pooled EGLS (Cross-section weights)

Sample (adjusted): 2002 2008

Included observations: 7 after adjustments

Cross-sections included: 10

Total pool (balanced) observations: 70

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	26.87660	12.69613	2.116913	0.0379
SVF?	-0.280188	0.162737	-1.721730	0.0897

**Weighted Statistics**

R-squared	-0.171949	Mean dependent var	7.394578
Adjusted R-squared	-0.189184	S.D. dependent var	2.892517
S.E. of regression	3.154281	Sum squared resid	676.5653
F-statistic	-9.977018	Durbin-Watson stat	0.116525
Prob(F-statistic)	1.000000		

**Unweighted Statistics**

R-squared	-0.041415	Mean dependent var	6.130952
Sum squared resid	880.9659	Durbin-Watson stat	0.117228

Results generated using EViews 5.1.

**2. Estimation results for independent variable: Life expectancy at birth – Males**

Dependent Variable: ISD?

Method: Pooled EGLS (Cross-section weights)

Sample (adjusted): 2002 2008

Included observations: 7 after adjustments

Cross-sections included: 10

Total pool (balanced) observations: 70

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.538201	7.026693	-0.788166	0.4333
SVB?	0.157414	0.101776	1.546678	0.1266

**Weighted Statistics**

R-squared	0.298592	Mean dependent var	7.961440
Adjusted R-squared	0.288277	S.D. dependent var	3.774663
S.E. of regression	3.184443	Sum squared resid	689.5662
F-statistic	28.94787	Durbin-Watson stat	0.134599
Prob(F-statistic)	0.000001		



Unweighted Statistics

R-squared	-0.081599	Mean dependent var	6.130952
Sum squared resid	914.9584	Durbin-Watson stat	0.107257

Results generated using EViews 5.1.

**3. Estimation results for independent variable: Fertility rate**

Dependent Variable: ISD?

Method: Pooled EGLS (Cross-section weights)

Sample (adjusted): 2002 2008

Included observations: 7 after adjustments

Cross-sections included: 10

Total pool (balanced) observations: 70

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-23.75447	4.336877	-5.477321	0.0000
RNT?	22.47266	3.311426	6.786401	0.0000

Weighted Statistics

R-squared	0.578122	Mean dependent var	8.027617
Adjusted R-squared	0.571918	S.D. dependent var	4.620837
S.E. of regression	3.023319	Sum squared resid	621.5512
F-statistic	93.18417	Durbin-Watson stat	0.177340
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.000461	Mean dependent var	6.130952
Sum squared resid	845.5416	Durbin-Watson stat	0.102241

Results generated using EViews 5.1.

**4. Estimation results for independent variable: Persons with lower secondary education attainment (as % of total population aged 15 to 64)**

Dependent Variable: ISD?

Method: Pooled EGLS (Cross-section weights)

Sample (adjusted): 2001 2009

Included observations: 9 after adjustments

Cross-sections included: 10

Total pool (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.060793	0.949770	8.487099	0.0000
LSE?	-0.108641	0.036271	-2.995240	0.0036

Weighted Statistics			
R-squared	0.390724	Mean dependent var	8.426175
Adjusted R-squared	0.383800	S.D. dependent var	4.069929
S.E. of regression	3.194829	Sum squared resid	898.2100
F-statistic	56.43367	Durbin-Watson stat	0.153056
Prob(F-statistic)	0.000000		
Unweighted Statistics			
R-squared	-0.074947	Mean dependent var	6.114630
Sum squared resid	1238.413	Durbin-Watson stat	0.089283

Results generated using EViews 5.1.

**5. Estimation results for independent variable: Persons with upper secondary education attainment (as % of total population aged 15 to 64)**

Dependent Variable: ISD?

Method: Pooled EGLS (Cross-section weights)

Sample (adjusted): 2001 2009

Included observations: 9 after adjustments

Cross-sections included: 10

Total pool (balanced) observations: 90

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.183406	2.398861	0.910184	0.3652
USE?	0.048506	0.039702	1.221744	0.2251

Weighted Statistics			
R-squared	-0.069727	Mean dependent var	7.486172
Adjusted R-squared	-0.081883	S.D. dependent var	2.948121
S.E. of regression	3.066447	Sum squared resid	827.4728
F-statistic	-5.736028	Durbin-Watson stat	0.127251
Prob(F-statistic)	1.000000		
Unweighted Statistics			
R-squared	-0.123933	Mean dependent var	6.114630
Sum squared resid	1294.849	Durbin-Watson stat	0.086322

Results generated using EViews 5.1.

**6. Estimation results for independent variable: Persons with tertiary education attainment (as % of total population aged 15 to 64)**

Dependent Variable: ISD?

Method: Pooled EGLS (Cross-section weights)

Sample (adjusted): 2001 2009

Included observations: 9 after adjustments

Cross-sections included: 10

Total pool (balanced) observations: 90

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.910020	0.640214	6.107366	0.0000
PSS?	0.094938	0.045381	2.092036	0.0393

Weighted Statistics

R-squared	0.384362	Mean dependent var	8.422919
Adjusted R-squared	0.377366	S.D. dependent var	4.209327
S.E. of regression	3.321459	Sum squared resid	970.8240
F-statistic	54.94122	Durbin-Watson stat	0.134899
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	-0.004960	Mean dependent var	6.114630
Sum squared resid	1157.783	Durbin-Watson stat	0.096380

Results generated using EViews 5.1.

**7. Estimation results for independent variable: Foreign languages learned per pupil**

Dependent Variable: ISD?

Method: Pooled EGLS (Cross-section weights)

Sample (adjusted): 2001 2007

Included observations: 7 after adjustments

Cross-sections included: 10

Total pool (balanced) observations: 70

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.339213	0.706706	7.555071	0.0000
LSI?	-0.259073	0.543147	-0.476985	0.6349

Weighted Statistics

R-squared	0.379194	Mean dependent var	7.242892
Adjusted R-squared	0.370064	S.D. dependent var	3.517330
S.E. of regression	2.791652	Sum squared resid	529.9460
F-statistic	41.53494	Durbin-Watson stat	0.161336
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	-0.083123	Mean dependent var	5.846810
Sum squared resid	691.9743	Durbin-Watson stat	0.150259

Results generated using EViews 5.1.

**8. Estimation results for independent variable: Mathematics, science and technology enrolments and graduates (as % of all graduates)**

Dependent Variable: ISD?

Method: Pooled Least Squares

Sample (adjusted): 2000 2009

Included observations: 10 after adjustments

Cross-sections included: 10

Total pool (unbalanced) observations: 99

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.523933	1.581461	2.228277	0.0282
STS?	0.132560	0.079001	1.677967	0.0966

R-squared	0.028208	Mean dependent var	6.112626
Adjusted R-squared	0.018189	S.D. dependent var	3.491897
S.E. of regression	3.459994	Akaike info criterion	5.340406
Sum squared resid	1161.241	Schwarz criterion	5.392833
Log likelihood	-262.3501	F-statistic	2.815575
Durbin-Watson stat	0.128036	Prob(F-statistic)	0.096573

Results generated using EViews 5.1.