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The Relationship between Foreign Direct Investment Inflows and Labour Productivity

Viorela Beatrice Iacovoiu, Adrian Stancu

Faculty of Economic Sciences, Petroleum-Gas University of Ploieşti, Bd. Bucureşti 39, 100680, Ploieşti, Romania
e-mail: vioiacovoiu@yahoo.com, astancu@upg-ploiesti.ro

Abstract

Theoretically, foreign direct investments (FDI) could play a significant role in increasing the productivity of the host economy. Starting from this idea, the analysis presented in this paper emphasizes the correlation between foreign direct investment inflows given by inward FDI stock, as independent variable, and labour productivity given by Gross Domestic Product per capita, as dependent variable, using the IBM® SPSS® Statistics Version 22 software. The findings showed that only 37.4% of the variation of labour productivity, given by the GDP per capita, is explained by the level of inward FDI stock. Thus, the quantity of inward foreign direct investment flows does not significantly influence the level of labour productivity of the host country. Consequently, our conclusion is that the positive impact of FDI received by any given country on labour productivity growth is much stronger when foreign companies are targeting the efficiency increase, because the technology and knowledge transferred by these companies influence both directly and indirectly, through training effects, the labour productivity of the host country.

Keywords: *foreign direct investment; inward stock; labour productivity; correlation.*

JEL Classification: *F21; F23; O52*

Introduction

As many theorists in the field underline, one of the most important effect of the foreign direct investment (FDI) on the host economy reflects in the productivity increment that can be sustained by the technologies and know-how transferred by the foreign companies. In this respect, most of the researches developed concluded that the productivity of the foreign investment subsidiaries exceeds the local competitiveness productivity from a certain economic segment (Iacovoiu, 2009; Panait and Voica, 2017). Moreover, following the pressures exercised by the local suppliers for producing quality input, it is likely for the national companies to improve performances by modernizing the production and improving the personnel qualification with direct impact on the productivity growth. Consequently, technology and knowledge transfer by means of FDI influences both directly and indirectly, through training effects, the labour productivity within the activity field where the foreign investment has been achieved (Iacovoiu, 2018; Matei, 2004; Voica, Panait and Haralambie, 2015; Ulku, 2004; Zaman, et al., 2011).

Foreign companies can achieve technological transfer, either by internalizing (transfer towards subsidiaries), or by externalizing (franchising, licensing, technical assistance). As compared to externalizing, technology internalizing, by means of FDI, is cheaper and more rapid, providing the access to all technical, organizational actives and the transnational corporation (TNC) capabilities (Akçomak and Bas ter Weel, 2008; Boudier-Bensebaa, 2008; Iacovoiu, 2016). The technology transfer includes both the physical goods (capital goods) and the unspoken knowledge (that implies new qualifications, technical and organizational capabilities), the latter one becoming more and more important in the last years (Iacovoiu and Stancu, 2017; Panait and Voica, 2017).

From the point of view of the target country, the technological transfer by FDI, envisages a multitude of advantages, namely the most important: making use of new technologies, whose implementation implies improving the workers' knowledge and abilities; the technological diffusion, knowledge and capabilities that positively influence upon the economic agents that TNC relates with (suppliers, subcontractors, competing companies), reflecting upon the costs and the quality of the goods and services supplied; the development of the relations between TNC and the local institutions (research institutes, universities, standard and quality control institutions, professional training centers); stimulating the competition and urging the intern companies to direct their efforts towards a technologies activity; by attracting the TNC employees by the local firms it is obtained a dispersion of the technological and managerial practices (Dunning, 2006; Narula and Dunning, 2010; Narula and Guimón, 2010).

Consequently, by means of externalizing and training, the local companies can have access to the technologies transferred by the foreign companies. Despite all these, in case the local companies don't improve their performances, by means of operational and technological adjustments, situations may come up when, because of the competition on the foreign market, they risk being taken off the market. Moreover, the local companies can also deal with a loss of qualified personnel, in case the foreign companies attracted it. As a consequence, despite the positive effects, the presence of the transnational corporations may engender negative effects, due to some restrictive practices.

The practice pointed out that the technological transfer achieved by the foreign companies is much more increased when TNC has as main object the efficiency increase, in which case they shall develop productive actives in the host country. In this respect, the best example is represented by the automobile production that attracted over 6% of the FDI inflows in Central and Eastern European (CEE) countries, where the technological transfer is significantly increased due to the fact that TNC targeted the development of new regional production centres with increased efficiency, based on the lower production costs (Iacovoiu, 2018). In the meantime, as long as the foreign companies use local pre-existent supplier networks (after having bought the state-owned companies) and impose to them high quality standards, a better dissemination of the transferred technology within the target company may occur.

Regarding the impact of inward FDI flows upon productivity growth of the CEE countries new members of European Union, an empirical study (Iacovoiu, 2009) showed that "the force of the FDI contribution at the labour productivity growth differed according to the level and structure of the foreign capital, as well as the innovative capabilities and the existing human resources in the host economy". According to the findings of this empirical research, "the technology and knowledge transfer related to FDI inflows with positive impact on the labour productivity it was much more increased in the CEE countries that benefited from a more advanced national innovation system and a higher qualification of the labour force".

Therefore, most of the theories and studies in the field emphasize that there is a direct relationship between foreign direct investment inflows and labour productivity growth, enhanced by the technologies and knowledge transferred by the foreign companies.

Starting from theories and findings above, the main goal of this paper is to emphasize the extent to which only the inward FDI level determines the labour productivity of the host country. In other words, we aim to answer to the following question: *Does the quantity of FDI inflows significantly influence the level of labour productivity of the host country?*

Data and Methodology

In order to empirically analyse the relationship between the level of foreign direct investment inflows and labour productivity we selected two representative indexes, namely:

- Inward FDI stock for the year 2016 that emphasize the degree of penetrability of foreign capital within the host economy;
- Gross Domestic Product (GDP) per capita at the level of the year 2017 that emphasize the labour productivity at macroeconomic level.

The values of the analysed indexes for 174 countries worldwide are presented in Appendix.

Taking into consideration the theoretical relationship between the analysed indicators, underlined above, we considered the GDP per capita as depending variable and the inward FDI stock as independent one.

$$\text{GDP/capita} = f(\text{Inward FDI stock}) \quad (1)$$

We used the IBM® SPSS® Statistics Version 22 software for analysing the data and we considered only models for which the value of significance probability (Sig.) is lower than 5%. The model with the higher coefficient of determination value (R Square) is the one that best describes the correlation between variables.

Results and Discussions

In Table 1 the values of F and R Square and of the parameters of the regression equations are presented.

Table 1. Values of F and R Square and of the parameters of the regression equation (Dependent Variable: GDP per capita; Independent variable: Inward FDI stock)

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	.164	33.737	1	172	.000	11715.658	.014		
Logarithmic	.297	72.677	1	172	.000	-28979.962	4412.806		
Inverse	.007	1.210	1	172	.273	14202.478	-133597.742		
Quadratic	.298	36.300	2	171	.000	8989.037	.042	-5.277E-9	
Cubic	.354	31.087	3	170	.000	6831.394	.093	-5.754E-8	6.768E-15
Power	**.374**	**102.819**	**1**	**172**	**.000**	**148.225**	**.372**		
Compound	.114	22.128	1	172	.000	4793.863	1.000		
S-curve	.007	1.180	1	172	.279	8.633	-9.901		
Logistic	.114	22.128	1	172	.000	.000	1.000		
Growth	.114	22.128	1	172	.000	8.475	8.704E-7		
Exponential	.114	22.128	1	172	.000	4793.863	8.704E-7		

Source: Authors own calculation based on data in Appendix

Given the findings underlined above, the model that best describes the association between the GDP/capita and inward FDI stock is the power model because 37.4% of the variation in the GDP per capita is explained by the level of inward FDI stock.

The power regression equation is:

$$\text{GDP/capita} = 148.225 \times (\text{Inward FDI stock})^{.372} \quad (2)$$

The position of the fitting line against the distribution of the data points for the power model is shown in Figure 1.

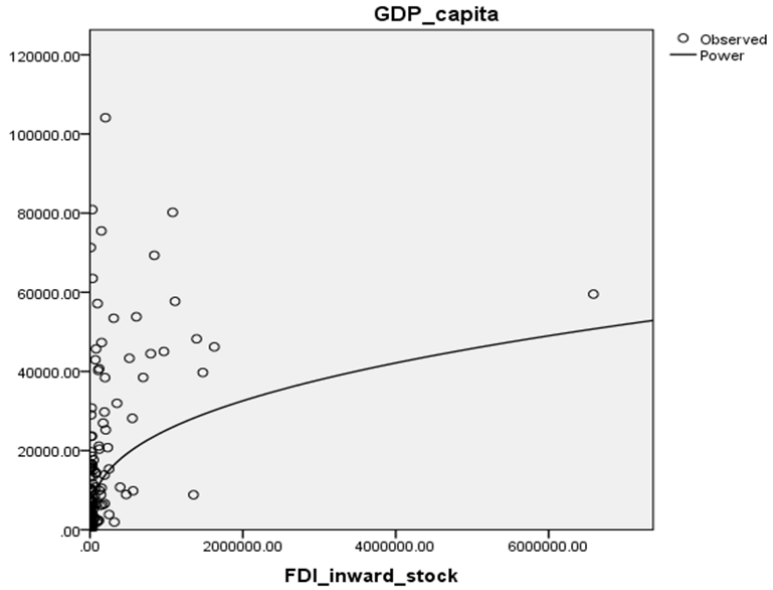

Fig. 1. The Power Model

Source: Authors own calculation based on data in Table 1.

Conclusions

The results of the analysis carried out showed that there is a weak positive relationship between the level of inward FDI stock, as independent variable, and GDP per capita, as dependent one. Thus, the correlation coefficient's values (R square) were between 0.007, in the case of the inverse model, and 0.374 in the case of the power model. Therefore, the power regression equation is the one that best describes the relationship between the level of inward FDI stock and the labour productivity of the host country.

The findings above show that only 37.4% of the variation of labour productivity, given by the GDP per capita, is explained by the level of inward FDI stock. Consequently, *the quantity of inward foreign direct investment flows does not significantly influence the level of labour productivity of the host country*. As theory pointed out, there are other factors such as the structure of the FDI inflows that account in a much higher degree, because the technology and knowledge transfer by the foreign companies is the one that influences both directly and indirectly, through training effects, the labour productivity of the host country. This means that the positive impact of foreign capital received by any given country on labour productivity growth is much stronger when most of the foreign direct investment is targeting the efficiency increase.

Given the fact that the technological transfer associated to foreign direct investment inflows is significantly higher when foreign companies are targeting the efficiency increase, the innovative capabilities of the host economy and labour force qualification are also important factors related to the impact of FDI received on labour productivity.

Consequently, in our opinion any econometric models used for the analysis of the relationship between the foreign direct investment inflows and labour productivity should take into consideration both the level and structure of inward FDI stock as well as some other important factors, such as the qualification of the local labor force or innovative capabilities.

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APPENDIX

No.	COUNTRIES	FDI inward stock[1] (Mil.US$)	GDP/capita[2] (US$/capita)
1	Afghanistan	1,376.24	585.9
2	Albania	4,985.20	4,537.90
3	Algeria	27,863.61	4,123.40
4	Angola	29,184.14	4,095.81
5	Antigua and Barbuda	742.74	15,021.70
6	Argentina	74,868.35	14,402.00
7	Armenia	4,634.84	3,936.80
8	Australia	606,139.74	53,799.90
9	Austria	151,915.52	47,290.90
10	Azerbaijan	26,683.10	4,131.60
11	Bahamas	19,705.98	30,762.00
12	Bahrain	26,055.32	23,655.00
13	Bangladesh	14,539.32	1,516.50
14	Barbados	6,791.60	16,788.70
15	Belarus	18,622.50	5,726.00
16	Belgium	515,054.60	43,323.80
17	Belize	2,098.90	4,905.50
18	Benin	1,705.43	829.8
19	Bhutan	137.49	3,110.20
20	Bolivia	11,563.70	3,394.00
21	Bosnia and Herzegovina	6,917.55	5,180.60
22	Botswana	5,041.75	7,595.60
23	Brazil	563,539.49	9,821.40
24	Bulgaria	42,994.16	8,031.60
25	Burkina Faso	2,061.49	670.7
26	Burundi	241.38	320.1
27	Cabo Verde	1,623.72	3,209.70
28	Cambodia	18,165.52	1,384.40
29	Cameroon	5,602.32	1,446.70
30	Canada	965,881.43	45,032.10
31	Central African Republic	633.25	418.4
32	Chad	5,104.22	669.9
33	Chile	248,623.71	15,346.40
34	China	1,354,613.00	8,827.00
35	Colombia	164,499.62	6,301.60
36	Comoros	110.43	797.3
37	Congo	16,847.07	1,658.00
38	Congo, Democratic Republic of the	21,186.81	457.8
39	Costa Rica	33,530.07	11,630.70
40	Côte d'Ivoire	7,696.74	1,662.40
41	Croatia	27,601.98	13,294.50
42	Cyprus	206,209.68	25,233.60
43	Czech Republic	121,854.62	20,368.10
44	Denmark	97,766.28	57,141.06
45	Djibouti	1,789.48	1,927.60
46	Dominica	328.31	7,609.60

Appendix (cont.)

47	Dominican Republic	32,952.90	7,052.30
48	Ecuador	16,658.58	6,198.90
49	Egypt	102,324.00	2,412.70
50	El Salvador	9,046.72	3,889.30
51	Equatorial Guinea	13,410.83	9,850.00
52	Estonia	19,741.22	19,704.70
53	Ethiopia	14,925.75	767.6
54	Fiji	4,093.50	5,589.40
55	Finland	80,564.57	45,703.30
56	France	694,859.16	38,476.70
57	Gabon	7,991.29	7,220.70
58	Gambia	359.90	483
59	Georgia	14,575.10	4,078.30
60	Germany	794,527.13	44,469.90
61	Ghana	29,882.30	1,641.50
62	Greece	24,615.40	18,613.40
63	Grenada	882.01	10,376.20
64	Guatemala	14,603.36	4,471.00
65	Guinea	3,737.43	825
66	Guinea-Bissau	152.78	723.7
67	Guyana	2,973.17	4,725.30
68	Haiti	1,370.11	765.7
69	Honduras	13,843.80	2,480.10
70	Hong Kong, China	1,626,013.41	46,193.60
71	Hungary	80,699.27	14,224.80
72	India	318,319.65	1,939.60
73	Indonesia	249,859.42	3,846.90
74	Iran, Islamic Republic of	48,468.89	5,415.20
75	Ireland	840,663.87	69,330.70
76	Iceland	9,841.00	71,314.77
77	Israel	107,483.00	40,270.30
78	Italy	352,633.67	31,953.00
79	Jamaica	15,026.78	5,109.60
80	Japan	196,613.88	38,428.10
81	Jordan	32,162.51	4,129.80
82	Kazakhstan	142,844.63	8,837.50
83	Kenya	11,520.17	1,507.80
84	Kiribati	11.61	1,685.20
85	Korea, Republic of	188,877.00	29,742.80
86	Kuwait	14,968.27	29,040.40
87	Kyrgyzstan	5,245.52	1,219.80
88	Lao PDR	5,746.50	2,457.40
89	Latvia	14,234.52	15,594.30
90	Lebanon	60,784.77	8,523.70
91	Lesotho	590.57	1,181.80
92	Liberia	8,332.89	456.1
93	Libya	18,461.90	5756.42
94	Lithuania	14,678.91	16,680.70
95	Luxembourg	202,173.55	104,103.00

Appendix (cont.)

96	Macao, China	30,713.47	80,892.80
97	Madagascar	5,882.43	449.7
98	Malawi	1,083.19	338.5
99	Malaysia	122,029.84	9,944.90
100	Maldives	3,214.48	10,535.80
101	Mali	3,257.23	824.5
102	Malta	172,136.96	26,946.00
103	Marshall Islands	173.67	3,753.30
104	Mauritania	6,749.55	1,136.80
105	Mauritius	4,616.54	10,547.20
106	Mexico	473,423.58	8,902.80
107	Moldova, Republic of	3,002.58	2,289.90
108	Mongolia	16,277.49	3,735.20
109	Montenegro	4,572.02	7,669.60
110	Morocco	54,784.22	3,007.20
111	Mozambique	35,714.18	415.7
112	Myanmar	23,464.94	1,298.90
113	Namibia	6,120.85	5,227.20
114	Nepal	1,343.25	835.1
115	Netherlands	1,394,229.88	48,223.20
116	New Zealand	70,416.00	42,940.60
117	Nicaragua	9,932.80	2,221.80
118	Niger	5,288.17	378.1
119	Nigeria	94,184.14	1,968.60
120	Norway	148,997.33	75,496.75
121	Oman	21,098.75	15,668.40
122	Pakistan	42,035.03	1,547.90
123	Palau	393.17	13,417.30
124	Panama	44,557.40	15,087.70
125	Paraguay	5,305.24	4,365.50
126	Peru	91,480.42	6,571.90
127	Philippines	64,507.46	2,989.00
128	Poland	188,733.59	13,811.70
129	Portugal	116,617.72	21,136.30
130	Qatar	33,943.13	63,505.80
131	Romania	73,906.08	10,813.70
132	Russian Federation	393,910.35	10,743.10
133	Rwanda	1,680.30	748.4
134	Samoa	72.00	4,360.80
135	Sao Tome and Principe	430.29	1,913.00
136	Saudi Arabia	231,502.31	20,760.90
137	Senegal	3,771.92	1,033.10
138	Serbia	30,369.09	5,900.00
139	Seychelles	2,917.02	15,504.50
140	Sierra Leone	843.23	499.4
141	Singapore	1,112,641.91	57,714.30
142	Slovakia	47,592.72	17,605.00
143	Slovenia	13,672.13	23,597.30
144	Solomon Islands	533.41	2,132.10

Appendix (cont.)

145	Somalia	1,931.52	499.8
146	South Africa	135,453.53	6,160.70
147	Spain	553,768.39	28,156.80
148	Sri Lanka	9,844.62	4,065.20
149	Sudan	25,467.46	2,898.50
150	Sweden	310,044.69	53,442.00
151	Switzerland	1,081,812.85	80,189.70
152	Tajikistan	2,368.72	801
153	Thailand	190,364.94	6,593.80
154	The former Yugoslav Republic of Macedonia	4,909.26	5,442.60
155	Timor-Leste	345.82	2,279.30
156	Togo	1,474.45	617.2
157	Tonga	423.72	3,944.20
158	Trinidad and Tobago	9,545.19	16,145.20
159	Tunisia	28,940.10	3,490.80
160	Turkey	150,023.00	10,540.60
161	Turkmenistan	31,940.68	7,355.80
162	Tuvalu	7.41	3,550.00
163	Ukraine	42,079.00	2,639.80
164	United Arab Emirates	119,579.64	40,698.80
165	United Kingdom	1,475,560.97	39,720.40
166	United Republic of Tanzania	18,669.10	936.3
167	United States	6,586,391.00	59,531.70
168	Uruguay	29,570.93	16,437.24
169	Uzbekistan	9,156.82	1,504.20
170	Vanuatu	518.45	3,123.60
171	Viet Nam	115,391.30	2,343.10
172	Zambia	18,855.10	1,509.80
173	Zimbabwe	4,338.56	1,079.60
174	Yemen	2,864.99	963.5

Source:UNCTAD, World Investment Report 2018, Annex Table 3, http://unctad.org/en/Pages/DIAE/World%20Investment%20Report/Annex-Tables.aspx and The World Bank, Data, http://data.worldbank.org/indicator/NY.GDP.PCAP.CD