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DOES FOREIGN DIRECT INVESTMENT INFLOWS ENHANCE LABOUR PRODUCTIVITY? AN EMPIRICAL ANALYSIS

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Abstract:
The empirical analysis presented in this paper underlines the correlation between labour productivity given by the Gross Domestic Product (GDP) per employee, as dependent variable, and inward foreign direct investment (FDI) stock, as independent one. The results indicated that there is not a strong positive relationship between the labour productivity and the level of inward FDI stock, as the values of the correlation coefficient fell between .029, in the case of the inverse model, and .4 in the case of the power model. Thus, only 40% of the change of labour productivity is described by the level of inward foreign direct investment stock. Given the theories and empirical studies in the domain, we concluded that a high volume of inward FDI stock will not necessarily boost the productivity, as the spillover effects depend on more important factors, such as the motivation of foreign investors, the existing conditions in the host country, the field concerned etc. Therefore, countries that aim to maximize the positive effects associated with FDI inflows should adopt proactive measures targeting to attract foreign investment mainly in knowledge and technology-intensive industries.

Key words: foreign direct investment; inward stock; labour productivity; correlation; spillover effects

JEL classification: F21, F23, O52

1. INTRODUCTION

Theories and empirical studies in the field provide different conclusions regarding the growth effects of foreign direct investment (FDI) inflows. Some experts in the field argue that FDI can enhance the productivity growth "both directly, by supplementing the internal capital directed to the acquisition of fixed assets and indirectly, by stimulating the local investments" (Iacovoiu, 2013), while others pointed out that "FDI per se does not boost economic growth" (Carkovic and Levine, 2002), because the effects of foreign investments depend on their kind, respectively market-seeking, efficiency – seeking, knowledge – seeking or exploitation of natural resources, as well as of the conditions existing in the host economy, in terms of innovative capabilities and labour force qualification (Iacovoiu and Stancu, 2019).

Thus, some researchers showed that "technology and business know-how transfer to poorer countries may have considerable spillover effects, boosting the productivity of all firms, not just those receiving foreign capital" (Romer, 1993; Dunning, 2000; Rappaport, 2000), as local firms will improve their workers' knowledge and abilities and modernize the production in order to compete with foreign companies (Dunning, 2006; Narula and Dunning, 2010; Narula and Guimón, 2010). On this issue, empirical studies underlined that "the productivity of the foreign investment subsidiaries exceeds the local competitiveness productivity from a certain economic segment" (Iacovoiu and Stancu, 2019). Therefore, foreign direct investment is a vigorous source of development and a potential driver for sustainable development mainly in developing countries where the financing needs are high (Voica et al., 2015).

On the other hand, empirical studies of particular countries conducted at microeconomic level showed that "the exogenous component of FDI does not exert a robust, positive influence on

economic growth" (Carkovic and Levine, 2002), and "the impact of FDI on economic growth depends on many different conditions existing in the host country" (Bengoa and Sanchez-Robles, 2003). Also, Borensztein, De Gregorio and Lee (1998) found that "FDI is more productive than domestic investment only when the host country has a minimum threshold stock of human capital", while other researcher discovered that "foreign direct investments were not the most significant cause of economic growth in Romania" (Misztal, 2010).

In conclusion, we note that the impact of foreign direct investment on productivity growth depends "not only on their volume but also of the existing conditions in the receiving economy, the field concerned, the motivation of foreign investors and the investing business strategy" (Zhang, 2001; Johnson, 2006; Iacovoiu, 2013; Voica et al., 2020). Therefore, any country that aims to attract FDI that could boost productivity growth needs "pro-active measures" targeting the orientation of foreign direct investment inflows towards "the activities that incorporate a higher degree of local resources and most of all, technology and knowledge" (Ivan and Iacovoiu, 2008).

Starting from the theories and empirical studies in this domain, the goal of this paper is to emphasize the relationship between foreign direct investment inflows and labour productivity, based on correlation analysis between two representative macroeconomic indicators, respectively inward FDI stock and labour productivity given by Gross Domestic Product (GDP) per employee.

2. DATA AND METHODOLOGY

Most of the empirical studies in the field use GDP per capita to emphasize the labour productivity at macroeconomic level. As compared with other analysis, we calculated the level of labour productivity using the following two representative macroeconomic indicators:

- Gross Domestic Product (GDP) for the year 2018 that emphasize the output of labour at macroeconomic level;
- The number of employees that was calculated by dividing the population by employment to population ratio expressed as a percentage in the total population, at the level of the year 2018.

The values of labour productivity expressed in US$/employee were computed by dividing GDP by the number of employees for the year 2018. The data regarding the above-mentioned indicators for the year 2018 were retrieved from the database of the World Bank (WB). In order to emphasize the degree of penetrability of foreign capital within the host economy, we used inward foreign direct investment (FDI) stock for the year 2018 retrieved from the database of the United Nations Conference on Trade and Development (UNCTAD). Thus, the values of the inward FDI stock and labour productivity for 172 economies around the world are presented in Appendix.

We used the IBM® SPSS® Statistics Version 22 software to perform correlation analysis between the two analysed indicators, considering the inward FDI stock as independent variable and the labour productivity as dependent variable.

3. RESULTS AND DISCUSSIONS

Table no.1 shows the values of R Square, F and the parameters of the regression equation for 11 analysed models which refer to the link between the labour productivity and the inward FDI stock.

Table no. 1. Values of R Square, F and the parameters of the regression equation

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	.159	32.171	1	170	.000	21724.466	.021		
Logarithmic	.327	82.657	1	170	.000	-65373.734	9080.681		
Inverse	.029	5.077	1	170	.026	27476.433	-4462143.419		
Quadratic	.283	33.408	2	169	.000	17161.439	.063	-6.920E-9	
Cubic	.361	31.574	3	168	.000	12711.160	.150	-8.009E-8	8.257E-15
Power	**.400**	**113.197**	**1**	**170**	**.000**	**133.077**	**.433**		

Compound	.106	20.077	1	170	.000	8889.803	1.000		
S-curve	.045	8.079	1	170	.005	9.329	-240.702		
Logistic	.106	20.252	1	170	.000	9.717E-5	1.000		
Growth	.106	20.077	1	170	.000	9.093	7.439E-7		
Exponential	.106	20.077	1	170	.000	8889.803	7.439E-7		

Source: Authors' calculation based on data in Appendix

The association between the analyzed variables is best described by the power model because 40% of the change in the labour productivity is described by the level of inward FDI stock.

Based on the values of the parameters from table no. 1, the power regression equation is as follows:

$$\textbf{Labour productivity} = 133.077 \bullet (\textbf{Inward FDI stock})^{.433} \quad (1)$$

Figure no. 1 depicts the fitting line compared to data scattering for the power model.

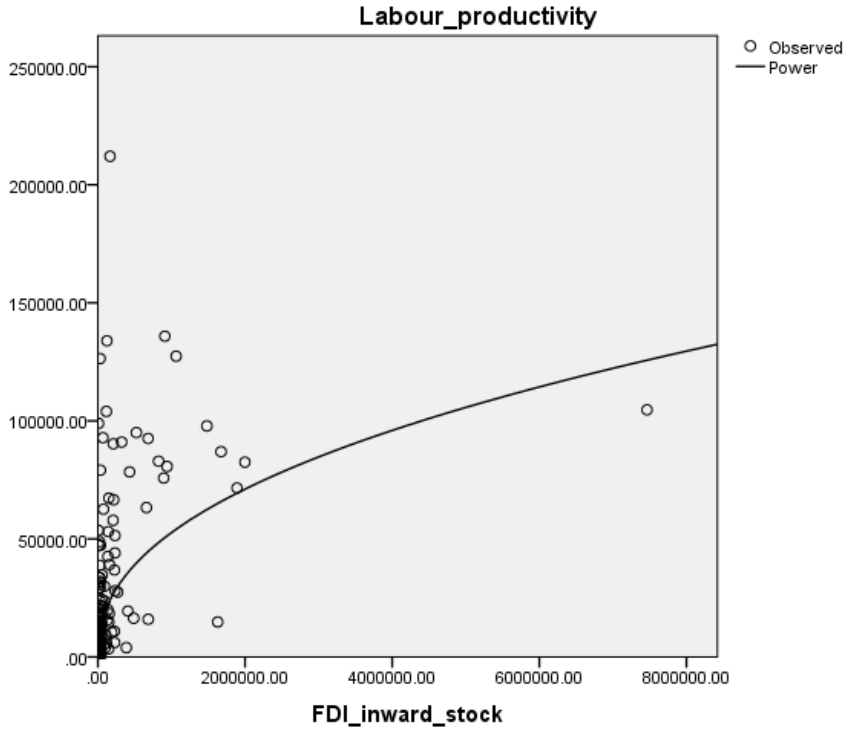

Figure no. 1. Power model plot for labour productivity and inward FDI stock

Source: Authors' design based on data in table no. 1

Therefore, the correlation analysis showed that the volume of foreign direct investment inflows does not significantly influence the level of labour productivity of the host country; statement also supported by the distribution of the 172 analyzed countries related with the level of labour productivity and inward FDI stock as compared with the global average (figure no. 2).

As underlined in figure no. 2, only 24 countries (section B) that received significant FDI inflows, accumulating in 2018 a stock over the global average (186,960.95 Millions US$), have a level of the labour productivity above 25,682.74 US$ per employee (the global average). Comparatively, 28 states, most of them European countries, as for example Croatia, Czechia, Denmark, Estonia, Finland, Greece, Hungary, Iceland, Latvia, Lithuania, Luxembourg, Norway, Portugal, Slovakia, and Slovenia have the level of labour productivity over the global average, although the values of the inward FDI stock are under the average (section D).

Also, there are 8 countries, namely Brazil, China, Colombia, India, Indonesia, Mexico, Russia, and Thailand (section A) that have a level of the labour productivity under the global average, although they have accumulated a significant foreign direct investment stock. Given that these states occupy the first positions in the world in terms of population, an explanation for these

findings could be that most of the foreign investments attracted by these economies have been market-seeking investments that do not significantly enhance the labour productivity growth.

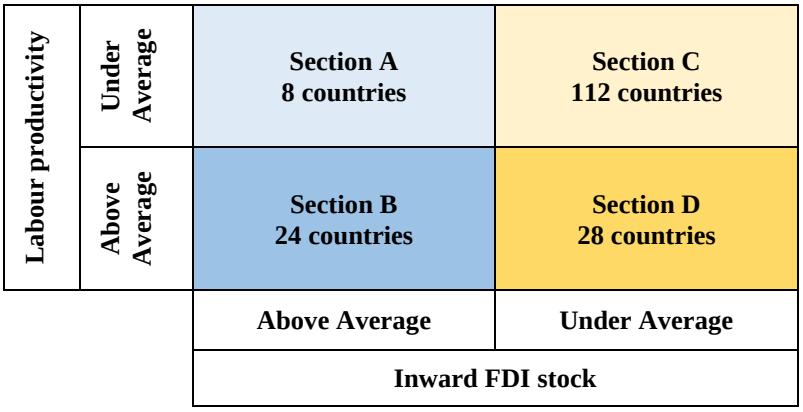

Figure no 2. Distribution of the analyzed countries related with the level of labour productivity and inward FDI stock

Source: Authors' design based on data in Appendix.

Moreover, countries with a similar level of inward FDI stock have different values of labour productivity. In Austria, Japan and Malta, the level of inward FDI stock is about 210,000 Millions US$, but the labour productivity values are very different, respectively 90,284.10 US$ per employee in Austria, 66,593.15 US$/employee in Japan, and 57,881.30 US$ per employee in Malta. Cyprus, Indonesia and Thailand have a similar level of inward FDI stock, respectively around 224,000 Millions US$, but the level of labour productivity varies between 6,083.74 US$ per employee in Indonesia and 36,823.40 US$/employee in Cyprus. In South Korea, Poland and Saudi Arabia, the level of inward FDI stock is about 231,000 Millions US$, while the labour productivity values are between 28,038.02 US$/employee in Poland and 51,414.34 US$ per employee in South Korea. Also, Australia and Brazil accumulated a similar stock of FDI inflows, respectively 682,865.98 Millions US$ (Australia) and 684,212.66 Millions US$ (Brazil), but the impact on productivity growth was very different, as the level of labour productivity is much higher in Australia than in Brazil, respectively 92,538.20 US$/employee compared to 15,929.93 US$ per employee.

Therefore, the volume of foreign direct investment inflows is not significantly related to labour productivity growth; statement also supported by other empirical studies in the field, as presented above.

4. CONCLUSIONS

The results of the correlation analysis performed using the IBM® SPSS® Statistics Version 22 software underlined that there is not a strong positive relationship between the labour productivity, given by the GDP per employee, as dependent variable and the level of inward FDI stock, as independent one. The values of the R square fell between .029, in the case of the inverse model, and .4 in the case of the power model. Therefore, only 40% of the change of labour productivity is described by the level of inward foreign direct investment stock which proves that the amount of FDI received by a country is not an important factor in terms of labour productivity growth.

Taking into consideration the theories and empirical studies in the field, we appreciate that a high volume of inward FDI stock will not necessarily boost the productivity, as the spillover effects depend on more important factors, such as: the motivation of foreign investors (efficiency –

seeking, market-seeking, knowledge – seeking or exploitation of natural resources); the existing conditions in the host country, as for example the labour force qualification; the field concerned etc.

These findings have important policy implications for any country that aims to maximize the positive effects associated with foreign direct investment inflows. As other studies pointed out, these countries should adopt pro-active measures targeting to attract FDI mainly in knowledge and technology-intensive industries, because the knowledge and technological transfer achieved by the foreign companies is generally much higher in productive activities.

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APPENDIX

No	Countries	Inward FDI stock, 2018 (Millions US$)[1)]	Labour productivity, 2018 (US$/employee)[2)]
1.	Afghanistan	1,568.83	801.38
2.	Albania	7,901.95	10,976.75
3.	Algeria	30,602.18	11,429.76
4.	Angola	23,703.70	4,767.20
5.	Argentina	72,784.00	21,243.55
6.	Armenia	5,511.02	8,775.14
7.	Australia	682,865.98	92,538.20
8.	Austria	209,098.20	90,284.10
9.	Azerbaijan	31,059.50	7,493.94
10.	Bahamas	21,576.51	48,814.96
11.	Bahrain	28,996.54	33,403.81
12.	Bangladesh	17,061.63	3,032.61
13.	Barbados	7,272.86	30,422.62
14.	Belarus	20,761.30	10,483.23
15.	Belgium	522,348.17	95,037.26
16.	Belize	2,244.08	8,007.78
17.	Benin	2,257.42	1,287.92
18.	Bhutan	137.53	4,989.60
19.	Bolivia, Plurinational State of	11,851.30	5,376.65
20.	Bosnia and Herzegovina	8,330.10	16,393.71
21.	Botswana	4,825.69	13,997.67
22.	Brazil	684,212.66	15,929.93
23.	Brunei Darussalam	6,701.60	53,607.58
24.	Bulgaria	49,275.90	17,831.97
25.	Burkina Faso	2,707.49	1,135.12
26.	Burundi	242.68	348.40
27.	Cabo Verde	1,988.77	5,959.64
28.	Cambodia	23,740.70	1,887.91
29.	Cameroon	7,224.40	2,072.62
30.	Canada	893,959.39	75,791.78
31.	Central African Republic	658.12	710.03
32.	Chad	6,101.43	1,040.49
33.	Chile	269,298.47	27,454.07
34.	China	1,627,719.19	14,804.31
35.	Colombia	188,750.67	10,418.42
36.	Comoros	122.22	3,369.70
37.	Congo	25,566.26	3,464.15
38.	Congo, Democratic Republic of the	24,020.89	920.95
39.	Costa Rica	39,290.26	21,867.94
40.	Côte d'Ivoire	10,234.20	3,063.45
41.	Croatia	32,884.47	31,722.75
42.	Cyprus	224,284.36	36,823.40
43.	Czechia	155,023.73	39,116.24
44.	Denmark	114,531.55	103,983.57
45.	Djibouti	2,219.48	5,504.54
46.	Dominican Republic	39,105.46	13,417.71
47.	Ecuador	18,678.05	9,613.44
48.	Egypt	116,385.00	5,928.21
49.	El Salvador	9,704.51	6,996.99
50.	Equatorial Guinea	14,110.79	18,324.63
51.	Estonia	24,342.20	38,777.36
52.	Eswatini	801.85	10,112.14
53.	Ethiopia	22,253.15	977.61
54.	Fiji	4,781.03	11,394.53
55.	Finland	67,335.35	92,874.70
56.	France	824,915.46	82,927.29
57.	Gabon	10,335.08	18,934.54
58.	Gambia	406.77	1,326.14
59.	Georgia	17,625.88	8,133.00
60.	Germany	939,033.16	80,683.10
61.	Ghana	36,126.00	3,495.73
62.	Greece	33,636.95	47,265.70
63.	Guatemala	16,364.60	7,457.39
64.	Guinea	4,796.64	1,417.10
65.	Guinea-Bissau	198.68	1,111.39
66.	Guyana	3,680.12	9,958.05
67.	Haiti	1,849.99	1,471.77
68.	Honduras	16,255.30	3,968.43
69.	Hong Kong, China	1,997,220.45	82,501.05
70.	Hungary	88,736.05	29,929.61
71.	Iceland	9,130.67	98,908.05
72.	India	386,353.72	3,941.14
73.	Indonesia	226,334.88	6,083.74
74.	Iran	56,968.23	14,231.44
75.	Ireland	909,509.25	135,873.05
76.	Israel	148,045.00	67,282.31
77.	Italy	431,019.73	78,370.92
78.	Jamaica	16,588.64	8,777.42
79.	Japan	213,753.89	66,593.15
80.	Jordan	35,109.15	12,853.91
81.	Kazakhstan	149,253.58	14,645.67
82.	Kenya	14,421.45	2,850.85
83.	Korea, Republic of	231,408.50	51,414.34
84.	Kuwait	14,741.83	47,214.44
85.	Kyrgyzstan	3,917.00	2,248.01
86.	Lao People's Democratic Republic	8,665.47	3,259.60
87.	Latvia	17,310.16	31,893.99
88.	Lebanon	66,187.00	18,794.96
89.	Lesotho	614.14	2,547.36
90.	Liberia	8,702.89	1,231.49
91.	Libya	18,461.90	16,841.17
92.	Lithuania	17,747.98	33,602.51
93.	Luxembourg	164,806.04	212,071.84
94.	Macao, China	29,307.99	126,388.38
95.	Madagascar	6,359.94	620.59
96.	Malawi	1,399.32	533.42
97.	Malaysia	152,510.22	18,343.93
98.	Maldives	4,259.06	16,935.31
99.	Mali	4,463.91	1,405.72
100	Malta	206,684.61	57,881.30
101	Mauritania	7,407.55	2,899.60
102	Mauritius	5,313.39	20,812.44
103	Mexico	485,806.74	16,395.67
104	Moldova, Republic of	4,047.33	7,871.50
105	Mongolia	20,223.02	7,360.23
106	Montenegro	5,558.88	20,567.84
107	Morocco	64,226.86	7,982.79
108	Mozambique	40,663.97	656.52

109	Myanmar	31,359.98	2,173.69
110	Namibia	6,726.77	12,620.09
111	Nepal	1,937.81	1,260.87
112	Netherlands	1,673,813.78	86,924.67
113	New Zealand	74,764.37	62,604.97
114	Nicaragua	11,063.90	3,170.15
115	Niger	6,533.85	524.03
116	Nigeria	99,684.62	3,900.35
117	North Macedonia	5,961.42	14,148.17
118	Norway	123,444.19	133,929.81
119	Oman	28,207.33	23,790.10
120	Pakistan	41,864.82	2,850.78
121	Panama	54,674.60	24,336.07
122	Papua New Guinea	4,562.84	5,935.38
123	Paraguay	6,482.50	8,689.28
124	Peru	104,410.69	9,254.98
125	Philippines	82,996.67	5,349.51
126	Poland	231,848.07	28,038.02
127	Portugal	135,776.84	42,559.84
128	Qatar	32,742.85	79,073.23
129	Romania	94,020.79	23,656.12
130	Russian Federation	407,362.35	19,445.27
131	Rwanda	2,264.82	931.26
132	Samoa	90.18	14,425.51
133	Sao Tome and Principe	461.96	3,848.34
134	Saudi Arabia	230,786.43	44,035.78
135	Senegal	5,303.91	3,539.43
136	Serbia	39,832.90	15,418.59
137	Sierra Leone	2,002.23	953.56
138	Singapore	1,481,032.75	97,851.36
139	Slovakia	57,109.31	34,719.12
140	Slovenia	16,808.58	47,498.18
141	Solomon Islands	556.63	3,053.84
142	Somalia	2,724.52	786.36
143	South Africa	128,809.26	15,546.41
144	Spain	659,037.51	63,272.69
145	Sri Lanka	12,757.37	8,204.96
146	Sudan	27,668.54	2,383.59
147	Suriname	2,185.18	12,987.60
148	Sweden	322,439.43	91,013.98
149	Switzerland	1,062,826.96	127,379.35
150	Tajikistan	2,759.66	2,119.54
151	Tanzania	20,711.60	1,255.95
152	Thailand	222,733.20	10,856.07
153	Timor-Leste	365.19	5,356.68
154	Togo	1,790.29	893.76
155	Tonga	445.70	7,396.37
156	Trinidad and Tobago	8,646.78	29,033.71
157	Tunisia	26,792.35	8,839.77
158	Turkey	134,524.00	19,936.55
159	Turkmenistan	36,011.77	11,058.15
160	Uganda	13,332.67	918.25
161	Ukraine	43,757.00	5,983.63
162	United Arab Emirates	140,319.15	53,092.53
163	United Kingdom	1,890,384.42	71,573.17
164	United States	7,464,678.00	104,657.64
165	Uruguay	29,035.92	29,284.69
166	Uzbekistan	9,666.88	2,471.57
167	Vanuatu	606.51	4,662.52
168	Venezuela	23,131.00	29,312.05
169	Viet Nam	144,991.30	3,377.10
170	Yemen	2,313.04	2,777.67
171	Zambia	20,435.43	2,199.86
172	Zimbabwe	5,432.62	2,717.72

Source:
[1] UNCTAD, World Investment Report 2018, FDI inward stock, by region and economy, 1990-2018, Annex table 3, https://unctad.org/Sections/dite_dir/docs/WIR2019/WIR19_tab03.xlsx;
[2] Own calculations.