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THE CONTRIBUTION OF FOREIGN DIRECT INVESTMENT TO ECONOMIC GROWTH IN THE SELECTED EMERGING EUROPEAN COUNTRIES: THE EVIDENCE BASED UPON THE PANEL COINTEGRATION MODEL

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This paper is aimed at examining the fact whether foreign direct investment (FDI) and exports do contribute to economic growth in the thirteen European Union (EU) new member states (namely Bulgaria, Croatia, Cyprus, Czech, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia) during the period from 2005 to 2020 or not. Various statistical tests were performed in order to examine the relationship and causality among the three observed series, including unit-root tests, the Kao and Pedroni cointegration tests, and finally the modified causality test. The obtained results are mixed. Although cointegration was established between FDI, exports and growth, the estimation of the long-term coefficients varied to such an extent that only ambiguous conclusions about the effect of FDI and exports on the growth of the real gross domestic product (GDP) could be reached. The research results imply the fact that positive effects of FDI and exports are neither automatic nor equal in all the countries, but the same rather depend on the many factors and conditions that the governments of the selected states should consider when designing policy measures for attracting FDI and promoting exports.

Keywords: foreign direct investment, gross domestic product, exports, the EU new member states, cointegration, causal relationship

JEL Classification: F21

INTRODUCTION

The global economy has been showing signs of slowing down over the last decade, this being so especially due to the latest global health crisis. In order for countries to increase their competitiveness and living standards, it is necessary for them to increase productivity and economic growth, which is the reason why policymakers need to design quality and appropriate development programs and policies irrespective of the fact that the available instruments are limited. The tense global geopolitical situation, the current health pandemic and the consequential economic crises have all increased uncertainty,

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reduced the willingness to invest and increased the possibility of supply shocks and changes in global supply chains. With low interest rates and reduced leverage, banks have become less interested in lending to enterprises, having focused on the activities that bring them higher fees and on trading. On the other hand, despite low borrowing costs, the public sector has not embarked on greater investments, mostly due to the public debt sustainability problems, particularly in developed countries.

The fact that foreign direct investment (FDI) and exports positively contribute to economic growth (Baiashvili & Gattini, 2020; Nguyen, 2020; Mohd & Muse, 2021) is commonly accepted. Their importance has significantly grown in the past few decades, especially in developing countries after market liberalization. The influence of foreign investments largely depends on the macroeconomic and business environments and the absorption capacity of the recipient country. The impact also differs among low-income and high-income countries (Baiashvili & Gattini, 2020). Technology and knowledge transfers are perhaps one of the most important ways in which FDI contributes to the recipient country. It is known that developing countries lag behind developed countries in terms of technological progress. Even if they have the same technology, enterprises in developing countries use it less efficiently because they do not have enough knowledge and skills. Because technology is not free and accessible to everyone, there is a big technological gap between developing and developed countries. Technology is an important element of innovation and innovation is an important factor in competitiveness. In order for developing countries to achieve a higher degree of competitiveness in the global market, they need to find ways to acquire more advanced technology. FDI could be the potential source of technology transfer (Grgić, Bilas & Franc, 2012). However, there is some evidence for developing countries that the impact of FDI on the recipient country's economy is stronger in the long run than in the short run (Gochero & Boopen, 2020).

FDI can have a positive effect on domestic enterprises in many ways due to the spillover of knowledge and skills. The presence of foreign enterprises can encourage the competitiveness of domestic enterprises due to the so-called demonstration effect. Namely, domestic enterprises can observe and learn from the positive and negative experiences of foreign enterprises. In developing countries, the market is often characterized by monopolistic competition. The emergence of foreign competition can change monopolistic conditions and have a positive effect on the productivity of domestic enterprises.

However, these positive spillovers are not automatic, nor are they guaranteed either. Although many economies compete to attract FDI, it is necessary to carefully consider the promotional strategies and incentives being offered to investors. The cost of incentives is expected to be recovered by means of the positive effects of FDI on the economy. Unless properly calculated, the cost of attracting FDI might overweigh its benefits. This is why it is necessary that countries should analyze and prepare for the expected effects of FDI on the economy. It is up to the government to design the policy instruments that would help their economy grow and become an attractive location for the desired type of FDI.

The effect of FDI and exports on economic growth is the research problem dealt with in this paper. The main aim implies examining whether FDI, exports and the GDP are cointegrated and causally connected with each other by using the sample of the new EU member states in the period from 2005 to 2020. Therefore, the research hypothesis tested in this paper reads as follows: "FDI and exports positively contribute to the GDP growth in the new EU member states". The hypothesis is tested using various statistical tests including unit-root tests, Kao and Pedroni cointegration tests and the modified Granger causality test. Based on the research results, certain policy implications are discussed. The emerging EU member states have all undergone market liberalization, deregulation and privatization. While some are internationally recognized as big FDI recipients, not all countries have exerted the same effects from those activities on their respective economies. Therefore, it is interesting to do research in those effects and draw a conclusion about the policy

implication. The paper consists of the five parts. The introduction is followed by a literature review. The third part of the paper is a methodology description, and the fourth part contains the research results and the discussion. The fifth part is the conclusion.

LITERATURE REVIEW

In the last few decades, change in the volume and structure of trade and capital flows has been seen. While the relatively low levels of international capital movements were recorded in the 1990s, this volume has increased significantly in the last decades. Likewise, in the past, capital flows were mostly short-term and consisted mostly of bank loans, whereas more recent trends have been showing a strong increase in private capital flows.

A considerable number of research studies provide evidence on the positive effects of FDI on economic growth (Rahman, 2014; Nguyen, 2020; Mohd & Muse, 2021). However, there are also the studies that have not unambiguously proven the fact that FDI significantly contributes to economic growth (Simionescu, 2016; Sopta, Bilas & Franc, 2021).

More concretely, it is interesting to examine how FDI contributes to emerging economies. S. Mohd and A. N. Muse (2021) examined the correlation between FDI and growth in Ethiopia. The results showed the presence of a positive impact of FDI on the GDP, yet no causal relationship between the two variables was established as such. FDI positively contributes to economic growth and this impact is stronger in developing countries than in the developed (Baiashvili & Gattini, 2020). T. Dinh, D. Hong Vo, A. The Vo and T. C. Nguyen (2019) also used various statistical techniques to determine the effects of FDI on economic growth in developing countries. The authors came to the conclusion that FDI promoted growth in the long run, whereas the effect on economic growth was negative in the short run. S. Chaudhury, N. Nanda and B. Tyagi (2020) emphasized the role of the sectoral composition of FDI. They concluded that FDI promoted overall economic growth, whereas FDI had a negative effect on economic growth in the secondary sector specifically. N. Mamingi and K. Martin (2018) found that FDI exerted positive effects on economic growth only when there was an adequate absorptive capacity in the recipient country; otherwise, the effect was negative. FDI will positively affect growth if there is a stable government and the rule of law (Trojette, 2016). S. Hobbs, D. Paparas and M. E. AboElsoud (2021) found a unidirectional link between FDI, exports and the GDP in Albania. What was uncommon was the fact that growth had caused the inflow of FDI in the short run, not contrariwise. Using panel regression, K. Curwin and M. Mahutga (2014) found that a smaller inflow of FDI was better for the country and that sudden larger amounts of FDI could actually harm the recipient country's economy. M. Carkovic and R. Levine (2005) used a dynamic panel estimation technique and found no robust positive impact of FDI on economic growth either directly or indirectly through human capital levels. In a similar fashion, considering the EU post-transition countries, Y. Saglam (2017) found that FDI negatively contributed to economic growth in some countries included in the sample. Using panel data analysis and different cointegration and causality tests, the author concluded that there was but one-way causality from FDI to GDP *per capita*. S. Žiković, I. Žiković and M. Grdinić (2014) found that FDI positively affected economic growth in the long run in all Central European countries, expect in Croatia, where the impact was negative.

Beside FDI, openness to trade and an increase in exports are often considered to be a factor of growth, especially in emerging countries. Regarding the effects of exports on economic growth, the evidence mostly indicates to mixed results. Although exports are thought to be the engine of growth, this is not automatically achieved. For example, A. P. Ribeiro, V. Carvalho and P. Santos (2016) indicate that exports positively contribute to the economic growth of the EU countries, which is only so if it is specialized in high added value products. G. Dudzevičiūtė, A. Šimelytė and J. Antanavičienė (2017) researched the relationship between the GDP and exports on the case of the EU as well. They found that there was a unidirectional effect from the GDP to exports in 11

countries. In a smaller number of the countries, there was a unidirectional effect from exports to the GDP, or a bidirectional relationship between the variables. A. Tsitouras and C. Nikas (2016) investigated the contribution of FDI and exports in 15 post-transition EU countries. They found that the two variables positively contributed to the GDP growth only in the countries which had joined the EU in 2004. For the rest of the sample, that contribution was not confirmed. A. Aravaci and I. Ozturk (2012) analyzed the causal relationship between FDI, exports and growth in the EU transition economies. They obtained mixed results. The results of the Granger causality test revealed that there was a long-term relationship and causality between the variables in only four of the ten EU transition countries included in the sample. Interestingly, F. Carril-Caccia and E. Pavlova (2018) state in their research done for the European Central Bank that FDI and exports are no longer seen as substitutes, but rather as complements. In many cases, horizontal, vertical, export-supporting and export-platform FDI promotes trade.

METHODOLOGY

FDI and exports are considered as the important factors of growth (Sultanuzzaman, Fan, Mohamued, Hossain & Aminul, 2019). In order to determine the relationship between FDI, the exports of goods and services (EXP) and economic growth (GDP) in the EU new member states, the annual data from 2005 to 2020 were used for 13 countries. Table 1 explains the variables used in the research and the data transformations.

After the necessary data transformations, various statistical tests were done so as to examine the relationship and causality among the three series. Firstly, the unit-root test was performed in order to check the stationarity of the time series. Then, Pedroni and Kao cointegration tests were carried out and the ARDL panel cointegration model was performed in order to examine the long-term relationship among the series (Cetintas & Barisik, 2009; Tomić, Šimurina & Jovanov, 2020). Finally, the causality test was performed to determine whether there is a causal relationship among the variables or not. The use of different statistical techniques ensures the robustness of the results and the related conclusions.

RESULTS AND DISCUSSION

Unit-root tests results

All the available panel unit-root tests in EViews v. 10 were conducted. Firstly, the results of the first-generation tests are presented in Table 2. However, those tests do not consider the dependence among the variables, so additional tests were applied (Table 3 and Table 4).

First-generation tests do not consider possible cross-sectional dependences, i.e. they assume cross-sectional independence. Therefore, the second-generation panel unit-root tests were applied. The null hypothesis in the Pesaran CIPS test reads that all the panels are nonstationary and contain a unit root, whereas the alternative hypothesis reads that some panels are stationary. The Pesaran CIPS test results indicate that the null hypothesis should be rejected at the 1% significance level for all but two series (EXP1/GDP and EXP2/GDP) and for the series FDI1/GDP in the model with the trend.

Because of the strong cross-sectional dependence, the results of the Pesaran CPIS test are considered to be more reliable than those of the first-generation tests. However, since quite a short time series (15 observations only) is being dealt with, even the Pesaran CIPS test results should be taken with some doubt because of its lower power when time series are short.

Additional tests were applied in order to test the cross-sectional dependence. In this case, the null hypothesis reads that there is no cross-sectional dependence at all.

The results of all the cross-sectional dependence tests (Breusch-Pagan, Pesaran scaled, Bias-corrected

Table 1 The variables and data transformations

Variable	Description	Source of data
New EU member states	Bulgaria, Croatia, Cyprus, Czech, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia	World Bank database
GDP	Gross domestic product (constant, 2010, U.S. dollars)	World Bank database
FDI	Annual net inflow of FDI (Balance of payments, current US$)	World Bank database
rGDP	Gross domestic product growth (annual %)	World Bank database
FDI%	FDI, net inflows (% of GDP)	World Bank database
E1	Exports of goods and services (Balance of payments, current US$)	World Bank database
E2	Exports of goods and services (% of GDP)	World Bank database
GDP deflator	GDP deflator: linked series (base year varies by country)	World Bank database
rtGDP	Special LOG transformation of the GDP annual growth (rGDP) because this series contains negative values.	World Bank database
GDP def2010	Since the base year varies by country, we have converted all GDP deflator series to the base year 2010=100	World Bank database
FDI2010	= FDI/GDP_def2010	World Bank database
FDI2010 GDP2	= FDI2010/GDP2*100 (%)	World Bank database
E12010	= E1/GDP_def2010	World Bank database
E12010 GDP2	= E12010/GDP2*100 (%)	World Bank database
LtFDI%	Special LOG transformation of the FDI% series because this series contains negative values. The following notation for this series was used: FDI1/GDP	World Bank database
LtFDI2010 GDP2	Special LOG transformation of the FDI2010 GDP2 series because this series contains negative values. The following notation for this series was used: FDI2/GDP	World Bank database
LE12010 GDP2	LOG transformation of the E12010 GDP2 series. The following notation for this series was used: EXP2/GDP	World Bank database
LE2	LOG transformation of the E2 series. The following notation for this series was used: EXP1/GDP	World Bank database

Note: Special LOG transformations are performed by the EViews program due to the negative values in the GDP and FDI series.

Source: Authors

scaled, Pesaran) reject the null hypothesis for no cross-sectional independence. These results recommend the use of the second-generation panel unit-root tests. In the next phase of the research, all the series are assumed to be integrated I(1).

Panel cointegration tests results

In the following part of the analysis, two methodological approaches are used in order to assess the long-term relationship in the panels: the P. Pedroni (1999; 2004) and C. Kao (1999) tests. Table 5 contains the results of the Pedroni panel cointegration tests for the two options of FDI and exports (EXP) series. The Pedroni test was used in two variants: with a constant only and with both the constant and the trend.

With two exceptions (the first two panel tests and the first group test), all the tests reject the null hypothesis for no cointegration and indicate the existence of cointegration between the GDP, FDI and exports for the new members of the European Union panel. In other words, the results are indicative of the existence of correlation among the variables.

C. Kao (1999) advanced the cointegration analysis and presented the parametric residual-based

Table 2 The results of the first-generation unit-root tests

Variables		Null hypothesis: unit root - common root		Null hypothesis: unit root - individual root			Null hypothesis: stationarity	
		Levin, Lin & Chu *t*-statistic	Breitung *t*-statistic	Im, Pasaran & Shin *W*-statistic	ADF Fisher Chi-square	PP Fisher Chi-square	Hadri Z-statistic	Heteroscedastic consistent Z-statistic
Level	rGDP	-0.26 (.40)	2.80 (.99)	-1.29 (.10)	31.32 (.22)	23.86 (.58)	3.55 (<.01)	3.58 (<.01)
	FDI1/GDP	-6.66 (<.01)	-2.97 (<.01)	-2.74 (<.01)	56.64 (<.01)	66.08 (<.01)	8.87 (<.01)	8.52 (<.01)
	FDI2/GDP	-6.55 (<.01)	-6.97 (<.01)	-4.85 (<.01)	66.28 (<.01)	50.33 (<.01)	7.30 (<.01)	9.01 (<.01)
	EXP1/GDP	0.20 (.58)	2.35 (.99)	1.38 (.92)	17.05 (.91)	10.09 (.99)	6.15 (<.01)	5.79 (<.01)
	EXP2/GDP	-4.52 (<.01)	1.16 (.88)	-0.28 (.39)	23.50 (.60)	35.82 (.10)	8.51 (<.01)	13.79 (<.01)
The first difference	ΔrGDP	-8.73 (<.01)	-0.67 (.25)	-6.39 (<.01)	83.91 (<.01)	100.19 (<.01)	7.28 (<.01)	13.26 (<.01)
	ΔFDI1/GDP	-10.73 (<.01)	-3.72 (<.01)	-6.60 (<.01)	110.85 (<.01)	190.63 (<.01)	21.63 (<.01)	24.35 (<.01)
	ΔFDI2/GDP	-10.16 (<.01)	-6.01 (<.01)	-8.58 (<.01)	107.83 (<.01)	169.90 (<.01)	5.67 (<.01)	20.25 (<.01)
	ΔEXP1/GDP	-5.28 (<.01)	-4.07 (<.01)	-4.13 (<.01)	60.78 (<.01)	76.64 (<.01)	4.57 (<.01)	9.38 (<.01)
	ΔEXP2/GDP	-12.09 (<.01)	-5.22 (<.01)	-9.40 (<.01)	118.04 (<.01)	187.98 (<.01)	15.90 (<.01)	26.58 (<.01)

Note: Individual effects and individual linear trends are excluded. The Schwarz criterion, the Newey-West automatic bandwidth selection and the Bartlett kernel were used.

Source: Authors

panel cointegration. The results of the Kao panel cointegration test are accounted for in Table 6.

Basically, all the Kao tests reject the null hypothesis for no cointegration at the significance level of 1%. Overall, the results of the Pedroni and Kao tests are supportive of the existence of cointegration between the rGDP, FDI1/GDP and EXP1/GDP and between the rGDP, FDI2/GDP and EXP2/GDP in the new EU members.

The ARDL model estimation

The autoregressive distributed lag model (ARDL) is useful for forecasting long-term relationships among variables. In this model, the rGDP is the dependent variable and two different alternatives of the models are used (with and without the constant).

The results reveal that the rate of the adjustment back to (long-term) equilibrium is 56.89% (the model with the constant) and 58.13% (the model with the trend) significant at the less than 1% significance level (Table 7). In the short run, all the coefficients are significant at the less than 1% significance level in both models with the constant and the trend. The long-term coefficients are all negative and mostly statistically significant (the FDI2/GDP coefficient in the model with the trend is not significant). In the short run, an increase in both FDI2/GDP and EXP2/GDP would lead to an increase in the rGDP, i.e. in economic growth. However, that is not the case in the long run, at least not so in the period from 2005 to 2020, when both series had a negative impact on the economic growth series. It should be also noticed that in both the long-term and short-term the impact of exports on economic growth is greater multiple times than that of FDI.

Table 3 The Pesaran CIPS test results

Variable	Without the trend	With the trend
Level		
rGDP	-2.63***	-2.84**
FDI1/GDP	-2.68***	-2.65
FDI2/GDP	-2.80***	-2.89**
EXP1/GDP	-1.74	-1.96
EXP2/GDP	-1.73	-2.46
First difference		
ΔrGDP	-3.91***	-3.70***
ΔFDI1/GDP	-3.39***	-3.44***
ΔFDI2/GDP	-4.49***	-4.38***
ΔEXP1/GDP	-2.69***	-2.80**
ΔEXP2/GDP	-2.89***	-2.67*

Note: The Wald test of the composite linear hypothesis is used. Significance at the 10 percent (*), 5 percent (**), and 1 percent (***) confidence levels.

Source: Authors

Hence the results of the cointegration test confirm the fact that there is a long-term relationship between the rGDP, FDI2/GDP and EXP2/GDP series in the case of the new EU member countries.

Granger causality analysis

Firstly, it was tested whether any pair of series Granger-cause the remaining, i.e. third series. These test results are presented in the first six rows of Table 8. In all the six cases, the null hypothesis of no-Granger-causality was rejected at least at the 5% significance level. To make clearer these results, Granger noncausality was tested for each series separately using univariate tests. These test results are presented in the remaining rows of Table 8. The fact that the test results depend on the definition of the FDI and the exports of goods and services series can be noticed, while for the three series rGDP, FDI1/GDP and EXP1/GDP there is a unidirectional causal relationship from FDI to the GDP to the real GDP growth rate and from the real GDP growth rate to the exports of goods and services to the GDP. In the case of the other three series: rGDP, FDI2/GDP and EXP2/GDP, three bi-directional causal relationships were detected between each of these three series.

In the multivariate systems, when all the three series are included (rGDP, FDI1/GDP and EXP1/GDP or rGDP, FDI2/GDP and EXP2/GDP), the test results

Table 4 The cross-sectional dependence test statistics

Variable	Breusch-Pagan LM	Pesaran scaled LM	Bias-corrected scaled LM	Pesaran CD
Level				
rGDP	685.14	48.61	48.18	25.74
FDI1/GDP	171.90	7.52	7.05	7.73
FDI2/GDP	390.54	25.02	24.56	14.12
EXP1/GDP	747.34	53.59	53.16	26.65
EXP2/GDP	546.12	37.48	37.05	21.83
First difference				
ΔrGDP	657.79	46.42	45.99	25.03
ΔFDI1/GDP	115.95	3.04	2.57	3.93
ΔFDI2/GDP	179.52	8.13	7.66	7.06
ΔEXP1/GDP	385.51	24.62	24.19	17.23
ΔEXP2/GDP	719.82	51.39	50.95	26.41

Note: The cross-section means were removed during the computation of correlations. The degree of freedom is 378 for all the tests. *P*-values for all the test statistics are less than 1%.

Source: Authors

Table 5 The Pedroni test results

Statistic	rGDP, FDI1/GDP & EXP1/GDP		rGDP, FDI2/GDP & EXP2/GDP	
	Constant	Constant & Trend	Constant	Constant & Trend
Panel-v	-0.35	-2.30	-1.08	-3.06
Panel-ρ	-1.18	0.63	-0.22	1.28
Panel-Phillips-Perron t	-5.43***	-6.17***	-3.06***	-5.18***
Panel-Augmented Dickey-Fuller t	-5.27***	-5.46***	-4.13***	-6.92***
Group-ρ	0.14	1.93	0.81	1.70
Group- Phillips-Perron t	-6.69***	-6.84***	-4.04***	-6.63***
Group-Augmented Dickey-Fuller t	-6.06***	-5.55***	-4.25***	-7.04***

Note: The test results generated by EViews. The Pedroni panel statistics are weighted. Significance at the 10 percent (*), 5 percent (**), and 1 percent (***) confidence levels.

Source: Authors

Table 6 The Kao panel cointegration test results

Statistic	rGDP, FDI1/GDP & EXP1/GDP		rGDP, FDI2/GDP & EXP2/GDP	
	(a)	(b)	(a)	(b)
Modified Dickey-Fuller (DF) t	-1.28*	-3.53***	-1.42*	-5.57***
DF t	-3.63***	-4.72***	-3.47***	-5.85***
Augmented DF t	-4.35***	-4.63***	-4.51***	-5.71***
Unadjusted modified DF t	-6.10***	-6.26***	-7.01***	-7.68***
Unadjusted DF t	-6.01***	-5.68***	-6.14***	-6.41***

Note: The test results generated by the Stata command xtcointtest. (a) Cross-sectional means not removed, (b) Cross-sectional means removed. Significance at the 10 percent (*), 5 percent (**), and 1 percent (***) confidence levels.

Source: Authors

in rows 1 and 4 in Table 8 suggest that both the FDI and the exports of goods and services series taken together Granger-cause the real GDP growth rate. The result is consistent with the panel cointegration results, where the cointegration relationship between these three series was established. The mixed results for each individual series in Table 8 are in some way consistent with the mixed results presented in Table 7, where the direction, intensity and significance of the impact FDI and the exports of goods and services series have on the real GDP growth rate depends on the estimation method and the software algorithm used. Therefore, there is ambiguous evidence regarding the impact of FDI and the exports series on the GDP growth rate in the EU emerging countries. The reason for such a conclusion lies in the fact that the results depend on the definition of FDI and the exports of goods and services series. The short time series might also have contributed to such nonconclusive results. Similar mixed results are also revealed in Y. Salgam (2017) and partly in J. Miteski and D. Janevska Stefanova (2017), who researched the contribution of FDI to economic growth in Central European and Southeastern European countries and found that the impact of FDI depended on the sectoral composition. They found that FDI did not have any statistically significant impact on economic growth in the construction sector.

Policy implications

The above results imply that the positive effects of FDI and exports are neither automatic nor equal in all the countries. They depend upon the many factors

Table 7 The ARDL model results

Variable	Constant			Linear trend		
	Coefficient	*t*-statistic	*P*-value	Coefficient	*t*-statistic	*P*-value
	Long-run equation					
FDI2/GDP	-0.0019	-1.78	.08	0.0006	0.61	.54
EXP2/GDP	-0.9068	-1.11	.27	-1.1472	-1.48	.14
	Short-run equation					
Cointegration equation	-0.5689	-7.41	<.01	-0.5813	-6.00	<.01
ΔFDI2/GDP	0.0573	2.22	.03	0.0546	2.17	.03
ΔEXP2/GDP	3.1902	3.41	<.01	3.5759	3.61	<.01
Trend				0.0245	4.32	<.01
Constant	1.3106	6.39	<.01	0.7889	3.66	<.01

Note: The Schwarz criterion (SIC) was used. The ARDL(1,1,1) model with the constant and thee ARDL(1,1,1) model with the trend were selected.

Source: Authors

Table 8 The improved Granger panel causality test

Null hypothesis	Wald statistic	Decision
(FDI1/GDP & EXP1/GDP) does not Granger-cause rGDP	10.05***	Not accepted
(rGDP & EXP1/GDP) does not Granger-cause FDI1/GDP	29.22***	Not accepted
(rGDP & FDI1/GDP) does not Granger-cause EXP1/GDP	22.03***	Not accepted
(FDI2/GDP & EXP2/GDP) does not Granger-cause rGDP	596.26***	Not accepted
(rGDP & EXP2/GDP) does not Granger-cause FDI2/GDP	880.66***	Not accepted
(rGDP & FDI2/GDP) does not Granger-cause EXP2/GDP	24.20***	Not accepted
rGDP does not Granger-cause FDI1/GDP	0.13	Accepted
FDI1/GDP does not Granger-cause rGDP	9.42***	Not accepted
rGDP does not Granger-cause EXP1/GDP	108.07***	Not accepted
EXP1/GDP does not Granger-cause rGDP	0.47	Accepted
rGDP does not Granger-cause FDI2/GDP	31.77***	Not accepted
FDI2/GDP does not Granger-cause rGDP	99.17***	Not accepted
rGDP does not Granger-cause EXP2/GDP	15.31***	Not accepted
EXP2/GDP does not Granger-cause rGDP	8.96***	Not accepted
FDI1/GDP does not Granger-cause EXP1/GDP	0.36	Accepted
EXP1/GDP does not Granger-cause FDI1/GDP	0.55	Accepted
FDI2/GDP does not Granger-cause EXP2/GDP	26.80***	Not accepted
EXP2/GDP does not Granger-cause FDI2/GDP	119.51***	Not accepted

Note: The BIC criterion is used. Significance at the 10 percent (*), 5 percent (**), and 1 percent (***) confidence levels. The decision was based on the 5% significant level.

Source: Authors

and conditions in the country that the government should consider when designing policy measures for attracting FDI and promoting exports. The companies taking FDI into consideration most often base their decisions on the availability of certain resources, the market size or another strategic advantage.

The significance of FDI is derived from a broader perspective. Access to the capital market and financial products is key to financing growth and development. While developed countries have much easier access to capital, developing countries have only begun the process of financial integration in recent decades. The domestic enterprises that are the drivers of the economy in developed countries usually have more sources of financing available on more favorable terms, whereas enterprises in developing countries are characterized by a higher degree of risk and therefore have stricter borrowing conditions. Banks and other external sources of financing disfavor risk and risky investments and often use a broad range of higher interest rates on loans in order to protect themselves from such investments, which means that the loan applicants whose claims seem to be risky are faced with very high interest rates on loans and their access to larger amounts of funding is difficult and limited. Private capital serves as an alternative in these circumstances. Foreign investors can be the source of so much needed capital.

Strategies and instruments for attracting FDI change over years as the expected benefits from such investments change as well. As competition to attract FDI is stronger, it is not uncommon for countries to compete with each other in the scope, value or type of incentives they offer. Governments seek to attract foreign investment projects by offering greater incentives than their competitors or they are creating incentive policies in response to incentives from other countries. Traditional measures and preconditions for attracting FDI are often no longer sufficient to achieve the best possible results, such as technology transfer, higher exports, higher employment, and the like. The market-friendly strategies that used to assume liberalized regimes and reduced barriers to foreign investments, the standards of preferential treatment for foreign investors and a greater role in the resource allocation process given to market forces are the basis for attracting FDI. Some economies can be very successful in attracting foreign investors by implementing such policies, whereas the existence of a healthy and stable economic and political environment to support this is an important prerequisite (Grgić *et al*, 2012).

In the case of targeted competition when the government offers greater incentives than its competition does, those incentives can be particularly high when speaking about big and expensive projects, and investors are indifferent between alternative locations. There are the cases when targeted competition for FDI has resulted in competitive wars, in which unprecedentedly high and even economically unsustainable incentives have been offered (OECD, 2003).

FDI policy instruments should be designed based on the state and orientation of the economy. As follows, if the economy is based on the primary sector, then the government should work on improving the regulatory framework, especially the land acquisition procedure, transaction laws and property rights. If the economy is based on manufacturing, then the government should concentrate on the institutional framework and relieving the administrative burden for investors. In case the economy is based more on the tertiary sector, creating linkages, intellectual property rights and regulating services should be prioritized.

There are various criteria for determining the usefulness of incentives, some of which are based on the efficiency, i.e. on estimating whether the same benefits could be achieved at lower costs, opportunity costs, and the reaction of the competition. If incentives provoke a reaction and increased incentives from other competing countries, it can lead to overspending, the domestic economy ultimately being adversely affected. In the international context, countries should design incentives deemed to be optimal from the point of view of domestic objectives, also considering the imperative of competition with other countries.

Finally, the results of this paper indicate that FDI and exports are not necessarily the engines of economic growth. Although FDI contributes to growth

according to theory, the empirical evidence does not confirm this without a doubt. In fact, there are rather mixed empirical results, which leads to the conclusion that incentives to foreign investors should be carefully designed and that incentives alone are not enough to generate the expected benefits for the economy.

CONCLUSION

Market liberalization and globalization have spurred trade and FDI, consequently leading to the growth of their economic importance. Since developing countries are usually less open, less technologically advanced, less skilled and with less capital than the developed, FDI can be a valuable source of capital, production and growth. Countries should have an adequate strategy and FDI attracting instruments in place. However, as is shown in the paper, the benefits generated from FDI are neither guaranteed nor equally distributed among the countries. Using annual time series for the new European Union member states in the period from 2005 to 2020, the results point to the two main conclusions. Firstly, the GDP, FDI and exports are cointegrated. This conclusion implies a long-term relationship between the tested series.

The results of the long-term coefficient estimation in panel cointegrating regressions based on different estimators and algorithms, however, demonstrate great variations, which is a limitation preventing us from making a clear and definite conclusion about the size and direction of the impact that FDI and the exports of goods and services may have on the real GDP growth. Secondly, the results of the causality test indicate that, in multivariate systems, FDI and the exports of goods and services taken together Granger-caused the real GDP growth. When the pairs of the series are considered, there are certain mixed results about the causality direction. However, these results are in line with the results of the long-term coefficient estimation in the panel cointegrating regressions. In other words, based on the causality test results, it is only ambiguous conclusions about the positive impact of FDI and the exports of goods and services on the real GDP growth in the new EU member states that could be reached, and the research hypothesis cannot be confirmed. Such results imply that national strategic and policy measures for promotion and attraction of FDI and exports should carefully be calculated as the expected positive effects are not assured. The final effect that FDI will have on the recipient economy depends on numerous factors, including the recipient economy's institutional framework, macroeconomic and political stability, business climate, human capital and so forth. The short time series are the main limitation of this study. In future research, the model could be estimated using higher-frequency data (quarterly or monthly) to support nonstationary heterogeneous panel models, which would capture the particularities of specific post-transition European countries.

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