

# **FDI Convergence versus Real and Structural Convergence at the EU Level. An Approach Based on the GINI Coefficient**

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## **ABSTRACT**

*The main goal of this paper is to analyze the evolution of disparities registered among the European Union member states for several variables, indicating the real convergence, the structural convergence and the stocks of FDI. The paper provides an assessment of the linkage between these evolutions during 1993 to 2013, using a methodology based on time series of Gini coefficients, at the entire Union and also at the level of the new and the old EU member states. We found decreasing disparities in the stocks of FDI/capita, GDP/capita and GDP/capita produced in agriculture for the new member states, but oscillating evolutions for the old ones. We found evidence suggesting a positive relationship among these three phenomena. Therefore, FDI can be considered as an enhancer for both real and structural convergence in the EU and the new EU member states. The finding was not confirmed for the old member states.*

**KEYWORDS:** *foreign direct investments, Gini coefficient, real convergence, structural convergence, European Union*

**JEL CLASSIFICATION:** *C1, F23, F45, O52*

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## **INTRODUCTION**

The central goal of the European Union (EU), as a functional economic entity, is to obtain convergence of the economic performance and social and economic cohesion among member states, as it is described by the second article of the Treaty establishing the European Community (Monfort, 2008). Of significant importance in this regard is the fact that, the Treaty clearly states that one of the aims of the Community is to reduce the development disparities of the different regions.

Although the objective of the EU is clearly indicated, in practice, we discuss of several forms of convergence: nominal convergence, real convergence or structural convergence, applied to different types of economic policies and/or indicators. But, while there are well established objectives for the nominal convergence criteria, countries are not imposed to obtain a certain degree of real convergence or structural convergence. Still, the EMU adhesion without reaching such types of convergence is found to be unsustainable.

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In this respect, we are interested if there are evidences supporting the idea that foreign direct investments (FDI) could be considered an enhancer for convergence. Very important in our undertaking is the fact that the European countries are the main destinations preferred by foreign investors, as the Ernst and Young report describes (2014). Evidence supporting this statement is provided in the UNCTAD World Investment Report (2014), where, it is shown that the European Union has the largest share of FDI stocks in the region. Another fundamental idea supporting our present approach relies on the fact that FDI is considered an important determinant for economic growth in several studies (Popovici et al., 2014a; Borensztein et al., 1995, Blomstrom et al., 1996 etc.).

Therefore, our main interest in this paper is to investigate if there are evidences supporting the idea that FDI could be considered responsible for the economic convergence in the EU and to what extent could it be considered a catalyst in the new EU countries as compared to the old ones. Secondly, we try to establish if FDI contributed more to the real convergence or to the structural convergence for the same two groups of countries and also at the level of the entire European Union. In this respect, we will use a methodology based on a time series of Gini coefficients for establishing if we can talk about convergence for the three studied variables. More precisely we will try to investigate the potential correlation between the time series of Gini coefficients for the stocks of FDI/capita, the time series of Gini coefficients for the GDP/capita (as a proxy for the real convergence) and the time series of Gini coefficients for the GDP/capita produced in agriculture (as a proxy for the structural convergence). We state very clear that we are not investigating in the present paper the causal relationship between these time series, but we are only evaluating the potential correlation. We are also aware that, for each type of convergence analyzed in this paper, the literature provides more elaborated proxies constructed as aggregated indices.

The rest of our paper is divided as follows: in the second part, we provide an overview of the FDI distribution in the EU and CEE countries and of the factors that could drive the spatial arrangement of FDI. In the third part, we explain the methodology and present the data employed in this paper. In the fourth part, we describe the empirical results obtained and formulate some policy remarks. Finally, in the conclusion we present synthetically the main findings of the paper, the main limitations, the formulated policy remarks and we provide some hints for future research which should be conducted in the field according to our vision.

## **1. LITERATURE REVIEW**

### **1.1 Insights on real and structural convergence**

Real convergence is referred to as a catching-up process undergone by developing economies with developed economies (Drastichova, 2012) mostly in terms of wealth and revenues, but not only. Still, there is not a clear set of indicators which can be used in order to describe the real convergence. In most of the cases the GDP per capita, or other variables related with revenues or labour productivity are used. Marelli and Signorelli (2010) find significant sigma convergence regarding the GDP/capita in the new EU member states and a weak divergence in the old ones. Also, convergence in real incomes per person is studied by Borsi and Metiu (2013) in EU-27 in the 1970-2010 period. The authors find evidence for convergence, but to different income levels.

Structural convergence is also important, as structural differences between countries could generate asymmetric shocks. In this case, the cost of adhesion at the EMU increases and an EMU adhesion becomes undesirable as long as the costs are higher than the benefits. Höhenberger and Schmiedeberg (2008) are testing for structural convergence in 14 countries in Europe during 1970-2005 and conclude that there is strong inter-sectoral convergence, but diversified intra-sectoral convergence. For the CEE countries, Crespo and Fontoura (2007) find convergence in both inter and intra-sectoral levels. Barrios et al (2002) establish a positive connection between income convergence and structural convergence for four periphery countries of the EU, Greece, Spain, Portugal and Ireland. Then, the authors find evidence that FDI inflows in the EU periphery help to increasing similarity between the industrial structure of the EU periphery and the one of the EU-core.

### **1.2 The actual state of FDI distribution and FDI contribution to disparities or concentration of economic activities**

The lack of an evenly distribution of FDI flows at the European level is evident. Almost 90% of the total FDI inflows in the EU countries were located in the Western EU member states. During the 1993-2012 period, only in three years the percentage of FDI flows to CEE countries represented more than 10% of the total FDI inflows (Popovici et al., 2014b). Still, the EU adhesion moment also meant an important increase of FDI in transition countries, which was also enhanced by the global economic expansion trend. At this moment, Western Europe is the most attractive region for FDI, followed by China and North America, according to the Ernst and Young attractiveness survey in 2014. The Central and Eastern European (CEE) countries are ranked on the fourth place in 2014, after they have been ranked on the third place in 2010. The last four years (2009-2013) meant an increase by 19% of the FDI projects in Western EU countries and a drop by 12% in the CEE countries as compared to the period stretching from 2004 until 2008.

The geographical location of FDI is explained through concentration and dispersion forces in the new economic geography (NEG) theory developed by Krugman at the beginning of the 90s. The main purpose of the theory is “to explain the formation of a large variety of economic agglomeration (or concentration) in geographical space” (Fujita and Krugman, 2004, p. 140) and to offer an explanation for the unequal spatial development. NEG is constructed on four important elements that explain the spatial distribution of economic activity: increasing returns to scale, monopolistic competition, transport costs and external economies (Ascani et al., 2012). In this context, economic integration has a significant impact on the spatial distribution, encouraging concentration of economic activities.

Also, besides these theoretical approaches, several studies point to the European integration as a concentration factor for FDI. Bevan et al. (2001) find a positive impact of EU enlargement on attracting FDI. Still, the authors point to a significant divergence in terms of attractiveness for FDI if discriminating between the countries ready to be accepted in the EU and the ones for which this process is delayed. In this respect, FDI inflows will be concentrated in the countries most likely to join quickly the EU, but hampered in the laggard countries (such as Bulgaria and Romania, which were put on the waiting list and joined later the EU), thus enforcing both a virtuous and a vicious circle in attracting FDI and enhancing regional divergence.

Clausing and Dorobantu (2005) test for the impact of EU accession announcements on the FDI inflows in CEE countries. Out of the three announcements for the enlargement process, the authors report a statistically significant effect for two of them on FDI. Soci (2003) is more reticent when talking about the impact of European integration on countries' attractiveness for FDI, although he recognizes the increase in FDI flows during the integration process and finds evidence on the agglomeration forces inside the EU. The same direction is followed by Danciu and Strat (2013) who find no significant impact of Romania's accession in the EU on FDI.

Analyzing the impact of the EU membership on the geographical concentration of Swedish MNE, Matha (1999) finds that the agglomeration forces became more significant along with the EU integration and the Single European Market programme, mainly due to a reduction in transaction costs. Still, due to the market size effect determined by the EU integration, the author also finds that the affiliate production of Swedish multinationals are more dispersed inside the EU. In the author's opinion, these results suggest an increase in the specialization of the EU member states in the long run.

Resmini (2004) finds an evenly distribution of the manufacturing production during the '90s in several countries in CEE since the start of the integration process as compared with the dawn of the 1990s. Evidence of firm relocation is small, and mostly for the industries with increasing returns to scale.

Seric (2011) checks the geographical concentration in ten Central and Eastern European countries and 23 manufacturing industries during 1995-2005, using location Gini coefficients. The author takes into account the employment level, the gross output and the value added and reports that the industrial concentration decreased in the analyzed period, and the trend was even more accelerated after 2000. Still, the concentration or dispersion trend depends on the type of industry. The author finds more geographic concentration for the technology-intensive industries and CEE industries presenting intermediate trade costs as compared to the non-technology intensive ones and CEE industries with high or low trade costs respectively. Important in this regard is also the structure and the level of those phenomena identified by the literature as determinants of foreign direct investments: market size, labour market, macroeconomic stability, employment/unemployment rate (Davidescu, 2014a, 2014b), infrastructure, existence of resources, the development of the human capital (Nedelcu et al, 2014), research and development level, corruption, political and institutional stability etc.

Soltwedel and Krieger-Boden (2007) confirm a high concentration of FDI in Hungary and the Czech Republic among the transition economies. Moreover, the authors find evidence that the location decision-making process of the foreign investors is carried rather at the regional level than at country level. Still searching for the geographical concentration, but this time at NUTS III level, Longhi et al. (2005) find increasing regional specialization in Bulgaria and Romania due to relocation, but no similar effect in Estonia, Hungary and Slovenia during 1990-1999. Again, the authors find evidence for a higher concentration in industries characterized by scale economies than those with low intensity of technology. Another important aspect is reported by Danciu and Strat, in a study published in 2014, when they argue that Romania has attracted mainly low tech foreign direct investments. When focusing on a single country, namely analyzing the situation in Hungary, Iara and Traistaru (2003) find changes in regional specialization and prove an increased divergence

of FDI at least in the first stage of the integration process. Casi and Resmini (2011) tend to incline for the concentration of FDI, due to the higher impact of agglomeration forces in the sectors intensive in labour force and in those focused on business services. Also, agglomeration is enhanced more by the supply conditions than the demand conditions and by the previous location of other firms

When analyzing the spatial distribution of FDI in transition countries, Resmini (2005) signals several important disparities due to the differences in the income level. Thus, low-income countries are less attractive for FDI and also seem to attract more low-tech companies. This pattern will lead to higher discrepancies between countries and also between regions. In this respect, the author finds that FDI is only contributing to economic growth, but not to convergence between the EU regions in CEE countries.

## **2. METHODOLOGY AND DATA ISSUES**

Due to the fact that the main goal of the present research paper is to analyze the linkage between the evolution of the magnitude of the disparities registered between the studied countries regarding the stocks of foreign direct investments/capita and the magnitude of the disparities registered among the same countries regarding the GDP/capita (as proxy for the evolution of the real convergence) and the GDP/capita from agriculture (as proxy for the evolution of the structural convergence), a methodology based on the Gini coefficient was employed.

Important to mention is the fact that even though GDP/capita is used as a proxy for the real convergence and the GDP/capita from agriculture is used as a proxy for structural convergence, the authors of this paper are aware that many composite indexes are used, in the literature as proxies for these two types of convergence.

### **2.1 Data issues**

In the present study the time series for the stocks of FDI/capita and the time series for the GDP/capita were used for the period 1993 – 2013 and the time series for the GDP/capita from agriculture was used only for the period 1995 – 2010, due to the unavailability of data. The first two time series were constructed for all 27 countries (EU except Luxembourg) and the third one was only constructed for 26 countries (EU except Luxembourg and Greece).

The time series for GDP/capita (expressed in US \$, constant prices for the year 2005 and constant exchange rates 2005) were downloaded from the database of UNCTAD. From the same database were downloaded the time series for FDI stocks, expressed as percentage from GDP. Using these two time series, for each country was constructed the time series for FDI stocks/capita. The time series expressing the percentage from GDP produced in agriculture was downloaded from the database of World Bank. Thus, using this time series and the GDP/capita we have constructed the time series for GDP/capita from agriculture.

When we will mention EU14 during this paper we will refer to the EU15 area, excluding Luxembourg and for the GDP/capita from agriculture Greece will also be excluded. Therefore the indicators will be calculated for 14 countries in the case of GDP/capita and FDI stocks/capita and for only 13 countries in the case of GDP/capita produced in agriculture.

The term East13 will refer, along this paper, to the 13 states which were admitted in the European Union starting with 2004.

## 2.2 Methodology

In order to analyze the disparities between the studied economies regarding the three phenomena discussed earlier, the Gini coefficient was employed. A time series of coefficients was constructed for each of the three domains. The analysis was conducted for all 27 countries (EU except Luxembourg) for the distribution of FDI stocks/capita and GDP/capita and for only 26 countries (EU except Luxembourg and Greece) for GDP/capita, from agriculture.

Further, the analysis was performed using the same methodology at the level of two subgroups, namely EU15 (only fourteen countries; except Luxembourg) and the new 13 EU members accepted after 2004.

In the final part of the analysis, after the series were obtained, the correlation coefficient was employed for analyzing the existence, the direction and the intensity of the potential linkages. This approach was also considered due to the fact that it can provide a starting point for the study of the relationship between the phenomenon of foreign direct investment and different types of convergence.

We believe that it is our duty to state clearly that this paper is not trying to investigate the existence of any potential causal linkage (as defined by Granger) between the analyzed phenomena.

## 3. EMPIRICAL RESULTS

Due to the fact that the approach proposed in this paper is based on a dynamic framework we will start the analysis with a short description of the evolution of the three studied indicators at the level of the entire sample of countries and also at the level of the two earlier mentioned subgroups.

**Table 1. Average values of the indicators**

Indicator	1993	1995	2000	2004	2007	2010	2013	2013/1993*
<b>27 Countries</b>								
GDP/capita	21214.0	22351.4	25670.9	27216.4	29311.1	28367.9	28534.5	1.35
FDI /capita	2472.54	2928.09	7154.90	9931.31	12798.96	12475.2	14010.74	5.67
GDP Ag/capita		646.29	590.65	562.68	493.89	453.31		0.701
<b>EU 14</b>								
GDP/capita	26096.5	27358.5	31178.8	32647.7	34806.6	33463.4	33487.4	1.28
FDI /capita	3132.26	3652.24	8702.75	11804.44	14956.51	14428.11	16184.46	5.17
GDP Ag/capita		692.24	653.69	597.98	525.65	484.17		0.699
<b>East 13</b>								
GDP/capita	4968.5	5473.5	6555.1	7751.9	9202.6	9424.5	9882.8	1.99
FDI /capita	277.44	487.10	1782.99	3218.46	4904.35	5214.85	5824.94	20.99
GDP Ag/capita		495.80	378.21	439.79	380.97	341.75		0.689

As expected, the data display a very impressive increase for the FDI stocks/capita at the level of the new members of the European Union. The registered stocks were in 2013 almost 21 times larger than the one registered in 1993. This phenomenon can be explained

through the increasing attractiveness of the east European countries for foreign investors, but mainly through the very low initial value of the stock.

The same phenomenon is visible when talking about the average annual GDP/capita, which almost doubled during the analyzed period for the 13 east European countries, which are subject of the present analysis.

The same trend is registered for the two indicators at the level of the EU14, but with a significantly lower intensity.

The differences registered between the two studied areas are a natural effect of the differences registered between the economical developments of the two areas. While the economies from EU14 are developed and mature economies, the economies from the East13 area are developing economies.

On the contrary, the GDP/capita resulted from agriculture registers a decreasing trend for the analyzed period for both studied areas. For both areas, the values registered at the end of the period represent only around 70% of the values registered at the beginning of the period. Also noteworthy is the fact that for this criterion (from the three analyzed indicators) the differences registered between EU14 and East13 are at the lowest level.

**Table 2. The percentage represented by the average indicator for East13 in the average indicator for EU14**

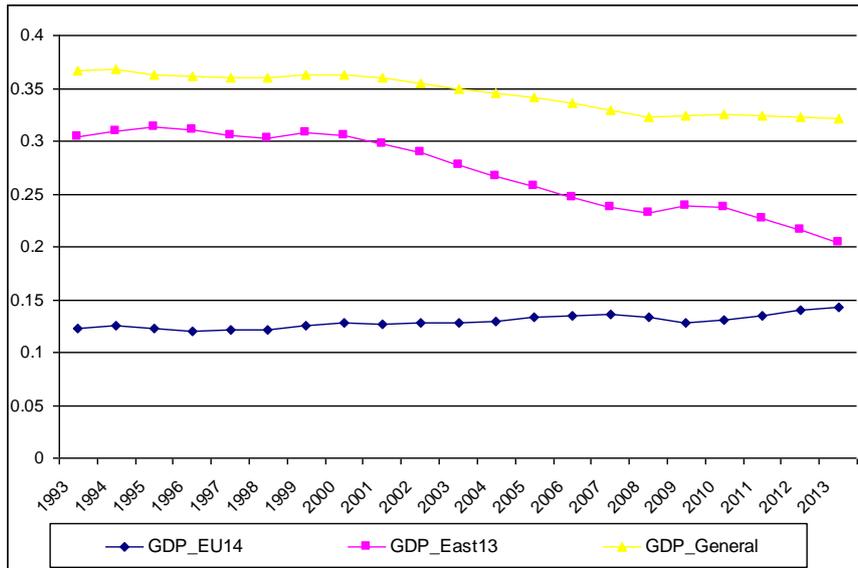
<b>Indicator</b>	<b>1993</b>	<b>1995</b>	<b>2000</b>	<b>2004</b>	<b>2007</b>	<b>2010</b>	<b>2013</b>
<b>East 13</b>							
GDP/capita	19.0%	20.0%	21.0%	23.7%	26.4%	28.2%	29.5%
FDI /capita	8.9%	13.3%	20.5%	27.3%	32.8%	36.1%	36.0%
GDP Ag/capita		71.6%	57.9%	73.5%	72.5%	70.6%	

As it is visible from the table number 2, the convergence speed towards the EU14's average is greater for the stocks of FDI/capita than for the GDP/capita. Noteworthy regarding the convergence aspect is also the fact that for the indicator GDP/capita, from agriculture, we cannot speak about convergence for the studied area towards the EU14.

For the East13 area the disparities between economies, regarding the GDP/capita, are registering a decreasing trend for the entire analyzed period. The concentration level, of almost 0.3 registered in 1993, is more than double the concentration level registered for the same period for EU14. After a rather constant evolution, until 2000, the concentration level started to decrease continuously. Even though the impact of the crisis is visible, since 2010 the decreasing trend has re-emerged.

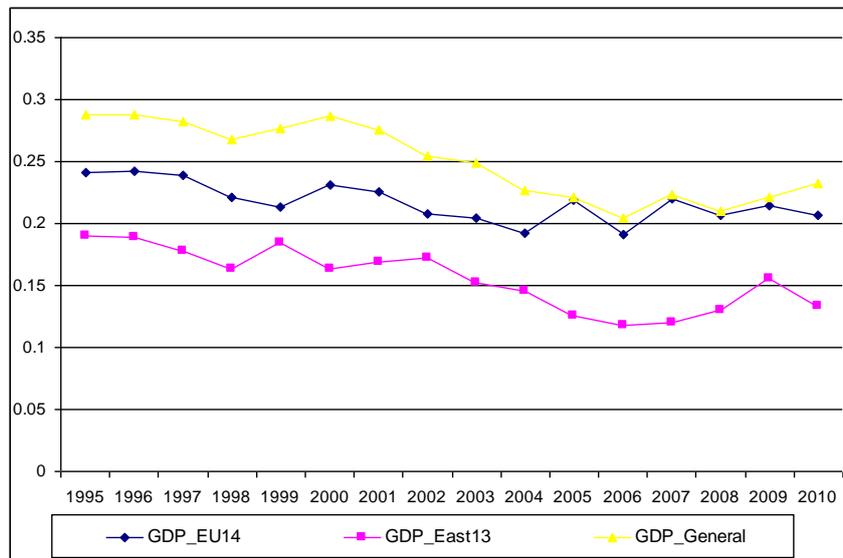
On the contrary, at the level of the EU14, the concentration level increases for the entire analyzed period. Although, the concentration level is significantly lower for this area, in comparison with the other half of the European Union. The impact of the crisis is visible in this case too, but afterwards, starting with 2011, the concentration level continued to increase.

At the level of the entire Union the trend indicates that the disparities among economies are decreasing but the crisis impacted significantly this trend, leading to a rather constant evolution.



**Figure 1. The evolution of the disparities for the GDP/capita**

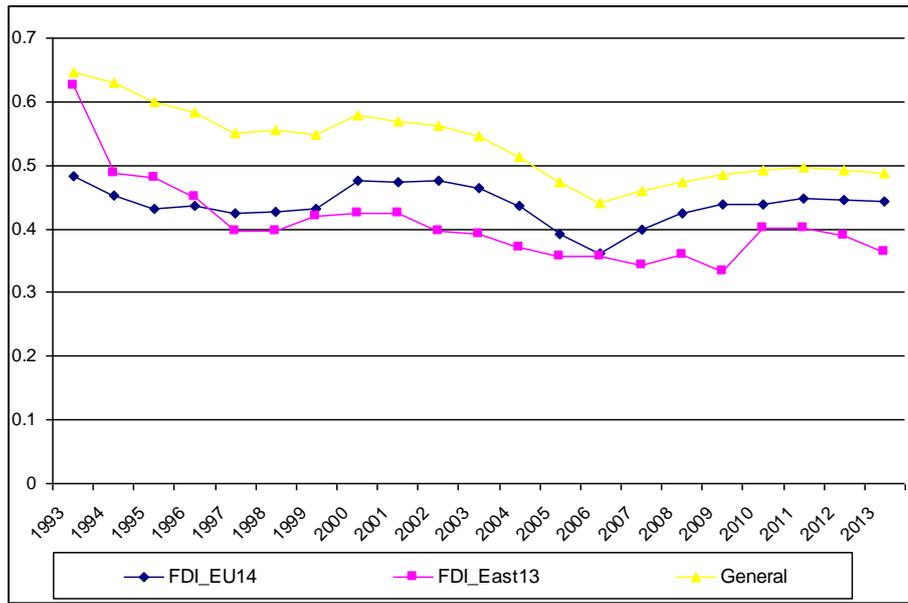
Summarizing, we can state that, while the disparities are decreasing in the newer half of the European Union, they are increasing in the older half of the European Union.



**Figure 2. The evolution of the disparities for the GDP/capita produced in agriculture**

At the level of the entire European Union, the disparities among member states register a decreasing trend for the analyzed period, although the crisis had a significant impact. The disparities, regarding this aspect, are lower for the newer half of the Union than for the older half. Moreover, the disparities are decreasing quicker for the newer half than they are for the older half of the Union.

The disparities registered for this phenomenon are lower than those for GDP/capita for the newer half of the European Union and higher for the older half of the Union.



**Figure 3. The evolution of the disparities for the stocks of FDI/capita**

The disparities registered for the stocks of FDI/capita among the studied economies, at the level of all the three analyzed areas, are greater than those for the other two aspects included in this research. For EU14 the evolution is oscillating and after a decreasing trend, registered until 2000, the concentration increases again for the period 2000 – 2003. The impact of the crisis is severe and the decreasing trend registered starting with 2004 shifts starting from 2007, showing therefore that the discrepancies increase.

The disparities decrease for the entire analyzed period, for the newer part of the Union and noteworthy is the fact that at the end of the analyzed period they are lower than those registered among the states from the older half of the Union. The impact of the crisis is visible in this case also, and after the coefficient increases, starting with 2008, the decreasing trend re-emerges starting with 2010.

At the level of the entire European Union the discrepancies registered for the stocks of FDI/capita decrease with the highest speed for the analyzed period. Therefore, we can conclude that the convergence registered for this aspect is the greatest. The higher convergence speed registered for this aspect might be explained due to the fact that the discrepancies among member states are very high.

The impact of the crisis is very important for this phenomenon, since the decreasing trend shifts in 2007 and is afterwards followed by a period when the disparities remain rather constant.

**Table 3. Correlation coefficients for the time series of GINI coefficients**

Indicator	EU	EU14	East13
FDI_GDP	0.869**	-0.286	0.606**
FDI_GDP_agric	0.940**	0.223	0.792**
GDP_GDP_agric	0.907**	-0.660**	0.889**

\*\* Significance level of 0.01

In the table listed above we present the correlation coefficients calculated for each combination of two time series of Gini coefficients, at the level of the three areas that we have used during this paper. As it is visible from the listed values, the evolution of the discrepancies, for all three analyzed phenomena, are positive and highly correlated at the level of the European Union. Curious is the fact that the evolution of the discrepancies registered for the FDI stocks is more intensely correlated with the evolution of the discrepancies of the GDP/capita produced in agriculture than it is with the evolution of the discrepancies of the GDP/capita.

At the level of the EU14 area, the evolution of the discrepancies registered for the stocks of FDI is negatively correlated with the evolution of the discrepancies registered for GDP/capita, but the coefficient is not statistically significant. Even though the correlation is not statistically significant we can mention that, while the discrepancies regarding FDI stocks/capita are decreasing, the discrepancies regarding the GDP/capita are increasing. Going further we notice that the correlation between the evolution of the discrepancies regarding the FDI stocks/capita and the evolution of the GDP/capita, produced in agriculture, is positive but not statistically significant.

For the newer part of the European Union both correlation are positive and intense and also statistically significant for the significance level of 0.01. Noteworthy is the fact that the evolution of the discrepancies regarding the FDI stocks/capita is more intensely correlated with the evolution of the discrepancies of the GDP/capita, produced in agriculture, than with the evolution of the discrepancies registered for the other analyzed phenomena.

Summarizing all the findings, we can state that, at the level of the entire Union, the discrepancies registered for each of the three analyzed aspects among the component economies are decreasing during the analyzed period. Moreover, we can argue that there is an intense and positive correlation (also statistically significant) between the evolutions of the disparities of these three indicators. Nevertheless, when conducting the analysis at the level of the two halves of the European Union we notice two different behaviours.

In the older part of the Union, while the discrepancies regarding the FDI stocks/capita and the discrepancies regarding GDP/capita produced in agriculture, decrease, the discrepancies regarding GDP/capita are increasing. Also, noteworthy is the fact that the evolution of the discrepancies regarding the FDI stocks/capita is not correlated with any of the other two analyzed phenomena.

On the contrary, in the newer part of the Union the discrepancies among the economies are decreasing for all three analyzed phenomena and their evolution is also positively and intensely correlated.

## CONCLUSIONS

In this paper, we aimed to obtain some evidence that FDI might be considered a determinant for real and structural convergence in the EU and separately in two sub areas, namely: the new member states (the 13 countries accepted starting from 2004) and the old EU member states. In this respect, using Gini coefficients, we analyzed the linkage between the evolution of the magnitude of the disparities registered between the studied countries regarding the stocks of FDI/capita and the magnitude of the disparities registered among the same countries regarding the GDP/capita and the GDP/capita from agriculture during 1993-2013 for the first two phenomena and 1995-2010 for the last one.

We find that both FDI stocks/capita and GDP/capita in East13 tend to converge towards EU14. The same result is not available for the GDP/capita resulted from agriculture. Moreover, we report a higher convergence in the stocks of FDI/capita than in GDP/capita. Therefore it might be assumed that FDI could be considered as representing an enhancer for real convergence in the new member states.

Our analysis provides evidences showing the fact that the disparities are decreasing in the newer half of the EU, while they are increasing in the older half of the European Union as regards the evolution of GDP/capita. We find significant impact of the economic and financial crisis over the trend (of the time series of Gini coefficients) in all of the three analyzed regions – East 13, EU14 and the whole EU.

As regards the evolution of disparities for the GDP/capita produced in agriculture, we find a decreasing trend at the EU level as a whole. Still, we find differences among the two groups of countries: lower disparities and quicker decreasing rate for the East13 than for the EU14. This means a higher structural convergence in the new member states than in the old ones. Again, the trend is severely affected by the crisis.

Regarding the stocks of FDI/capita, we find higher disparities than for the other two assessed variables. At the EU level, we find a decrease in disparities, so higher convergence for the stocks of FDI/capita. Again, there are different evolutions in the two regions: while we find oscillating evolution in EU14, the disparities are decreasing in East13. Still, the impact of the crisis leads to increases in concentration for both EU14 and East13.

We also use the time series of Gini coefficients to assess the correlation for each combination of two time series (presenting the studied phenomena). We find that discrepancies for each of the three analyzed phenomena are decreasing both at the EU level and in the East13 region and the evolutions are positively and intensely correlated. This result might be interpreted so that the FDI stocks/capita can be regarded as a determinant for both real and structural convergence. Several differences are reported for the EU14. We find more convergence as regards the FDI stocks/capita and the GDP/capita produced in agriculture, but increasing discrepancies in GDP/capita. This time, we do not have any evidence suggesting that FDI stocks/capita might be considered as being a determinant neither for real, neither for structural convergence.

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