

Real Convergence and European Integration with Focus on the New Member States

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Abstract

Our paper aims to analyse the dynamics of real economic convergence and the impact of several macroeconomic and institutional factors on this process, within the EU countries for the period 1995-2018. Employing cross-sectional and panel data techniques, this paper examines both the level and dynamics of absolute and conditional convergence within the EU28 countries and identifies key drivers of economic growth within the EU28 and subsequent groups (the EU15 versus New EU Member States group), by explicitly taking into consideration the impact of the recent global economic crisis. We find that the real convergence process is quite uneven and unstable over the 1995-2018 period. Our results confirm the negative effects of the recent global economic crisis on per capita GDP growth, suggesting a weakening of the convergence process at the EU28 level, especially at the level of New EU Member States. In addition, we find that investment, the openness of the economy and the quality of the institutional framework represent the main drivers of real convergence within the EU countries.

Keywords: European integration; beta convergence; conditional convergence; economic growth; financial crisis.

JEL classification: F43; F45; C33.

1. INTRODUCTION

The process of convergence represents a fundamental point within the entire European Union, irrespective of the membership status, being of major importance for both economic and monetary integration.

Moreover, the negative implications of the recent global economic crisis have spawned an intensive debate among economists about the catching-up process, especially when the new EU

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member states are addressed. Furthermore, we are witnessing a revival of policymakers' interest in accelerating the convergence process which was negatively affected by the recent global economic crisis. So, which is the state of convergence within EU countries? Do its drivers behave in the same manner or are there particularities across groups of member states? Broadly, we aim to find answers to these questions by analysing the state and the dynamics of real convergence and its determinants within EU countries for the period 1995-2018. We do this by placing the absolute and conditional convergence as the central pieces of our argumentation line. Specifically, using a cross-country regression, first, this paper examines both the level and dynamics of absolute convergence within the EU28 countries. Second, by applying a panel regression, we analyse the level and dynamics of conditional convergence, and, thus, the macroeconomic and institutional determinants of economic growth within the EU28 and subsequent groups, i.e., the EU15 versus New EU Member States group, by taking into consideration the impact of the recent global economic crisis.

Our results generally support that the convergence process is an important goal for the entire European Union. The real convergence process is quite uneven and unstable in the 1995-2018 period. In this regard, we point out that absolute convergence slowed down in both analysed groups, the EU core and the New Member States. In addition, both macroeconomic and institutional fundamentals matter in shaping the growth patterns, especially when the new member countries group is addressed.

The remainder of the paper is presented as follows. [Section 2](#) synthesises the empirical literature related to convergence across European Union. [Section 3](#) explains the data and the methodology. [Section 4](#) discusses the empirical results and [Section 5](#) concludes.

2. LITERATURE REVIEW

There is a vast body of literature that analyses real convergence within the European Union. First of all, we might mention that cross-country regression techniques have been widely used within the empirical investigations related to absolute convergence. Interesting for our study, in this case, there is a relatively consistent pattern within the recent studies, i.e., the level of GDP per capita registered by poorer EU member states has increased faster along the last 30 years than that registered by the developed EU countries, thus, validating the neoclassical growth hypothesis ([Alcidi *et al.*, 2018](#); [Siljak, 2015](#); [Szeles and Marinescu, 2010](#)). And it seems that the empirical studies reached the aforementioned consensus even though there are no clear-cut answers regarding methodological questions such as “convergence of what?” and “convergence towards what?” (see [Mihaljek, 2018](#) and [Dobrinjsky and Havlik, 2014](#) for a debate related to the instruments used for assessing economic convergence). In other words, irrespective of the growth indicators used to measure the economic convergence – GDP or GDP per capita at current exchange rates, current PPPs or real growth rates –, the benchmark to which the growth indicators are supposed to converge or the starting year used for the initial level of GDP, the results shape quite the same picture that presents an inverse nexus between the initial-year GDP levels and subsequent growth, thus allowing the New Member States to form a ‘club’. So, based on distinct methodological choices, the previous findings sketch quite the same trend, the only difference, not one to neglect, being only relative to the speed of convergence.

Second, within this particular strand of research more controversy arises when the conditional convergence of EU states is addressed. As a parenthesis, we might point out that,

in general, the conditional convergence analyses share a common root relative to the employed set of variables; to wit, next to the ubiquitous initial level of GDP per capita, the evolution of prices, economic openness and investment level are members of the basic set (Borys *et al.*, 2008; Ertan Ozguzer and Ogus-Binatli, 2016; Siljak and Nagy, 2018). However, naturally, within the existing literature, to this common set, various other economic, social and political variables are added.

As expected, the previous studies find evidence of convergence ‘clubs’ and, thus, start their analysis based on these confined sets of economies in order to assess in an accurate manner the degree of economic convergence (Fare *et al.*, 2006). In this respect, Marelli and Signorelli (2010) demonstrated that real convergence is different regarding old member versus New Member States in terms of output, productivity and labour market performance. In particular, the authors highlighted that within the former group of countries the pattern of convergence was uncertain, while the latter group experienced a widespread catching-up in the period 1990-2007, but the authors did not overlook the fact that this latter group faced a more severe impact of the financial crisis. In addition, they drew the attention towards the disparities related to the labour market and to the different specialisations of these two sets of countries. These results are in line with those of Cavenaile and Dubois (2011) which underlines the presence of heterogeneity among the two groups of European countries with different convergence rates. Returning to the impact of the financial crisis in the EU, Halmai and Vasary (2012) concluded in a clear manner that: in the medium term, within the European growth model – estimated using the potential growth rates – the most unfavourable trends were registered in the ‘Mediterranean’ and ‘Vulnerable’ groups, while within the ‘Catch-up’ group, the real convergence stopped; in the long run, the European catch-up model – estimated using per capita potential growth rates – pointed out that the catch-up potential of the New Member States declined as compared to the ‘Developed’ countries, with the ‘Catch-up’ group being more balanced than the ‘Vulnerable’ group that, in fact, experienced divergence. At the end, the authors gave a forelook and suggested that in the coming decades, the new members “will increasingly constitute a stagnating ‘convergence club’ after the rapid initial convergence” and, moreover, this sketches “further erosion of the growth potential in Europe” owing to the decreasing dynamics of total factor productivity (Halmai and Vasary, 2012, p. 320).

Matkowski and Prochniak (2007) showed that over the 1993-2004 period, the CEE countries registered a strong economic convergence and a good conformity of cyclical fluctuations with the EU core. Rapacki and Prochniak (2009) found the same unambiguous evidence of real convergence for the CEE countries over a similar period, i.e., 1990-2005. In the same vein, the study of Vojinovic *et al.* (2010) led to the robust conclusion that the speed of β -convergence between the new countries that joined the European Union in 2004 accelerated over time, but that this was not a linear trend; it diverged on the background of the recession related to the transition process within this perimeter; however, it converged thereafter.

Given these results, one might question what are the common key drivers that narrowed the economic development gaps between the old and new group of EU countries? It seems that the less developed countries profit from: (1) the access to a broader technological knowledge, (2) the large financial aid from the EU and structural funds, (3) an intensive international trade (Crespo Cuaresma *et al.*, 2008). However, when addressing the question whether this catching-up and real convergence were sustainable, the answer of Halmai and

Vasary (2010) was sharp: “No”; and this is merely due to faster growth based on exuberant domestic demand financed through cheap credit. Furthermore, Crespo Cuaresma *et al.* (2012) believe the demographic changes within this perimeter will impose constraints to sustainable economic growth and see the solution in better institutions - educational attainment levels and improving education quality.

Noteworthy for our analysis is the fact that the previous literature laid weight on the key role played by the quality of institutions in increasing the economic performance of the EU member states (Acemoglu *et al.*, 2004; European Central Bank, 2015; Masuch *et al.*, 2016; Prochniak, 2011; Žuk and Savelin, 2018). In this regard, the European Central Bank pointed out that the real convergence within EU is negatively affected by several factors, and among these “weak institutions, structural rigidities, weak productivity growth and insufficient policies to address asset price booms” attracted the attention (European Central Bank, 2015, p. 30).

However, dissimilar to these results, Strielkowski and Horschle (2016) did not find much evidence for the presence of convergence in EU within the time frame 1995-2011 and argues that the reason of this divergent result might be the presence of the financial crisis. In the same line, Borsi and Metiu (2015) demonstrated that, over the last 40 years, there was no overall income convergence in the EU. Yet, the authors identified convergence clubs that are not necessarily related to the EMU membership, but on a geographic dimension, suggesting a division along the South-East versus North-West areas since the 1990s.

Seeking within the existing literature, as we already saw above, it seems that the empirical evidence related to real convergence within EU countries are not quite close to a consensus. In addition, it seems that the basis of these diverging results lies in the broad array of chosen settings and methods, i.e., the period, macroeconomic and institutional fundamentals considered within the analysis, countries considered in groups, methodology, etc. However, it seems that the only consistent pattern within the existing literature emphasizes that, until the outbreak of the financial crisis, the income gap between the old and the New EU Member States has narrowed although not at the same speed or to the same degree, while after the financial crisis, it has widened. This might be translated into the fact that the economic convergence among the EU countries, and especially the less developed ones, was not entirely based on solid grounds. This lack of sustainable economic performance alongside the last three enlargement processes, that exacerbated the problems in the old member states, led Lane (2007) to state that it is not desirable to complete the jigsaw puzzle of Central Europe with any further expansions. In addition, it might be that on the grounds of this loose economic convergence, the EU member countries not in the Eurozone avoid ticking off the next step, the Euro adoption. Therefore, considering the wave of pessimism that followed the recent global economic crisis and the fact that the measures undertaken to overcome this big downturn did not behave in a tide-type manner, we decided to explicitly analyse the effects of the recent global economic crisis on the evolution of convergence and its determinants within the EU. In addition, following the previous literature, we decided to perform the analysis on two subsets of countries, EU15 versus New EU Member States, fact that will allow us a comparison between results.

3. DATA AND METHODOLOGY

In order to measure the speed of adjustment to the steady state of growth within the European Union, we compute in this analysis the β -convergence, which is framed in the neoclassical growth model developed by Ramsey (1928), Solow (1956), and Koopmans (1963). More precisely, we estimate the two well-known types of β -convergence: (1) the absolute (or unconditional) convergence that relies on the starting premise that countries, developed and less developed, converge to the same steady state and that is to be estimated using a cross-sectional simple regression; (2) the conditional convergence that presumes different steady states for different countries, fact that implies additional explanatory variables to be included in a multiple regression equation.

1. For the unconditional convergence we take into consideration the following settings:

We employ a cross-sectional simple regression in order estimate the β coefficient that assesses the relationship between per capita GDP growth rate and the initial level of per capita GDP, like in the equation:

$$\frac{1}{T} \ln\left(\frac{Y_{i,T}}{Y_{i,0}}\right) = \alpha_0 + \alpha_1 \ln(Y_{i,0}) + \varepsilon_i \quad (1)$$

where $Y_{i,T}$ represents the average annual growth rate of per capita GDP for country i over T periods; $Y_{i,0}$ is the initial level of per capita GDP for country i ; α_0 is a constant; ε_i is the error term.

Thus, the convergence coefficient, β , is computed as:

$$\beta = -\frac{1}{T} \ln(1 + \alpha_1 T) \quad (2)$$

Estimating the absolute convergence within a cross-sectional simple regression framework is in line with the entire body of literature on the subject (see Mihaljek, 2018; Siljak and Nagy, 2018; Yin *et al.*, 2003). The authors plead for the cross-sectional data because it is free of distortions that can displace the economy from the path towards the steady state; hence, this model is quite the standard one. However, we cannot argue that there is the same uniformity about the variables and the beginning of the period of analysis considered in the empirical literature. As we briefly mentioned in the previous section, there are several issues related to measurement of the variables. In this regard, firstly, one must choose between several alternative growth indicators: GDP at current exchange rate versus purchasing-power-parity versus real growth rate; GDP growth rates versus GDP per capita growth rates; arrangement between GDP/GDP per capita, on one side, that converges to EU average, EMU average or regional average, on the other side (Dobrinsky and Havlik, 2014; Mihaljek, 2018). Secondly, it seems that the choice of the initial year makes a quite big difference in the results. Therefore, following Borys *et al.* (2008) and Mihaljek (2018) for our analysis we chose as dependent variable in equation (1) the growth rate of GDP per capita in EKS PPPs, relative to EU14, 1995-2018. As a parenthesis, the benchmark to which the per capita GDP is converging is computed as the simple average of per capita GDP of 14 EU countries that were in EU before 2004. Luxembourg was excluded from the computation because of the distortions caused by the high number of

cross-border workers (ECB, 2015). Since the calculations are sensitive to initial-year GDP per capita and the time frame is not too long, we chose as the independent variable in equation (1) the GDP per capita in the year 1995. This year is strictly linked to the transition of the CEE economies, but it is somewhat arbitrary since there is no formal start of this long-lasting process. This selection is also based to the fact that many previous studies use this year to analyse the absolute convergence, thus, allowing us a comparison. In addition, we chose also to analyse other periods, i.e., 2000-2008, 2009-2013 and 2014-2018. The reasons are threefold: (1) the EU's pre-accession strategy of doubling its assistance towards the candidate countries of Central and Eastern Europe (Phare, ISPA, SAPARD) starting in the year 2000 alongside the growth trend of the EU economies until the crisis; (2) the analysis of the crisis and of the recovery periods; and (3) the comparison between all sub-periods. The data source for the GDP per capita in EKS PPPs is Groningen Growth and Development Centre Total Economy Database.

2. For the conditional convergence we employ a panel regression with the following form:

$$\ln y_{i,t} - \ln y_{i,t-1} = \alpha_0 + \alpha_1 \ln y_{i,t-1} + \sum_{k=1}^n \phi_k X_{kt} + \varepsilon_{i,t} \quad (3)$$

where $y_{i,t}$ represents the annual growth rate of GDP per capita at PPP for country i in year t , α_0 is the constant, X_{kt} is a vector of n exogenous explicative variables, and $\varepsilon_{i,t}$ it is the error term. We estimate GLS specifications with cross-section heteroskedasticity that allows different residual variance for each cross section. We use the White cross-section method for computing robust covariances, which assumes that the errors are cross-sectionally correlated. And, finally, we estimate equation (3) within a fixed-effects framework. As in the previous case, the conditional convergence takes place when $\alpha_1 < 0$.

Our study covers all the 28 European Union countries that we split into two subgroups based on the time period of membership: the EU15 (or the 'old' countries, namely, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, UK) and the EU13 (or the New EU Member States, namely, Bulgaria, Cyprus, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovenia, Slovakia). The time frame for our analysis is 1995-2018.

The real convergence indicator that we analyse, to wit, the dependent variable in equation (3), is the annual growth of GDP per capita at PPP (GDP_t) that we try to explain through different macroeconomic and institutional factors, which are considered by the theoretical and empirical studies as important determinants of the rate of economic growth and of the steady states to which every country tends. In this regard, following the common path in the literature, we incorporate in our analysis as explanatory variables the logarithm of the initial level of real GDP per capita at PPP from the previous year (GDP_{t-1}), the annual average rate of inflation ($HICP$), trade openness computed as exports plus imports as a percentage of GDP ($Open$), and gross fixed capital formation as a percentage of GDP (Inv). In addition to this conventional set, we follow the ECB (2005) prescript to include also the level of foreign direct investment as % of GDP (FDI) and the level of domestic credit to private sector as % of GDP ($Priv_lending$). Given the fact that the sample contains also the recent global economic crisis, we decided to explicitly include it in the model through a dummy variable, alongside the level of government debt as % of GDP (Gov_debt). All the macroeconomic variables are obtained from Eurostat Database,

except for FDI and GDP per capita in PPPs which are retrieved from the World Bank Data Catalog and, respectively, Groningen Growth and Development Centre Total Economy Database.

In order to assess the role of institutional features in promoting economic growth, we chose the Human Development Index (*HDI*) and the simple average of the Worldwide Governance Indicators (*WDI*). These two variables represent measurement units for the degree of informal institutional efficiency that, next to the macroeconomic indicators, can just as well be blamed or complimented for the economic results. The importance of human capital was highlighted by the canonical study of Barro (1991) who stated in a concise and unequivocal manner that “poor countries tend to catch up with rich countries if the poor countries have high human capital per person (in relation to their level of per capita GDP), but not otherwise” (Barro, 1991, p. 437). The *HDI* measures the basic dimensions of human development, i.e., health, education and the standard of living. Even though the average years of education is used as a proxy for human capital within the previous literature (see Crespo Cuaresma *et al.*, 2008; Nenovsky and Tochkov, 2014), we opted for this compound measure because it encompasses the key dimensions of human development. In computing the average Worldwide Governance Indicator, we used the four indicators (out of six) that sketch, on one side, government’s ability to formulate and implement sound policies, i.e., Government Effectiveness and Regulatory Quality, and, on the other side, the confidence of citizens and the state for the institutions, i.e., Rule of Law and Control of Corruption. The source of these two variables is the United Nations Development Programme Database and, respectively, the World Bank Data Catalog.

The statistical description of the variables used in our study is presented in Table no. 1.

Table no. 1 – Descriptive statistics

	Mean			Max.			Min.			Std. Dev.		
	EU28	EU15	EU13	EU28	EU15	EU13	EU28	EU15	EU13	EU28	EU15	EU13
<i>GDP_t</i>	2.351	1.505	3.343	21.518	21.518	13.620	-15.386	-9.429	-15.386	3.538	2.749	4.069
<i>GDP_{t-1}</i>	4.545	4.611	4.469	6.517	5.616	6.517	3.589	4.135	3.589	0.574	0.390	0.727
<i>Inv</i>	22.201	21.322	23.216	37.300	35.600	37.300	4.500	11.100	4.500	4.037	3.229	4.604
<i>Open</i>	111.867	101.186	124.192	408.362	408.4362	325.854	37.496	37.496	45.4765	62.573	68.948	51.731
<i>HICP</i>	3.359	1.852	5.146	154.900	7.900	154.900	-1.700	-1.700	-1.600	7.754	1.234	11.135
<i>FDI</i>	84.766	6.472	11.785	451.716	86.611	451.716	-58.323	-58.323	-46.769	31.222	12.956	43.122
<i>Priv_lending</i>	84.766	103.949	61.098	253.262	201.259	253.262	0.186	30.991	0.186	46.486	35.501	47.578
<i>Gov_debt</i>	56.841	71.081	40.737	181.200	181.200	109.200	3.800	6.900	3.800	33.103	34.161	22.995
<i>HDI</i>	0.843	0.874	0.806	0.938	0.938	0.896	0.680	0.767	0.680	0.054	0.037	0.047
<i>WDI</i>	1.119	1.501	0.679	2.185	2.185	1.375	-0.321	0.098	-0.321	0.605	0.489	0.388

Source: Authors' calculations

As it can be seen in Table no. 1, the average growth rate of GDP per capita at PPP is higher for EU13 than for EU15 countries, but, also remarkable is the higher variability registered in the former group relative to the latter. Thus, we expect to have quite large development disparities between the two subgroups of EU member states. Also, from these figures it is easy to observe that the EU13 group establishes, on one hand, the right boundaries in the cases of the initial level of GDP per capita, investment level, inflation rate, FDIs, and private lending, and, on the other hand, the left boundaries are registered for almost the entire data within this perimeter (the average growth rate of real GDP, the initial level of GDP per capita, investment, domestic credit, government debt, HDI and WDI). As a parenthesis, the

large discrepancy observable in the case of inflation rate in EU13 group relative to the EU15 group can be justified by the severe early years of transition that characterised this area in the period 1995-1999.

4. EMPIRICAL RESULTS

The regression results for absolute convergence over the period 1995-2018 are presented in [Figure no. 1](#).

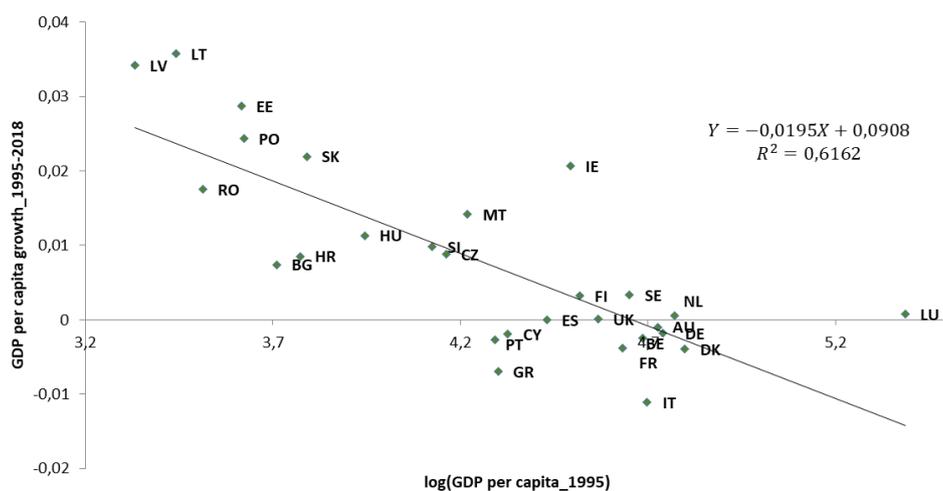


Figure no. 1 – Unconditional speed of convergence of EU countries over the period 1995-2018

Source: Authors' calculations

The negative slope of the trend line presented in [Figure no. 1](#) confirms the absolute convergence hypothesis within the EU-28 countries for the timespan that ranges between 1995 and 2018. In other words, this means that the presence of a negative, statistically significant relationship (α_1) between the initial level of GDP per capita and the average rate of GDP per capita growth emphasises that less developed EU countries exhibited a faster growth than the developed ones since 1995. Therefore, as we might see in the figure above, the Baltic states, Poland, Slovakia and Romania registered the best economic performance relative to the EU-14 average, while Italy, Denmark, France and Germany attained the lowest rates of growth vis-à-vis the EU-14 average. This result is also confirmed by the previous literature that analysed the absolute β – convergence considering the year 1995 as the initial one ([Siljak, 2015](#); [Mihaljek, 2018](#); [Glodowska and Pera, 2019](#)).

As figures in [Table no. 2](#) show, the income convergence speed for the entire period is 2.63%, implying that each year, the distance between GDP per capita in these countries and the steady state level decreased by an annual rate of 2.63% over the 1995-2018 sample period. The magnitude of absolute convergence is in line with the '2% rule' of convergence that was already found in the literature ([Vojinovic et al., 2010](#); [Dobrinsky and Havlik, 2014](#)). Moreover, the levels of beta-convergence in the EU found in previous studies illustrate quite the same pattern and 'club' convergence as our findings. The only slight difference to be found lies in the

dimension of the β coefficient. However, these distinct sizes can be explained by the selection of different benchmarks (EU-14 average versus EU-28 average) and different period lengths that encompass or not turbulent times. This fact weighted in our decision to evaluate beta-convergence in different sub-periods strictly connected to the trend of economic growth.

Table no. 2 – Regression Results for β – convergence

Period	α_0	α_1	R^2	β
1995-2018	0,0908***	-0,0195***	0,6162	0,0263
2000-2008	0,1576***	-0,0336***	0,7345	0,0340
2009-2013	0,0605	-0,0128	0,0716	0,0132
2014-2018	0,0954 ***	-0,0201***	0,3719	0,0212

Note: ***, **, * indicates significance at the 1%, 5%, and 10% level, respectively.

Source: Authors' calculations

At first sight, the general picture related to the sub-period analyses presented in [Table no. 2](#) highlights the following: the magnitude of absolute convergence increases when the EU countries are situated within a period of economic development; the outbreak of the global economic crisis impacted negatively the convergence of the EU member states (the coefficients of the regression are not even statistically significant and the value of the R-square is too low to highlight the presence of a negative relationship between the initial income level and the annual average of income – the prerequisite of the convergence hypothesis); in the aftermath of the crisis, the analysed EU countries have recommenced to narrow their distance towards the steady state, but the level is still tepid as compared to the one registered before the crisis. To sum up, these results point out a lack of linearity in the convergence process of the EU member states and, also, it might disclose a lack of sustainability of the adopted convergence policies. These nonlinearities and unsustainability features, peculiar to the EU convergence process were also found by [Vojinovic et al. \(2010\)](#), [Halmai and Vasary \(2010\)](#) and [Siljak \(2015\)](#). Now, turning to the growth dynamics at the level of each country, it is worth mentioning that: the most 'jumpy' countries that register quite divergent movement around the steady states in the three subperiods are Greece, Ireland, Portugal, Spain, Cyprus and Malta; Luxembourg acts like an outlier in all subperiods; the 'clubs' that persist within all the periods under study, with slight differences in positions, are the former socialist countries (the Baltic states, Poland, Hungary, Czech Republic, Slovakia, Slovenia, Romania, Bulgaria and Croatia) and the rest of developed EU countries (Germany, Netherlands, Denmark, Austria, France, UK, Finland, Sweden, Belgium, Italy). Overall, we conclude that most of the EU member states had economic growth trajectories which often deviated from the common tendency registered by the EU-14 benchmark ([Rapacki and Prochniak, 2019](#)). This reinforces the findings of the previous literature which claims that the EU convergence 'clubs' are not specifically related to the euro membership ([Borsi and Metiu, 2015](#); [Halmai and Vasary, 2012](#); [Monfort et al., 2013](#)).

As we mentioned in the previous section, we test whether less developed countries record higher economic growth than the developed ones using a panel approach. To do this, we consider several macroeconomic and institutional fundamentals and we present the results in [Tables no. 3](#) and [no. 4](#) that correspond to the EU28 and, respectively EU15 versus new EU member countries (EU13).

Table no. 3 – Panel growth regressions for the EU28, 1995-2018

Explanatory variables	<i>Dependent variable: annual growth of real GDP per capita</i>		
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
	<i>GLS, FE</i>	<i>GLS, FE</i>	<i>GLS, FE</i>
Initial GDP per capita	-0.198** (-2.494)	-0.174*** (-2.993)	-0.389*** (-3.020)
Investment	0.279*** (3.193)	0.289*** (4.339)	0.327*** (3.573)
Trade openness	0.078** (2.382)	0.057*** (2.884)	0.087*** (2.823)
Inflation rate	-0.074*** (-5.041)	-0.072*** (-5.589)	-0.101** (-2.018)
Foreign direct investment	-0.007 (-1.535)	-0.008** (-2.838)	-0.008 (-1.494)
Private lending	-0.037*** (-4.508)	-0.024*** (-4.497)	
Government debt		0.028* (3.674)	
Human Development Index			0.219*** (2.711)
Worldwide Governance Index			0.025* (1.895)
Crisis dummy		-2.039** (-2.529)	
R2	0.493	0.597	0.526

Note: ***, **, * indicates significance at the 1%, 5%, and 10% level, respectively. For the variables initial per capita GDP, FDI and HDI we have used their 1-year lagged values.

Source: Authors' calculations

First of all, as the data in Tables no. 3 and no. 4 show, all coefficients in the first row have the expected signs, i.e., the estimated coefficient on the lagged GDP per capita is negative and significant in all the models, thus highlighting the inverse relation between the growth rate of real GDP per capita in terms of PPPs and the initial level of GDP per capita. This result validates the conditional convergence hypothesis within the analysed European perimeter. Comparing the results of the unconditional and conditional convergence models, we can draw the conclusion that the magnitudes of the beta coefficients are higher when considering several key control variables, fact which highlights that, within this particular framework, the analysed countries registered a higher speed of convergence. In addition, it seems that controlling for the crisis period decreases the level of α_1 coefficient, meaning a decline of the real convergence at the European level. These results are in line with the previous literature (Dobrinsky and Havlik, 2014; Halmai and Vasary, 2012). Moreover, it seems that controlling for the quality of institutions augments quite much the level of convergence. The significant role that the institutional framework plays in increasing performance in the EU states was already confirmed by the empirical literature (Borys *et al.*, 2008; Glodowska and Pera, 2019, Marelli and Signorelli, 2010; Masuch *et al.*, 2016; Žuk and Savelin, 2018).

Secondly, as showed in Table no. 3, all the coefficients of the macroeconomic variables exhibited the expected sign, except the levels of FDI and financial deepening. The level of investment had the major positive influence on the growth rate of real GDP per capita within the entire dataset, while the major negative influence comes from price changes. Interestingly,

net capital inflows to these countries that should enhance sustainable long-term economic development registered a negative impact. Possible explanations for such an impact could be the poor performance of the investments, the long gestation period, the asymmetric effects of the financial crisis along with the contraction registered during these turbulent times, especially within the ‘jumpy’ countries and the CEE ones (Diaz del Hoyo *et al.*, 2017; Rapacki and Prochniak, 2019). On the same side, it seems that financial deepening proxied by the level of private lending exhibited a quite large negative effect on the economic growth. In this regard, Law and Singh (2014) found that the reason of this counterintuitive relationship might be explained through the fact that more finance is not always synonymous with more economic growth, arguing that if banking development exceeds an optimal level, this will tend to harm the economic performance.

Table no. 4 – Panel growth regressions for the EU15 versus EU13, 1995-2018

Explanatory variables	Dependent variable: annual growth of real GDP per capita					
	EU15			EU13 (New EU member states)		
	Model 1 GLS, FE	Model 2 GLS, FE	Model 3 GLS, FE	Model 1 GLS, FE	Model 2 GLS, FE	Model 3 GLS, FE
Initial GDP per capita	-0.269** (-2.359)	-0.267*** (-2.762)	-0.751*** (-3.254)	-0.189** (-2.344)	-0.176*** (-2.914)	-0.375** (-2.432)
Investment	0.208** (2.366)	0.232*** (2.820)	0.454*** (3.907)	0.400*** (4.962)	0.362*** (5.195)	0.334*** (3.614)
Trade openness	0.063* (1.869)	0.040** (2.175)	0.042** (2.131)	0.101*** (2.742)	0.079*** (3.403)	0.106*** (3.163)
Inflation rate	-0.024 (-0.084)	0.142 (0.611)	0.148 (0.553)	- 0.067*** (-6.370)	-0.071*** (-7.003)	-0.051 (-1.040)
Foreign direct investment	0.004 (0.262)	0.011 (0.996)	0.019** (2.234)	-0.005 (-1.172)	-0.008*** (-3.599)	-0.011* (-1.718)
Private lending	-0.031*** (-3.328)	-0.021*** (-3.062)		- 0.054*** (-3.791)	-0.020** (-2.716)	
Government debt		0.033*** (2.662)			0.027*** (2.725)	
Human Development Index			0.173*** (3.099)			0.348*** (2.646)
Worldwide Governance index			0.021 (1.575)			0.031** (2.096)
Crisis dummy		-1.649** (-2.019)			-2.948*** (-3.438)	
R2	0.368	0.506	0.477	0.471	0.634	0.572

Note: ***, **, * indicates significance at the 1%, 5%, and 10% level, respectively. For the variables initial per capita GDP and FDI we have used their 1-year lagged values.

Source: Authors' calculations

A separate analysis of the two subgroups of countries reveals that the real convergence indicator is higher within the ‘old’ member states than within the new EU member states, as suggested in Table no. 4. It seems that the macroeconomic and institutional drivers weighted more within the developed Europe than within the NMSs (Dobrinsky and Havlik, 2014). Overall, the negative impact of the crisis was stronger in the EU13 as compared to the EU15.

In addition, we find that the positive impact of institutional framework was stronger in the EU15-13 as compared to its counterpart (Halmaj and Vasary, 2012). A similarity between these two groups highlights that the major effects on economic performance are exhibited by the level of investment and trade openness. This finding, accentuated by the impact of the crisis and institutional framework, stress that the quality of investments is an important source of a sound economic growth; and this result is particularly more evident when the developed group of countries is addressed. These results are in line with the studies of Žuk and Savelin (2018) and Prochniak (2011). However, the impact of these factors on the growth of real GDP per capita has diminished under the circumstances of the recent international crisis for both groups of countries (Halmaj and Vasary, 2012).

A striking difference between the two sets of countries is to be seen regarding the level of FDI. While net inflows generate a positive, yet generally nonsignificant effect on the developed EU15 states, in the case of EU13 this is statistically significant and negative. Possible explanations for such an impact have been provided previously. The evolution of prices had a deeper negative effect on GDP growth in the EU13 case relative to EU15, but this might be explained through the long-term process of alignment of CPI after the transition period in this former-socialist perimeter.

To sum up, our results highlight that the macroeconomic factors were not the only driving forces of the EU Member States growth and convergence. The institutional quality has a decisive role in promoting and augmenting the real economic convergence, and, thus, sound structural reforms could enhance the EU economic policy coordination (Bongardt *et al.*, 2013).

5. CONCLUSIONS

The results of our analysis support the existence of the absolute convergence of the New EU Member States towards the EU14 Member States in the period 1995-2018. However, this magnitude is quite fluctuant over the time, meaning a lack of sustainable convergence process. Meanwhile, when the conditional convergence is addressed, the situation exhibits several changes that can be translated briefly into several aspects. First, the crisis had a major negative impact on real convergence, especially within the NMSs group of countries, suggesting a weakening of the convergence process in this perimeter. Second, amongst the analysed macroeconomic variables, the level of investment and trade openness generated most of the economic growth in both groups of countries, meaning that these two macroeconomic indicators represent the key drivers of convergence within the EU countries. Furthermore, for the purpose of our analysis, the institutional explanatory variables provide an interesting insight: the quality of institutions has a positive and significant role in promoting the process of real convergence; and, notably, this is a more important driver of the economic growth in the subset of the EU15 as compared to the EU13 countries, involving the necessity to improve the institutional environment in the NMSs area.

Therefore, we can state that the catch-up potential of the New Member States is not constant across the analysed period. In order to be more balanced and maintain an upward trend, the less developed countries should implement more sound economic policies.

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