The Real Convergence of THE NMS-10 to THE EU-15

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Abstract

The goal of this article is to study the group and the individual convergence of ten new member states - Bulgaria, the Czech Republic, Poland, Romania, Slovakia, Estonia, Hungary, Latvia, Lithuania and Slovenia (known as the NMS-10), to the fifteen old member states – Austria, Finland, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, the United Kingdom and Sweden (referred to as the EU-15). A beta convergence approach was applied on three samples of annual Eurostat data (2000-2008, 2009-2019 and 2000-2019). The results from the empirical research show that the NMS-10 converged to the EU-15 both absolutely and conditionally in all analyzed periods. However, five new member states only (the Czech Republic, Estonia, Latvia, Lithuania and Romania) converged individually to the old member states over 2000-2019. The other five new member states - Bulgaria, Hungary, Poland, Slovakia and Slovenia, diverged from the EU-15. Fiscal balances, which took into account the economic cycle phase, encouraged a rise in the living standard in the old and the new member states prior to and following the global financial crisis. However, government debt and government consumption impeded the growth of the PPS per capita GDP in the EU-15 and the NMS-10 after the global economic crisis.

Keywords: real convergence; beta convergence; economic growth; new member states; old member states

JEL: F15; O47

Introduction

Economic convergence between the Member States and their regions has always been a key priority of the European Economic Community (EEC) and its successor, the European Union (EU). The Treaty of Rome stated as objectives of the EEC "a high degree of convergence of economic performance" and "economic and social cohesion". The Maastricht Treaty contains three objectives related to economic convergence: the harmonious and sustainable development of economic activities; the high level of implementation of economic activities; and the economic and social cohesion and solidarity of the Member States.

Real convergence is an endogenous process at national level, and at regional level it is key to improving European cohesion and increasing the competitiveness and efficiency of the Single Market. Therefore, the Europe 2020 Strategy was aimed at

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achieving smart, sustainable and inclusive growth and emphasized the need to reduce regional disparities (European Commission, 2012), and real convergence was one of the main objectives of the EU Cohesion Policy in the period 2007-2013, which focused on the poorest regions of the Union (Jozwik and Ponikowski, 2014).

The issue of real convergence has involved researchers and policymakers in ceaseless discussions for decades. The topic gained additional relevance and importance following the global financial crisis of 2008. The fundamentals of the Euro area (EA) were shaken and the further development of the European Union (EU) as an economically integrated system of countries was put under question.

The proper functioning of the Economic and Monetary union (EMU) in the EU depends on the convergence between the member states, some of which significantly differ from the other in terms of social and economic parameters. A variety of tools and methodologies has been employed to describe and categorize the divergence between the EU member states. The EMU convergence has often been analyzed in the context of a set of convergence parameters.

According to the Maastricht Treaty, a country which applies for a Euro area membership must meet the nominal convergence criteria of price stability, government finance, long-term interest rates and exchange rate. The merits and demerits of these criteria have been heavily debated by policymakers, business circles and academics. Additional quantitative indicators (labor productivity, employment, per-capita output and absorption rate of European structural and investment funds, investment share in GDP and other) and qualitative

parameters (knowledge, skills, qualifications, competences, innovative potential and expertise) have also been discussed.

Real convergence (a decrease in the differences in the living standards across countries and regions) is a key issue of economic governance and economic management in the European Union (EU) at a communitarian, national, regional and local level. The real convergence between the new and the old member states has been a matter of a permanent interest of academics, policymakers and business circles since the accession of the NMS-10 to the EU in 2004 and 2007. Recently, many theoretical and empirical studies have been devoted to this topic.

The goal of this paper is to investigate empirically the group and the individual convergence of the NMS-10 to the EU-15 over the period 2000-2008, 2009-2019 and 2000-2019. To achieve this goal, the research employed a beta convergence methodology (both absolute and conditional) and annual Eurostat data.

The paper is structured in accordance with its goal. Section one systematizes the theoretical and empirical studies on the real convergence between the new and the old member states. Section two represents an application of the beta convergence methodology to the NMS-10 and the EU-15. Section three outlines the trends in the individual convergence of the new member states to the EU-15. The last section draws inferences and discusses the implications of this research for policymakers at the national and the communitarian level in the EU.

1. Literature review

1.1. Theoretical foundations of economic convergence

Economic convergence occurs when poorer economies grow faster than richer ones and thus reduce their lag behind them (De la Fuente, 2000).

Convergence is a process of reducing disparities in development between countries and regions. Two groups of theories have the main contribution to the explanation and understanding of this process - the economic growth theories and the economic integration theories (Barro and Sala-i-Martin, 1992; Capello, 2007; Quineti et al., 2011).

In the specialized literature, economic convergence at different levels (national, regional and subregional) is considered through the prism of mid-term and long-term economic development, in relation to the dynamics of individual economic sectors and in the context of mechanisms and institutions that support economic integration (Ghizdeanu et al., 2015; Iancu, 2009).

Solow (1956) and Swan (1956) contributed to the theory of economic convergence by introducing simplified models of general equilibrium. Neoclassical growth theory and the concept of beta convergence are based on these models.

The theoretical and methodological framework for the study of real convergence was provided by the neoclassical models of growth of Solow (1956) and Swan (1956). An important place in the neoclassical theory of real convergence takes the impact of investments in physical capital on convergent economic growth. A key assumption is that the reduction in disparities depends on the diminishing marginal productivity of capital. The output growth rate is inversely proportional to the amount of physical capital in an economy, and therefore to its level of development. Poorer countries should grow faster than richer ones until they catch up with them in living standards. The main drawback of Solow's and Swan's models, as well as of the neoclassical theory of real convergence, is that the assumption of a diminishing marginal return on capital often does not correspond to empirical facts.

The neoclassical models of Solow (1956) and Swan (1956) were refined and transformed by Mankiw, Romer and Weil (1992) and others into endogenous models of growth.

The shortcomings of the neoclassical (exogenous) theory of economic growth and real convergence were overcome by the endogenous theory of growth and convergence. It focused on intangible factors and their effects, called externalities or spillovers. They are quantitatively immeasurable and take the form of knowledge, skills, qualifications, competencies, innovations and know-how. Endogenous models add human capital and technological progress to the factors of growth and convergence and abandon the unrealistic assumption of diminishing marginal productivity of capital.

1.2. Theoretical and empirical studies on the real convergence between the NMS-10 and the EU-15

Adomnicai (2018) concluded that Romania's progress in economic development was above the Euro area average during 2000-2015. However, Romania's labor productivity was below the EA average for the same period.

Campeanu and Ghitac (2015) found out that Bulgaria, Hungary, Romania, Poland and the Czech Republic converged in real terms to the EA during 2004-2013.

Donath and Mura (2019) analyzed panel data for the Czech Republic, Poland, Hungary, Slovakia, Romania and Bulgaria over the period 1995-2016 and inferred that the four Visegrad countries had reached a higher degree of real convergence than the two Balkan states. However, Romania and Bulgaria have a catch-up potential, especially in β-convergence.

Coutinho and Turrini (2020) stated that convergence might be impeded by macroeconomic imbalances and huge private debt. Despite the similar patterns of convergence in the EU and the EA, the degree of convergence in the EU is much higher than in the EA.

Dauderstädt (2014) ascertained that the main challenge to the EU convergence was the disparity within national borders. The author recommended that the EU legislation allow national governments more flexible economic and social policies for mitigating local and regional inequalities.

According to Dobrinsky and Havlik (2014), the global crisis of 2008 had a negative and long-lasting impact on the convergence of the new EU member states from Central and Eastern Europe.

Dolls et al. (2018) claimed that during 1995-2017 the new EU member states from Central and Eastern Europe considerably converged in real terms with the old member states due to their good national convergence plans.

According to Eurofound (2018), in 2008-2017 real divergence took place in most of the EU countries, especially in labor markets and living conditions.

The single currency has not played its role as a catalyst for real convergence among the members of the Euro area. The empirical data suggest even divergence for a period of over

15 years. The main contributors to sustainable convergence are macroeconomic stability, effective capital allocation and total factor productivity (TFP) growth (European Central Bank, 2015).

The European Central Bank (2018) found a link between income convergence and price convergence in Bulgaria, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia, the Czech Republic and Slovakia. The global crisis of 2008 retarded the convergence of the NMS towards the EU-28 average, but the Baltic countries and Poland managed to catch up after 2010.

According to Głodowska and Pera (2019), during 1995–2016 the NMS-10 as group diverged from the EU-15.

Grela et al. (2017) attributed the real convergence of the CEE-6 (the Czech Republic, Bulgaria, Romania, Slovakia, Hungary and Poland) before the global crisis of 2008 to the large inflows of Foreign Direct Investment (FDI). After the crisis the convergence process of the CEE-6 became dependent mainly on the structural competitiveness of their economies, innovations, institutional environment and profound policymaking especially targeted at tackling the demographic dynamics on the labor market.

Matkowski et al. (2016) noted that the convergence between the NMS and the EU-15 was most intense in the interval 2000-2007. The enlargement wave in 2004 stimulated convergence through trade liberalization, increased capital and labor mobility and enhanced cooperation between the policymakers. The global crisis of 2008 slowed down the convergence process.

Iancu (2017) estimated that 22 years would be necessary for Romania to reach the EU-28 average GDP per capita expressed in

Purchasing Power Parity (PPP). According to Szeles and Marinescu (2010), the presence of Romania in CEE deepens this process of regional economic convergence.

Micallef (2020) concluded that the main drivers of convergence in the EU in the years to come would be labor productivity and labor utilization.

In 2004-2015, the NMS converged as a group, but the EU-15 group diverged (Młynarzewska-Borowiec, 2018). The overall convergence process at a communitarian level was driven by the NMS.

Petrevski et al. (2016) showed that the real convergence in CEE was most intense over the period 2004-2008. Slovenia registered substantial divergence after 2008.

Two important inferences can be made from the analysis of the studies on the real convergence between the new and the old member states: first, the NMS were more prepared for the accession to the EU than Ireland, Spain, Portugal and Greece; second, the better convergence performance of the NMS could be attributed to the comparatively high level of skilled human resources, the fast economic reforms and macroeconomic stability.

2. The beta convergence of the NMS-10 to the EU-15 as a group

2.1. Methodology

The methodology of beta convergence was first applied by Barro and Sala-i-Martin (1992). They distinguished two types of beta convergence: absolute and conditional.

2.1.1. Absolute convergence

Absolute convergence is based on the assumption that all states or regions in a group move to one steady state. The rate of convergence (the so-called beta coefficient)

is obtained by a simple regression approach (with one explanatory variable). The beta coefficient shows the speed per annum at which the countries or regions move to the steady state. The dependent variable is the growth rate of per capita income in Purchasing Power Standard (PPS). The independent variable is the natural logarithm of the initial level of real per capita output in PPS:

$$(1)\ \text{YGR}_{i.0,T} = \alpha + \beta \log(Y_{i,0}) + \varepsilon,$$

where β is the convergence (beta) coefficient; $\text{YGR}_{i.0,T}$ is the average annual growth rate of per capita GDP in PPS of country i in the analyzed period $0-T$; $Y_{i,0}$ is the per capita GDP in PPS of country i in year 0 (the initial year of the analyzed period); α is the constant; ε is the error term; and T is the final year of the analyzed period.

2.1.2. Conditional convergence

Convergence suggests that less developed countries (with lower per capita income in PPS) tend to grow faster than more developed states (with higher per capita output in PPS). Convergence implies a negative β (beta coefficient). If β is positive, this means that a group of countries does not converge but diverges.

In this study, the β coefficient was assessed by a cross-sectional linear regression, which used the average rates for the analyzed period. Cross-sectional data are free of short-term cyclical fluctuations and reflect the long-term economic dynamics to the steady state.

Conditional convergence assumes that countries move to different steady states, because they develop in various political, economic, social, natural and demographic conditions. Under conditional convergence, the β coefficient is extracted by a multiple regression. Equation (1) is expanded by new

regressors, which account for the effects of country-specific factors on the per capita GDP (in PPS) growth rate. In this analysis, the new regressors are the inflation rate, the fiscal balance, the government debt and the shares of exports, gross capital formation, government consumption and household consumption in GDP:

$$(2) \quad YGR_{i.0,T} = \alpha + \beta_1 \log(Y_{i,0}) + \beta_2 INFL_{i.0,T} + \beta_3 FB_{i.0,T} + \beta_4 GD_{i.0,T} + \beta_5 EX_{i.0,T} + \beta_6 GCF_{i.0,T} + \beta_7 GC_{i.0,T} + \beta_8 HC_{i.0,T} + \varepsilon,$$

where β_1 is the convergence (beta) coefficient; α is the constant; $\beta_2 \ldots \beta_8$ are the regression coefficients before the other regressors; ε is the error term; 0 is the initial year of the analyzed period; T is the final year of the analyzed period; $YGR_{i.0,T}$ is the average annual growth rate of per capita GDP (in PPS) of country i in the analyzed period 0-T; $Y_{i,0}$ is the per capita GDP in a PPS of country i in year 0 (the initial year of the analyzed period); $INFL_{i.0,T}$ is the average annual inflation rate (measured by the Harmonized Index of Consumer Prices) of country i in the analyzed period 0-T; $FB_{i.0,T}$ is the average fiscal balance (percentage share of GDP) of country i in the analyzed period 0-T; $GD_{i.0,T}$ is the average government debt (percentage share of GDP) of country i in the analyzed period 0-T; $EX_{i.0,T}$ is the average percentage share of exports in GDP for country i in the analyzed period 0-T; $GCF_{i.0,T}$ is the average percentage share of gross capital formation in GDP for country i in the analyzed period 0-T; $GC_{i.0,T}$ is the average percentage share of government consumption in GDP for country i in the analyzed period 0-T; and $HC_{i.0,T}$ is the average percentage share of household consumption in GDP for country i in the analyzed period 0-T.

2.2. Data

Annual Eurostat data for three time periods: 2000-2008, 2009-2019 and 2000-2019 were used in the research.

2.3. Empirical results

2.3.1. Absolute convergence

The results from the estimation of Equation (1) for the periods 2000-2008, 2009-2019 and 2000-2019 are shown in Tables 1-3. The significant and negative beta coefficients imply that the NMS-10 converged absolutely to the EU-15 in all three analyzed periods. However, before the global financial crisis (during 2000-2008) the speed of absolute convergence was higher than after the crisis (2009-2019). It may be inferred that the global financial crisis of 2008 retarded the process of real convergence of the new member states to the old member states of the European Union (EU).

Table 1: Results from the estimation of Equation (1) for the period 2000-2008

Variable/coefficient	Coefficient value	Standard error	t-Statistic	Probability
Constant/α	27.26661	2.983880	9.137971	0.0000
log(Y_{i,0})/β	-2.445889	0.306446	-7.981474	0.0000

Source: Prepared by the authors

Table 2: Results from the estimation of Equation (1) for the period 2009-2019

Variable/coefficient	Coefficient value	Standard error	t-Statistic	Probability
Constant/α	10.62677	2.730182	3.892331	0.0007
log($Y_{i,0}$)/β	-0.964542	0.280391	-3.439990	0.0022

Source: Prepared by the authors

Table 3: Results from the estimation of Equation (1) for the period 2000-2019

Variable/coefficient	Coefficient value	Standard error	t-Statistic	Probability
Constant/α	12.46474	3.431168	3.632797	0.0014
log($Y_{i,0}$)/β	-1.131129	0.345835	-3.270721	0.0034

Source: Prepared by the authors

2.3.2. Conditional convergence

The results from the estimation of Equation (2) for the periods 2000-2008, 2009-2019 and 2000-2019 after the step-by-step removal of insignificant variables are reported in Tables 4-6.

Table 4: Results from the estimation of Equation (2) for the period 2000-2008

Variable/coefficient	Coefficient value	Standard error	t-Statistic	Probability
Constant/α	31.07198	2.586054	12.01521	0.0000***
log($Y_{i,0}$)/β_1	-2.898907	0.265973	-10.89924	0.0000***
FB/β_4	0.208032	0.083505	2.491239	0.0212**
EX/β_6	0.018406	0.007688	2.394268	0.0261**

*Note: *** p<0.01, ** p<0.05, *p<0.1*

Source: Prepared by the authors

Table 5: Results from the estimation of Equation (2) for the period 2009-2019

Variable/coefficient	Coefficient value	Standard error	t-Statistic	Probability
Constant/α	22.09805	5.335971	4.141336	0.0005***
log($Y_{i,0}$)/β_1	-1.569901	0.412707	-3.803913	0.0011***
FB/β_4	-0.310416	0.105432	-2.944238	0.0080***
GD/β_5	-0.015488	0.007691	-2.013693	0.0577*
HC/β_9	-0.096550	0.034373	-2.808930	0.0108**

*Note: *** p<0.01, ** p<0.05, *p<0.1*

Source: Prepared by the authors

Table 6: Results from the estimation of Equation (2) for the period 2000-2019

Variable/coefficient	Coefficient value	Standard error	t-Statistic	Probability
Constant/α	17.11522	1.594737	10.73232	0.0000***
log($Y_{i,0}$)/β_1	-1.210249	0.195114	-6.202769	0.0000***
GD/β_5	-0.019693	0.004497	-4.379326	0.0003***
GC/β_8	-0.094963	0.053782	-1.765714	0.0920*

*Note: *** p<0.01, ** p<0.05, *p<0.1*
Source: Prepared by the authors

There is statistical evidence that the NMS-10 converged conditionally to the EU-15 in all three periods of investigation. However, before the global finical crisis (2000-2008) the speed of conditional convergence was higher than after the crisis (2009-2019). It may be concluded that that the global financial crisis slowed down not only the absolute but also the conditional convergence of the new member states to the old EU member states.

Before the global financial crisis (2000-2008) the growth rate of per capita GDP (in PPS) in the old and the new member states was negatively influenced by its initial level and positively affected by the percentage shares of fiscal balance and exports in GDP. After the crisis (2009-2019) the growth rate of per capita output (in PPS) of the old and the new member states was negatively impacted by the initial level of per capita income and the percentage ratios of the fiscal balance, government debt and household consumption in GDP. During the entire period of investigation (2000-2019) the percentage change in the standard of living in the old and the new member states was negatively affected by the initial level of per capita income in PPS and by the shares of government debt and government consumption in GDP.

2.3.3. Interpretation of the empirical results

The results from the empirical analysis of the beta convergence of the NMS-10 to the EU-15 confirm two important conclusions of almost all studies on the same topic: first, the NMS-10 as a group converged to the EU-15 both absolutely and conditionally; second, the speed of convergence was higher before the global crisis of 2008 than after it.

3. Individual convergence of the NMS-10 to EU-15

Table 7 presents the convergence process of each country from the NMS-10 to the EU-15 in the period 2000-2019. For the entire analyzed period (2000-2019), five NMS (the Czech Republic, Estonia, Latvia, Lithuania and Romania) converged to the old member states. The remaining five NMS (Bulgaria, Hungary, Poland, Slovakia and Slovenia) diverged from the EU-15.

Table 8 indicates the convergence process of each country in the NMS-10 in the period 2000-2008 to the EU-15. Before the global financial crisis of 2008, four of the NMS (Estonia, Latvia, Lithuania and Slovakia) shortened their distance to the old member states in terms of living standards. The other six NMS (Bulgaria, the Czech Republic, Hungary, Poland, Slovenia and Romania)

increased their difference in per-capita output with the EU-15.

Table 9 shows the convergence process of the individual countries within the NMS-10 to the EU-15 in the period 2009-2019. After the global financial crisis of 2008, four new member states only (Estonia, Latvia, Lithuania and Romania) caught up with the old member states in terms of living standard. The other six new member states further fell behind the EU-15 in terms of per-capita output in PPS.

Table 7: Convergence process of the individual NMS to the EU-15 during 2000-2019

Entity	GDP per capita (in PPS)		Difference from the EU-15 average		Convergence process
	2000	2019	2000	2019	
Bulgaria	5 300	16 500	-18 320	-21 913	Diverges
Czechia	13 500	28 900	-10 120	-9 513	Converges from below
Estonia	7 800	26 100	-15 820	-12 313	Converges from below
Latvia	6 700	21 500	-16 920	-16 913	Converges from below
Lithuania	7 000	26 000	-16 620	-12 413	Converges from below
Hungary	9 800	22 800	-13 820	-15 613	Diverges
Poland	8 900	22 700	-14 720	-15 713	Diverges
Romania	4 900	21 700	-18 720	-16 713	Converges from below
Slovenia	14 900	27 700	-8 720	-10 713	Diverges
Slovakia	9 400	21 900	-14 220	-16 513	Diverges
EU-15 average	23 620	38 413			

Source: Prepared by the authors

Table 8: Convergence process of the individual NMS to the EU-15 during 2000-2008

Entity	GDP per capita (in PPS)		Difference from the EU-15 average		Convergence process
	2000	2008	2000	2008	
Bulgaria	5 300	10 900	-18 320	-20 967	Diverges
Czechia	13 500	21 600	-10 120	-10 267	Diverges
Estonia	7 800	17 700	-15 820	-14 167	Converges from below
Latvia	6 700	15 100	-16 920	-16 767	Converges from below
Lithuania	7 000	16 100	-16 620	-15 767	Converges from below
Hungary	9 800	16 100	-13 820	-15 767	Diverges
Poland	8 900	14 200	-14 720	-17 667	Diverges
Romania	4 900	13 000	-18 720	-18 867	Diverges
Slovenia	14 900	23 000	-8 720	-8 867	Diverges
Slovakia	9 400	18 300	-14 220	-13 567	Converges from below
EU-15 average	23 620	31 867			

Source: Prepared by the authors

Table 9: Convergence process of the individual NMS to the EU-15 during 2009-2019

Entity	GDP per capita (in PPS)		Difference from the EU-15 average		Convergence process
	2009	**2019**	**2009**	**2019**	
Bulgaria	10 500	16 500	-19 493	-21 913	Diverges
Czechia	20 900	28 900	-9 093	-9 513	Diverges
Estonia	15 500	26 100	-14 493	-12 313	Converges from below
Latvia	12 800	21 500	-17 193	-16 913	Converges from below
Lithuania	13 700	26 000	-16 293	-12 413	Converges from below
Hungary	15 600	22 800	-14 393	-15 613	Diverges
Poland	14 400	22 700	-15 593	-15 713	Diverges
Romania	12 600	21 700	-17 393	-16 713	Converges from below
Slovenia	20 800	27 700	-9 193	-10 713	Diverges
Slovakia	17 300	21 900	-12 693	-16 513	Diverges
EU-15 average	29 993	38 413			

Source: Prepared by the authors

Conclusion

The results from this study indicate that the NMS-10 as a group converged to the old member states both absolutely and conditionally in all three periods of investigation (2000-2008, 2009-2019 and 2000-2019). The speed of convergence was higher before the global economic crisis of 2008, which slowed the convergence process. Before the crisis, the real per-capita economic growth in the old member countries and the member states was positively influenced by increasing exports and fiscal surpluses. After the crisis, the rise in the living standard in the old member countries and the member states was affected positively by fiscal deficits and negatively by government debt and household consumption. Over the entire period of the study (2000-2019), the rate of change of the PPS per-capita output in the old member countries and the member states

was negatively impacted by government debt and government consumption.

As to the individual convergence process of the separate new member states, during 2000-2019 the Baltic countries, the Czech Republic and Romania shortened the distance in the standard of living with the old member states. The other new member states - Bulgaria, Hungary, Poland, Slovakia and Slovenia, recorded an increasing difference in the living standard with the EU-15.

It may be inferred that fiscal policy is a crucial determinant of the rise in the living standard in the old member countries and the new member states. This research provides empirical evidence that fiscal surpluses before the global financial crisis and fiscal deficits after it contributed to the increase in the standard of living in the old and the new member states. Excessive government debt and ineffective government consumption became an obstacle to the growth of PPS per-

capita income in the old member countries and the member states after the global financial crisis.

The empirical results from this study point at several important implications for policymakers in the old and the new member states: first, a countercyclical fiscal policy (fiscal surpluses during expansion and fiscal deficits in time of contraction) is recommended for rising the PPS per capita income; second, a decline in government consumption and government debt is advisable for improving the standard of living.

The limitations of this research are related to the weaknesses of the neoclassical analytical framework. The beta convergence as a theoretical concept and as an empirical methodology reflects the long-term dynamics but fails to capture the short-run fluctuations of an economy or a group of economies.

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