

dr Victor Voronov
dr Olga Lavrinenko
dr Oksana Ruzha
mgr Alina Ohotina
Institute of Social Investigations
Daugavpils University

<https://doi.org/10.26366/PTE.ZG.2014.10>

The processes of convergence and divergence in the regions of the European Union: features and evaluation (1995 – 2011)

Increased stability and cohesion of the Member Countries of the European Union (EU) is an important aspect of the process of European integration and consolidation. At the same time, the question remains of how this policy is effective for the regions at different levels? Whether in the EU there is a convergence of regions at all levels or is it selective and has particular qualities among regions at different levels?

The aim of the analysis in this chapter is to evaluate the process of convergence of regions NUTS-1, -2, -3 in the period from 1995 to 2011. To achieve this aim we have set the following objectives: based on the review of the basic tenets of the theory of convergence, suggest methods of the evaluation of the types of convergence viewed in the paper; based on previous experience of empirical studies of convergence in the EU, perform an empirical analysis of convergence of EU regions at three levels - NUTS 1, NUTS 2 and NUTS 3²⁹.

First of all, we note that under the regions in this paper we understand the statistical regions of the EU, defined on the basis of Regulation 2003 of the European Parliament (*Regulation (EC) 2003*). The main criterion for distinguishing the levels of regions in the EU is the number of the population. Thus, the following division into regions is adopted: for the level of NUTS 1 – from 3 to 7 million people (reflects the national level for all the territory of EU Member States); for NUTS 2 level - from 800 thousand to 3 million people (reflecting the level of sub-regions that are members in each EU country, with an exception only in Lithuania, Latvia and Estonia, where NUTS 1 level coincides with the level of NUTS 2); for the level of NUTS 3 - from 150 thousand to 800 thousand people (this is the level of small regions within sub-regions). In the EU as of 31.12.2011 there are 97 regions of NUTS 1 level, 271 regions of NUTS 2 level and 1303 of NUTS 3 level.

Basics of the theory of convergence. “Convergence” (Lat. “*converge*”) in the social

²⁹ Nomenclature of Territorial Units for Statistics (Fr. *nomenclature des unités territoriales statistiques, NUTS*) - standard territorial division of the European Union for statistical purposes. The standard defines three levels of NUTS-units. NUTS-units can meet the administrative-territorial units of countries, but in some cases there is no match.

sciences represents rapprochement, cohesion of similar but not identical objects. In the second half of the 20th century under the convergence they understood the convergence of capitalism and socialism as two types of industrial society based on similar technology (J. Galbraith, D. Bell, and others). To date, the theoretical content and the practical meaning of the term "convergence" in the social sciences have lost the political aspect and expanded because of the deepening differentiation of branches of sociological and economic sciences. Sociologists (experts in economic and regional sociology), economists (experts in econometrics and regional economy) are actively using this term in the research of uneven socio-economic development of the territories, territorial differentiation and integration of regions for the convenience of their cohesion and strengthening (consolidation). The consolidation of the territories is analysed based on different concepts of convergence. The following types of convergence are distinguished: interregional and cross-country, convergence in terms of growth rate or income level, absolute and conditional, club, β -convergence and σ -convergence (Zverev, Kolomak 2010). Thus, in the Russian science, the terms "convergence", "cohesion", "bridging the gap", "alignment", "rapprochement" are usually used interchangeably and as their opposites - "discrepancy", "differentiation", "polarization", "stratification", "divergence". In studies of European sociologists and economists the terms "convergence" and "divergence" have settled. The authors follow this tradition, using the Russian terms where it is justified. We interpret the term as follows: *convergence - is a process of rapprochement of economic parameters of regions to a certain level.*

Cross-country convergence is based on indicators of the differences between countries; interregional convergence considers this process within a single country. Convergence in terms of the growth rate is defined as the alignment of various economies to a single trajectory of growth. This approach is based on the assumptions of the neoclassical theory of growth (Solow 2000). Conditional convergence implies the existence of fundamental differences and irresistible heterogeneity in the studied objects, which leads to different trajectories of economic growth. Absolute convergence suggests the homogeneity of objects and the presence of a single trajectory of growth for all economies. Club convergence, as opposed to absolute suggests that the economies of countries and regions are not the same for all growth trajectories but a unified within a group of similar economies on the initial level of development and other characteristics.

β -convergence determines the presence of a negative correlation between the growth rate and the initial level of economic development. It is conceptualized as a process of "replenishment" in which poor countries or regions have higher rates of economic growth.

σ -convergence is a more general case and implies a reduction in the time of variation of characteristics of studied objects in the sample of countries or regions. In the scientific literature the studies of β -convergence and σ -convergence are the most prevalent (Barro, Sala-i-Martin 2004, pp. 50-51; Le Pen 1997, pp. 715-756). In the term " β -convergence" the first letter denotes the coefficient at the initial GDP per capita in the estimated equation (Barro, Sala-i-Martin 1990; Barro 1998). Hypotheses of β -convergence and σ -convergence are related, but not equivalent. σ -convergence does not follow absolute β -convergence directly (Barro, Sala-i-Martin 2004, pp. 50-51). Scientists have been proposed interpretation of the relationship between absolute β -convergence and σ -convergence (Henin, Le Pen 1995). The first one points to the existence of a trend to reduce the gap in GDP per capita. At the same time, the random shocks affecting the economy of the regions, can counteract this trend and temporarily increase the dispersion of the distribution of GDP per capita.

More than forty years ago, British economist John Williamson found that national development contributes to regional differences in the early stages. At the same time, in the later stages the economic growth creates rapprochement of regional levels, i.e., regional convergence resulting in the inverted U-shaped curve (Williamson 1965, pp. 1-84). The main argument in the approval of J. Williamson is that in the early stages in the region there are several growth poles, in which the capital and skilled workers are concentrated. As a result of a rapid increase in productivity, the economy growth is accelerated in these poles and results in an increase in regional differences (divergence). In the later stages of development the wages grow in the areas of growth poles, so the capital is likely to move to other regions with lower labour costs. This, together with the effects of a uniform distribution of knowledge can increase the reallocation of productive factors across sectors and regions, leading to the convergence of their regional development. The starting point for the analysis of alignment is the model of " β -convergence", based on the neoclassical growth theory by R. Solow (Solow 1957, pp. 312-320). In this theory, the rate of economic growth positively correlates with the gap of GRP per capita of the given region, and GRP per capita of the region in the state of a sustainable growth, which is characterized by constant growth. Consequently, the weaker regions should develop faster than stronger ones, and in the long run there will be the alignment of regional economic development levels. Thus, the theory of β -convergence shows that the relatively weak regions in the initial period of development are characterized by higher rates of growth. To estimate β -convergence the models of "growth-initial level regressions" are used, in which the dependent variable is the rate of growth, and independent - the initial level of the indicator. Simple regression of this type takes the form:

$y_i = a + \beta \ln(x_{it-T}) + e$, where x_{it-T} - the indicator at a time preceding the current time t by T periods (typically, the initial integration period or other time significant for development of integration group), β - the coefficient to be estimated, y_i - the average growth rate in the i -th country over T periods, calculated as $\ln(y_{it})/\ln(y_{it-T})$, e - random deviation (Liebman 2006, pp. 58-73). Indicator of the presence of convergence is the sign of β . If $\beta < 0$, the high level of the indicator at the initial time is correlated with relatively lower growth.

In contrast to β -convergence, σ -convergence shows a decrease with time of indicators characterizing smoothing divergence between regions. β -convergence not always implies σ -convergence. In a situation where a group of stronger and weaker regions is constantly changing (due to the worsening economic situation in stronger and improvement in weaker), but overall the gap between stronger and weaker regions is constant - then there is no σ -convergence (Barro, Sala-i-Martin 1995; Sala-i-Martin 1996a, pp. 1325-1352; Sala-i-Martin, 1996b, pp. 1019-1036).

To determine σ -convergence in the presence of a trend in the time series can be used such an indicator as dispersion or relative indicators of variation: the coefficient of range (K_R) and the coefficient of variation (V_σ). Increasing of the range and variation coefficients directly indicates an increase in the variation of variable in the studied aggregate. Thus, analyzing the dynamics of these factors on the key parameters, we can give qualitative and quantitative characteristics of the process of the growth of the existing differences by GRP per capita in the regions of the EU.

Another indicator to determine σ -convergence is the normalized Theil index (Theil 1967): $T = \sum_{i=1}^n y_i \ln(y_i / p_i)$, where y - a share of GDP of the country in GDP of the whole EU, p - a share of population of the country in the population of the EU. The index value is zero in the case of complete equality, and increased with increasing inequality. Thus, reducing the value of the index over time indicates the presence of convergence, an increase of the index indicates the process of divergence, i.e. growth of differences.

A review of studies of convergence in the EU. The EU territory has been classified by the area of the "periphery" and "core" based on the study of 12 countries (EU-15 with the exception of Austria, France and the UK) from 1989 to 1999 held by S. Dallerba and J. Le Gallo. The core includes the majority of developed EU countries. Significant convergence among countries of the periphery has been established, but they do not get the same result of the development as for the core. According to the researchers concluded, the benefits of

investment projects of the EU Structural Funds are beyond doubt in the regions where they were directed to, but the effects of a uniform result from the impact of the EU Structural Funds are only present in the major regions (the core). A possible reason for this is that the core regions have the smaller territories, as well as being better connected to each other through a network of transport and trade. Researchers have noted two groups of countries: four - Greece, Portugal, Spain and Ireland - as less developed, and three - Germany, United Kingdom and Italy - as more developed countries. They found that there are multiple poles of growth, while other regions lag, which leads to increasing inequality (Dall'erba, Le Gallo, 2003).

Italian researchers examined 15 EU countries representing 140 regions of NUTS 2 level between 1980 and 1999 and found there significant convergence: an analysis of the distribution showed that the levels of income per 1 person in poorer countries tend to converge, i.e. the convergence process is more intense among the regions of low-income populations (Brasili, Gutierrez, 2004). Income Study (LIS) for the Czech Republic (1992, 1996), Hungary (1991, 1994), Poland (1992, 1995, 1999) and Russia (1992, 1996) showed that regional income inequality within the countries of the CEE region increases, the leaders are the capitals and major urban areas. Perhaps, in the future, regional differences within individual EU countries would further exacerbate, particularly between large urban agglomerations and economic periphery of the "old" economic specialization. However, even good economic performance of some large peripheral regions will be achieved mainly through local points of growth (Förster, Jesuit, Smeeding 2005).

The study of EU-25 and their 1214 regions of the level of NUTS 3 in the period 1995-2002 led to the conclusion that regions with lower GDP per capita developed at a higher speed during the 1995-2002 period. Convergence speed was higher for NUTS 3 regions in the EU-15 than for the NUTS 3 regions in the new EU countries. Within the regions of the EU-15 convergence was observed, while in the group of new EU Member States – it was not (Paas, Kuusk, Schlitte 2004). These findings reveal a more serious problem: while smoothing inter-regional differences in the level of large regions the disparities in smaller regions are usually left out of the action mechanisms of regulation of territorial development. Even wealthy countries may have poor regions, which have nothing to expect. The EU regions of NUTS 3 level may be the subject of regional policy aimed at improving the competitiveness and employment, only under a number of criteria. Local administrative units are generally outside of the field of action of the regional programs of the EU.

Based on the analysis of 19 of the 27 EU member states in 1995-2004 (both at the

national level and within each country at the level of NUTS 2) B. Szörfi has determined that the date of entry into the EU has an impact on the degree of regional differences. New EU Member States have a higher level of regional differences (Szörfi 2007, pp. 100-121). In a study of 10 new EU countries for the period 1995-2005 to identify convergence of economies by GDP (quarterly data on real GDP per capita during this period) the trend of alignment of these countries to the EU average level of GDP was defined (Ranjpour, Karimi 2008, pp. 157-166). Over the past 15 years, we observe the growing interest in the study of differences in the development of EU regions using different econometric methods. Most studies of convergence have focused on the analysis of β -convergence and σ -convergence (spatial convergence).

The above review shows that the results depend on the selected research methods, the study period, and a list of the regions under study. However, despite the fact that the authors of the studies reviewed used different measurement of convergence, their results are comparable and allow us to draw the following conclusions. For a quarter century there has been convergence of the level of development between the relatively poor and the rich countries of the EU. This convergence occurred in a period when the poorest EU countries were countries of southern Europe and Ireland (1980-1999), as well as at a time when the states of Central and Eastern Europe began to be treated as the poorest (1995-2005). Thus, the process of convergence at the level of individual regions (NUTS 2 and NUTS 3) was complex. If the Scandinavian countries and Italy were, in general, characterized by convergence and differences in economic development between regions decreased, while in other EU countries the process was controversial and convergence periods alternated with periods of divergence. Recent EU members from Central and Eastern Europe have a higher level of regional differences in comparison with the "old" EU countries. In this case, the disparity between large and small regions in many of the "new" EU countries increased due to the rapid development of metropolitan regions and large cities compared to others, especially small regions. Consider this in detail.

Evaluation of convergence of regions at NUTS 1 level. For the empirical analysis we used Eurostat data from 1995 to 2011. In the EU the GDP at PPP per capita in regions of NUTS 1 level in 2009 ranges from 44% of the average in the EU-27 (U.S.\$10,300 at PPP per capita) in Bulgaria to 266% in Luxembourg (U.S.\$62,500 at PPP per capita). Disparities of EU regions of NUTS 2 level are even more acute: the GDP at PPP per capita in 2009 ranged from 27% of the average for the EU-27 (U.S.\$6,400 at PPP) in the North-West region of Bulgaria to 332% (U.S.\$78,000 at PPP) in the Metropolitan area (Greater London), UK. In the

"new countries" the leader is Prague (Czech Republic) - 175% (U.S.\$41,200 at PPP per capita) and the region of Bratislava (Slovakia) - 178% (U.S.\$41,800 at PPP) from the average for the EU-27. However, these two regions should be considered as an exception among the new states that joined in 2004. Followed by the most prosperous regions in the new member: Bucharest in Romania - 111% of the average for the EU-27 (U.S.\$26,100 at PPP), Central Hungary (Hungary) - 109% (U.S.\$25,500 at PPP), Western Slovenia (Slovenia) - 105% (U.S.\$24,600 at PPP), Cyprus - 100% (U.S.\$23,500 at PPP) from the average level for the EU-27. With the exception of the Mazowieckie voivodeship in Poland - 97% and Malta - 82%, all other regions of the new Member States have GDP at PPP per capita of 75% or less of the average level for the EU-27.

Increase in the level of GDP per capita in poor areas is the main task of the main directions of the EU regional policy – convergence. The basis for obtaining assistance is the development of less than 75% of GDP at PPP from the EU average. Inclusion of Central and Eastern European countries (CEEC) in the EU automatically decreased the amount of the EU average, so the less-developed regions of the "old" countries (East Germany and middle-income areas of Greece) will not be able to get this assistance. Increase the level of GDP per capita in poor areas of the EU by NUTS 1 criterion leads to a smoothing of disparities in GDP (The Regional Policy of the EU, 2009). G. Petrakos, A. Rodríguez-Pose and A. Rovolis analyzing this process in France, Great Britain, Italy, Portugal, Spain, Belgium, Greece, the Netherlands between 1981 and 1997 found that the long-term development processes tend to equalize the distribution of resources. Although, a more rapid growth of GDP leads to a more intense increase in regional inequalities. Regional differences at the national level in the EU are cyclical: they increase during periods of rapid GDP growth and decline in periods of slow (Petrakos, Rodríguez-Pose, Rovolis 2005, pp. 1837-1855).

The analysis of such indicators as GDP per capita shows that the level of differentiation between regions of NUTS 1 level that are members of the EU, has steadily declined throughout the period. The slow decline of differentiation characteristic for 1995-1999 gave way to rapid convergence in 2000-2009. The accession of ten new countries to the European Union in 2004 and two more countries (Bulgaria and Romania) in 2007 is likely to have a positive impact on the process of convergence, but the effect was relatively small and the rates of convergence were similar throughout the first decade of the 21st century. However, the economic crisis of 2008-2009 still had some influence on the process of convergence within the EU as a whole. Its rate declined slightly, in 2010 there was even slight divergence, but then again the processes of convergence began and in 2011 the Theil index returned

almost to the level of 2009 (see Table 1.).

Table 1. Changes of the Theil index in the EU (EU – 27), 1995-2009

Years	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Theil index	6.44	6.21	6.18	6.16	6.12	6.05	5.68	5.31	4.97	4.64	4.41	4.09	3.65	3.21	2.96	3.00	2.95

Source: authors' calculations.

Note: The data for Slovenia, the Czech Republic, Slovakia, Hungary, Poland, Lithuania, Latvia, Estonia, Bulgaria, Romania, Cyprus and Malta were taken into account throughout the period, regardless of whether or not these countries at the time were members of the EU or not.

This rapid process of convergence in 1995-2009 primarily stemmed from contraction of differentiation between the "old" (EU-15) and "new" countries, which was caused both by a higher rate of GDP growth in the new countries, and a slower rate of population growth in them. GDP growth and the process of convergence in the EU are displayed as follows. GDP growth in the poorer new EU countries up to 2008 significantly exceeded the rate of economic growth in the EU-15. In some of the "new" countries (e.g. Latvia in 2005-2007) GDP growth rate reached 10% a year, while in most of the EU-15 the figure was only 3.2% (see Table 2.).

Table 2. The growth rate of real GDP in the EU (1996-2010), in%

Countries	1996	2000	2004	2008	2009	2010	2011
EU -27	1.8	3.9	2.5	0.3	-4.3	2.1	1.6
EU-15	1.5	3.8	2.2	0.4	-4.4	2.0	1.4
Bulgaria	-9.0	5.7	6.7	6.2	-5.5	0.4	1.8
Czech Rep.	4.5	4.2	4.7	3.1	-4.5	2.5	1.9
Estonia	5.9	9.7	6.3	-4.2	-14.1	3.3	8.3
Cyprus	1.8	5.0	4.2	3.6	-1.9	1.3	0.5
Latvia	4.3	5.7	8.9	-3.3	-17.7	-0.9	5.5
Lithuania	5.2	3.6	7.4	2.9	-14.8	1.5	5.9
Hungary	0.2	4.2	4.8	0.9	-6.8	1.3	1.6
Malta	:	:	-0,3	3,9	-2.6	2.9	1.7
Poland	6.2	4.3	5.3	5.1	1.6	3.9	4.5
Romania	3.2	2.4	8.5	7.3	-6.6	-1.1	2.2
Slovenia	3.6	4.3	4.4	3.4	-7.8	1.2	0.6
Slovakia	6.9	1.4	5.1	5.8	-4.9	4.4	3.2

Source: Eurostat, 1996-2011.

Such high differences in the pace of economic growth, of course, led to a reduction in the level of differentiation between "rich" and "poor" countries of the EU.

Consider the hypothesis of σ -convergence of studied EU regions at NUTS 1 level by GDP at PPP per capita. It is believed that a necessary condition for the existence of σ -alignment is the existence of β -convergence (Sala-i-Martin 1996a, pp. 1325-1352; Sala-i-Martin 1996b, pp. 1019-1036; Arbia, Piras 2005). When calculating the coefficients of variation and range it was established that in the period 1995-2009 "polarization" of EU regions at NUTS 1 by GDP per capita decreased, as evidenced by direct reduction in the coefficient of variation by 9%.

During this period, the growth of the standard deviation (σ) did not overtake the growth of the average European values by GDP per capita. Consequently, differences in GDP decreased and smoothed the differences in GDP at PPP per capita, which confirms the σ -convergence of regions of the EU by GDP per capita. The fact of fixed spatial convergence should follow and support the hypothesis of β -convergence of regions studied by GDP at PPP per capita (σ -convergence is followed by β -alignment) (Barro, Sala-i-Martin 2004, pp. 50-51). When building a regression of GDP growth from 1995 to 2004 at its initial level in 1995, in which the dependent variable is the growth rate, and independent - initial index level ($y = a + \beta x$, where $y = \ln(\text{GDP 2004}/\text{GDP 1995})$, $x = \ln(\text{GDP 1995})$), it was found that the coefficient of initial GDP at PPP per capita is negative ($\beta = -0,0000017 < 0$, Beta = 0,588 < 0) and statistically significant ($p = 0.001$). Therefore, the assumption of β -convergence in the period 1995-2004 by GDP at PPP was correct.

When building a regression of GDP growth from 2004 to 2009 at its initial level in 2004 ($y = a + \beta x$, where $y = \ln(\text{GDP 2009}/\text{GDP 2004})$, $x = \ln(\text{GDP 2004})$), we found that the coefficient is negative ($\beta = -0,00000078 < 0$, Beta = -0,627 < 0) and statistically significant ($p = 0.000$). Therefore, the assumption of β -convergence in the period 1995-2004 by GDP at PPP is also true. So, in the period from 1995 to 2009 there is σ - and β -convergence of regions of the EU at NUTS 1 level. Thus, the EU regions with weaker values of economic development increase it at a faster pace than the stronger ones.

In the period 2010-2011 in the EU regions of NUTS 1 both σ - , and β -convergence occurred. The fact of the spatial convergence between 2010 and 2011 was found, the variation coefficient decreased by more than 4% (see Table 3.).

EU regions with weaker values of economic development continue to increase it at a faster rate than stronger regions: β -convergence ($\beta = -0,004 < 0$, Beta = -0,491 < 0, $p = 0,009$).

Comparing the above value to the data in the regions of Russia in the period 2010-2011 it can be noted as follows.

Table 3. Changing the coefficient of range and the coefficient of variation of GDP at PPP per capita in NUTS 1 regions in the period from 2010 to 2011

Indicators of variation	2010	2011
Coefficient of range, (K_R)	2.26	2.17
2010 = 100%	100%	95.96%
Coefficient of variation, (V_σ)	0.44	0.42
2010 = 100%	100%	96.49%

Source: authors' calculations.

The fact of σ -convergence of the districts of Russia in the period from 2010 to 2011 was found, the coefficient of variation decreased by 1.5% (see Table 4.):

Table 4. Changing the coefficient of range and the coefficient of variation of GDP per capita in Federal Districts of Russia in the period from 2010 to 2011

Indicators of variation	2010	2011
Coefficient of range, (K_R)	1.27	1.25
2010 = 100%	100%	98.13%
Coefficient of variation, (V_σ)	0.43	0.42
2010 = 100%	100%	98.51%

Source: authors' calculations.

In 2010-2011 in the Federal Districts of Russia β -convergence tended, i.e. the Federal Districts of Russia with weaker values of economic development increased it faster than stronger regions ($\beta = -0.006 < 0$, Beta = $-0.627 < 0$, $p = 0.096$).

Exploring the same period for the regions of Russia we established the fact of their σ -convergence in the period from 2010 to 2011, the coefficient of variation decreased by 12% (see Table 5).

Table 5. Changing the coefficient of range and the coefficient of variation of GDP per capita in the regions of Russia in the period from 2010 to 2011

Indicators of variation	2010	2011
Coefficient of range, (K_R)	12.30	10.29
2010 = 100%	100%	83.66%
Coefficient of variation, (V_σ)	1.53	1.35
2010 = 100%	100%	88.12%

Source: authors' calculations.

In the regions of Russia in the same period we found the presence of β -convergence ($\beta = -0.007 < 0$, Beta = $-0.482 < 0$, $p = 0.000$).

According to the authors, the role of the Structural Funds of the European Union (Social Fund, Regional Development Fund, etc.) in the process of convergence is also an issue of great importance. Scientists agree that it is necessary to raise the level of income in the poorer regions, where its rate is less than 75% of the EU average. In the frameworks of endogenous theory the public policy plays an important role in determining the long-term growth: public infrastructure is a factor in the production function, and its increase raises the marginal product of private capital, which leads to an increase in capital accumulation and growth. In the framework of neoclassical theory, such a policy is also intended to accelerate the process of convergence, as the marginal product of private capital increases with the provision of public capital. To account for the role of EU funds, the right-hand side of the regression equation can be added with an additional factor - the proportion of investment of EU Structural Funds together with the co-financing of states in GDP (see Table 6).

Table 6. Evaluating β -convergence of the regions of the EU to include the share of public investment in GDP, 2000-2010

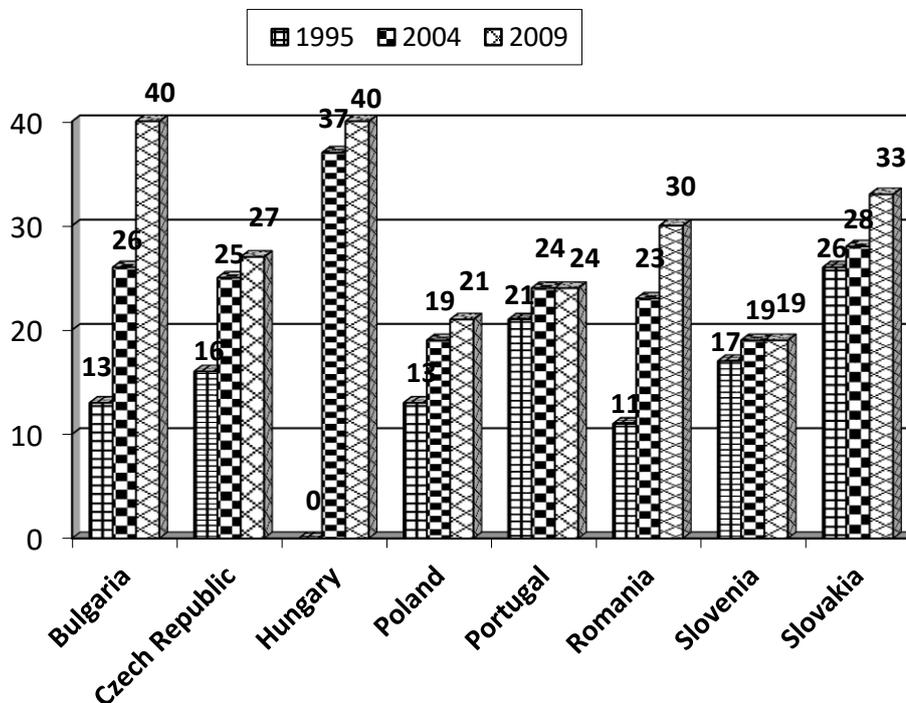
Variable	Coefficient	Standard error	t-statistics	p-value
Constant β_0	0.129	0.016	7.809	0.000
Initial GDP per capita in 2000, logarithm	-0.027	0.003	-8.394	0.000
Public investments, share in GDP	0.002	0.001	1.253	0.222
Coefficient of determination, R^2				0.82
Standard error				0.006

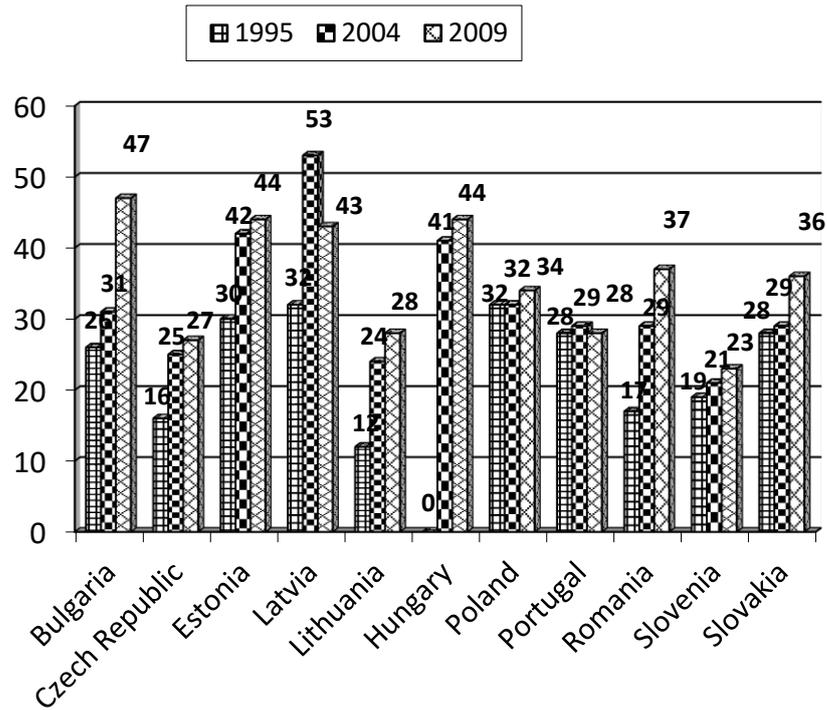
Source: Hotulev 2012, pp. 289-290.

The coefficient of the initial GDP per capita is negative and statistically significant (-0.027). But the coefficient of the variable characterizing the impact of public investment, while positive, is statistically insignificant. The results can be interpreted as evidence that within the EU between 2000 and 2010 the processes of convergence occurred, but the impact of the financial support of European Structural Funds in the integration process cannot be assessed unambiguously. The growth of public investment in less developed countries and regions of the EU through support of Structural Funds increased and, based on theoretical considerations, it should have a positive impact on the process of convergence. However, by using the proposed model it is not supported.

Evaluation of convergence of regions at NUTS 2 and NUTS 3 levels. Next we consider the problem of inequality in the old and new countries - EU Member States at the level of NUTS 3, compared with the level of NUTS 2 (see Figure 1).

Fig. 1. Dispersion in new countries of the EU at the level of NUTS 2 (top) and NUTS 3 (bottom) levels in the period 1995-2009, in %





Source: Eurostat 1995-2009.

Disparities of EU regions at NUTS 3 level by GDP at PPP per capita in 2009 are the sharpest and range from 22% in the regions of Silistra and Sylvain (Bulgaria) and Vaslui (Romania) (U.S.\$664 at PPP and U.S.\$1,087 at PPP, respectively) to 596% in the region of London City-West in the UK (U.S.\$156,661 at PPP). In the new EU countries a significant gap between the level of development of NUTS 3 regions mostly devoid of political colour and is associated with an exaggerated development of capitals, especially in the small Baltic countries.

The contrasts within the regions of the new EU countries at the level of NUTS 3 are even more acute. For example, in Bulgaria, the GDP per capita in the capital exceeded the Silistra and Silva GDP almost 5 times (105% to 22%). In 2009 in small Latvia the GDP per capita in Riga exceeded the Latgale GDP 3 times: 86% vs. 28% of the EU average, in Hungary the gap between Budapest and Nograd was almost 5 times (147% to 30%). In countries such as Romania and Poland differentiation is also significant. In Ilfov – a district that surrounds Bucharest – the GDP per capita is 115% of the average in the EU-27, while on the border with Moldova in Romanian Vaslui county - only 22% (a gap of more than 5.2-fold); in Poznan the same indicator reached 121% compared to 35% in the bordering with Belarus Bialski region (almost four times the gap). Significant historical and economic

differences are important to consider when choosing the direction of funds from the EU Structural Funds for regional cohesion, while addressing the tough dilemma of market "efficiency - justice." For example, in Latvia it is fairer to allocate funds from the EU Structural Funds in the Latgale region, but the returns there will be only 100 LVL per unit of resource input. Therefore, it would be more efficient to send funds to the central Riga region, where the returns will be 200-300 LVL per unit of resource input, i.e. 2-3 times higher. In a market precedence - for efficiency, not for justice. In this case, the differentiation of large regions (NUTS 1 and NUTS 2 level) in the new EU countries are not as significant: by GDP per capita the most advanced in Poland Mazovia voivodeship surpassed Lublin only by 2.4 times (97% to 41%), and Metropolitan area in Romania is 3.8 times ahead of the North-West region of the country (111% to 29%). In Bulgaria, the gap between the regions of the South-West and North-West is 2.7 times (75% to 27%). This gap in some Western European countries - such as the UK and France - was more.

We make some conclusions. The study established the presence of processes of β - and σ -convergence in regions of the EU by GDP at PPP per capita at NUTS 1 level. In this case, for the past 15 years, the process of convergence in the EU was fast enough, especially at the level of individual countries. This was due to a higher rate of GDP growth in the new EU countries, as well as lower rates of population growth in them. In the "new" EU countries the gap in the development of individual regions on NUTS 2 and NUTS 3 levels is associated with an exaggerated development of the capitals, especially in small states. The entry of new countries into the EU significantly stimulated β - and σ -convergence in them. Therefore, the reduction of differences revealed by GDP at PPP per capita is in the interests of both "new" and "old" EU countries and therefore indicates fairly positive EU policy towards the development of regions of NUTS 1 level.

Convergence processes in the regions of the EU at the levels NUTS 1, NUTS 2 and NUTS 3 are ambiguous and suggest that the goal of achieving regional convergence, parity ("equality") and to maximize the total output of the product ("efficiency") in a market conditions are not always compatible. Under these conditions, the negative effect of the slowdown in the "core" regions of the EU will exceed the influence of positive effect of growth in the "periphery." Therefore, the GDP growth of EU regions at NUTS 1 and NUTS 2 levels can be provided, including, at the cost of deepening regional inequality (divergence) at NUTS 3 level.

The analysis showed that the larger EU regions (NUTS 1 and NUTS 2 levels), the shorter is the period of time to align their differences. Conversely, the lower regions of the EU

(NUTS 3 level), the longer is the period of time for the same purpose. Therefore, when choosing objects of alignment, the priority to the regions of NUTS 3 level is preferred, a balanced policy of integration of regions also makes sense. The last remark is very important for many regions of the European part of Russia, where diversified production and clustering of the economy to equalize the levels of their development is necessary.

References

1. Arbia G., Piras G. (2005), *Convergence in Per-capita GDP Across European Regions Using Panel Data Models Extended to Spatial Autocorrelation Effects*, URL: http://www.isae.it/Working_Papers/WP_Arbia_Piras_n51_2005.pdf (26.11.2009).
2. Barro R. (1997), *Determinants of Economic Growth (The Lionel Robbins Lectures)*, The MIT Press Second Printing, Cambridge.
3. Barro R., Sala-i-Martin X. (2004), *Economic Growth*, Second edition, Massachusetts Institute of Technology, Cambridge, Massachusetts, London.
4. Barro R., Sala-i-Martin X. (1995), *Economic Growth*, The MIT Press Chicago.
5. Gadziev Y.A., *Neoklassicheskie i kumulativnie teorii regionalnogo rosta I razvitiya, Korporativnoe upravlenie i innovacionnoe razvitie Severa: Vestnik Nauchno-issledovatel'skogo centra korporativnogo prava, upravleniya i venchurnogo investirovaniya Siktivkarskogo gosudarstvennogo universiteta*, [Elektronny journal] URL: <http://koet.syktsu.ru/vestnik/2008/2008-1/1/1.htm> (accessed 28 February 2013).
6. Hotulev A., (2012), *Vliyaniye regionalnogo investirovaniya na procesi sotsialno-ekonomicheskoy integratsiy v ramkah EU*, Starptautiskās zinātniskās konferences „Eiropas integrācijas sociālā un ekonomiskā dimensija: problēmas, risinājumi, perspektīvas” materiali. 2011. gada 3.-5. novembris). III daļa. Ekonomiskais aspekts. Daugavpils: Daugavpils Universitātes Akadēmiskais apgāds "Saule".
7. Sala-i Martin X. (1996a), *Regional Cohesion: Evidence and Theories of Regional Growth and Convergence*, "European Economic Review", Vol. 40, Iss. 6.
8. Sala-i-Martin X. (1996b), *The Classical Approach to Convergence Analysis*, "The Economic Journal", Vol. 106, No. 437.
9. Brasili C., Gutierrez L. (2004), *Regional Convergence Across European Union*, Econ.
10. Dall'erba S., Le Gallo J. (2003), *Regional Convergence and the Impact of the European Structural Funds Over 1989–1999*, "A Spatial Econometric Analysis", REAL Discussion Papers.
11. Förster M., Jesuit D., Smeeding T. (2005), *Regional Poverty and Income Inequality in Central and Eastern Europe: Evidence from the Luxembourg Income Study*, Spatial Inequality and Development, Kanbur R, Venables AJ (eds). Oxford University Press.
12. Henin P., Le Pen Y. (1995), *Les épisodes de la convergence européenne*, "Revue Économique", Vol., 46 (3).
13. Le Pen Y. (1997), *Convergence internationale des revenus par tête: Un tour d'horizon*, "Revue d'Économie Politique", Vol. 107.
14. Libman A. (2006), *Roly ekonomicheskoy integratsiy i dezintegratsiy na postsovet'skom prostranstve: kolichestvenniy analiz*, "Problemi prognozirovaniy" No. 5.
15. Paas T., Kuusk A., Schlitte F. (2004), *Modelling Regional Income Convergence in EU-25*. University of Tartu, URL: <http://www.ecomod.org/files/papers/1388.pdf> (21.06.2011).
16. Petrakos G, Rodríguez-Pose A., Rovolis A. (2005), *Growth, Integration, and Regional Disparities in the European Union*, Environment and Planning A, 37 (10).
17. Ranjpour R., Karimi T.Z. (2008), *Evaluation of the Income Convergence Hypothesis in Ten New Members of the European Union. A Panel Unit Root Approach*, "Panoeconomicus", 2.

18. *Regionalnaya politika stran EU* (2009), Centr evropeyskikh issledovaniy IWEIR RAS, Otv.red. prof. A.V. Kuznescov, IWEIR RAS, Moscow.
19. *Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003, on the Establishment of a Common Classification of Territorial Units for Statistics (NUTS)*. URL: <http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?> (25.02.2013).
20. Sala-i-Martin X. (1996a), *Regional Cohesion: Evidence and Theories of Regional Growth and Convergence*, "European Economic Review", Vol. 40. Iss. 6.
21. Sala-i-Martin X. (1996b), *The Classical Approach to Convergence Analysis*, "The Economic Journal", Vol. 106. No. 437.
22. Solow R.M. (1957), *Technical Change and the Aggregate Production Function*, "The Review of economics and Statistics", V. 39 No. 3.
23. Solow R.M. (2000), *Growth Theory: an Exposition*, Oxford University Press, New York.
24. Szörfi B. (2007), *Development and Regional Disparities – Testing the Williamson Curve Hypothesis in the European Union. Focus on European Economic Integration*, URL: http://www.oenb.at/de/img/feei_2007_2_szoerfi_tcm14-79074.pdf (15.11.2011).
25. Theil H. (1967), *Economics and Information Theory*, North-Holland.
26. Williamson J.G. (1965), *Regional Inequality and the Process of National Development: a Description of the Patterns*, "Economic and Cultural Change" No. 13.
27. Zverev D.V., Kolomak Ye.A. (2010), *Subfederalnaya fiskalnaya politika v Rossii: mezhhregionalnye razlichiya i svyazi*, Seriya "Nauchnye doklady: nezavisimyy ekonomicheskyy analiz", No. 209, Moskva: Moskovskiy obshchestvennyy nauchnyy fond; Sibirskiy tsentr prikladnykh ekonomicheskikh issledovaniy.

Streszczenie

Procesy konwergencji i dywergencji w regionach Unii Europejskiej: charakterystyka i ocena (1995 – 2011)

Wyższy poziom spójności pomiędzy krajami członkowskimi Unii Europejskiej jest istotnym elementem integracji europejskiej, lecz pozostaje dość wątpliwy w charakterze. Prawo o Wspólnym Rynku, którego celem jest zwiększenie wydajności gospodarczej UE stało się przedmiotem dyskusji pomiędzy naukowcami sugerującymi, że jego wykonalność na poziomie politycznym i społeczno-gospodarczym zależy od sprawiedliwej dystrybucji zysków pomiędzy kraje i regiony Wspólnoty. Dyskusja ta skutkuje znacznym wzrostem nakładów na fundusze przeznaczone na rozwój poszczególnych regionów UE z Funduszy Strukturalnych UE oraz Funduszy Spójności UE, których celem jest niwelowanie różnic regionalnych.

Słowa kluczowe: konwergencja, dywergencja, region, Unia Europejska

Abstract

The processes of convergence and divergence in the regions of the European Union: features and evaluation (1995 – 2011)

A higher level of unity and cohesion across the European Union member states is an important aspect of the European integration though it is rather ambiguous in nature. The Law on the Common market, which aims at increasing the economic efficiency of the EU, has become the subject of extensive discussions among researchers suggesting that its viability at the political and socio-economic levels depends on fair distribution of gains among the countries and regions of the Community. These discussions have resulted in a considerable increase in funding allocated for the development of the EU regions from the EU Structural Funds and the Cohesion Fund whose aim is to reduce regional disparities.

Key words: convergence, divergence, the region, the European Union

mgr Angela Burchardt
mgr Zuzanna Sikora
Urząd Statystyczny w Zielonej Górze
Lubuski Ośrodek Badań Regionalnych

<https://doi.org/10.26366/PTE.ZG.2014.11>

Potencjał demograficzny województwa lubuskiego

1. Wstęp

Według stanu w dniu 31 grudnia 2013 r. ludność województwa lubuskiego liczyła 1021,5 tys. osób, tj. o 1,8 tys. mniej niż w końcu 2012 r. Rok 2013 był pierwszym, w którym liczba ludności zmalała po trzech latach względnej stabilności w stanie populacji. Tempo ubytku ludności wyniosło 0,2%, co oznacza, że na każde tysiąc mieszkańców województwa ubyły 2 osoby (tabela 1.).

**Tabela 1. Ludność w województwie lubuskim (na podstawie bilansów ludności)
(stan w dniu 31 XII)**

WYSZCZEGÓLNIENIE	2012	2013	2013	
			przyrost(+)/ spadek(-) liczby ludności w porównaniu z 2012 r.	2012=100
w liczbach bezwzględnych				
OGÓLEM	1023317	1021470	-1847	99,8
Mężczyźni	498430	497340	-1090	99,8
Kobiety	524887	524130	-757	99,9
Miasta	647594	644970	-2624	99,6
Wieś	375723	376500	777	100,2

Źródło: opracowanie własne na podstawie danych GUS.

Obniżenie się liczby ludności w ciągu 2013 r. było głównie spowodowane pogłębieniem ujemnego salda migracji stałej – z minus 0,6 tys. osób w 2012 r. do minus 1,4 tys. osób w 2013 r. Drugim elementem mniej znacząco wpływającym na spadek liczby ludności jest ujemny przyrost naturalny, zanotowany po raz pierwszy od powstania województwa w 1999 r.

Województwo lubuskie cechuje średni stopień zurbanizowania, który wykazuje tendencję malejącą, w wyniku przenoszenia się ludności miejskiej na obszary podmiejskie i wiejskie. W 2013 r. w miastach zamieszkiwało 645,0 tys. osób, tj. o 2,6 tys. (0,4%) mniej niż przed rokiem. Na wsi w ciągu roku liczba ludności zwiększyła się o 0,8 tys. (0,2%) i osiągnęła poziom 376,5 tys. osób.