

## **IMPACT OF ACTUAL CRISIS ON EU CONVERGENCE\***

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### ***Abstract:***

*Estimating a set of concentration indicators for the period of actual crisis (emerged in 2008), we demonstrated a significant impact of it on convergence process in EU. However, the differences in matter of convergence emerge at the level of groups of countries. Thus, while in EU-10 (most recent acceded countries to EU) is manifesting a strong convergence, in EU-15 (old members of EU) a significant trend of divergence was demonstrated.*

**Keywords:** convergence, divergence, variation coefficient, European Union

### **1. Introduction**

Convergence theory has a long tradition showing in long-run the existence of an increasing trend during the general process economic development. Moreover, in EU history there is demonstrated a significant progress in matter of convergence. However, convergence is not linear; there are periods of accelerating or periods of braking, under the influence of a number of specific conditions.

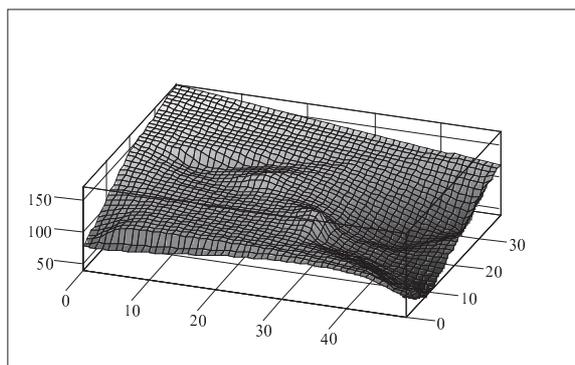
In line with Solow model, in EU real convergence refers explicitly to the income per inhabitant or to the level of productivity per employed person. Generally, as economic development is advancing (usually expressed by the GDP per capita growth), there is a general convergence process among countries. Empirical evidences throughout economic history have generally confirmed this process. In order to quantify the impact of actual crisis on convergence process in EU, in this study, we used a set of concentration indicators (coefficient of variation, Gini coefficient, etc.) at the level of EU-27 but also inside of two groups of countries, EU-10 and respectively EU-15.

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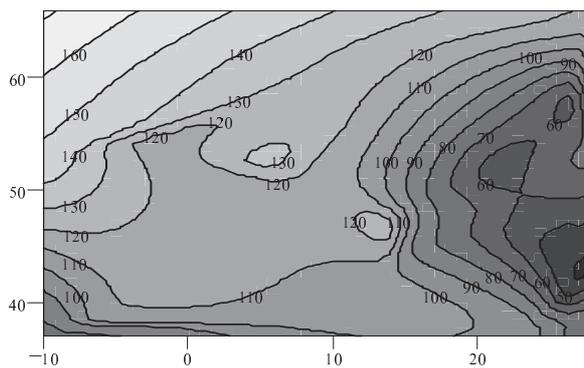
\* The paper presents some results of the research performed for the study "Modele de analiză multiscară integrată a sistemelor economice cu aplicații pentru estimarea performanței tranzițiilor", Institute for Economic Forecasting, Romanian Academy, 2012.

### 2. Empirical evidences

Despite convergence programmes in EU, today still there are significant discrepancies among countries in matter of GDP per capita. As empirical evidence, we are presenting in Figure 1 the spatial distribution of GDP per capita in EU, in 2007 (before crisis), where LO means longitude (on its left side relating to the origin, 0 meridian, the Western longitude, as it is marked usually on geographical maps, was changed in negative values), LA – latitude, and y – GDP per inhabitant in purchasing power standard). The purchasing power standard, denoted as PPS, is an artificial currency unit (PPS is the technical term used by Eurostat for the common currency in which national accounts aggregates are expressed when adjusted for price level differences using PPPs; PPP being Purchasing power parity).



LO , LA , y%UE2007



LO , LA , y%UE2007

Source: Own calculations based on Eurostat data

### Figure 1. Spatial Distribution of GDP per capita in EU, in 2007

Aside the three-dimensional picture it is presented its attached “geodesic” map (or the so-called contour plot). In Figure 1 we excluded from the graphical representation two island states (Malta and Cyprus) and Luxembourg due to its high level of GDP per inhabitant (283.5% comparing to the EU average level).

On such EU stylized map, between longitude and latitude dimensions it was conserved an approximated proportion as it is in the actual geographical map. As in case of geographical map, light colours correspond to high lands and dark colours to abyssal zones.

Regarding dynamics for a longer period, GDP per inhabitant (in thousand PPS) at the level of EU-27 increased from 19.4 in 2000 to 24.1 in 2006 and to 25.4 in 2007. Due to global crisis, during the period 2008-2012 it was registered quasi-stagnation: 25.4 in 2008, 23.9 in 2009, 24.9 in 2010, 25.5 in 2011, and 25.5 (estimated) in 2012, as it is presented in Table 1. Among countries, only in Poland GDP per capita increased continuous after 2007.

**Table 1. GDP per inhabitant (in thousand PPS) in EU-27 countries, 2007-2012**

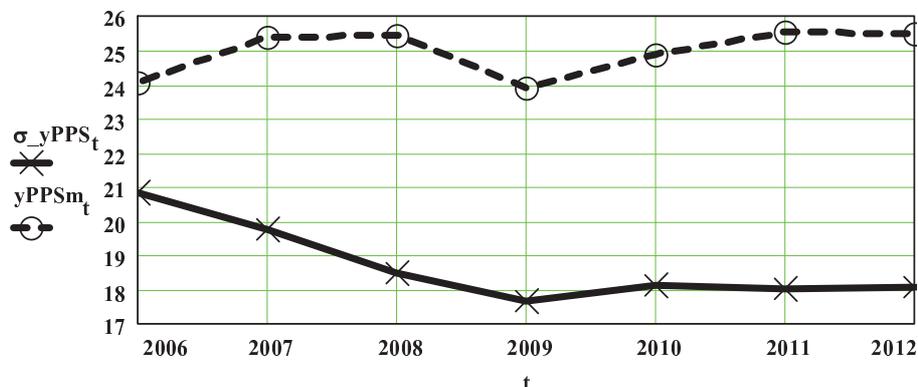
GEO/TIME	2007	2008	2009	2010	2011	2012
<b>EU27</b>	<b>25.393</b>	<b>25.426</b>	<b>23.878</b>	<b>24.875</b>	<b>25.544</b>	<b>25.487</b>
Belgium	28.969	28.953	27.674	29.094	29.796	29.454
Bulgaria	10.006	10.856	10.309	10.678	11.162	11.316
Czech Rep.	20.665	20.243	19.292	19.428	19.986	19.691
Denmark	30.742	31.189	28.891	30.972	31.425	31.193
Germany	29.178	29.323	27.474	29.359	30.688	30.868
Estonia	17.580	17.309	14.885	15.753	16.857	17.403
Ireland	36.931	33.308	29.960	31.142	31.852	32.054
Greece	23.405	24.097	23.052	22.754	21.395	20.061
Spain	26.303	26.054	24.371	24.553	24.822	24.452
France	28.355	28.166	26.769	27.797	28.451	28.306
Italy	26.235	26.309	24.484	24.738	25.451	25.356
Cyprus	24.030	25.819	24.618	25.229	25.656	24.394
Latvia	13.836	14.023	12.007	12.469	13.517	14.504
Lithuania	14.788	15.336	12.762	13.925	15.498	16.333
Luxembourg	70.871	72.792	64.616	68.722	71.458	69.895
Hungary	15.597	16.209	15.431	16.044	16.772	16.576
Malta	19.137	19.914	19.423	20.498	21.321	21.405

GEO/TIME	2007	2008	2009	2010	2011	2012
Netherlands	33.465	34.081	31.662	32.986	33.453	32.971
Austria	31.316	31.546	29.856	31.300	32.838	32.949
Poland	13.907	14.455	14.630	15.631	16.663	16.976
Portugal	19.648	19.497	18.783	19.551	19.448	18.879
Romania	10.363	11.712	11.041	11.361	12.284	12.404
Slovenia	22.153	22.582	20.649	20.845	21.356	20.811
Slovakia	16.959	18.183	17.045	17.941	18.448	18.776
Finland	29.479	29.909	26.981	28.055	29.003	28.806
Sweden	31.230	31.027	28.147	30.335	31.805	31.800
UK	29.680	28.703	26.595	27.962	27.893	27.649

Source: Eurostat; own estimations for 2012.

Based on using a set of concentration indicators, we tried to estimate the impact of crisis on convergence process in EU. Before crisis, for the period 2000-2007 there was a strong convergence trend demonstrated by a continuous decreasing in value of concentration indicators. For instance, the variation coefficient decreased from 26.2% in 2000 to 20.8% in 2006, and 19.8% in 2007. Up to 2009, despite of crisis reflected in diminishing average GDP per capita, the value of variation coefficient continued to go down to 18.5% in 2008 and to 17.7% in 2009. However, in 2010-2012, the prolonged crisis generated higher values of variation coefficient (around 18.1%), thus a stagnation of convergence process. In Figure 2, there are presented comparatively dynamics of variation coefficient,  $\sigma_y$  PPS (in %), and average level of GDP per capita,  $yPPSm$  (in thousand PPS).

Resuming the results of our analysis, we can conclude: for the period 2000-2009 at the EU-27 level it was a strong convergence process; but then, at least up to 2012 the main impact of crisis was to stop the convergence process.



Source: Eurostat; own estimations for 2012.

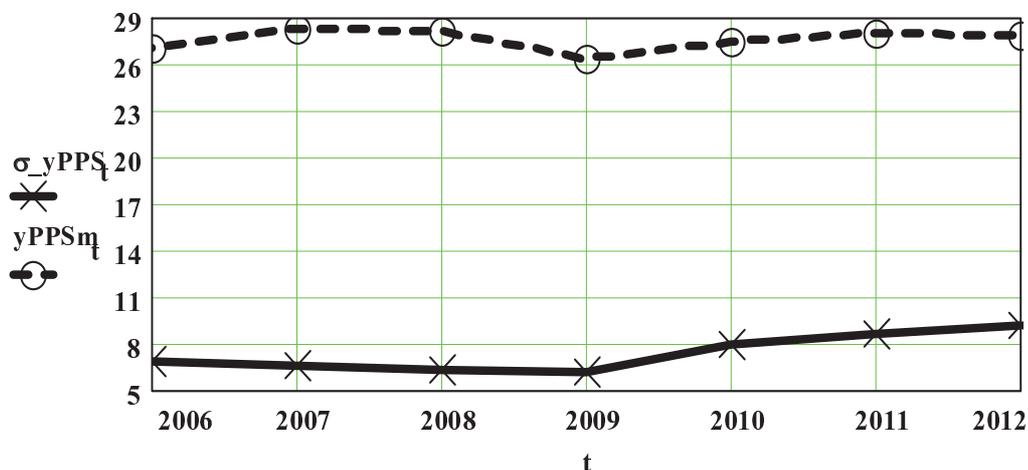
**Figure 2. Trends in GDP per capita and convergence in EU-27, 2006-2012**

### 3. Differences between groups of countries in matter of convergence

Usually EU countries (excluding the two island states, Cyprus and Malta) are separated into two groups: old EU countries, so-called EU-15 group (Austria, Belgium, Denmark, Germany, Greece, Finland, France, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and UK) and former communist countries of Central and Eastern Europe, so-called EU-10 group (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia).

Based on using the same set of concentration indicators, we tried to estimate the impact of crisis on convergence process inside EU-15 and respectively inside EU-10.

In case of EU-15, before crisis, there was a relative stagnation of convergence demonstrated by small changes in value of concentration indicators. For instance, the variation coefficient changed from 6.7% in 2000 to 6.8% in 2006, and 6.6% in 2007. Up to 2009, despite of crisis reflected in diminishing average GDP per capita (from 28,4 thousand PPS in 2007 to 26,4 in 2009) the value of variation coefficient continued to go down to 6.4% in 2008 and to 6.3% in 2009. However, in 2010-2012, the prolonged crisis generated higher values of variation coefficient (8.0%, in 2010, 8.7% in 2011, and 9.2% in 2012), thus a divergence process. In Figure 3, there are presented comparatively dynamics of variation coefficient,  $\sigma_{yPPS}$  (in %), and average level of GDP per capita,  $yPPSm$  (in thousand PPS) in case of EU-15.



Source: Eurostat; own estimations for 2012.

**Figure 3. Trends in GDP per capita and convergence in EU-15, 2006-2012**

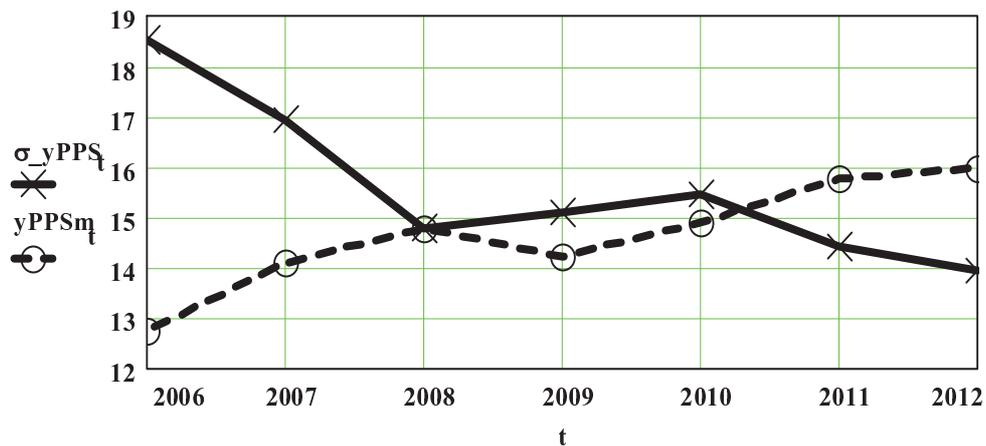
Resuming the results of our analysis, we can conclude: for the period 2000-2009 inside EU-15 it was a stagnation of convergence process; but then, at least up to 2012 the main impact of crisis was to a strong divergence.

Contrary, in case of EU-10, before crisis (emerging this time in 2009), there was a strong convergence demonstrated by significant decreasing in value of concentration indicators. For instance, the variation coefficient decreased from 25.6% in 2000 to 16.9% in 2007 and to 14.8% in 2008. Up to 2010, in accordance with crisis reflected in slow changes in average GDP per capita (from 14.8 thousand PPS in 2008 to 14.2 in 2009 and to 14.9 in 2010) the value of variation coefficient goes up to 15.1% in 2009 and to 15.5% in 2010. However, in 2011 and 2012, already attenuated crisis generated new decreases in values of variation coefficient (14.4%, in 2011 and 13.9% in 2012), thus convergence process was resumed.

In Figure 4, there are presented comparatively dynamics of variation coefficient,  $\sigma_{yPPS}$  (in %), and average level of GDP per capita,  $yPPS_m$  (in thousand PPS) in case of EU-10.

Resuming the results of our analysis for the whole period 2000-2012, we can conclude: for the period 2000-2008 inside EU-10 it was a strong convergence

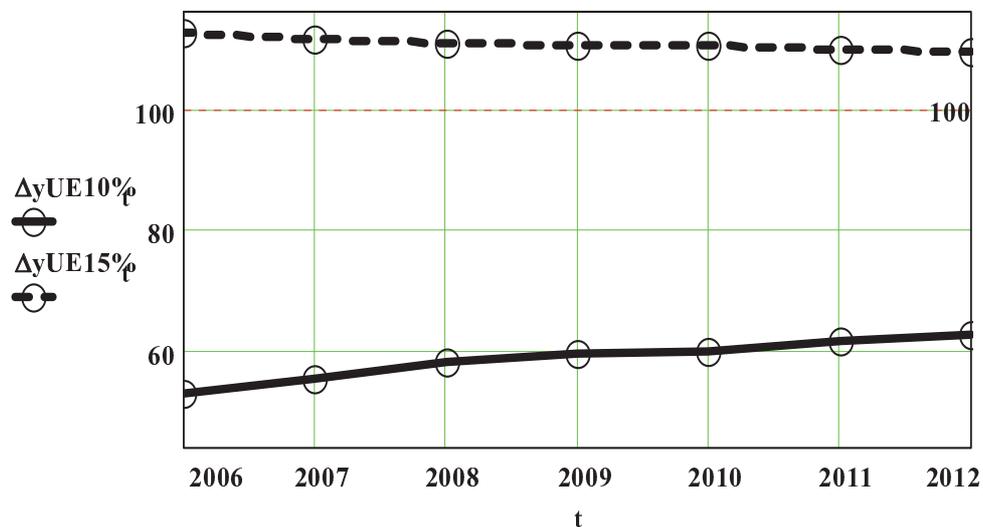
process, followed by stagnation in 2009-2010; after that, at least up to 2012, the convergence process was resumed.



Source: Eurostat; own estimations for 2012.

**Figure 4. Trends in GDP per capita and convergence in EU-10, 2006-2012**

Convergence between the two groups of countries in EU for the period 2006-2012 is reflected in Figure 5 (where  $\Delta y_{UE15\%}$  and respectively  $\Delta y_{UE10\%}$  are percentage deviations from the EU average (100) in the two groups of countries). We can see a continuous convergence, however remarking a significant brake during middle of the crisis (years 2009 and 2010).



Source: Eurostat; own estimations for 2012.

**Figure 5. Convergence between EU-10 and EU-15, 2006-2012**

Referring to the whole period 2000-2012, the convergence process advanced without interruption. It is reflected by dynamics of ratio between GDP per capita in EU-10 group and its average level in EU-27, namely from 44.5% in 2000 to 62.6% in 2012. In the same period GDP per capita in EU-15 related to its level in EU-27 decreased from 115.5% to 109.5% in 2012.

#### 4. Conclusions

Based on available data on GDP per inhabitant in EU, it was demonstrated an accentuated convergence process inside the EU-10 group, but a significant divergence process inside EU-15. The crisis seems to have an impact of slowing down the convergence process inside the two groups of EU countries. However, the analysis needs to be extended on a number of significant development indicators and further to estimate an aggregate (or composite) index of convergence.

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