# REAL CONVERGENCE EVOLUTION OF THE ROMANIAN ECONOMY FROM THE EURO ADOPTION PERSPECTIVE[9]

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**Abstract:** Joining the EMU should not be an end in itself but a logical step after a thorough preparation of the economy. Taking this finding as starting point, the article aims to assess the real convergence process at the UE level. In this sense, based on the GDP per capita index at PPP a comparative, retrospective and prospective analysis has been undertaken, which revealed that Romania, although obtained a number of positive results, must press the accelerator for a healthy economic growth, sustainable and durable designed to reduce the gaps with the developed countries of the EU. In conclusion, it is considered that the objective of adopting the euro on the 1st of January 2019 is feasible, under the condition that the procedures are started urgently, based on a strict schedule and assumed by all political forces regardless of colour, as there are many other goals to be met before initiating this process, otherwise a too early adoption may hinder or even derail the process of convergence.

**Jel classification**:

**Key words: GDP, real convergence, indicators of variation.**

## 1. Introduction

Romania, a full member country of the EU since 1st of January 2007, assumed by signing the Treaty of Accession also the adoption of the euro at a later date when it meets the nominal, legal and real convergence criteria.

At the time of entering the EU, Romania aimed to adopt the euro in 2014. Unfortunately, the economic, social and geopolitical evolutions and the inconsistency of the politicians, led to the failure of this objective and therefore Romania has reconsidered this goal based on the progress it made on nominal and real convergence, on structural reforms and on solid perspectives of economic growth, following to adopt the single currency at January the 1st, 2019.

The establishment by the authorities of the date of January the 1st, 2019 for the euro adoption takes into consideration the fact that Romania has met since June 2014, all nominal criteria laid down in the Maastricht Treaty. Adopting the euro is an ambitious goal as Romania still seriously lags behind, especially in terms of legal

convergence[10] and real convergence criteria. Because of that, structural problems and increasing competitiveness of Romanian economy should be the top priority of any government, because ultimately economy has no political colour, being neither left or right.

**"We support any objective that the political factor, in an agreed manner will establish and we will express our opinion whether it is realistic or not. About 2018 - 2019 I do not belive it is out of a certain reality, but it is good if we anchor this goal, to put some intermediate deadlines, because things will not happen this way: at January 1st 2019 someone comes with the wand and ready, you have joined the Euro Area. People must know what it is about"**[11]

An analysis of the evolution of Romania during 2000-2013 shows that although clear progress has been made, however, our country is still far from EU standards especially in terms of real convergence criteria.

## 2. Evolution of GDP per capita adjusted to PPP

Analysing the most relevant indicator, the GDP per capita adjusted to the Purchasing Power Parity (Table no.1) we find that Romania has made in the period 2000-2013, the highest growth in the EU of 2.78 times (average rate annual growth of 8.18%). The same trend was also in 2007-2013 when adjusted GDP per capita in Romania at SPPP increased by 30% (average annual growth rate of 4.46%) compared with an increase of only 3% (average annual growth rate of 0.46%) as recorded in the UE-28. However we find that in Romania the level of GDP per capita adjusted at SPPP stood, in 2013, at about 54% of the European average with an increase from 43% that is by 25.6% (average annual growth rate 3.87%) in 2007-2013.

If we consider that the poorest countries allowed into the Euro Area where Estonia (in 2011), with a GDP / capita adjusted to PCS of 66% of the EU average and Latvia (2014), with a GDP / capita adjusted to PCS of 60% of the EU average, in table 2 we calculated the number of years needed by Romania to achieve convergence with EU 28 and EU 18, in terms of GDP / capita calculated on SPPP-euro and to achieve 60 % of the average.

For calculation we use the relation:

$$(1) \quad N = \frac{\log N0UE - \log N0R}{\log(1 + RmedR) - \log(1 + RmedUE)}$$

where: $N_{0UE28}$ is the initial level in UE-28

Table no.1

Evolution of GDP per capita adjusted to PPP in EU countries

| o. | Country | 000 | 007 | 008 | 009 | 010 | 011 | 012 | 013 | 013 000 | 013 007 | hythr 013/ | hythr 013/ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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[10] Ciobanu, A.M., *Legal convergence criteria and the euro adoption in Romania*, Conference: Challenges of the academic speech: themes, trends and methods, project POSDRU/159/1.5/S/140863, Competitive Researchers in Europe in the Field of Humanities and Socio-Economic Sciences. A Multi-regional Research Network; 19-22.11.2014, Poiana Braşov, Romania

[11] Mugur Isărescu, Guvernor of NBR, cited by Agerpres

| | | | | | | | | | | | | 000 | 007 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UE28 | 9000 | 500 | 500 | 350 | 440 | 510 | 550 | 570 | ,1 | ,0 | ,1 | ,4 |
| | UE18 | 1200 | 710 | 710 | 540 | 650 | 730 | 760 | 770 | ,1 | ,0 | ,0 | ,1 |
| | Belgium | 4000 | 8900 | 8900 | 7600 | 9400 | 0200 | 0700 | 0500 | ,27 | ,06 | ,86 | ,90 |
| | Bulgaria | 400 | 0000 | 0900 | 0300 | 0800 | 1700 | 2100 | 2000 | ,22 | ,20 | ,33 | ,09 |
| | Czech Rep | 3500 | 0600 | 0200 | 9400 | 9700 | 0300 | 0700 | 0600 | ,53 | ,00 | ,30 | ,00 |
| | Denmark | 5000 | 0600 | 1100 | 8900 | 1200 | 1500 | 2100 | 2100 | ,28 | ,05 | ,94 | ,80 |
| | Germany | 2400 | 8800 | 9000 | 6900 | 9200 | 0800 | 1500 | 2000 | ,43 | ,11 | ,78 | ,77 |
| | Estonia | 600 | 7500 | 7200 | 4900 | 5800 | 7300 | 8300 | 8800 | ,19 | ,07 | ,20 | ,20 |
| | Ireland | 5100 | 6500 | 2900 | 0100 | 1400 | 2300 | 2900 | 2500 | ,29 | ,89 | ,01 | 1,92 |
| 0 | Greece | 6000 | 2600 | 3200 | 2300 | 1600 | 0300 | 9500 | 9200 | ,20 | ,85 | ,41 | 2,68 |
| 1 | Spain | 8500 | 6200 | 5900 | 4200 | 4200 | 4300 | 4400 | 4500 | ,32 | ,94 | ,18 | 1,11 |
| 2 | France | 1900 | 6900 | 6700 | 5500 | 6600 | 7400 | 7700 | 7800 | ,27 | ,03 | ,85 | ,55 |
| 3 | Croatia | 500 | 5600 | 6200 | 4900 | 4700 | 5200 | 5600 | 5600 | ,64 | ,00 | ,89 | ,00 |
| 4 | Italy | 2300 | 6000 | 6000 | 4300 | 5100 | 5500 | 5600 | 5200 | ,13 | ,97 | ,94 | 0,52 |
| 5 | Cyprus | 6700 | 3500 | 4800 | 3400 | 3600 | 3500 | 3400 | 2100 | ,32 | ,94 | ,18 | 1,02 |
| 6 | Latvia | 900 | 4300 | 4600 | 2700 | 3500 | 5000 | 6400 | 7300 | ,51 | ,21 | ,33 | ,23 |
| 7 | Lithuania | 500 | 5500 | 6100 | 3600 | 5100 | 6900 | 8300 | 9100 | ,55 | ,23 | ,46 | ,54 |
| 8 | Luxembourg | 6500 | 8400 | 5800 | 9200 | 4000 | 6700 | 7100 | 7900 | ,46 | ,99 | ,96 | 0,12 |
| 9 | Hungary | 0300 | 5300 | 5900 | 5300 | 6100 | 6900 | 7000 | 7200 | ,67 | ,12 | ,02 | ,97 |
| 0 | Malta | 6500 | 9600 | 0300 | 9800 | 1300 | 1600 | 2100 | 2700 | ,38 | ,16 | ,48 | ,48 |
| 1 | Holland | 5500 | 3000 | 3500 | 1000 | 1700 | 2500 | 2500 | 2600 | ,28 | ,99 | ,91 | 0,20 |
| 2 | Austria | 5100 | 0900 | 1100 | 9500 | 0900 | 2300 | 3100 | 3200 | ,32 | ,07 | ,17 | ,20 |
| 3 | Poland | 200 | 3600 | 4100 | 4200 | 5400 | 6400 | 7100 | 7500 | ,90 | ,29 | ,07 | ,29 |
| 4 | Portugal | 5400 | 9600 | 9500 | 8800 | 9600 | 9300 | 9400 | 9400 | ,26 | ,99 | ,79 | 0,17 |
| | Romania | | | | | | | | | | | | |

| 5 | | 000 | 0700 | 2200 | 1700 | 2400 | 2900 | 3600 | 3900 | ,78 | ,30 | ,18 | ,46 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | Slovenia | 5200 | 2100 | 2700 | 0200 | 0600 | 1200 | 1400 | 1300 | ,40 | ,96 | ,63 | 0,61 |
| 7 | Slovakia | 500 | 6900 | 8100 | 7000 | 8100 | 8900 | 9400 | 9600 | ,06 | ,16 | ,73 | ,50 |
| 8 | Finland | 2300 | 9300 | 9700 | 6900 | 7900 | 9100 | 9400 | 8700 | ,29 | ,98 | ,96 | 0,34 |
| 9 | Sweden | 4300 | 1200 | 0900 | 8200 | 0200 | 1400 | 2200 | 2700 | ,35 | ,05 | ,31 | ,79 |
| 0 | UK | 2900 | 9400 | 8600 | 6300 | 6300 | 6400 | 6600 | 7200 | ,19 | ,93 | ,33 | 1,29 |

*Source: Eurostat and own calculations*

Table no.2

**Number of years required to achieve the GDP/capita convergence calculated based on PPP-euro on different alternatives of annual average growth rate in Romania**

| The initial level of GDP/capita in year 2013-euro PPP $(N_0)*$ | | Average annual growth rates EU 28 and EU 18 | Nr. years (N **) to achieve convergence on alternatives of annual average growth rate in Romania | |
|---|---|---|---|---|
| | | | $R_{medR}2000\text{-}2013=$ 8,1825% | $R_{medR}2007\text{-}2013=$ 4,4572% |
| $N_{0UE28}=25700$ | $N_{0R}Romania=13900$ | $R_{medUE}2000\text{-}2013=$ 2,3507% | 11,09 | 28,59 |
| $N_{0UE28}=25700$ | $N_{0R}Romania=13900$ | $R_{medUE}2007\text{-}2013=$ 0,4613% | 8,30 | 17,67 |
| $N_{0UE18}=27700$ | $N_{0R}Romania=13900$ | $R_{medUE}2000\text{-}2013=$ 2,0785% | 10,58 | 26,68 |
| $N_{0UE18}=27700$ | $N_{0R}Romania=13900$ | $R_{medUE}2007\text{-}2013=$ 0,3656% | 8,19 | 15,38 |
| $60\%N_{0UE28}=$ 15420 | $N_{0R}Romania=13900$ | $R_{medUE}2000\text{-}2013=$ 2,3507% | 1,87 | 5,09 |
| $60\%N_{0UE28}=$ 15420 | $N_{0R}Romania=13900$ | $R_{medUE}2007\text{-}2013=$ 0,4613% | 1,41 | 3,08 |
| $60\%N_{0UE18}=$ 16620 | $N_{0R}Romania=13900$ | $R_{medUE}2000\text{-}2013=$ 2,0785% | 2,36 | 4,38 |
| $60\%N_{0UE18}=$ 16620 | $N_{0R}Romania=13900$ | $R_{medUE}2007\text{-}2013=$ 0,3656% | 1,38 | 2,60 |

*\* Eurostat data and own calculations*

$N_{0R}R$ =initial level in Romania

$N_{0UE18}=$ initial level in UE-18

$R_{medUE}2000\text{-}2013=$ average annual growth rhythm at the level of the EU between 2000-2013

$R_{medUE}2007\text{-}2013=$ average annual growth rhythm at the level of the EU between 2007-2013

$R_{medR}2000\text{-}2013$ = average annual growth rhythm at the level of Romania between 2000-2013

$R_{medR}2007\text{-}2013$ = average annual growth rhythm at the level of Romania between 2007-2013

Analysing the results in Table no.2 we can observe that in any variant Romania can reach up to January 1st, 2019, 60% of the GDP/capita calculated at PPP-euro registered in the EU and therefore the euro adoption date seems feasible.

According to some forecasts GDP per capita at SPPP will represent in Romania, about 64.2% of the EU average in 2018 and about 69.5% in 2020[12].

However, the most recent forecasts provided by the major international institutions anticipate „the gradual increase of the average annual inflation rate, from historically low levels to values between 2.2% and 2.5% in 2014 and between 3.0 and 3.3% in 2015"[13]

The forecasts for 2014 were not confirmed so, at the end of 2014, annual CPI inflation fell to 0.83 per cent, down by 0.71 percentage points from the end of the third quarter, thus placing it under lower limit of the interval of variation of ± 1 percentage point associated to the target of 2.5 per cent. The development was entirely determined by exogenous variables in the context of the substantial decline of international prices of crude oil, and of the falling prices of agricultural raw materials under the joint action of recording above average crops at regional level and of the closing of an important export market for the European countries (Russia). At the same time, the persistence of the negative demand deficit and the improvement of inflationary expectations, along with the slight appreciation of the domestic currency against the euro, have favoured the maintenance at a low level the base inflation CORE2 adjusted (1 per cent).[14]

In this context, on the medium and long term, it is possible that the process of catching-up the gaps towards the Euro Area to affect either the inflation or the nominal exchange rate, or both, if we consider that the GDP per capita and the price levels still remain lower in Romania than in the Euro Area countries.

### 3. Real Convergence Study Based on Synthetic Indicators of Variation

To follow the evolution of real convergence in the EU we will use Eurostat data on GDP per capita at SPPP and synthetic indicators of variation calculated based on them, as well as the linear average deviation (d), dispersion ($\sigma^2$), standard deviation ($\sigma$) and coefficient of variation (CV) shown in table no. 3.

Table no.3. Evolution of the synthetic indicators of variation calculated based on Eurostat data on GDP per capita at PPP

| No | Indicators | 2000 | 2002 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Average linear deviation (d), | 6988 | 7069 | 7769 | 7275 | 6675 | 7050 | 7238 | 7240 | 7216 |
| 2 | Dispersion ($\sigma^2$) | 77049439 | 80083099 | 121815957 | 106931059 | 86993202 | 100761429 | 106839439 | 106209630 | 107429082 |
| 3 | Standard deviation ($\sigma$) | 8778 | 8949 | 11037 | 10341 | 9327 | 10038 | 10336 | 10306 | 10365 |
| 4 | Coefficient | 0,5005 | 0,4707 | 0,4521 | 0,42201 | 0,4099 | 0,4218 | 0,4208 | 0,4122 | 0,4122 |

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[12] Romanian Government, *Convergence programme 2014-2017*,Bucharest, April 2014, pag.5 and EUROSTAT
[13] ECB, Eurosistem, *Convergence report,* June 2014, Romanian version, pag.97-98.
[14] NBR, *Inflation report*, February 2015, pag.13.

| | of variation (CV) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

Calculated indicators express, in a concentrated form (by a number), to what extent the variable x levels (GDP per capita at SPPP), recorded at a given time for each EU countries distance themselves from the average level ($\bar{x}$) recorded at the level of EU-28. It is noted that the convergence stage at a given time, is measured by an indicator of variation, showing rather the opposite of the convergence expressing, through a number, how far from the average level the EU countries are, towards which the GDP per capita at SPPP values allegedly converge to. Analysed in time the above synthetic indicators show, to the extent that their level is decreasing, the manifestation of the process of convergence.

The data calculated for the coefficient of variation (CV) in Table 3 show a clear convergence process manifested in the period 2000-2009 when the value of the coefficient of variation decreased from 0.5005 to 0,4099. In 2010 the coefficient of variation value increases to 0.4218 just so that by 2013 to decline slightly to 0,4127.Overall through ought the period 2000-2013 we note that there is an increasing degree of convergence by about 9% as shown and Graph no. 1.
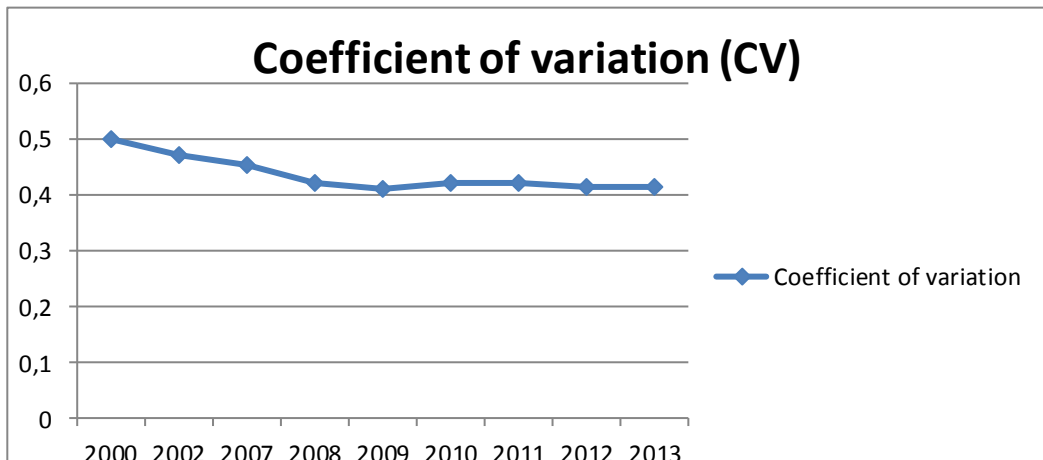


Fig no.1: Evolution of the coefficient of variation of GDP per capita at PPP in relation to the EU-28 average

On the chart it is observable the tendency of continuous decrease of the coefficient of variation of GDP per capita at PPP in relation to the EU-28 average which confirms the growth of the real convergence of EU countries measured by GDP per capita at PPP.

Since CV> 0.4, from the perspective of the positioning of GDP per capita at PPP in relation to the EU-28 average results a not too homogenous ensemble. From

here the conclusion that between 2000-2013, the scattering rather accentuated and thus the convergence doesn't seems to be confirmed, in terms of the indicators analysed.

### 4. Study of Real Convergence Based on the Indicator $Z_{it}$

Because of the too little conclusive results obtained by studying the real convergence based on the indicators of variations we note:

$$zit = \frac{xit}{\overline{xt}} \quad (2)$$

where: $z_{it}$=the position of the level achieved by the country i in year t in relation to the EU-28 average,

then results $$\frac{\sum zit}{n} = 1$$

and the dispersion will be[15]: $$\sigma^2{}_{zit} = \frac{\sum (zit - 1)^2}{n} \quad (3)$$

If the dispersion level thus computed registers a continuous decrease, we can conclude that from the perspective of GDP per capita at SPPP the convergence process of EU countries takes place throughout the entire reviewed period. If we follow the evolution of the indicator $z_{it}$ for each country in successive periods, we see on the chart (in case of convergence) a downward slope for the countries that at $t_0$ moment had the GDP per capita at SPPP level above the EU average, respectively a rising slope for the countries that at $t_0$ moment were below the average level of GDP per capita at SPPP EU-28.

The slope will be more or less pronounced depending on the average annual rhythm by which each country approaches the EU-28 average which obviously changes from one year to another.

To illustrate this, we computed based on Eurostat data, the dispersion $$\sigma^2{}_{zit} = \frac{\sum (zit - 1)^2}{n}$$ in Table no 4, which is transposed in Graph no. 2.

Table no.4. Dispersion calculated considering the position level achieved by country i in year t relative to UE-28 average

| No | Indicator | 2002 | 2005 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|----|-----------|------|------|------|------|------|------|------|------|------|
| 1 | Dispersion | 0,2242 | 0,2075 | 0,2073 | 0,1806 | 0,1699 | 0,1807 | 0,1815 | 0,1742 | 0,1753 |

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[15] We note that $\sqrt{\sigma^2{}_{zit} = \frac{\sum (zit - 1)^2}{n}}$ is exactly the coefficient of variation (CV=$\frac{\sigma}{xaverage}$)

**Dispersion calculated according to the $z_{it}$**
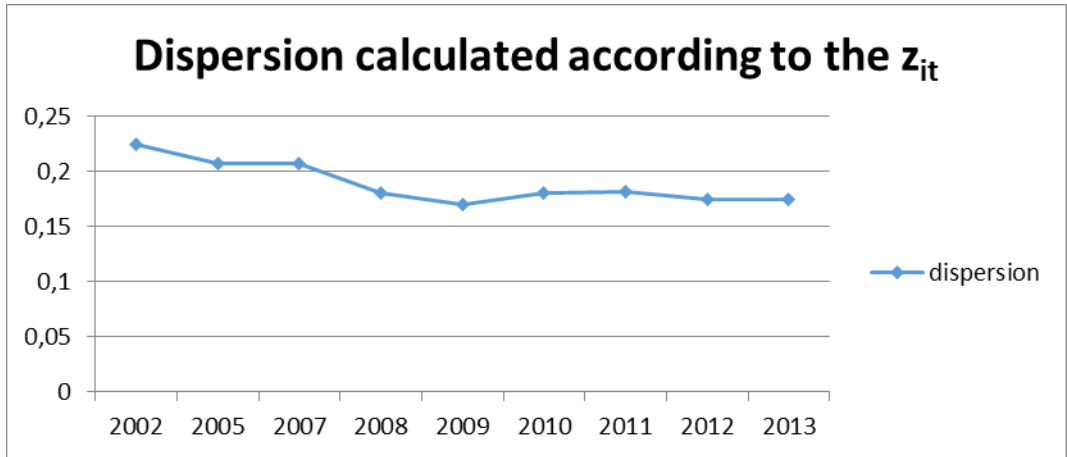
Graph no 2: Evolution of the dispersion calculated considering the weight of the level achieved by country i in year t relative to UE-28 average of GDP per capita at PPP

Can be observed the tendency of reduction of the dispersion calculated by the relation $\sigma^2{}_{zit} = \dfrac{\sum (zit-1)^2}{n}$ which indicates the existence of the process of real convergence of GDP per capita at SPPP manifested in the period 2002-2013.

Following the evolution of indicator $z_{it}$ for Romania and other countries from outside the Euro Area (Table no. 5 and Graph no. 3) we find the following:

In the countries which initially positioned over the EU average -Denmark, Sweden and the UK the evolution of the $z_{it}$ indicator was downwarding.
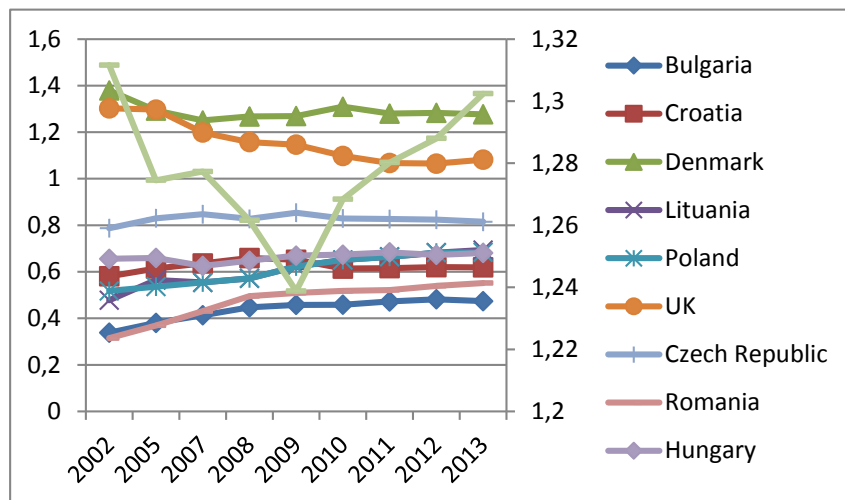
Table no.5

Position of the level achieved by country i in year t in relation to the EU-28 average in terms of GDP per capita at PPP

| o. | Country | 002 | 005 | 007 | 008 | 009 | 010 | 011 | 012 | 013 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Bulgaria | ,3385 | ,3805 | ,4131 | ,4476 | ,4578 | ,4584 | ,4726 | ,4819 | ,4738 |
| | Croatia | ,5807 | ,6144 | ,6359 | ,6594 | ,6516 | ,6139 | ,6157 | ,6201 | ,6190 |
| | Denmark | ,3794 | ,2929 | ,2505 | ,2675 | ,2693 | ,3094 | ,2800 | ,2829 | ,2770 |
| | Lithuania | ,4778 | ,5646 | ,6276 | ,6510 | ,5916 | 6246 | ,6822 | ,7252 | ,7541 |
| | Poland | ,5177 | ,5360 | ,5541 | ,5718 | ,6224 | ,6511 | ,6643 | ,6824 | ,6936 |
| | UK | ,3027 | ,2970 | ,1987 | ,1573 | ,1464 | ,0979 | ,0673 | ,0652 | ,0820 |
| | Czech Rep. | ,7872 | ,8300 | ,8475 | ,8275 | ,8538 | ,8292 | ,8268 | ,8242 | ,8153 |

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|---|---|---|---|---|---|---|---|---|---|---|
| | R omania | ,3148 | ,3693 | ,4307 | ,4955 | ,5093 | ,5177 | ,5218 | ,5395 | ,5516 |
| | S weden | ,3136 | ,2745 | ,2773 | ,2616 | ,2388 | ,2684 | ,2802 | ,2880 | ,3024 |
| 0 | H ungary | ,6559 | ,6595 | ,6254 | ,6476 | ,6697 | ,6738 | ,6836 | ,6727 | ,6810 |

*Source: Own calculations based on Eurostat data*

In all the other countries that initially were below the EU average, the evolution of the $z_{it}$ indicator was ascendent which confirms the real convergence process manifested at the EU level in terms of GDP per capita at PPP.



**Graph no 3: Evolution of the position of the level achieved by country i in year t in relation to the EU-28 average in terms of GDP per capita at SPPP**

Deepening the analysis we notice the strong increases and without oscillations recorded by Romania and Bulgaria whose initial level of GDP per capita at SPPP was very low.

### 5. Conclusions

From the above stated it results that Romania, meeting the nominal criteria needed for the adoption of the euro, still has a lot of catching up and therefore must harness the potential competitive advantages of the economy so that they become effective and contribute to a substantial extent to mitigate the negative effects of the economic crisis and to a healthy and sustainable growth aimed at reducing the gap with the developed countries of the EU.

The adoption of the single currency has benefits (reducing the risk of monetary and financial turbulence, disciplining the economic policy, reducing the risk premium

on loans, the possible stabilization of long-term interest rates levels, the elimination of the risk of the evolution of the exchange rate against the euro area, reducing transaction costs, increasing the international transparency of the prices and increasing the foreign trade) as well as costs and risks (difficulty of establishing the correct parity for the conversion leu-euro, eliminating the possibility of using monetary policy and exchange rate adjustment in the event of shocks, possible asymmetries in the transmission of monetary policy).

Therefore joining the euro area doesn't automatically mean the elimination of all structural problems and the entering into the field of welfare. Monetary stability, no matter how attractive, is just one of the conditions - although perhaps the most important - for boosting economic activity.

There are many other desideratum to be met prior to initiating this process, otherwise too early adoption of the single currency may hinder or even derail the process of convergence. The entry into EMU should not be an end in itself, but rather a last resort which follows after thorough preparation of the economy for the realities of post-accession. If this chronology is not respected, the short and medium term risks are major and on the long-term the possibility of maintaining or even deepening the economic imbalances is almost a certainty[16].

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[16] Ciobanu, A.M., *Will Romania Ready for Euro Adoption by January, the 1st 2019?,* 15th EBES Conference, 8-10.01.2015, Lisbon, Portugal