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TRENDS IN ECONOMIC PERFORMANCE DEVELOPMENT OF THE EU [*]

This article explores the economic performance of the EU and its Member States. As analysed indicators nominal gross domestic product per capita, gross domestic product at purchasing power standard in the selected time series, 1995 to 2013 were chosen. Differences in GDP growth were followed through the variation coefficient and variation range. Time series analysis, synthesis, and comparison of the maximum, minimum and average values have been also applied.
Keywords: European Union; GDP; GDP per capita; purchasing power standard.

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ТРЕНДИ РОЗВИТКУ ЕКОНОМІЧНИХ ПОКАЗНИКІВ ЄС

У статті відстежено динаміку розвитку економічних показників ЄС в цілому та для його окремих членів. В якості індикаторів для аналізу було обрано номінальний ВВП на душу населення та ВВП в перерахунку на купівельну спроможність. В аналізі використано часові ряди за 1995–2013 роки. Різниці в зростанні ВВП визначено за допомогою коефіцієнта варіації. Також використано аналіз часових рядів, синтез та порівняння максимальних, мінімальних та усереднених значень.
Ключові слова: Європейський Союз; ВВП; ВВП на душу населення; купівельна спроможність.

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ТРЕНДЫ РАЗВИТИЯ ЭКОНОМИЧЕСКИХ ПОКАЗАТЕЛЕЙ ЕС

В статье отслежена динамика развития экономических показателей ЕС в целом и его отдельных членов. В качестве индикаторов для анализа были выбраны номинальный ВВП на душу населения и ВВП в пересчёте на покупательную способность. В анализе использованы временные ряды за 1995–2013 годы. Разницы в росте ВВП определены при помощи коэффициента вариации. Также использованы анализ временных рядов, синтез и сравнение максимальных, минимальных и усреднённых значений.
Ключевые слова: Европейский Союз; ВВП; ВВП на душу населения; покупательная способность.

Introduction. The European Union is an international grouping, which currently consists of 28 European countries. These are the states united voluntarily into a political and economic alliance to achieve common goals and unity in Europe by foreign and domestic policies of the Member States.

Success of economy of a country can be assessed in accordance with final results, which afterwards affect the overall levels of consumption, savings, investment and employment. The global objective of economic development is increasing the quality of life for its inhabitants. It crucially depends on economic performance, the overall level of gross domestic product (GDP) and by economic growth. Economic growth

also represents changes in the economy, as reflected in the increase of macroeconomic variables over time.

Materials and methods. As a basic indicator that best represents economy's performance as a result of the activities of production factors located on the territory of a state gross domestic product shall be considered. This indicator best characterizes the processes occurring in the economy, and its overall results (what is produced in the economy and what is purchased), and thus affects all other macroeconomic variables. In this article, we follow the trends in nominal GDP per capita in EUR and nominal GDP per capita in PPS. We have been using the Eurostat database, further supplemented with time series database "Knoema".

For the purposes of this article, we use time series analysis through which we investigate trends in the performance of the EU economy. We have chosen a time series for the years 1995–2013. We then used the comparison of changes in %; we watched the differences between the lowest and highest value and its average. Basic statistical methods employed in the article are the coefficient of variation, by which we measured variation between the countries. The coefficient of variation expresses the relationship:

$$V_k = \frac{s}{\bar{x}} \times 100\%, \text{ respectively } V_k = \frac{s}{\bar{x}} = \frac{\sqrt{\dfrac{\sum\limits_{i=1}^{n}(x_i - \bar{x})^2}{n}}}{\bar{x}}. \tag{1}$$

The coefficient of variation (V_k) provides possibilities to correlate variability of average values with different values (standard deviation is adjusted by the amount of the average value).

Variation range (R) is the simplest measure of variability, calculated as the difference between the maximum and minimum value set.

$$R = x_{max} - x_{min}. \tag{2}$$

Next, we measure GDP growth. GDP growth rate, or economic growth as a relative increase, which reflects the percentage of absolute GDP growth in the period and the level of real output in the previous period. It can be expressed as a formula:

$$g = \frac{GDP_t - GDP_{t-1}}{GDP_{t-1}} \times 100. \tag{3}$$

For formulating the conclusions we have used the method of synthesis.

Results and discussion.

The European Union and its performance. The EU was created in 1992 under the Treaty on European Union, known as The Treaty of Maastricht. The main objectives of the European Union are strong economic growth, competitive economy and improving quality of the environment. The EU seeks to improve the living and working conditions for its citizens, gradual convergence of economic imbalances between countries and regions, but primarily it is to ensure free movement of goods and services, capital and labour, and also an economic and monetary union.

Countries of Europe, but especially their business entities to become part of the common market of the European Union on the one hand, created many opportunities for placement of its production. On the other hand, companies under common market

are exposed to more intense competition and demand at the EU markets is increasingly affecting economic reality of each Member State. Economic developments in the EU and expected trends are an important external determinant of development perspectives for each member country. As stated in K. Haviernikova (2014), Europe is the world's largest exporter of manufactured goods and services. M. Kordos (2012) asserted the motor of European prosperity is trade. Europe is the world's largest exporter of manufactured goods and services which are produced in European regions.

In September 2008, the world economy was severly affected by the financial crisis, which led to closer economic cooperation between the EU Member States. The subsequent recession has not resist even most developed countries in the world (Mynarzova and Svajdova, 2010: 209).

E. Adamowicz and K. Walczyk (2013: 255) present that the outbreak of the 2007–2012 global financial crisis sparked a marked decline of European real economy. The EU had not yet fully recovered from the challenges of the recession and another threat knocked at its doors – the fiscal crisis.

Developed countries of the world and their leaders are trying to implement such economic policies that would ensure growth performance of their economies. The most commonly used indicator to measure economic performance of a state is gross domestic product. In monetary terms, it is the value of final goods and services produced on the territory of a country for a certain period (year), regardless who owns production factors. It is a summary of final products and services that have undergone the official market. In this article we will go through the gross domestic product data looking for the developments of the economic performance of the European Union.

Figure 1 shows the data according to the current number of Member States in the year, thus calculated maximum, minimum and average values are not the same in the time series. This means that in 1995–2003 the values are for the EU15; in 2004–2006 25 Member States were described, 27 Member States in period 2007–2012 and finally 28 states in 2013.

The performance of the European Union during 1995–2013 measured by gross domestic product at current market prices is presented in Figure 1.

In Figure 1, it is possible to observe a positive development of the GDP of the European Union during 1995–2008. GDP increased from 6,768,206.6 mln EUR in 1995 to 12501007.4 mln EUR in 2008. In 2008, GDP growth was only moderate, since Europe was moving into economic recession. This is the evolution of GDP fully reflected in 2009, when GDP decreased, and although was recorded in 2011 GDP growth; it did not reach the level of 2008. In the following years, GDP grew only slightly. The growth rate of nominal GDP in EUR during 1996–2013, we visualized in Figure 2.

As follows from Figure 2, the highest nominal GDP growth was achieved in 2004 and 2007, the years in which the European Union expanded. Although in these years there has been the growth of GDP, this increase is not considered very significant given the number of states. For example, in 2004 the EU entered 10 new countries, but the overall GDP compared to 2003 increased by only 9.9%. The reason is that the new EU Member States are smaller in size and population, and also weaker in performance. This was also in 2007, after Bulgaria and Romania entry to the EU; the European Union's GDP increased by 7.2%, but this was due not only to the acces-

sion of these two new states, but overall faster growth of other economies. In 2013, after Croatia's accession to the EU, GDP increased by 1.2%, which is, however, slower growth than in the previous years.
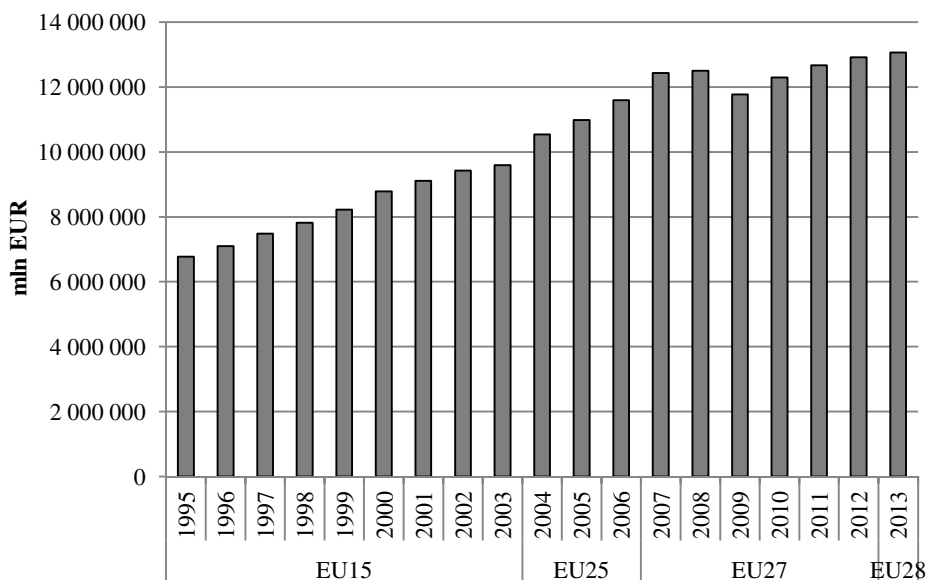

Figure 1. **Gross domestic product at current market prices,**
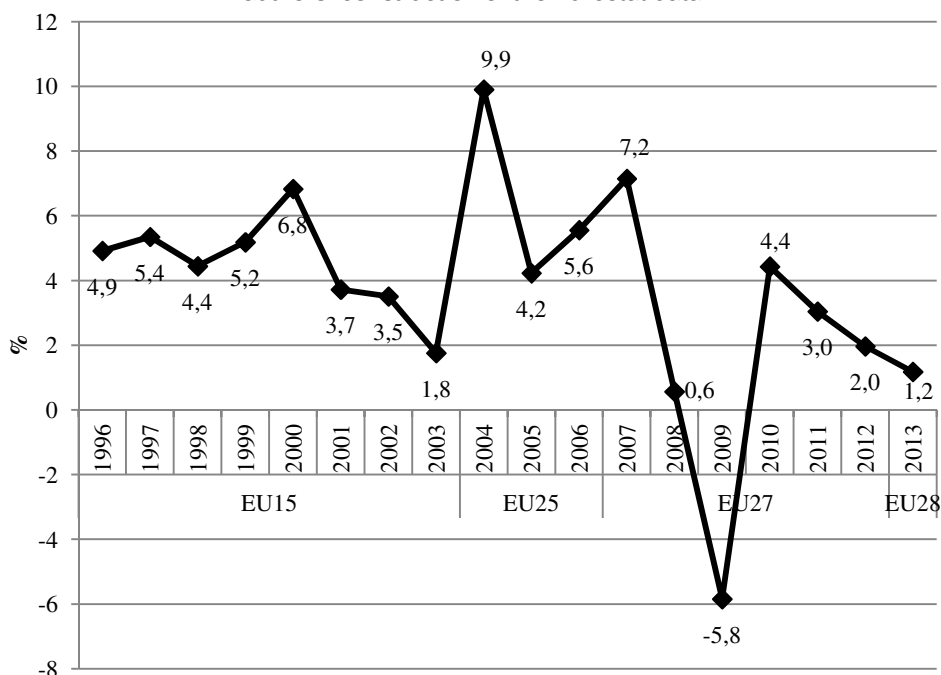*authors' construction of the* Eurostat data

Figure 2. **GDP nominal growth rate,** *authors' construction of the* Eurostat data

We can say that the performance (GDP) the European Union affects both the number of states, and their economic strength and overall economic development in the world.

An important indicator of performance evaluation and comparison of the different States of the European Union and the EU as a whole is the indicator of GDP per capita. We will address it in the next part of this article.

Nominal GDP per capita expressed in EUR. The basic information source for GDP calculation is the value of all productions on the territory of a country in the current prices of the year in which the calculation is made. Thus, the calculated GDP indicator is referred to as nominal GDP. Dividing GDP by population we obtain the indicator of GDP per capita. There are significant differences in the level of GDP per capita between the States of the European Union, resulting in the average GDP per capita of the EU (Figure 3).
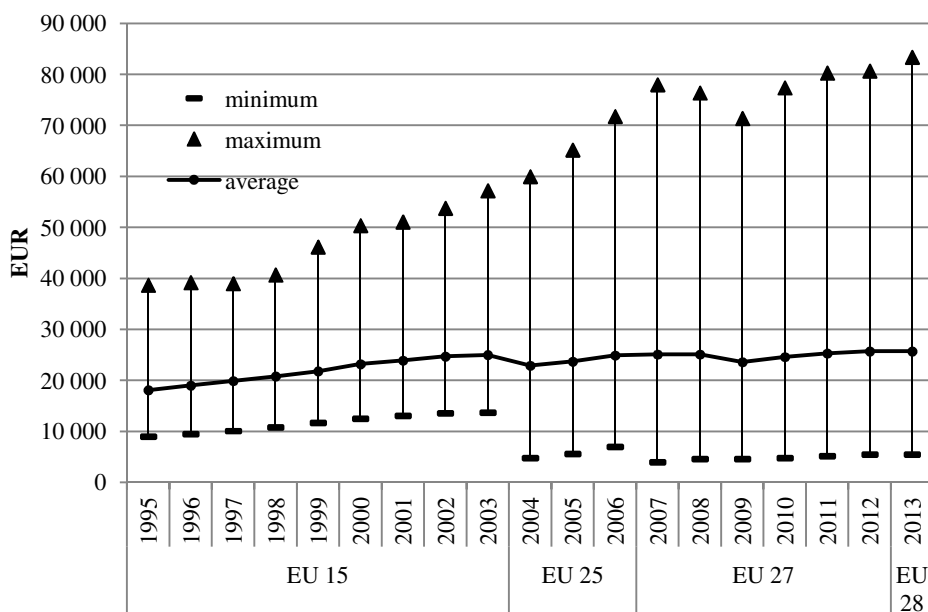

Figure 3. **Minimum, maximum and average GDP per capita in the EU,**
authors' presentation of the Eurostat and Knoema data

Maximum values of GDP per capita in the period was reached annually by Luxembourg from 38,700 (1995) to 83,400 EUR (2013). The lowest GDP per capita during 1995–2003 belonged to Portugal, from 9000 to 13,700 EUR per capita.

Figure 3 demonstrates that after the accession of the new members to the EU the minimum value of GDP per capita was reduced. This reduction in 2004 was significant, but reduction in 2007 was moderate. The average GDP per capita of the EU is closer to the minimum value, due to the significantly high GDP per capita in Luxembourg as well as low levels of GDP per capita in newer EU Member States.

In the years 1995–2003 Luxembourg GDP per capita reached from 195.7% (1998) to 228.8% of the EU average (2003). After accession of 10 countries in 2004, the average distance from Luxembourg has increased up to 288.4% in 2006. After the

accession of Romania and Bulgaria in 2007, Luxembourg reached the GDP per capita of more than 300% of the EU average (2013: 324.5%).

The accession of new Member States in 2004 and 2007 increased the gap between the weakest state from the EU average. The worst situation was in 2007, when Bulgaria in GDP per capita reached only 15.9% of the average GDP per capita the European Union. This is shown in Figure 4.
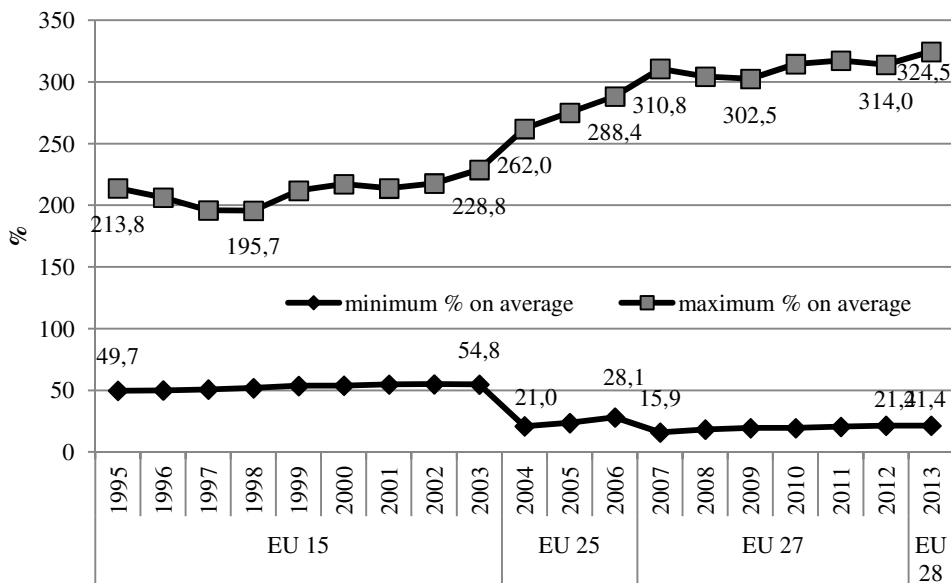

Figure 4. **The percentage share of the weakest and the strongest economic performance of the EU in average GDP per capita in EUR,** *authors' presentation of the* Eurostat and Knoema data

As previously mentioned, the difference between the maximum and the minimum values of GDP per capita is known as a variation range. It is an absolute rate of variability. A relative rate of variability is the coefficient of variation. Comparison of these indicators of variability is in Figure 5.

The analysis of coefficient of variation shows that, in general, differences between EU countries in this indicator are unable to reduce. In the period 1995−2003, when the EU consists of 15 countries that were also differences within the EU minimum, when the value of the coefficient of variation were located from 40.24 to 33.87 and the value variation ranged from 29,700 EUR to 43,500 EUR. Due to accessing 10 new members in 2004, the disparity in GDP per capita increased. It was the most ambitious enlargement in the EU history. The EU was joined by the countries with markedly different cultural, economic and political levels, which was also reflected in the increasing disparities between the EU countries. The values of the coefficient of variation increased from 56.95 (2004) and were increasing until 2007 to the level of 62.29. Due to the impact of the economic crisis, the differences decreased slightly, but in 2013 we again recorded an increase in the disparity between the levels of GDP per capita.
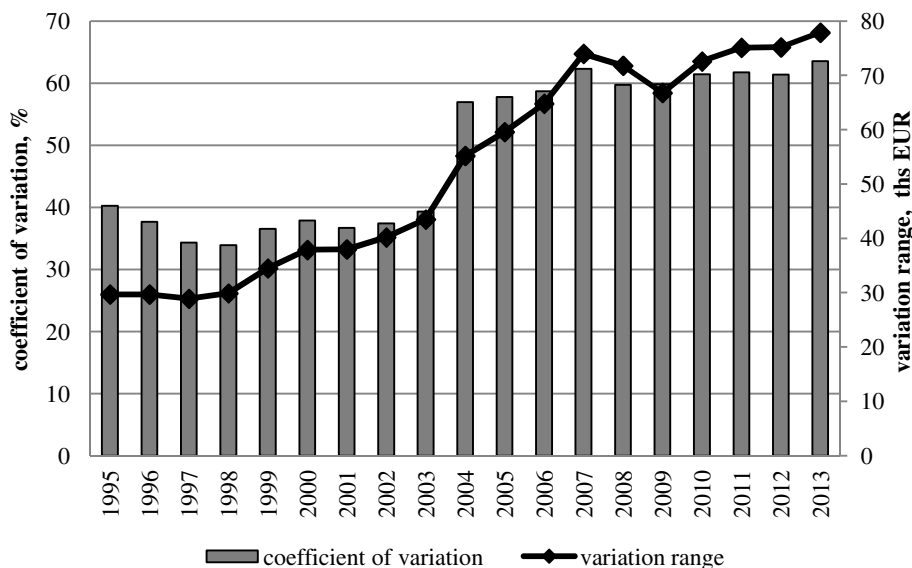
Figure 5. **Development of variation range and coefficient of variation of GDP per capita in the EU in EUR,** *authors' calculation of the* Eurostat and Knoema data

Nominal GDP per capita in PPS. For the detection of economic development of the country K. Haviernikova (2008: 26) considers GDP per capita measured in purchasing power standard as the most objective indicator. This indicator also tells about the life of citizens of the country as such.

GDP per capita expressed in purchasing power standard (PPS) enables the comparisons of GDP between countries and regions, and wipes away differences in price levels of individual countries (Grmanova, 2013: 27).

Development of minimum, maximum and average GDP per capita in the EU in PPS is presented in Figure 6.

As with GDP in EUR, the highest GDP per capita in PPS had annually Luxembourg, from 32,500 in 1995 to 68,400 in 2007. The lowest GDP per capita in PPS in 1995–1999 was in Greece, from 11,000 to 13,200; than in 2000–2003 in Portugal – 15,400–16,400. After the accession of new members in 2004, the state with the lowest GDP per capita in PPS became in Latvia, in 2006 it was Poland. Since 2007, newly added country – Bulgaria reached the lowest GDP per capita in PPS, with the values ranging from 10,000 to 12,100 per capita.

In Figure 7 we showed the proportion of the most and the least powerful of the state average GDP per capita in the EU in PPS.

In Luxembourg, which throughout the investigated time series had the highest GDP per capita in PPS, the share of this indicator for the average EU level increased from 191.2% in 1995 to 217.4% in 2003. Following the accession of new Member States between 2004 and 2007, Luxembourg distancing from the EU average increased to 241.2% in 2004 and then to 273.6% in 2007.

On the other hand, distancing of the weakest economies from the EU average was significantly decreased in the period of new members entry, in 2004 from 69.8% in 2003 to 44.7% in 2004 and 2007 it decreased 50% in 2006 to 40% in 2007.
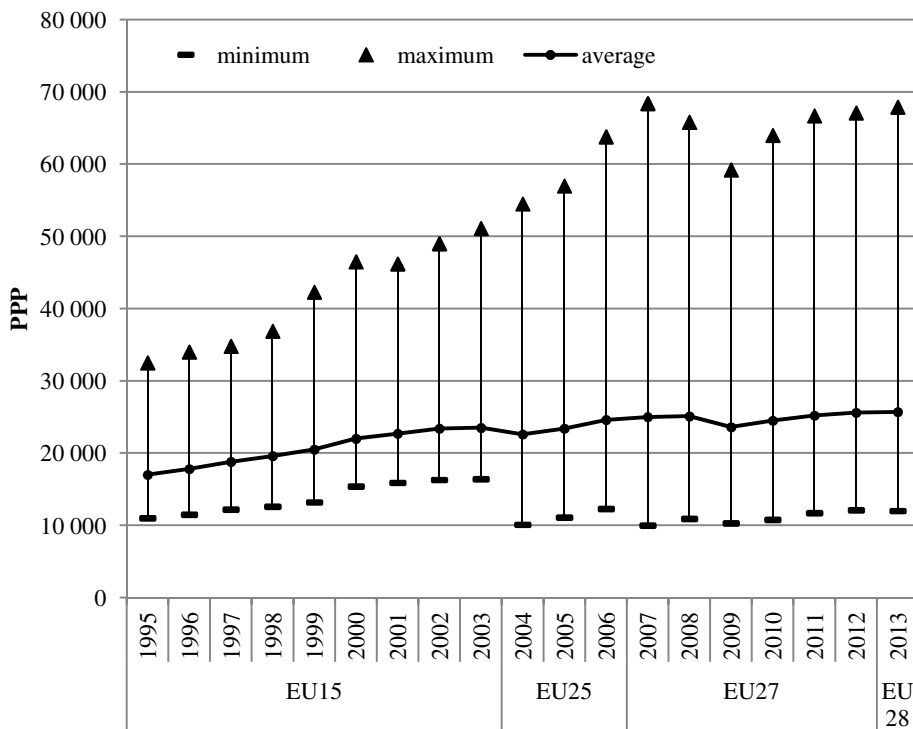
Figure 6. **Minimum, maximum and average GDP per capita in the EU in PPS,**
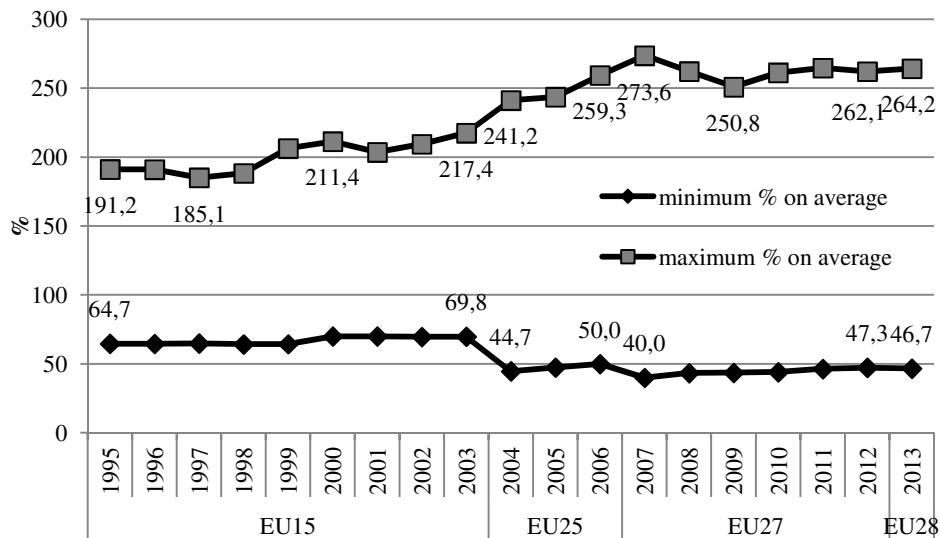*authors' presentation of the* Eurostat and Knoema data

Figure 7. **The percentage share of the weakest and strongest economic**
performance of the EU average in GDP per capita in PPS,
authors' presentation of the Eurostat and Knoema data

Comparing the GDP expressed in EUR (Figure 4) and PPS (Figure 7) we can observe that GDP in PPS across the countries shows less differences in PPS. More specifically, it can be seen when comparing the calculations of the lowest and highest values of the EU average. Luxembourg in the period 1995−2003 amounted from 185.1% to 217.4% of the EU average (in GDP per capita in EUR it was 228.8%). Similarly, distancing of the weakest states from the was less significant.

Figure 8 presents the comparison of indicators of variability (variation range and coefficient of variation) of the gross domestic product per capita in PPS.
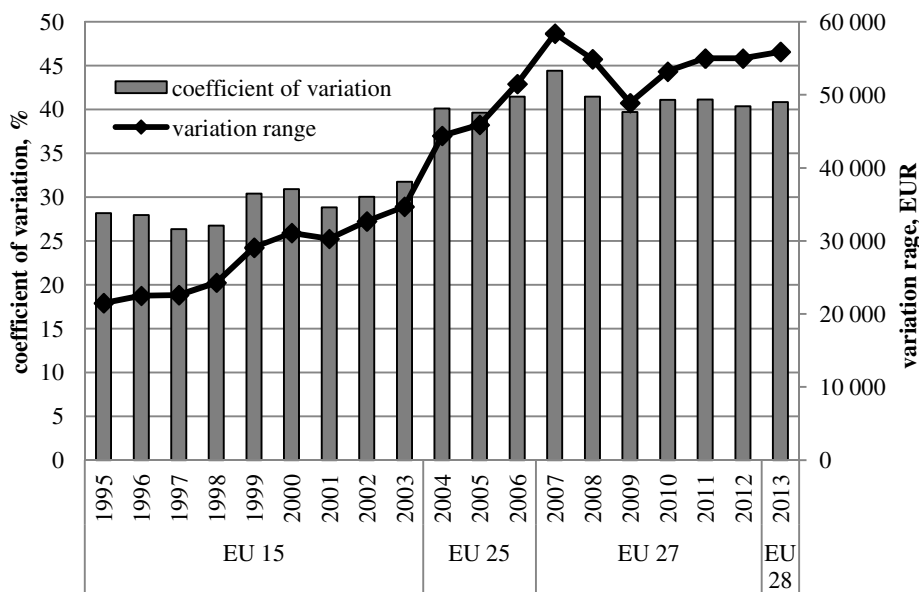

Figure 8. **Development of variation range and coefficient of variation of GDP per capita in PPS EU,** *authors' calculation of the* Eurostat and Knoema data

As it is evident from Figure 8, variation range as well as the coefficient of variation of GDP per capita in PPS in the EU increased significantly in 2004 and 2007, due to the accession of new, economically weaker countries. The biggest increase in the coefficient of variation was in 2004 (from 31.75 in 2003 to 40.12 in 2004). In 2007, the coefficient of variation increased as compared to 2006 by nearly 3% to 44.42. Thus, in consequence of the economic recession, the absolute and relative differences between the EU countries decreased.

Conclusions. As S. Vojtovic and E. Krajnakova (2013) noted, the key indicators of economic and social development of each country are gross domestic product and employment. In this article we pay attention to the trends in GDP in the EU. Currently, the EU is the major player in the global economy and with the creation of a common market of 28 countries, the EU became the world's largest major trading economy. Although the EU represents only 7% of the world's population, its trade with other countries is about 20% of global exports and imports. To measure the performance of the EU economy in the years 1995−2013 measured by gross domestic product at current market prices we have seen positive developments in 1995−2008. In 2008 the economic recession slowed down the GDP growth. In the following year

already, 2009, the crisis has been fully reflected in a decreased GDP. The highest nominal GDP growth was achieved in 2004 and 2007, the years in which the EU expanded and therefore the increase is not considered significant due to the number states acceded. Overall, we can conclude that the performance (measured in GDP) of the European Union affects not only the number of states, but also their economic strength and overall economic development in the world. In examining the development of nominal GDP per capita expressed in EUR, we observed that the maximum values reached annually by Luxembourg and the lowest GDP per capita had some of the new acceded members, except Croatia in 2013. When comparing of the weakest and the strongest economies of the EU average by GDP per capita in EUR, we see that the accession of new members in 2004 and 2007, increasing the distance of the weakest state of the EU average, while the average is closer to the minimum value, due to significantly high GDP per capita in Luxembourg, while low levels of GDP per capita are observed in the new EU Member States.

In the development of nominal GDP per capita in PPS, the situation was similar, and the highest GDP per capita in PPS was produced annually by Luxembourg. The lowest levels GDP per capita in PPS in the period 1995−1999 showed Greece and then Portugal in 2000−2003. Bulgaria is the least powerful country in the EU since 2007. GDP in PPS in each country shows less differences in PPS which can be seen when comparing calculations of the lowest and the highest values of the EU average. The economic recession after 2007 caused a reduction in disparities between the Member States, where the coefficient of variation and variation range reached the lowest values in 2009.

We found that EU's enlargement policy had its effect on enlarging disparities in GDP per capita between the Member States.

Differences between the EU Member States are not only in economic performance. Examining other aspects of differences between the Member States can be the subject for further research.

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