

ANALYSIS OF EUROPEAN UNION COHESION

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Abstract: *The European Union is formation of 27 states at the present. The similarity of the EU member states with the nature of the integration process contributes to successful action in the diminishing of differences and creating a sense of belonging among together. The aim of the article is to examine similarity of EU member states, which can show the integration process success.*

The European Union should be a whole that can build its growth on the joint development of welfare in reducing economic disparities. The article examines if EU is not only disorderly group of states whose consistency is maintained artificially by political decisions. Politics has seemed to be the most influential representatives of the States in two last years. This implies the idea associated with the fact that in order to progress in the integration process, the individual member states are gradually forced to give up sovereignty in execution of their own economic policy. In the case of disorderly economic development in member states it can happen that, they cannot use the tools of economic policy in such way that is needed to address their own economic situation.

Keywords: *Cluster analysis, European Union, European Union Cohesion, Real GDP growth rate, General government gross debt.*

JEL Classification: *E20, E23.*

Introduction

The European Union is formation of states, which is the result of nearly more than 60 years of the ongoing integration process. This process involves many areas, especially economic and political, which were one of its main causes. In the integration process beginning there were the post-war France and Germany. First integration formation called the European Coal Steel Community was established in 1951. It comprised six Western Europe developed countries. Since those times this formation was transformed and has got seven-times more member states. The Western European integration has achieved high integration level. Nowadays it is in realization of penultimate integration level - full economic and monetary union.

The Eurozone problems have occurred with debt crisis in two last years. It has started discussion about at least of disunity European Union states (EU). This hidden tendency was confirmed by separatist stance of Great Britain and the Czech Republic in the EU Summit on 9th December 2011. The principle of solidarity is far more used within the EU economic policy in comparison with the first decade of the 21th century. This is one main reason for EU desintegration tendencies increasing. Why do have states with more efficient economic performance endow less powerful and irresponsible ones (eg. Greece).

The politician action in the provision of economic assistance is justified by appeals to the solidarity of economically stronger states with weaker ones, in some cases even irresponsible farming. There is also preferred view on the EU economy as a whole, which could be seriously threaten by small problem part.

Economic cohesion in the EU is thus supported mainly by policy measures, rather than based on a similar development and sense of belonging of the member states. Opinions of the euro area future, respectively the EU are very different. According to prof. Klaus can be expected 10 years of economic stagnation in the EU Member States [3]. Skeptics according to their negative scenarios are used to talk about the possible abandonment of the achieved levels of integration, or even the disintegration of the EU.

Article responds to the currently topical issue of consistency among the EU member states. The angle of view is not political or security - strategic aspects, that are within the economic policy is constantly emphasized, but rather economic. Political will may for a long time to replace the functioning of the natural order and faire laws [15]. But it can not provide effectiveness and prevent a different economic development and non-fulfillment of real convergence in many different aspects of a whole, which the EU undoubtedly is.

1 Objective and Methodology

The main article objective is to analyze the similarity of the EU member states on the evolution of selected variables. The hypothesis is defined for this purpose. Its validity is examined by using multivariate statistical methods.

The hypothesis H_0 states that: "EU member states are under the influence of EU economic policy similar to the development of selected economic variables." In case of hypotheses validity confirmation (hereinafter " H_0 " indicating the null hypothesis) can be said the following claims. Thanks to the integration process and the implementation of common economic policy of EU member states, the EU is relatively compact economic unit.

In case of the null hypothesis rejection the alternative hypothesis will be valid. This hypothesis state: „Then integration process and performance of common economic policy has no effect on real macro economic indicators. The success of the integration process and common policies can manifest itself more in the qualitative (removal of administrative barriers, quality of life, etc.)“. These achievements of course contributed to the completion of a common market based on free movement and allow next stages of integration process, but don't remove disparities in economy.

The core category, on which null hypothesis is built, is a similarity. Similarity is quantified on empiric data and used methods. Using the cathegory of similarity has several reasons. The first is the semantic meaning of the word itself. „Similar“ means that the object in comparison with the other evaluation one has most characters the same or only slightly differing. For example, in some relatively minor attributes. The second reason is based on logical deduction. The similarity of objects means that between them are only small differences. Differences are also engaged in regional

science policy and regional development. Too big differences among individuals and territories may lead to serious social and political problems. [8]

The persistence of significant differences leads to a very small willingness of individual parts of the whole to maintain cohesion. Consistency, especially the territorial one means solidarity, cooperation and effective use of territorial potential in order to provide balance, sustainable development and competitiveness of the territory. [9]

The similarity of the EU member states deals strongly with the nature of the integration process. Its successful work in reducing differences and creating a sense of member states belonging should contribute to the cohesion of the EU as a whole. The whole, which can build on the joint development to prosperity in reducing economic disparities. In contrast of this is vision of disorderly grouping, whose cohesion is maintained artificially by political decisions of the most influential member states.

Another article benefit is to determine, which member states groups are simile and how strong links are between these groups. In the case of strong ties can be assumed joint advocacy of these countrie's groups aims. There will be identified and tracked states with the largest economic performance in the EU, which should be uniform in their behavior to maintain a minimum level of integration achieved.

2 Cluster analysis

The term cluster analysis was first used by Tryon, in his work in 1939. According to Tryon cluster analysis involves several different algorithms and methods that group objects of similar kind into respective categories. [15] The cluster analysis leads to the examiner's analysis, which uses its instruments to objects classification into groups, in order to create group with maximum degree of connection. The maximum degree of connection means the shortest distance among objects of cluster. Objects having a les degree of connection, will belong to another group. Cluster analysis can not be considered as standard statistical test, since it is a collection of different algorithms, which aims to group objects according to similarities based on defined assumptions.

The output of cluster analysis is horizontal or vertical hierarchical tree fence, called dendogram. Groups of objects are known as so-called clusters. If we want to distinguish the individual clusters, there must be taken into account the element of distance. The most common and most widely used method of calculating the distance between the clusters is Euclidean distance. This is the geometric distance in multidimensional space and the calculation by formula 1 [11].

$$d(x, y) = \sqrt{\sum_{i=1}^n (x_i - y_i)^2} \quad (1)$$

Subsequently it is the necessary to chose clustering method. When statistical software is used, it is recommended to use the method of weighted average of groups pairs. The principle of this method is to take into account the obvious nature of clusters and number of objects in the cluster is taken as a weight. This method is recommended in case of cluster inequality suspicion.

These are following criteria selected into cluster analysis:

- Real GDP growth rate in %;
- employment rate (age of group 16-64 years) in %;
- inflation rate in %;
- public finance deficit to nominal GDP in % (negative values);
- public debt to nominal GDP in % (positive values);
- index number of college students in % (measured as the ratio of the number of college graduates to total population);
- index of the relationship with other countries in % (measured as the balance of payments balance to nominal GDP in %).

Data for cluster analysis were taken from the source database Eurostat and the Organisation for Economic Cooperation and Development (OECD).

Empirical data were inserted into the software product STATISTICA, which made their standardization and subsequently performed cluster analysis based on selected criteria and parameters set for clustering.

3 Cluster analysis results

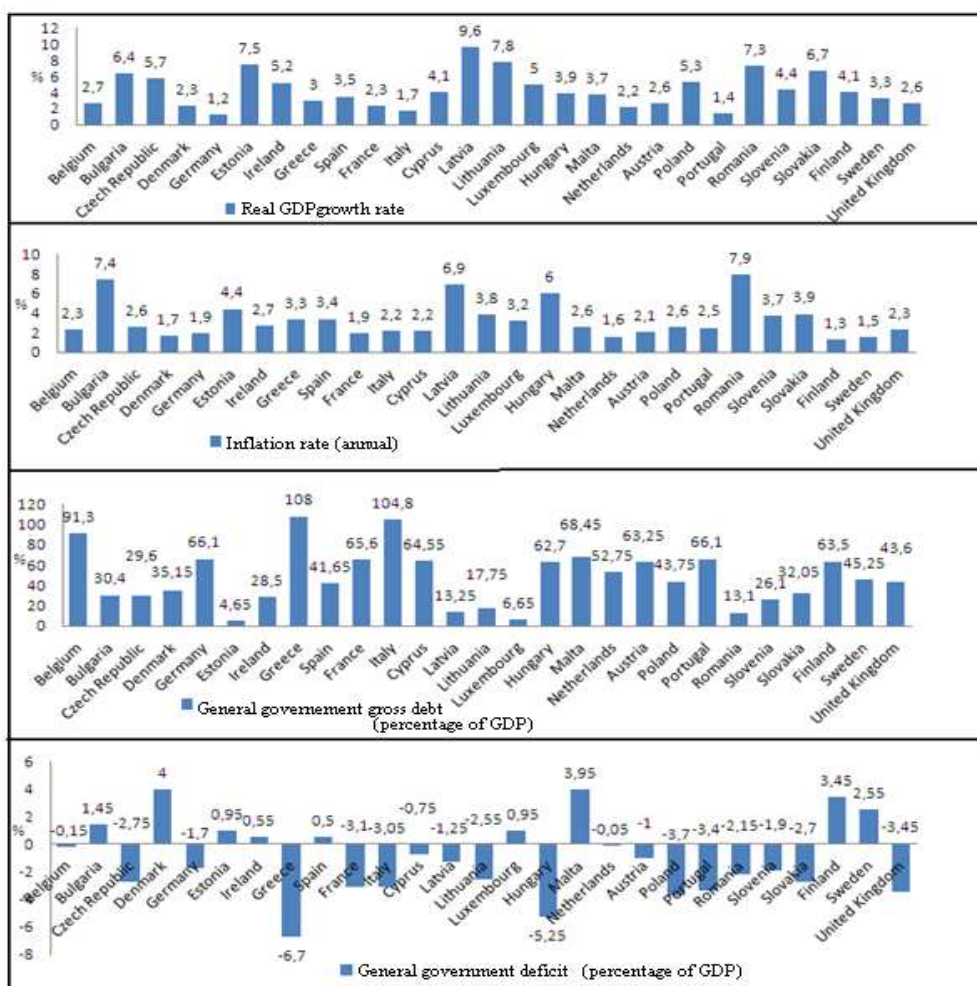
The longest possible period of 16 years is selected due to data availability and relative unencumbered data of anomalies. The European Union has reached between years 1994 - 2010 the largest expansion. Monetary union was achieved and the end of the period is marked by the economic crisis. Time series data are divided into four periods, that were defined in the context of the historical EU development.

Graphical output, consisting of dendograms and column charts, is chosen for better and more comprehensive interpreting and presenting the results of cluster analysis within each period. This article cannot include all examines period, because of its given length. It consists of two last periods which have the most influence on EU development. Previous periods are mentioned only for addition of examination.

3.1 Period 2004-2008

This period is characterized by the largest EU enlargement by 10 countries of Central and Eastern European initially with transition economies. Moreover Romania and Bulgaria has joined in 2007. The EU includes now 27 members who have in terms of political regime and economic system different past. There are problems with the budgetary discipline of member states and the vast majority of the eurozone members is not able to fulfill the Maastricht criteria or the Stability and Growth Pact.

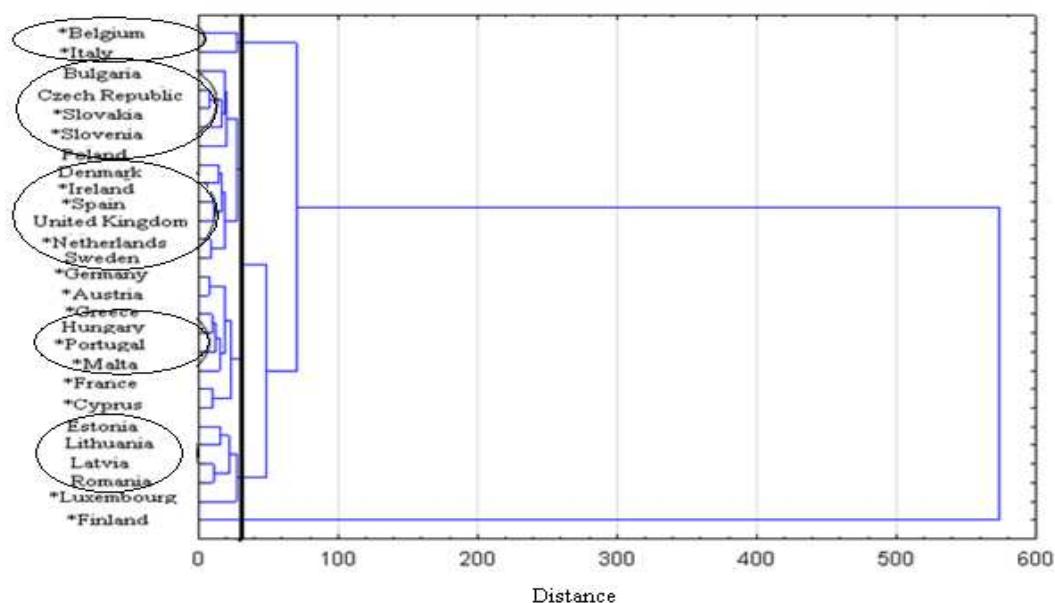
Fig. 1: Median values of selected criteria of the EU member states in the period 2004 – 2008



Source: own according to [13]

Figure 1 shows the GDP growth rate of newly admitted member states. It is well above the average of the optimal value of 3% set by OECD. Moreover, in comparison with the other member states is much higher. Looking at the rate of inflation it can be found that the vast majority of these states has got a value far above the optimal limit of 2% (5-8%). The ratio of public debt to GDP of these countries had since 2000 a downward trend (Estonia, Latvia). Thus inflation rate increasing can be attributed rather to monetary area.

Fig. 2: EU member states dendrogram in the period 2004 - 2008



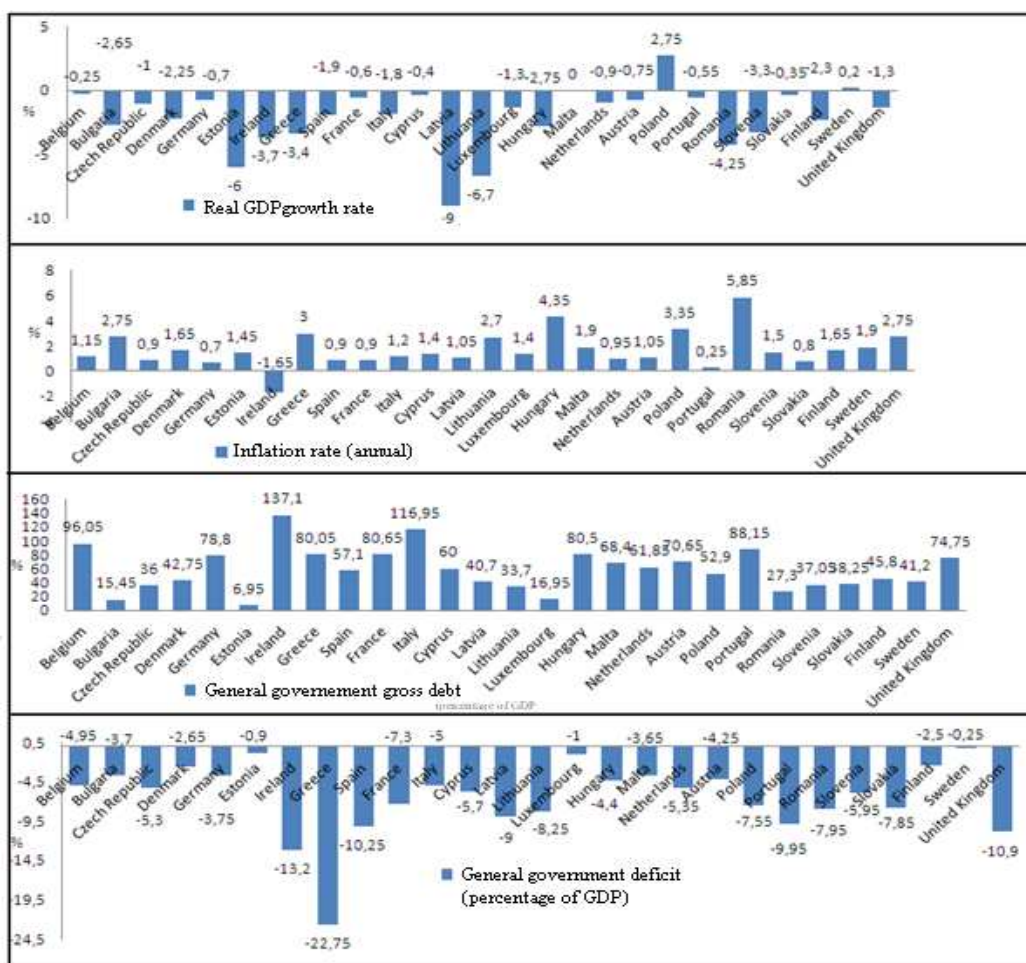
Source: own according to [13]

Cluster analysis result is with four clusters same as in former period. They differ in its composition, because of the newly admitted states (Fig. 2). States with star in front their names belong to eurozone. They show similarity in eurozone. Greece is moving from the cluster including Italy, which represents the third most powerful EU economy. Greece moves to cluster with less powerful economy, e.g. Portugal. In this period there is a merger of two groups of economically powerful states in the group consists of UK, Ireland, Denmark, the Netherlands, Sweden. This cluster also includes Spain, because it reaches like other countries in the cluster corresponding growth rate of real GDP output (median of the period is 3.2), as well as fulfilling the Maastricht fiscal criteria. Moreover employment is on the same level as in other states. The only criterion that Spain may push the edge of the cluster and separate the latter is the criterion of balance of payments deficit to nominal GDP, where the latter reaches the median for the period of 9%. The similarity of Germany and France is shown again. But the relationship strength between them is weaker than in the previous period.

3.2 Period 2009-2010

Financial crisis has broke out at the end of 2008. It has reflected by worsening macro-economic data in developed Western economies (EU, USA) during 2009. Countries with deep impact of the economic crisis has increased governmental spending and enacted laws supporting the demand for key products industry.

Fig. 3: Median values of selected criteria of the EU member states in the period 2009 - 2010



Source: own according to [13]

GDP growth rates significantly dropped during this period (Fig. 3). Especially those, which had have the highest growth rate in the previous period (Latvia, Estonia). Public debt rose most in Ireland and Italy. Most member states does not meet the Maastricht criteria with long-term values of 60%.

This leads to the question, what is the nature of the relationship between the variables of real GDP growth rate and public debt as a share of nominal GDP.

$$Real\ GDP\ growth\ rate = \frac{GDP_t - GDP_{t-1}}{GDP_{t-1}} \times 100 \dots [\%] \quad (2)$$

$$General\ government\ gross\ debt = \frac{General\ government\ gross\ debt_t}{nominal\ GDP_t} \times 100 \dots [\%] \quad (3)$$

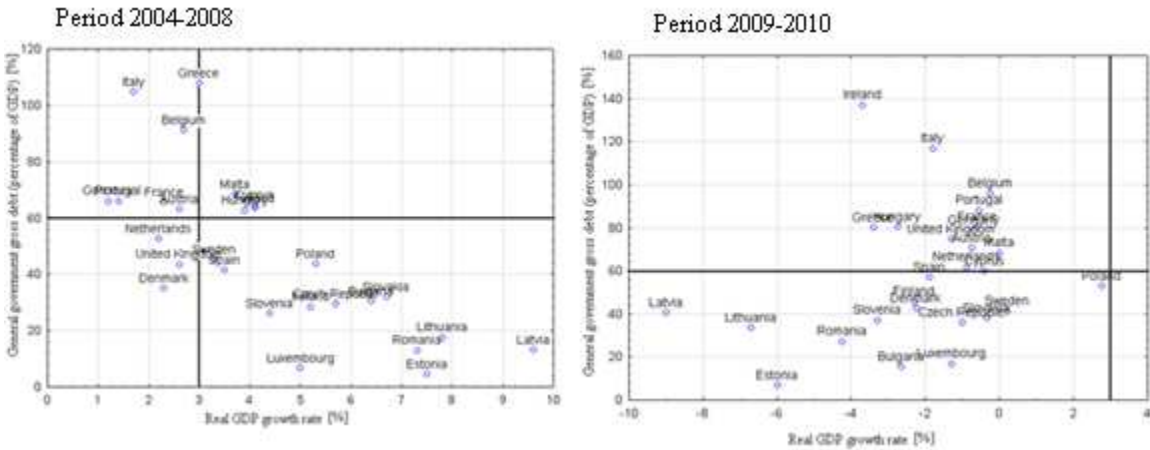
Based on the principle of calculating these variables (see formula 2, 3) it can be suggested, that the development of real GDP and the share of public debt to nominal GDP have inverse relationship. In addition, usually rising price level is captured in the inflation rate and further supports this relationship. However, this is not clearly reflected in the development of their empirical values. This is evident from the graphical view by using the point graph with marked generally recommended values

3% of GDP growth rate and 60% of public debt corresponding to the Maastricht criteria (see Fig. 4).

Period 2004 - 2008 confirms, that the higher the GDP growth rate is, the more possible is to observe total debt decreasing. This is in keeping with Keynesian policy of increasing government spending during the downturn in economic performance [17].

The last period is marked by economic crisis and GDP growth rates sharp reduction. EU member states are equally placed above and below the line representing 60% of total debt. Examined relationship of GDP growth and debt cannot be clearly characterized due to different trends of individual countries. Luxembourg is worth noting, because his debt was below 60% in all the periods and ranked among the countries with overall slightly above-average economic performance relative to other states.

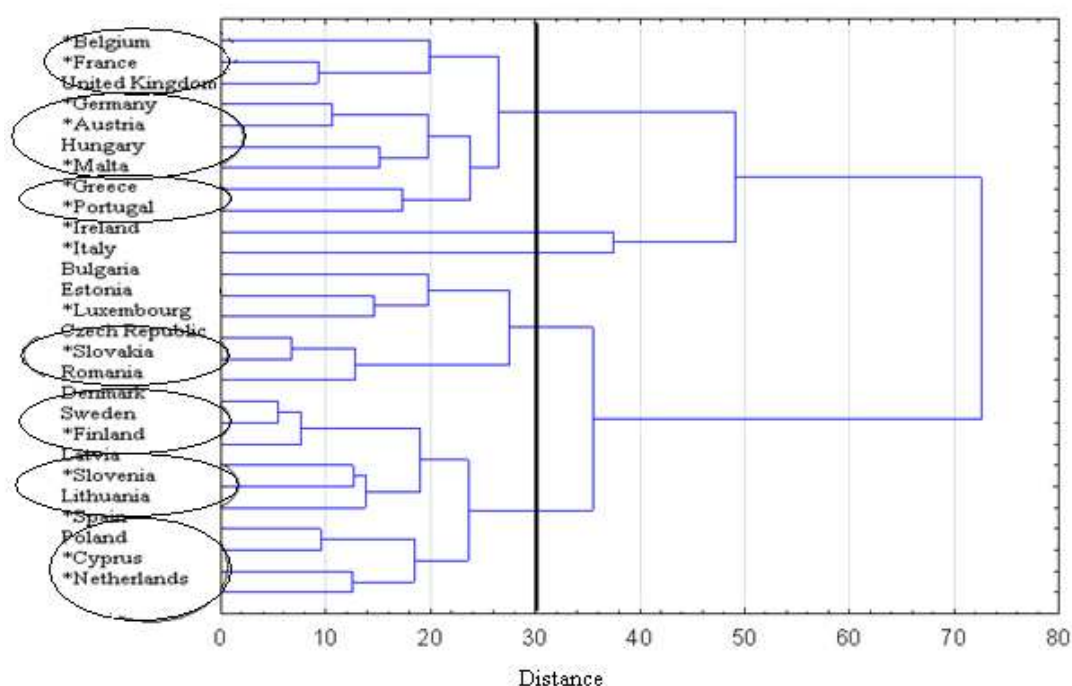
Fig. 4: Real GDP growth rate and general government gross debt in the period 2004-2008 and 2009-2010



Source: own according to [13]

From the ambiguous economic development, partly due to the different reactions of the Governments of the member states is apparent failure of fiscal discipline and moral irresponsibility of the individual states for their impact on the status of the integration formation.

Fig. 5: EU member states dendrogram in the period 2009 - 2010



Source: own according to [13]

The number of observable clusters grown at double in comparison with the previous period (see Figure 5). Individual clusters represent a lower number of states. Greece gets into the cluster with Portugal. These countries went to troubles. Another one cluster consist of the Scandinavian countries. It is apparent dominance segregation by values corresponding to more underlying economic situation in individual countries before the EU admitting.

The EU is exposed to the economic crisis which manifested itself in 2009. Governments of the member states as well as the European Central Bank have used their instruments in expansionary policies to mitigate crisis impact. It has deepend debt and a fall in GDP, which has unleashed problems for eurozone due to Greece. After the financial and economic crisis, the debt crisis occurs. The solution should lie in changes in the Treaties and finding system tools, than the violation of basic economic rules and loss of credibility of the euro area leading to disunity within the EU. Divisions on the euro area is also apparent from Fig. 5, when these states spread unevenly in different clusters.

Conclusion

Each state in a given period behaves relatively independently. Instead of decreasing clusters number as evidence of economic integration success and real convergence, can be seen increasing of different groups number during two last reporting periods. The null hypothesis set at the beginning can be disprove due to this facts. Alternative hypothesis can be accepted. The process of integration and performance of common economic policy has no effect on real macro economic indicators. The success of the integration process and common policies can manifest itself more

clearly rather in the qualitative aspects (removal of administrative barriers, quality of life, etc.).

It is paradoxical that in comparison of clusters in the periods 2004 – 2008 their number did not increase, even though the EU has grown by 12 states. On the contrary, during a relatively short period 2009 - 2010 the number doubled. According to the analysis it can be suggested that one of the causes of larger clusters number appearance is the minimum similarity of individual member states. Due to the manifestation of the crisis in the fiscal area was also to highlight the inconsistency of individual states. In addition, this internal division may be one of the causes of disintegration tendencies manifesting inconsistency and disruption of the EU as a whole.

The economic crisis has reflected in economic reality, which revealed a previously underserved obvious problems, particularly in the fiscal area among the member states and calls for immediate response to the economic policies of the EU offering a system solution. In times of economic crisis, which should be considered as an empirical phenomenon repeated in about 80 year periods, showed very little similarity between the economic development of states. The occurrence of the paradox can not automatically attribute to an exceptional event. In the case of the European Union, the authors believe that the economic crisis played a role rather a kind of catalyst to accelerate reactions leading to a decrease in cohesion of the EU as a whole.

The analysis of macroeconomic data doesn't show positive effects of integration, particularly in the last stages (common market and economic and monetary union). In addition, due to failure of fiscal discipline and inconsistency of the EU Member States is also weakened external competitiveness of the EU, eg. with as the United States.

The EU example shows that to ensure consistency of this large economic unit is very difficult. The question is whether preparing the fiscal union can bring tendency to reduce the enormous debt of member states. Due to the tradition of violations Maastricht criteria and reluctance of member states to follow fiscal discipline, its effects may not occur in practical. Nowadays negotiation about fiscal union leads to separation of countries, which don't want to automatically accept certain disadvantages (Great Britain and the Czech Republic).

Waiver of autonomy in using the tools of monetary and fiscal policies also will lead to further loss of national sovereignty to European institutions in the future. Furthermore, it may affect one of the common EU economic policies principles - the principle of subsidiarity. In case of worse economic development persistence it should certainly cause distrust in the EU and strengthen nationalism and disintegration tendencies (see Finland, Hungary). The authors believe that the success of EU cohesion should be firstly based on loyalty and member states willingness to the growth of the whole. Unfortunately, this political formation, paradoxically, has no distinctive symbols and statesman with whom individual states, respectively citizens could be identified.

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