Institutional Integration in the Sphere of Business Infrastructure in the European Union in the Years 2000-2008[#]

Adam P. Balcerzak[*]

Department of Economics, Faculty of Economic Sciences and Management, Nicolaus Copernicus University, Poland

Abstract: The last decade has been a period of accelerated integration in Europe. A manifestation of this was the biggest ever enlargement of the EU in 2004. Therefore the aim of this study is an evaluation of integration process in EU in the sphere of economic institutional order. The analysis concentrates on the institutional factors that affects the ability of country to utilize potential of competitive global economy. In this study some taxonomic tools were used - a hierarchical classification procedure (Ward's method with Euclidean and Manhattan distance). The study was based on annual data from the period 2000-2008. It allowed to capture a period of four years before and after the biggest enlargement of the EU. The research problem of this study amounted to the question: whether in the analyzed period can one speak about the process of growing similarities in the sphere of business institutional order for "old" and "new" EU countries? The study confirms existence of integration processes in relation to institutional order. However, it also proves the existence of group of countries that can be described by homogenous institutional factors especially effective in supporting utilization of the potential of competitive global economy.

Keywords: Business infrastructure, integration, institutions, taxonomy.

INTRODUCTION

The last two decades were a period of fundamental institutional change in Europe. For the countries of Central and Eastern Europe these changes relate to both the political sphere as well as to fundamental rebuilding of the foundations of economic life. Each of the countries in the region by choosing the transformation towards market economy and European integration has had to take the trouble of radical rebuilding of the existing institutional order. However, the fundamental institutional changes in the economic sphere have not been only limited to so-called transformation countries of Central and Eastern Europe. For the past two decades the developed countries of "Old Europe" have been also forced to take the trouble of institutional reforms relating to the economic order. On the one hand, it was necessitated by the intensification of globalization and increasing economic competition in the international dimension, the most tangible manifestation of these has been the growing international role of Asian countries. On the other hand, the need for intuitional reforms has been the result of the mentioned political and economic changes in Central and Eastern Europe.

Another significant phenomenon of recent years, which must have had a significant impact on institutional changes in Europe can be called "information explosion". Probably never before there have been the technological and social infrastructure which would allow such a rapid diffusion of knowledge and so-called good governance practices or institutional rules that are conducive to improving economic growth or that can become a significant obstacle to improving the level of social welfare.

These phenomena undoubtedly can be treated as the drivers of the integration processes in the economic sphere in Europe as only strong and big integrated European market can face the globalization challenges. Therefore, the purpose of this analysis is formalized assessment of the phenomenon of institutional integration in the sphere of economic order in the European Union in the first decade of the twentieth century.

An attempt to measure institutional phenomena is associated with many methodological issues that relate to the problem of quantification of phenomena whose essence is the qualitative and multidimensional nature. Therefore, this study used commonly accepted taxonomic tools.

*Address correspondence to this author at the Department of Economics, Faculty of Economic Sciences and Management, Nicolaus Copernicus University, ul. Gagarina 13A, 87-100 Toruń, Poland; Tel: +48 56 611 46 22; Fax: + 4856 611 2280; E-mail: apb@umk.pl

[#]The first version of this paper was presented at the conference "Economics and Law" under the title "Integration and disintegration processes in contemporary economy" on 20-21th September 2011 in Department of Economics at Faculty of Economic Sciences and Management at Nicolaus Copernicus University in Toruń (Poland). This is an improved version of a paper that was presented at International Conference on Applied Business and Economics – ICABE 2011 at University of Piraeus in Greece 29tth September 2011 – 1stt October 2011. I would like to thank all the participants of these conferences whose remarks and suggestions were valuable in improving the quality of the paper.

INTEGRATION AS A CONSEQUENCE OF EFFORTS TO IMPROVE THE EFFECTIVENESS OF INSTITUTIONAL ORDER IN THE REALITY OF HIGHLY COMPETITIVE GLOBAL ECONOMY

North defines institutions as the constraints of human behavior that affect the quality of interaction. The institutions include formal rules and regulations of behavior, informal constraints (norms of behavior, conventions, and patterns of conduct). As a result the institutions can be the source of restrictions on contracts between the actors of economic life. In this way institutions affect the economic effectiveness and determine transaction costs (North, 1994, pp. 359 and passim). Therefore, from the perspective of long-term prospects the occurrence of all the factors influencing economic growth and improving social welfare, such as the intensification of technological progress, improvement of the quality of human capital and development of entrepreneurship, is only possible to achieve under the conditions of threshold efficiency of the institutional system, which ensures sufficiently low level of transaction costs in the economy (North, 1993).

Institutional conditions, in particular relating to the informal rules rooted in the social consciousness, are usually the consequence of long-term historical process of formation, which may take tens or even hundreds of years (Willliamson, 2000, pp. 595-613). Reformulation of these institutional rules and the emergence of integration processes in this area are always very difficult. This is a particular problem if certain informal rules are important obstacles for development processes in a given country. On the other hand, many elements of institutional arrangements relating to so-called positive rules, such as legal restrictions and requirements relating to economic activity, formal regulations affecting the characteristics of competition intensity in specific industries or in given markets, are a consequence of some recently adopted and current political decisions and social choices. These elements of institutional order can usually be modified in a few years. Thus, they are subject to relatively rapid changes as a result of diffusion of knowledge concerning good governance, or are changed by the presence of strong exogenous stimuli, such as the growing international competitive pressures (Balcerzak and Rogalska, 2010, pp. 49-55). This means that these elements of institutional order may be influenced by relatively rapid process of integration.

Probably one of the most important phenomena of recent decades, influencing the evolution of these "economic rules" is the emergence of highly competitive global economy. Currently, economists agree that the last two decades has been the time of extremely rapid, profound transformation of almost all economic sectors and economies as a whole in case of all developed countries and also most developing countries. The main factor leading to these changes is the growing importance of technological innovation in telecommunications and information processing. This change of technological paradigm in the field of information and communication is accompanied by reorganization of businesses practices, development and rising dynamics and importance of capital markets, the growing role of individual entrepreneurship as a driver of economic growth, increasing volatility of labor markets, and last but not least globalization leading to continuous and increasing competition at national and international level. It can be argued that these new conditions represent a fundamental departure from the national corporate economy based on mass production of goods, which was dominant in developed countries since the late forties till the end of the seventies of the twentieth century. The current economy is a global, knowledge-based and entrepreneurial economy, in which the key factors of success is the extent to which knowledge, technology and innovation are embedded in products and services (Atkinson and Correa, 2007, p. 3).

The above described realities has forced the adjustment of many areas of institutional order in accordance with the requirements of the new global economic conditions in all countries, where the objective of socio-economic policy is to use the potential of the highly competitive global economy. The most important segments of the institutional order that affect the development potential of the country in realities of global economic transformation presented above are: a) the effectiveness of national regulations that support private entrepreneurship, b) the role of competitive environment and the institutional order of the labor market; c) the institutional order that affects the efficiency of financial markets in supporting the development of enterprises with high growth potential; d) the institutional rules that facilities the accumulation of knowledge and intellectual property. Naturally, the proposed selection is in a way arbitrary, which must be remembered during interpretation of the research results. It is the result of attempts to synthesize the lessons learned from the literature of the subject and widely accepted international research programs that are basis for such studies as the Economic Freedom of

the World, prepared by economists working under the auspices of the Fraser Institute, Index of Economic Freedom created with support from The Wall Street Journal and Heritage Foundation, or a global survey of business conditions prepared annually by the World Bank (See. also Balcerzak, 2009, pp. 289 and passim).

Currently there is no controversy in regard to the statement that the level of entrepreneurship is one of the most important intangible factors of economic growth of a country (Holcombe, 1998, pp. 45-62; Acs, 2006, pp. 97-107). It depends on many informal institutional factors shaped in the course of many decades, such as public perception and public acceptance for individual entrepreneurship. But on the other hand, the experience of recent decades confirms that the national level of entrepreneurship is significantly negatively correlated with institutional factors of a legal nature, which increase the scope of the regulation and are sources of additional burdens and restrictions on freedom of economic activity (Ardagna and Lusardi, 2008; Stel *et al.*, 2007, pp. 171-186). As a result, in recent years in many countries one can notice significant institutional reforms aimed at so-called "simplifying" and improving the conditions of running individual business.

Empirical studies conducted in recent years have shown that in the case of countries obtaining considerable success in exploiting the potential associated with the processes of global transformation state regulatory activity was mainly focused on creating a highly competitive market order. High competitive pressure on domestic markets is a key source of incentives for innovation in the sphere of high technology and organization, and increases the rate of diffusion of the most effective business solutions, which is an important stimulator of raising the productivity growth rate of the economy. The state regulatory activity with respect to labor markets should not lead to increased rigidity of the market. It should not focus on the administrative protection of existing jobs in any given industries. Labour market policy should rather increase its efficiency in connecting the demand side and the supply side of the market by reducing transaction costs. Activities of the state should provide assistance for people losing their jobs during the transitional period and increase their chances of finding new employment, while in the same time reducing the likelihood of addiction on that state aid of the beneficiary (Balcerzak, 2009, pp. 71-102).

An important factor that accelerates economic growth in developed countries, whose role has significantly increased its importance in recent years, is the functioning of the new highly innovative companies with high growth potential. These companies are becoming an important carrier of both the development and diffusion of new technologies and contribute to the acceleration of technological change. The potential for development and functioning of such companies is closely related to the effectiveness of the institutional governance of financial markets, which should contribute to the rapid reallocation of capital from so-called traditional-mature industries with low growth potential to industries with high development potential (Balcerzak, 2009, pp. 30-39).

Contemporary global economy is also increasingly dependent on production of "intangible products", where the main source of added value is accumulated in the "product" knowledge and intellectual values. Therefore, the development of the countries that intend to take advantage of highly competitive global economy is closely linked with the shape and effectiveness of institutional order in the sphere of protection of intellectual property rights (Okoń-Horodyńska and Wisła (ed.), 2009).

As a result, in case of the empirical part of this work the analysis of integration processes in European Union countries will refer to the above outlined areas of institutional order.

METHODOLOGY OF THE RESEARCH

The discussion carried out in the previous section leads to the conclusion that on the one hand the institutional order is a phenomenon difficult to measure, on the other hand any attempt to measure it must take into account its multidimensional character. This means that in case of any proposals of formal empirical analysis that aim at international comparisons in relation to specific changes of institutional systems of individual countries it is necessary to use multidimensional analysis tools. In the case of this study some well recognized taxonomic tools were used. In the literature a similar approach was applied to study the institutional framework of monetary policy (Pietrucha, 2008, pp. 228-236) and institutional conditions for supporting the innovative potential of the country (Piech, 2009, pp. 287-394).

In the present study the tools of hierarchical classification method were used to achieve taxonomic

clusters of countries that are members of the European Union according to institutional criteria[1]. This allowed obtaining the homogeneous subsets of countries due to the shape of the institutional system in different years. Such subsets are referred to as concentration. They are defined as a set of objects that are similar to each other at the same time, however, they are significantly different from the objects belonging to other sets. As a measure of similarity the distance between objects was used in that case two approaches first Euclidean and Manhattan distance were used as they both are usually characterized with good mathematical characteristics (see more Ostasiewicz (ed.), 1998, pp. 86-108). This test was made based on the annual data from the period 2000-2008 for 27 countries members of EU[2]. In the research three years were chosen: 2000, 2004 and 2008, which allowed to capture the four-year period before and four-year period after the biggest enlargement of the European Union. Assessment of changes in the composition of the sets examined during the analysis can be helpful in showing the transformation of institutional conditions and processes of integration in the sphere of institutional order in the surveyed countries. The main research problem of this analysis concentrates on the question: whether in the analyzed period can one speak about the process of forming growing similarities in the institutional sphere between so called “old” and “new” EU member states?

For obvious reasons, in case of the study of this kind it is not possible to eliminate the threat of a subjective evaluation, which is associated with the selection of diagnostic variables for a quantitative description of different spheres of institutional order. However, seeking to minimize that risks the weighing of taxonomic variables describing given segments of institutional order was not included in the research. Additionally, in the research the ranking of the effectiveness of institutional systems of countries were not created, but the whole research effort was concentrated on the attempt to assess similarity of institutional systems of analyzed countries.

In the first phase of the research diagnostic variables meeting the formal criteria were selected[3], which allow to evaluate different aspects of institutional order in the countries surveyed in accordance with the convention based on the considerations from the previous section. On this basis, the sets of potential diagnostic variables were selected that were classified into four groups:

a) The government regulation that is aimed at increasing entrepreneurship:

x_{i1} - Administrative Conditions/Entry of New Business;

x_{i2} - Time with government bureaucracy;

x_{i3} - Starting a new business;

x_{i4} - Irregular payments;

x_{i5} - Judiciary independence;

x_{i6} - Impartial courts;

x_{i7} - Law and Order.

b) The importance of a competitive environment and labor market flexibility:

x_{i8} - Price controls;

x_{i9} - Regulatory Trade Barriers;

x_{i10} - Impact of minimum wage;

x_{i11} - Hiring and firing practices;

x_{i12} - Labor force share with wages set by centralized collective bargaining.

c) The financial market and growth of companies with high growth potential:

x_{i13} - Competition in domestic banking;

x_{i14} - Extension of credit;

d) The institutional order influencing the accumulation of knowledge and intellectual property:

x_{i15} - Protection of intellectual property.

[1]Profound methodological analysis on classification methods one can find in the works of Milligan and Cooper (1987, pp. 329-354), Everitt and Dunn (2001) or Everitt *et al.* (2011).

[2]The entire data set used in the study comes from the Fraser Institute database created for the report Economic Freedom of the World. The year 2008 was the last year for which a full set of data was available in the latest available study published in 2010 (see. Gwartney *et al.*, 2010). An alternative source of data for this study could be the base of the World Bank used to create a report on Doing Business. Fraser Institute database was chosen for study because it offers the possibility to extend the test period and is characterized by greater methodological stability than the base of the World Bank (see. Doing Business 2011, 2010).

[3]These criteria include: versatility and measurability of variables, the availability and quality of the data, the ability to interpret the variable (see Zeliaś (ed.), 2000, pp. 37-38).

Table 1: Diagnostic Variables that do not Fulfill the Criterion of High Spatial Variability

Year	2001	2002	2003	2004	2005	2006	2007	2008
Variables	-	-	-	-	x_{i3}, x_{i9},	x_{i3}, x_{i9}	x_{i3}, x_{i9}	x_{i3}, x_{i9}

Source: own elaboration.

These variables have been assessed due to the criteria of information value of variables. According to these criteria, diagnostic variables should have a sufficiently large spatial variability, validity and low correlation.

The first criterion means that the variables should not be similar to each other in terms of information about objects. Spatial variability of features can be assessed using the coefficient of variation. The variable for which the coefficient is lower than the adopted value is eliminated. Typically, the variables for which the value of the coefficient of variation is lower than or equal 10% are eliminated from the research (Ostasiewicz, 1998, pp. 115-116).

Potential diagnostic variables are considered as valid if in case of a given variable it is difficult to reach its high values. To assess the validity of the variable skewness coefficient can be used. Assuming that the variable is a stimulus[4], in case of valid variable its distribution should be right-skewed. In case of stimulus left-skewed distribution means that most of the objects reach high values for a given variable. Thus, this feature does not differentiate sufficiently the objects; therefore it should be eliminated from the research (Ostasiewicz, 1998, pp. 115-116).

A strong correlation between the diagnostic variables can lead to repetition of information. In case of too high degree of correlation of variables the representative variables are usually selected. To do this, the parametric method of Hellwig was used here, where the maximum value of correlation coefficient equals to $r^* = 0{,}8$ (Strzała and Przechlewski, 1995, pp. 154-156).

Table **1** shows the diagnostic variables, which in subsequent years did not meet the criterion of high spatial variability. According to the formal criterion used due to the frequency of occurrence of variables x_{i3} and x_{i9} in the sets that do not meet the criterion of spatial variability one should consider elimination of these variables from further research (Zeliaś (ed.), 2000, pp. 126-133). However, referring to the aim of the research, which is to assess the occurrence of integration processes in the institutional sphere, already at this stage an interesting phenomenon should be pointed out. In May 2004 the European Union had the biggest enlargement. The consequences of this enlargement associated with the harmonization of regulations affecting the cost of starting new business and restricting the freedom of trade are strongly visible in the case of the analyzed indicators for the EU countries. Since 2005 there has been a reduction in variability of variables, which can be interpreted as consequences of the implementation of European Union legislation. Thus it can be regarded as a manifestation of the integration processes in relation to the economic legal order.

In accordance with the demands for the validity of diagnostic variables, which were described above, when one uses the asymmetry coefficient as a tool for testing the validity of variables, in case of stimulus for valid variable its distribution should be right-skewed. This can guarantee the high differentiation of objects by the variable. In this study, all potential diagnostic variables were considered as stimulus. However, most of the variables were characterized by a left-skewed distribution. This was associated with the specific characteristics of objects (countries of European Union) and the methodology used by the Fraser Institute in building a database that allowed the quantification of relatively difficult to measure qualitative phenomena, such as the characteristics of individual elements of institutional order. In case of variables used in the research the countries could get the values from 0 to 10, where higher value was equal to the higher evaluation of the segment of the institutional system. In the research the European Union countries were only included, which are characterized by relatively high values for institutional systems as compared with the other countries included in the database. Fraser Institute database is created for more than 120 countries, thus in this set the EU countries tend to obtain relatively high values. Moreover, an attempt to find alternative measures that enable methodologically

[4]Variable is a stimulus when for every two values x_{ij}, x_{kj} corresponding to two objects A_i, A_k the following relation is valid $x_{ij} \rangle x_{kj} \Rightarrow A_i \succ A_k$ where $\succ$ means that object A_i is preferred to object A_k (Walesiak, 2002, pp. 16-19).

Table 2: Diagnostic Variables that do not Fulfill the Criterion of High Information Validity

Year	2001	2002	2003	2004	2005	2006	2007	2008
Variables that are eliminated.	x_{i6}, x_{i9}	x_{i6}, x_{i9}	$x_{i4}, x_{i5}, x_{i6}, x_{i9},$	$x_{i4}, x_{i5}, x_{i6}, x_{i9}$	$x_{i4}, x_{i5}, x_{i6}, x_{i9}$	$x_{i4}, x_{i5}, x_{i6}, x_{i9}, x_{i15}$	$x_{i4}, x_{i5}, x_{i6}, x_{i9}, x_{i15}$	$x_{i4}, x_{i5}, x_{i6}, x_{i9}, x_{i15}$

Source: own elaboration.

consistent assessment of the institutional systems of the European countries, for the period under consideration, was relatively difficult. Thus, due to dominant role of merit criteria in the research it was necessary to abandon the use of a formal criterion concerning the distribution of diagnostic variables[5].

For the last criterion of information validity (the assessment of correlation of variables) and after the application of Hellwig's parametric methods in order to select the representative variables in subsequent years the variables shown in Table **2** should be eliminated.

Analysis of the results for the information validity criterion leads to a similar conclusions as in case of the criterion of high spatial variability. Also in this case there are visible signs of faster integration processes in relation to the various segments of the institutional system of the countries after the EU enlargement in 2004.

Thus, due to the aim of the research and merit interpretation of the results of the validity criteria for the potential variables, despite the formal indications of the analysis it was decided to not eliminate any of the variables from the set of potential diagnostic variables.

In the next stage of the research, the comparability of diagnostic variables was achieved. For this purpose, a classical normalization procedure based on the arithmetic mean and standard deviation (equation 1) was implemented. It resulted in achieving variables with arithmetic mean equal to 0 and variance equal to 1.

$$x_{ij} := \frac{x_{ij} - \bar{x}_j}{s_j} \quad (1)$$

Where:

x_{ij} - Value of j variable for i object,

$\bar{x}_j$ - Arithmetic mean of j variable,

s_j - Standard deviation of j -variable.

The last step of the analysis was the grouping of the countries based on Ward's method first with Euclidean and then with Manhattan distance. In case of Manhattan distance not as with Euclidean distance where the distance between two points is the length of the line conceding them, the distance between two points is the sum of the absolute differences of their coordinates. These procedures are considered as ones of the most widely used hierarchical classification methods, and the Euclidean and Manhattan distance were used because of their good mathematical properties. In Ward's method to extract the cluster the analysis of variance is used, which gives the possibility of formation of clusters of relatively small size and relatively large distances between their centers. This method involves the sequential reduction of the number of clusters by combining them into groups of higher order until obtaining their full hierarchy. The starting point of the whole procedure is a matrix of distance D between the objects, each of which initially makes a separate cluster. A pair of clusters with the smallest distance from each other is combined into a new cluster, and then its distance from other clusters is determined. From the matrix D the distances associated with the objects appearing in the new cluster are eliminated, and the distance of the new cluster from other clusters is inserted there, thus a new distance matrix id obtained. This algorithm is repeated until all objects form one cluster. Differences between the hierarchical methods of agglomeration arise from different ways of determining the distance between the clusters. In the case of Ward's method it is defined as the difference between the sums of squared deviations of individual points from center of groups to which they belong (Ostasiewicz, 1998, pp. 88-96). Results of grouping for 2000, 2004 and 2008 are presented in the Figures **1** to **3** for Euclidean distance and **4** to **6** for Manhattan distance.

[5]A similar problem occurred in a research of institutional effectiveness of OECD countries in terms of support for the development of the new global knowledge-based economy (see Balcerzak, 2009, pp. 289-290).

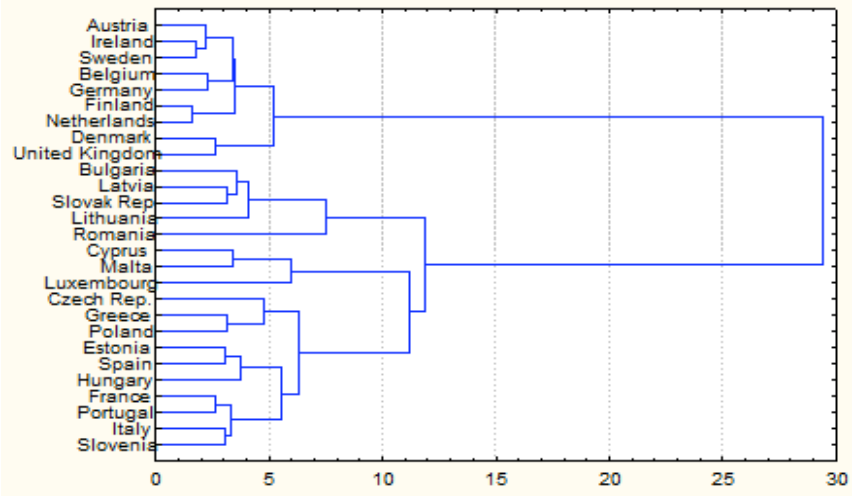

Figure 1: Grouping of European Union Countries based on the similarities of institutional systems based on Ward method with Euclidean distance for the year 2000.
Source: own elaboration based on Fraser Institute data base (see Gwartney *et al.*, 2010).

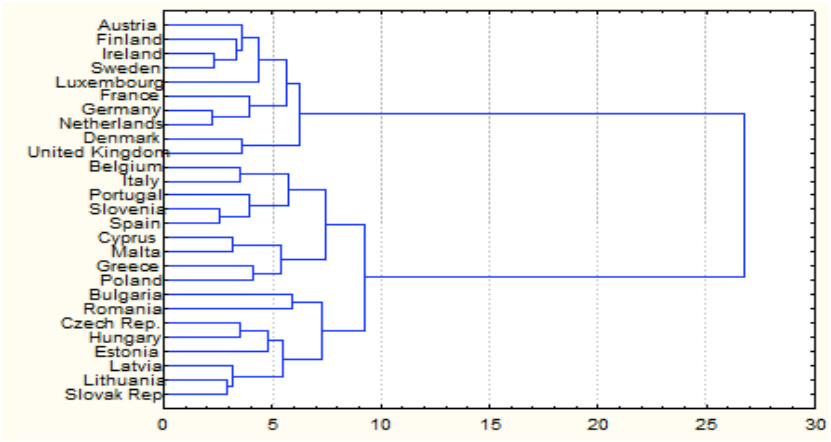

Figure 2: Grouping of European Union Countries based on the similarities of institutional systems based on Ward method with Euclidean distance for the year 2004.
Source: own elaboration based on Fraser Institute data base (see Gwartney *et al.*, 2010).

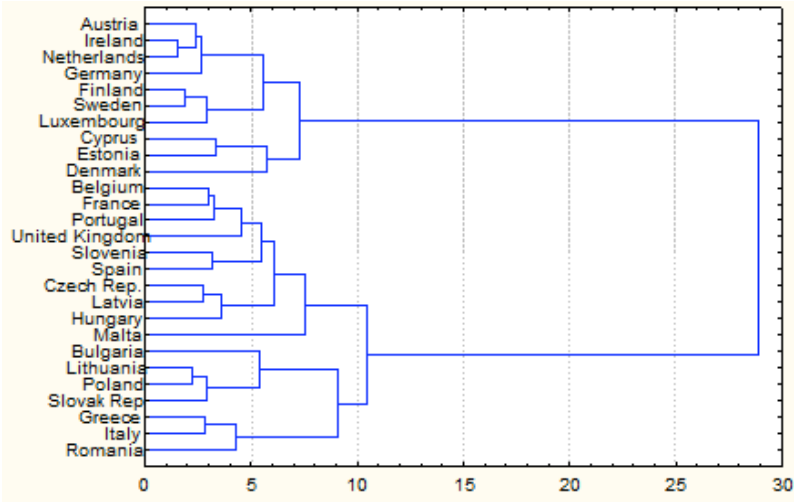

Figure 3: Grouping of European Union Countries based on the similarities of institutional systems based on Ward method with Euclidean distance for the year 2008.
Source: own elaboration based on Fraser Institute data base (see Gwartney *et al.*, 2010).

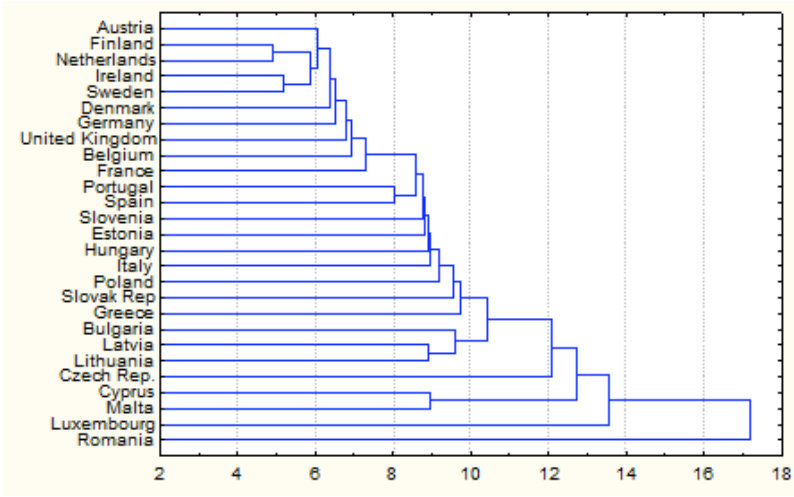

Figure 4: Grouping of European Union Countries based on the similarities of institutional systems based on Ward method with Manhattan distance for the year 2000.

Source: own elaboration based on Fraser Institute data base (see Gwartney *et al.*, 2010).

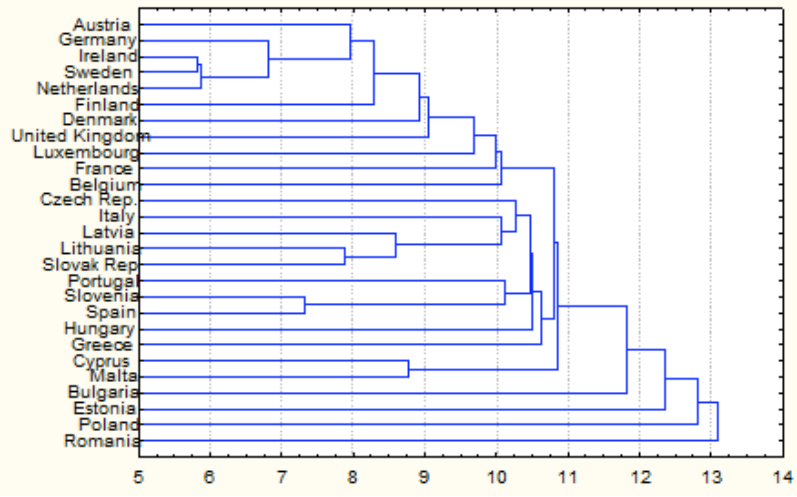

Figure 5: Grouping of European Union Countries based on the similarities of institutional systems based on Ward method with Manhattan distance for the year 2004.

Source: own elaboration based on Fraser Institute data base (see Gwartney *et al.*, 2010).

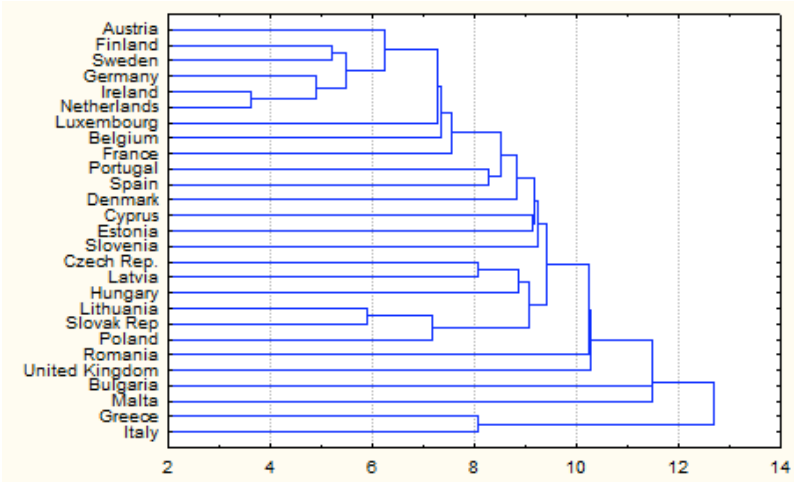

Figure 6: Grouping of European Union Countries based on the similarities of institutional systems based on Ward method with Manhattan distance for the year 2008.

Source: own elaboration based on Fraser Institute data base (see Gwartney *et al.*, 2010).

Table 3: The Separate Clusters for the Year 2000, 2004 and 2008

2000	2004	2008	2000	2004	2008
Euclidean Distance			**Manhattan Distance**		
Cluster I	**Cluster I**	**Cluster I**	**Cluster I**	**Cluster I**	**Cluster I**
Austria	Austria	Austria	Austria	Austria	Austria
Ireland	Finland	Ireland	Finland	Germany	Finland
Sweden	Ireland	Netherland	Netherlands	Ireland	Sweden
Belgium	Sweden	Germany	Sweden	Sweden	Germany
Germany	Luxemburg	Finland	Denmark	Netherlands	Ireland
Finland	France	Sweden	Germany	Finland	Netherlands
Netherland	Germany	Luxemburg	UK	Denmark	Luxemburg
Denmark	Netherland		Belgium	UK	Belgium
UK	Denmark		France	Luxemburg	France
	UK			France	Portugal
				Belgium	Spain
					Denmark
					Cyprus
					Estonia
					Slovenia
Cluster II	**Cluster II**	**Cluster II**	**Cluster II**	**Cluster II**	**Cluster II**
Bulgaria	Belgium	Cyprus	Slovenia	Czech Rep;	Czech Rep.
Latvia	Italy	Estonia	Estonia	Italy	Latvia
Slovak Rep	Portugal	Denmark	Hungary	Latvia	Hungary
Lithuania	Slovenia		Italy	Lithuania	Lithuania
Romania	Spain		Poland	Slovak Rep.	Slovak Rep.
			Slovak Rep.		Poland
			Greece		
Cluster III	**Cluster III**	**Cluster III**	**Cluster III**	**Cluster III**	**Cluster III**
Cyprus	Cyprus	Belgium	Bulgaria	Portugal	Greece
Malta	Malta	France	Latvia	Slovenia	Italy
Luxemburg	Greece	Portugal	Lithuania	Spain	
	Poland	UK			
		Slovenia			
		Spain			
		Czech Rep.			
		Latvia			
		Hungary			
Cluster IV	**Cluster IV**	**Cluster IV**	**Cluster IV**	**Cluster IV**	
Czech	Bulgaria	Malta	Cyprus	Cyprus	
Greece	Romania		Malta	Malta	
Poland					

(Table 3). Continued.

Estonia	Cluster V	Cluster V	Separate Clusters	Separate Clusters	Separate Clusters
Spain	Czech	Bulgaria	Czech Rep.	Hungary	Romania
Hungary	Hungary	Lithuania			
France	Estonia	Poland	Luxemburg	Greece	UK
Portugal	Latvia	Slovenia			
Italy	Lithuania	Greece	Romania	Bulgaria	Bulgaria
Slovenia	Slovak Rep.	Italy			
		Romania		Estonia	Malta
				Poland	
				Romania	

Source: own elaboration based on Fraser Institute data base (see Gwartney *et al.*, 2010).

Table **3** presents the separate clusters for the year 2000, 2004 and 2008 for both methods with Euclidean and Manhattan distance.

CONCLUSIONS

The empirical research based on hierarchical taxonomic clustering procedures with Ward's method confirms the presence of institutional integration processes in the countries of the European Union in relation to institutional economic order. Already at the stage of the information validity of potential variables analysis one can indicate evidence of growing institutional integration of the EU countries. It could be seen in decreasing volatility and increasing correlation of some diagnostic variables that has got stronger since 2004. Similar conclusions can be drawn from a cluster analysis for the years 2000, 2004 and 2008. For example, in case of research with Euclidean distance in 2000, one will find that with the exception of France and Italy, leading economies of the EU and candidate countries into the EU formed separate homogeneous clusters. Analysis for the year 2004 in the case of the so-called "new member" countries participating in the process of European integration one could see a clear distinction between the countries joining the EU this year, and Romania and Bulgaria which have been incorporated into the Union three years later. For the year 2008, this division has not occurred any more, but there was a new cluster grouping such countries as Belgium, France, Portugal, Spain, United Kingdom, and Czech Republic, Latvia or Hungary. The analysis with Manhattan distance leads to similar conclusions.

It should be also noted that despite the institutional integration processes in the analyzed period, one can still point to a fairly homogeneous group of countries in relation to the institutional support of potential highly competitive global economy, which in all three annualized years and basically in case of both methodological approaches were always grouped in the first cluster, such as Austria, Ireland, the Netherlands, Germany, Finland and Sweden. This can be explained by the fact that serious institutional changes especially in case of informal rules, which can still significantly influence formal institutions, the serious reforms and changes usually take quite a long time.

REFERENCES

Acs, Zoltan. 2006. "How Is Entrepreneurship Good for Economic Growth?" Innovations. Winter. http://dx.doi.org/10.1017/CBO9780511510816

Ardagna, Silvia and Annamaria Lusardi. 2008. "Explaining International Differences in Entrepreneurship: the role of Individual Characters and Regulatory Constraints". NBER Working Papers Series, Working Paper 14012, May;

Atkinson, Robert D and Daniel K. Correa. 2007. "The 2007 State New Economy Index. Benchmarking Economic Transformation in the States". Kauffman Foundation, The Information Technology and Innovation Foundation, February.

Balcerzak, Adam P. and Rogalska Elżbieta. 2010. "Government's Effectiveness in Creating Institutional Conditions for Entrepreneurship in Central and Eastern Europe in the Years 2004-2010"in: Policies for Improving Growth Potential: International Perspective, edited byAadam P. Balcerzak. Toruń: Nicolaus Copernicus Publishing House.

Balcerzak, Adam P. 2009. Państwo w realiach "nowej gospodarki". Podstawy efektywnej polityki gospodarczej w XXI wieku. Toruń: Wydawnictwo Adam Marszałek, Toruń.

Balcerzak, Adam P. 2009."Wpływ działalności regulacyjnej państwa w obszarze kreowania ładu konkurencyjnego na rozwój nowej gospodarki"in Aktywność regulacyjna państwa a potencjał rozwojowy gospodarki, edited by A.P. Balcerzak and Michał Moszyński. Toruń: Polskie Towarzystwo Ekonomiczne Oddział w Toruniu.

Balcerzak, Adam P. 2009, "Structure of Financial Systems and Development of Innovative Enterprises with High Grow Potential" in Global Challenges and Politics of the European Union - Consequences for the "New Member States, edited byM. Piotrowska and L. Kurowski. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, nr 59. Wrocław: Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu.

Doing Business 2011. Making Difference for Entrepreneurs.2010.The International Bank for Reconstruction and Development / The World Bank, Washington.

Everitt Brian S., Dunn Graham. 2001. Applied Multivariate Data Analysis. London: Wiley.

Everitt Brian S., Landau Sabine, Leese Morven. 2011. Cluster Analysis. London: Wiley.

Gwartney, James and Joshua Hall and Robert Lawson. 2010. Economic Freedom of the World 2010 Annual Report. Fraser Institute.

Holcombe, Randall G. 1998, "Entrepreneurship and Economic Growth" Quarterly Journal of Austrian Economics 2.

Okoń-Horodyńska, Ewa and Rafał Wisła, eds. 2009. Kapitał intelektualny i jego ochrona, Warszawa: Instytut Wiedzy i Innowacji.

Milligan, Glenn W. and Cooper Martha C. 1987. "Methodology Review: Clustering Methods." Applied Psychological Measurement 11(4). http://dx.doi.org/10.1177/014662168701100401

North, Douglas C. 1994. "Economic Performance through Time" American Economic Review 84(3).

North, Douglas C. 1993, "Institutions, Transactions Cost and Productivity In The Long Run" Economic History 9309004, Ecin WPA, http://ideas.repec.org/e/prio11.html (28.03.2007).

Piech, Krzysztof. 2009. Wiedza i innowacje w rozwoju gospodarczym: w kierunku pomiaru i współczesnej roli państwa. Warszawa: Instytut Wiedzy i Innowacji.

Pietrucha, Jacek. 2008. Ramy instytucjonalne polityki pieniężnej – teoria i pomiar. Katowice: Wydawnictwo Akademii Ekonomicznej w Katowicach.

Ostasiewicz, Walenty ed. 1998. Statystyczne metody analizy danych, Wrocław: Wydawnictwo Akademii Ekonomicznej im. OskaraLangego.

Stel, Andre and David Storey and A. Roy Thurik. 2007. "The Effect of Business Regulations on Nascent and Young Business Entrepreneurship" Small Business Economics 28(2). http://dx.doi.org/10.1007/s11187-006-9014-1

Strzała, Krystyna and Tomasz Przechlewski. 1995. Ekonometria inaczej. Gdańsk: Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk.

Willliamson, Oliver. 2000. "The New Institutional Economics: Taking Stock, Looking Ahead", Journal of Economic Literature XXXVIII.

Zeliaś, Aleksander ed. 2000. Taksonomiczna analiza przestrzennego zróżnicowania poziomu życia w Polsce w ujęciu dynamicznym. Kraków: Wydawnictwo Akademii Ekonomicznej.

Received on 21-02-2013 Accepted on 22-04-2013 Published on 07-05-2013

DOI: http://dx.doi.org/10.6000/1929-7092.2013.02.11