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SOCIAL-ECONOMIC DIMENSION OF GLOBALISATION AND INCOME INEQUALITY

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Abstract

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Globalization is a broad concept casually used to describe a variety of phenomena of countries. However, there is no universally accepted definition and neither standard measurement for globalization nor social dimension of globalization. Many attempts have been made to measure globalization. Authors introduce single indices – economic and social globalization index and index for progress in reducing income inequality as fuzzy membership functions. Authors analyse the dependence of the new indices. Authors create clusters of similar EU countries in the view of these two indices with the help of fuzzy c-cluster analysis. The result is two clusters of states – original EU countries, newly associated and four states – Greece, Portugal, Slovenia a Malta turned out as not decided.

Keywords: globalization, income inequality, fuzzy c-cluster analysis, cohesion policy, EU

INTRODUCTION

Centres of globalization are major cities where cultural differences diminished and are still diminishing. These cities (e.g. Berlin, Paris, London, New York) are called melting pots. Immigration is also part of globalization, both in Europe and North America. The reason for migration is primarily a vision of better life. It heads to places with high purchasing power, developed economy and busy traffic. OECD (the Organization for Economic Co-operation and Development) defines globalization as a process, as a result of which markets and production in different countries are becoming more and more dependent on each other, thanks to the dynamics of goods trading, services and the mobility of capital and technology.

Globalization is often divided into three categories: economic, political and social. Though all three are interdependent, economic and political forces are usually the driving factors of globalization, while social changes generally occur as a result of those activities. Social globalization pertains to human interaction within cultural communities, encompassing topics like family, religion, work and education, Datko stated (see also Rašticová, Kolářová, 2015; Rašticová *et al*., 2015).

The history of the globalization of its borders, as well as globalization as a political instrument are presented by Weiss (2000). Polasek and Sellner (2013) deal with globalization at the NUTS 2 level in 27 EU countries. By economic globalization they mean an increase in economic integration and interaction between countries. They agree with the definition of globalization by Clark (2000). Polasek and Sellner (2013) establish the extent of globalization, integration and technology transfers to regions at the NUTS 2 level and consider the openness of trade as a condition for peaceful globalization WEF (World Economic Forum) defines globalization as a process supported by the development of communication systems, transportation systems and global capital transfers, creating "company networks" as a result

of the digital revolution. Cappelen *et al.* (2003), Puigcerver-Penalver (2007) and Becker *et al.* (2010) found a significant association between the use of Structural Funds and GDP growth.

Basic stimuli of globalization are new technologies, market liberalization, trans-national corporations, a combination of technological progress, lower transport costs and policy liberalization in the European Union and beyond led to intensified trade and financial flows between countries, which have important implications for the functioning of the country's economy, not only EU (Rašticová, Konečný, 2014).

The growing international economic integration, which is commonly known by the term globalization, offers many opportunities. Businesses, not only in the EU, are gaining easier access to new and expanding markets, as well as to sources of finance and technology. Consumers in developed economies have access to greater variety of goods at lower prices.

But the public often associates globalization with job losses, decreasing wages and worsening of working conditions. These worries are based on fears from increasing competition from low cost countries, which exerts pressure on local producers and workers and it may result in the closure or partial closure of local businesses and their subsequent transfer abroad. Additionally, it could be stated that the recent world economic crisis unprecedentedly hit the business sectors especially in the countries of Eurozone periphery, namely in Greece, Ireland, Portugal or Spain (Vavřina, Lacina, 2014). Finding an adequate response to globalization may be perceived as part of general policy challenges within dynamic economies – i.e. to successfully cope with structural economic changes.

Globalization, an integration of economic activities in the world through the development of international trade and investment, is certainly one of the most important trends in the current global economy. International organizations and many economists argue that globalization promotes economic growth and poverty reduction. However, there is a widespread critic that economic performances of globalization are disappointing. It is argued that the growth effects of globalization are not evident though international trade may be better than financial globalization. Recently, the effect of globalization on income inequality has caught the attention of many researchers. There is a growing concern that globalization may worsen income distribution and hinder poverty alleviation. Given the debates, it is crucial to develop more extensive and comprehensive analysis of the effects of globalization on income inequality and poverty (Kang-Kook Lee, 2015).

The conceptualization and measurement of poverty have been the subject of intense study for more than a century. The adoption of the Millennium Development Goals (MDGs) in 2000 gave additional stimulus to these longstanding efforts, this time at the global level, and the progress made towards reducing world poverty is encouraging (Christiaensen, Shorrocks, 2012). When inequality in some distribution is a concern because it is an injustice, the choice of the relevant comparisons and measures of this inequality is an issue that belongs to the field of social ethics (Serge-Christophe Kolm, 2011). Authors know that distribution and inequality affect society's ability to convert income into welfare (Herzer, Vollmer, 2012).

The evolution of earnings and income inequality in developed countries over the last few decades is one of the most extensively researched topics in economics (Aaberge, Mogstad, 2011).

Globalization and inequality are topics which are often debated in the literature. Globalization provides advantages and opportunities for economic growth. Does the growth process have an impact on inequality? Does the distribution of income and wealth among agents determine aggregate growth? Or are both endogenous outcomes of the economic system, subject to common influences with respect to structural changes as well as macroeconomic policies (García-Peñalosa, 2010).

The challenge for economic policy is to transform the potential positives of globalization into real gains while minimizing the social costs. Gajdoš (2002) highlighted the fact that poverty, regardless of its definition, is a serious problem also in economically most developed countries. Here, a person can become poor without his own fault, because poverty has become a structural phenomenon. With the falling role of certain sectors in the economic structure of the state, part of the population may become poor, no matter if self-inflicted or not. Another reason is that these countries are attractive for people from poor countries, but citizens of those developed countries are considering immigrants inferior, not equal. Williamson and Lindert (1985) created a purely economic model explaining the downward trend in inequality in the United States and Great Britain. Soderberg (1991) points more on variations in inequality in Sweden as a process of increasing inequality. Dumke in Brenner, Y.S., Kaelble, H., and Thomas, M. (1991) identified the causes of rising income inequality in Prussia in the period of industrialization. According to him, the inequality is more dependent on capital than on a variety of skills. Inequality is often regarded as a necessary evil that must be tolerated in order to maintain growth (Clarke, 1992).

There are opinions that inequality is necessary for the accumulation of wealth, and contains the cores of eventual increase of income. Others argue that inequality slows down growth because increased inequality leads to bigger conflict over issues relating to the distribution, thus promoting just more economic intervention and higher taxes. Stehlikova (2012) notes that the occurrence of poverty in strong and developed economies may be a signal of failure of management and governance in the society. Therefore, many people are trying to name this

problem and find an explanation, solution to this problem, or at least find relevant preventive tools. The issue of examining the dependence of poverty and income inequality from other indicators is difficult and complicated. There is no economic theory which would be generally accepted. Dreher (2006) concludes that to globalize the economies of poor countries in order to achieve economic growth and reduce poverty is not sufficient. Goldberg and Pavcnik (2007) give an overview of the impact of globalization on income inequality. They identify a significant effect of reducing income inequality due to changes in the countries' trade policy. Beer and Boswell (2001) also examined the impact of globalization on income inequality.

MATERIAL AND METHODS

A linguistic variable is a variable with values that are words or sentences in natural languages. Fuzzy sets are used to express the contents of a linguistic variable Klir (1995). The attributes – descriptors of suitable income inequality, required economic and social globalization – can be understood to be linguistic variables. We introduce new single indices for social globalization and income inequality – as values of the fuzzy membership function.

Consider the crisp set A of the universe U. The fuzzy set A is defined by a set of ordered pairs, a binary relation $A = \{(x, \mu_A(x)) : x \in A, \mu_A(x) \in \langle 0,1\rangle\}$, where $\mu_A(x)$ is a function $\mu_A(x) : \mathrm{U} \longrightarrow \langle 0,1\rangle$ called membership function. The value $\mu_A(x)$ is the grade of membership of x to A. The value $\mu_A(x)$ specifies the grade or degree to which any element x in U belongs to the fuzzy set A. Larger values of $\mu_A(x)$ indicating higher degrees of membership. Fuzzy numbers are special cases of fuzzy sets. The trapezoidal fuzzy number $A_{(a^1,b^1,b^2,a^2)}$is defined by membership function

$$\mu_A(x) = \begin{cases} \dfrac{x-a_1}{b_1-a_1}, a_1 \le x \le b_1, \\ 1, b_1 \le x \le b_2, \\ \dfrac{x-a_2}{b_2-a_2}, b_2 \le x \le a_2, \\ 0, \text{otherwise.} \end{cases} \quad (1)$$

A linguistic variable is a quintuple (v, T, X, G, M), where v is the name of the variable, T is a set of natural language terms from which v can be taken on its values, X is a universe set, a common set on which the fuzzy sets corresponding to the linguistic variable are defined, G is the a context free grammar, syntactic grammar which produces terms in $T(x)$, M is the semantic rule which maps terms in $T(x)$ to fuzzy sets in X. M assigns to each linguistic term $t \in T$ its meaning M(t), which is a fuzzy set on X. A new index of social globalization is the value of membership function (the meaning) of the linguistic term.

The shape of the linguistic terms are generated by certain accepted membership functions – piecewise linear functions (with restrictions), Gaussians or Sigmoids are almost exclusively used. (Garibaldi, John, 2003). The certain theoretically sound motivation behind the common use of triangular (and trapezoidal) membership functions is in Pedrycz (1994). In this note we look at a certain theoretically sound motivation behind the common use of triangular (and trapezoidal) membership functions.

The minimum and the maximum are also basic aggregation operators. The minimum gives the smallest value of a set, while the maximum gives the greatest one. They do not give a representative "middle value", but they can be very meaning full in different contexts.

The simplest and most common way to aggregate is to use a simple arithmetic mean (also known as the average).This operator is interesting because it gives an aggregated value that is smaller than the greatest argument and bigger than the smallest one.

Other aggregation operators find the median, the minimum and the maximum, as well as some classical generalizations like the weighted mean and the k-order statistics. There are the quasi-arithmetic means, a large useful family built on a transformation of average operator (Dubois, Prade 1985; Detyniecki, 2001).

The most visible form of inequality is wealth and income. The income we understand as a financial amount of money, which an individual gains with a certain periodicity for his/her activities, usually performed in the labour market or in a certain relation with this labour market. There are two common ways how to measure the income inequality in the EU: with the ratio S80/S20. The ratio S80/S20 is the ratio of overall income of 20 % population in the country with the highest income to the income of 20 % of the country population with the lowest income) and coefficient Gini. To understand both ways of measurement can be demanding. At the same time they are characterised by certain basic drawbacks when picking the exact picture of inequality. Gini coefficient takes into consideration the overall distribution of incomes, while the ratio S80/S20 examines only top and bottom. It is a technical formula, which identifies a relation between a cumulative share of population ordered according to the level of income and cumulative share of the overall sum, which they receive. In the case of perfect equality (i.e. if each person would receive the same income), this coefficient would be 10 %. If the gross national income was in the hands of the only person, then the coefficient would present 100 %. The higher the coefficient is, the bigger is inequality of income distribution in the country. Gini coefficient is also twofold of the area between the lines of absolute equality and Lorenz curve.

Income inequality in the paper is evaluated using the Gini coefficient. The Gini coefficient is defined as the relationship of the cumulative shares of the population arranged according to the level of equalized disposable income, to the cumulative share of the equalized total disposable income received by them. The higher the value of Gini coefficient, the higher the inequality of income distribution in society.

A C-fuzzy cluster analysis was used to create clusters of similar countries in terms of fuzzy income inequality and new indices of globalization. The subject of cluster analysis is the classification of objects into categories. For a given finite set of data the problem of clustering is to find cluster centres that properly characterize classes. Let $Z = \{z_1, z_2, \ldots, z_n\}$ be a set of data. The fuzzy c partition of Z is a family $\wp = \{P_1, P_2, \ldots, P_c\}$, of fuzzy subsets of Z, for which $\Sigma P_i(z_k) = 1$, $P_i(z_k) \geq 0$, for all z_k,k = 1, 2, ..., n, i = 1, 2, ..., c. The cluster centres associated with the partition are calculated by the formula:

$$t_i = \frac{\sum_{k=1}^{n} \left[P_i(z_k)\right]^m x_k}{\sum_{k=1}^{n} \left[P_i(z_k)\right]^m}, \tag{2}$$

i = 1, 2, ..., c, where $m > 1$. We use $m = 2$. The smaller value of the Bezdek index

$$J_m(\wp) = \sum_{k=1}^{n} \sum_{i=1}^{c} \left[P_i(z_k)\right]^m \left\| \mathbf{z}_i - \mathbf{t}_i \right\|^2, \tag{3}$$

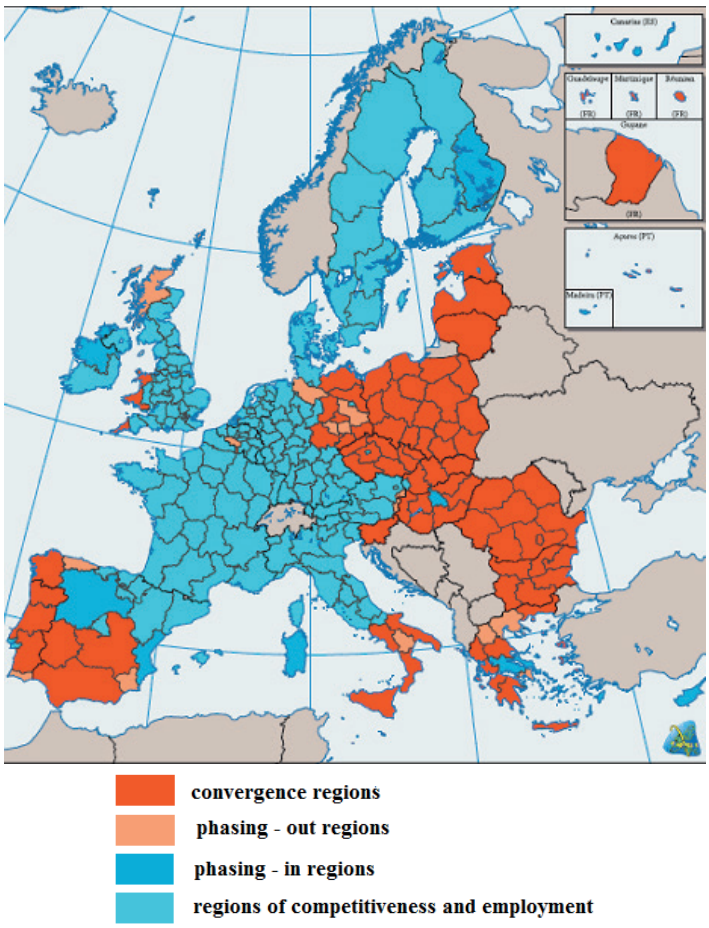
where $\| \ \|$ is an inner product induced norm, indicates the better fuzzy c partition $\wp$.

All data comes from Eurostat's public database. Analysed data are from years 2007–2013.

RESULTS AND DISCUSSION

According to cohesion policy there are the three principle funds. The EU's cohesion policy for 2014–20 has 11 thematic objectives, which are covered by three principal financial tools that have been set up to implement the regional policy within the EU. The first two of these are known as structural funds, while the cohesion fund is intended for those Member States whose GDP per capita is less than 90 % of the EU average (Fig. 1).

The European Regional Development Fund (ERDF) concentrates its actions on innovation and research, the digital agenda, support for small and medium-sized enterprises (SMEs), and the low-carbon economy. The resources allocated to each of



1: *Cohesion policy 2007–2013*

I: *Indicative Financial Allocations: 2007–2013*

Country	National	Convergence Objective		Total EU Regional Funds			
	GDP per head, €, 2005	Million €	€ per head in recipient regions	Million €	€ per head in recipient country	Share of GDP %	Share of total regional funds %
Bulgaria	7.913	5,888	753	6.047	768	3.15	2.0
Romania	7.933	16,912	778	17.316	795	3.00	5.6
Latvia	11.180	4.010	1.725	4.090	1.749	3.52	1.3
Poland	11.482	59.048	1.546	59.698	1.562	3.43	19.4
Lithuania	11.914	5.999	1.737	6.096	1.757	3.42	2.0
Slovak Republic	13.563	9,663	1.796	10.264	1.904	3.30	3.3
Estonia	14.093	3,011	2,221	3,058	2,247	3.31	1.0
Hungary	14.393	20.243	1.998	22.451	2.210	3.22	7.3
Portugal	16.891	18.316	1.750	19.147	1.847	1.82	6.2
Czech Republic	17.156	22.979	2.252	23.698	2.323	3.25	7.7
Malta	17.330	747	1.878	761	1,922	2.35	0.2
Slovenia	19.462	3.646	1.827	3.739	1.874	1.70	1.2
Cyprus	20.753	193	265	580	812	0.56	0.2
Greece	21,589	17.447	1.585	18.217	1.658	1.34	5.9
Spain	23.069	23,411	1.566	31.536	778	0.49	10.2
Italy	23.474	19.255	1.112	25.647	449	0.25	8.3
Germany	25.797	14,323	933	23.449	284	0.14	7.6
France	25.077	2.838	1.623	12.736	208	0.10	4.1
Finland	25.774	0	0	1.533	295	0.13	0.5
United Kingdom	26.715	2.594	949	9.468	160	0.07	3.1
Belgium	27,135	579	452	2.020	195	0.09	0.7
Sweden	27.721	0	0	1.682	188	0.08	0.5
Denmark	28.375	0	0	545	101	0.04	0.2
Austria	28.852	159	568	1.301	161	0.07	0.4
Netherlands	29.374	0	0	1.697	105	0.05	0.6
Ireland	32.197	0	0	815	207	0.06	0.3
Luxembourg	59.202	0	0	58	130	0.02	0.0

Source: UK Parliament Website, 2016

these priorities depends on upon the region — for example, in more developed regions, at least 80 % of any funding should focus on at least two of these priorities, whereas in less developed regions this share falls to 50 %.

The European Social Fund (ESF) aims to improve employment and education opportunities, as well as the situation of the most vulnerable people, for example, those at risk of poverty. During the period 2014–20 the ESF will focus on supporting four thematic objectives: promoting employment and supporting labour mobility; promoting social inclusion and combating poverty; investing in education, skills and lifelong learning; enhancing institutional capacity and an efficient public administration. *The Cohesion Fund* supports investment in the environment, trans-European networks and other infrastructure projects, through a focus on the following areas: the shift towards a low-carbon economy; promoting climate change adaptation and risk prevention; preserving and protecting the environment and promoting resource efficiency; promoting sustainable transport and removing key bottlenecks in network infrastructures; enhancing institutional capacity. It is subject to the same rules of programming, management and monitoring as the ERDF and ESF.

The higher growth and more jobs for all regions and towns of the European Union are the core of cohesion policy for the period 2007–2013. European cohesion policy is proposed to bring concrete results, supported economic and social cohesion and to lower the difference between the levels of development in various regions. It brought value added to activities from the base as it invests into concrete projects. The main idea is modernisation of our regions so that they could be a driving force and competitiveness.

The Structural Funds and the Cohesion Fund are financial tools set up to implement the regional

II: *Membership function values for share of total EU Regional Funds of GDP*

Country	Share of GDP %	Membership function for a share of total EU Regional Funds of GDP
Austria	3.15	0.0175
Belgium	3.00	0.0200
Bulgaria	3.52	0.8943
Cyprus	3.43	0.1543
Czech Republic	3.42	0.9229
Denmark	3.30	0.0057
Estonia	3.31	0.9400
Finland	3.22	0.0314
France	1.82	0.0229
Germany	3.25	0.0343
Greece	2.35	0.3771
Hungary	1.70	0.9143
Ireland	0.56	0.0114
Italy	1.34	0.0657
Latvia	0.49	1.0000
Lithuania	0.25	0.9714
Luxembourg	0.14	0.0000
Malta	0.10	0.6657
Netherlands	0.13	0.0086
Poland	0.07	0.9743
Portugal	0.09	0.5143
Romania	0.08	0.8514
Slovak Republic	0.04	0,9371
Slovenia	0.07	0.4800
Spain	0.05	0,1343
Sweden	0.06	0,0171
United Kingdom	0.02	0,0143

Source: Own calculations based on Eurostat database

policy of the European Union. They aim to reduce regional disparities in terms of income, wealth and opportunities. A country that does not need funding from the Structural Funds will be regarded as globalized from the economic and social point of view. A smaller proportion of the Structural Funds on GDP means that the country is more economically and socially globalized.

Let be share of total EU Regional Funds of GDP (%) in the country *i*. We define the linguistic variable of economic and social globalization on universe (0, 4). The maximum of share is 3.52 (Latvia). The primary term is "required". The semantic rule is M (required) = $\{(x, \mu_{\text{required}}(x)): x \in (0, 4)\}$, where

$$\mu_{required}(x) = \begin{cases} 1, & 0 \le x \le \min, \\ \dfrac{x - \max x_i}{\min x_i - \max x_i}, & \min x_i \le x \le \max x_i, \\ 0, & \text{otherwise.} \end{cases} \quad (4)$$

Income inequality measured by the Gini coefficient is falling in EU countries during the reporting period 2007–2013. Also the maximum value of the Gini coefficient decreased from 37.8 (Romania) in 2007 to 22.7 (Slovenia) in 2009. The smallest difference of the Gini coefficient in the years 2013 and 2007 is –3.8 in Romania. The least favourable is the case of France, where the difference is +3.5 and presents a growth in income inequality. The effectiveness of cohesion funds we quantify with the difference between Gini coefficient in the year 2013 and Gini coefficient in the year 2007.

III: *Membership function values for progress in reducing income inequality*

Country	2007	2008	2009	2010	2011	2012	2013	difference 2013-2007	membership function for progress in reducing income inequality
Austria	26.2	27.7	27.5	28.3	27.4	27.6	27.0	0.8	0.4000
Belgium	26.3	27.5	26.4	26.6	26.3	26.5	25.9	-0.4	0.5500
Bulgaria	35.3	35.9	33.4	33.2	35.0	33.6	35.4	0.1	0.4875
Cyprus	29.8	29.0	29.5	30.1	29.2	31.0	32.4	2.6	0.1750
Czech Republic	25.3	24.7	25.1	24.9	25.2	24.9	24.6	-0.7	0.5875
Denmark	25.2	25.1	26.9	26.9	27.8	28.1	26.8	1.6	0.3000
Estonia	33.4	30.9	31.4	31.3	31.9	32.5	32.9	-0.5	0.5625
Finland	26.2	26.3	25.9	25.4	25.8	25.9	25.4	-0.8	0.6000
France	26.6	29.8	29.9	29.8	30.8	30.5	30.1	3.5	0.0625
Germany	30.4	30.2	29.1	29.3	29.0	28.3	29.7	-0.7	0.5875
Greece	34.3	33.4	33.1	32.9	33.5	34.3	34.4	0.1	0.4875
Hungary	25.6	25.2	24.7	24.1	26.9	27.2	28.3	2.7	0.1625
Ireland	31.3	29.9	28.8	30.7	29.8	29.9	30.0	-1.3	0.6625
Italy	32.0	31.2	31.8	31.7	32.5	32.4	32.8	0.8	0.4000
Latvia	35.4	37.5	37.5	35.9	35.1	35.7	35.2	-0.2	0.5250
Lithuania	33.8	34.5	35.9	37.0	33.0	32.0	34.6	0.8	0.4000
Luxembourg	27.4	27.7	29.2	27.9	27.2	28.0	30.4	3.0	0.1250
Malta	26.3	28.1	27.4	28.6	27.2	27.1	27.9	1.6	0.3000
Netherlands	27.6	27.6	27.2	25.5	25.8	25.4	25.1	-2.5	0.8125
Poland	32.2	32.0	31.4	31.1	31.1	30.9	30.7	-1.5	0.6875
Portugal	36.8	35.8	35.4	33.7	34.2	34.5	34.2	-2.6	0.8250
Romania	37.8	36.0	34.9	33.3	33.2	33.2	34.0	-3.8	0.9750
Slovak Republic	24.5	23.7	24.8	25.9	25.7	25.3	24.2	-0.3	0.5375
Slovenia	23.2	23.4	22.7	23.8	23.8	23.7	24.4	1.2	0.3500
Spain	31.9	32.4	32.9	33.5	34.0	34.2	33.7	1.8	0.2750
Sweden	23.4	24.0	24.8	24.1	24.4	24.8	24.9	1.5	0.3125
United Kingdom	32.6	33.9	32.4	32.9	33.0	31.3	30.2	-2.4	0.8000

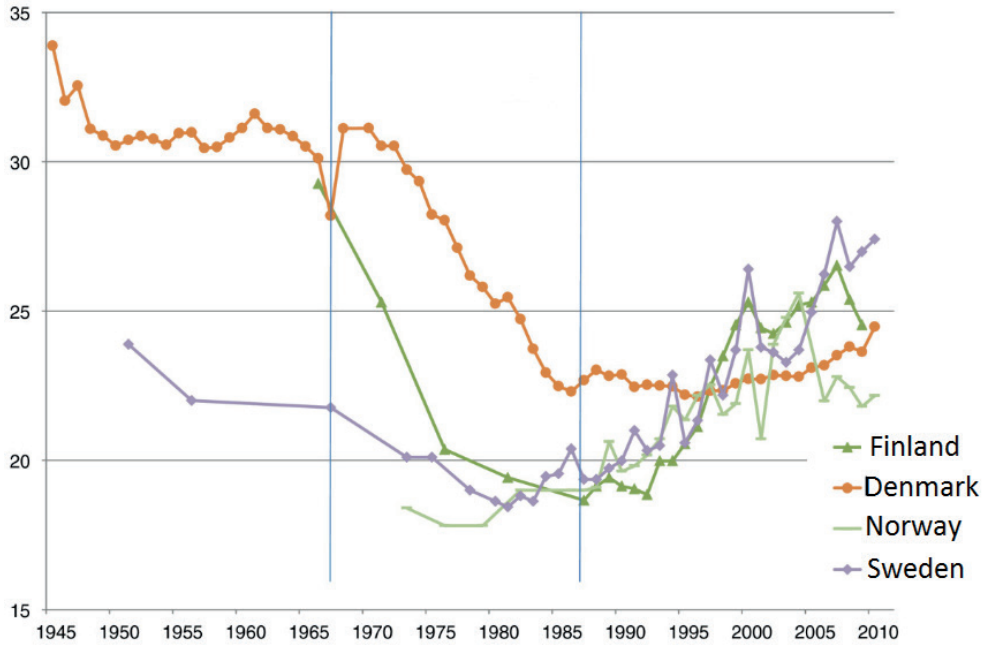
Source: Own calculations based on Eurostat database

The name of the linguistic variable is progress in reducing income inequality. In fuzzy modelling, we consider the negative values of the difference as good. It is given as a numerical value on universe $X = (-4, 4)$. The possible values for the linguistic variable are linguistic terms T (progress in reducing income inequality) = {very small, small, suitable, large, and very large}. The primary term is "suitable". The semantic rule is M (suitable) = $\{(x, \mu_{suitable}(x)): x \in (-4, 4)\}$, where

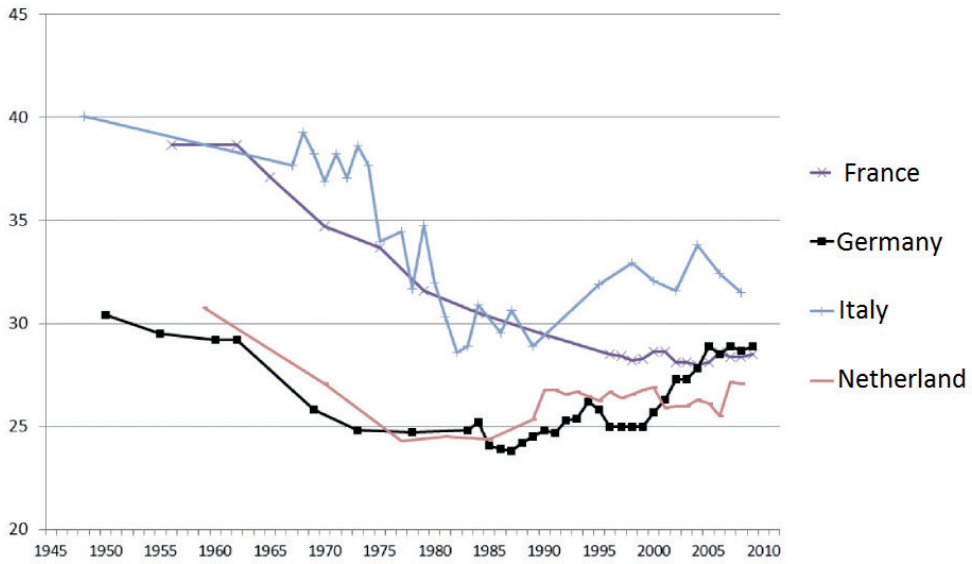
$$\mu_{suitable}(x) = \begin{cases} 1, & -4 \le x \le \min, \\ 1 - \dfrac{x - \max x_i}{\min x_i - \max x_i}, & \min x_i \le x \le \max x_i, \\ 0, & \textit{otherwise}. \end{cases} \quad (5)$$

Let us look back to the history. In the northern countries the Gini coefficient has declined since the end of the Second World War up to 1983. Then there is a growth almost at the same rate in Finland, Norway and Sweden. The increase in Denmark is slower. In the assessed period 2007–2013 the income inequality in Sweden and Denmark grew further. In Finland the decline was by 0.8. The Gini coefficient in 2013 reached the value about 25 per cent. Equally also in France, Netherland it comes to the decline in the income inequality since the end of the Second World War until round 1985. In Italy it was with lower, higher deviations. In France positive decline stopped and in the assessed period the increase of the Gini coefficient occurred by 3.5 to 30.1.

Decline in inequality is the product of tax and transfer policy. At this time, all the countries concerned operated highly progressive personal income taxes. There were progressive taxes on wealth, or on the transfer of wealth via inheritance. It was the time of the expansion of the welfare state, which meant that the safety net became more



2: *Income inequality development in the northern countries*
Source Atkinson, 2013

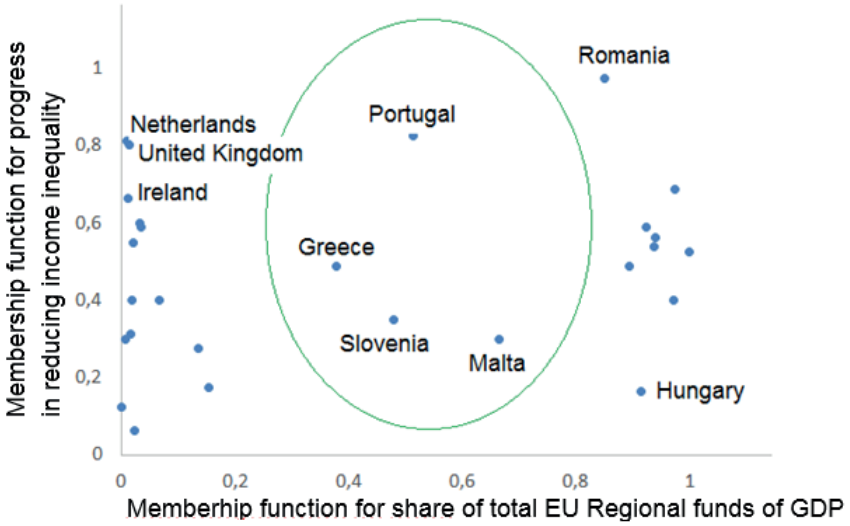


3: *Income inequality development in the selected old European countries*
Source: Atkinson, 2013

effective and that those at the bottom of the income distribution were able to share in rising prosperity, Akinson notes (2013).

Finally, we create clusters of countries with a similar level of globalization and income inequality (Fig. 4).

Two clusters were created. The first one consists of countries original EU15, where cohesion funds presented a very low share from the GDP of the country (The value of the affiliation function for the countries Luxemburg, Denmark, Netherlands, Ireland. United Kingdom, Sweden, Austria, France, Finland, Germany, Italy is lower than 0.1. In the case of Spain and Cyprus the values are 0.13 and 0.15. Progress in reducing income inequality was achieved in Netherlands (the affiliation function is 0.8125), United Kingdom (0.8000), also Ireland (0.6625) and Finland (0.6000) Germany (0.5875) and Belgium (0.5500). The second cluster is created with "newly associated" states. In 2007–2013 it came to a significant decline in income inequality in Romania (the affiliation value 0.9750). Other countries have the affiliation function value in the scope of 0.4000 (Lithuania) to 0.5875 (the Czech Republic) with



4: *Result fuzzy c of cluster analysis*
Source: Own calculations based on Eurostat database

the exception of Hungary, where the value is 0.1625, where the Gini coefficient increased. Ambivalent are seem to be the countries Greece, Slovenia, Portugal and Malta. In these countries the value of the affiliation function for the share of cohesion funds from the GDP is in the scope from 0.3771 to 0.6657. The decline of income inequality measured with the Gini coefficient occurred just in Portugal, but its value is high 34.2.

What will be the future like? Legislative package concerning regional policy in the overall value 336 billion euros is linked to the strategy Europe 2020 and its goals. In an effort to increase the effectiveness the Committee came with the proposal of the package of simple rules for five EU funds, i.e. the European Regional Development (ERDF). European Social Fund (ESF), Cohesion fund, the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF). This simplifying comes with the development of new regional architecture, implementation of distinguishing between three categories of regions, i. e: less developed regions (with the GDP per capita lower than 75 per cent of the European average), transitive regions (the GDP per capita between 75 and 90 per cent) and more developed regions (the GDP per capita more than 90 percent of the average). Such division still allows for richer countries to apply for structural funds. Those still go to those regions which need it most and have the biggest problems, but at the same time also transitive regions could have the access to Euro funds to support investments into innovations, energetic effectiveness, social cohesion and competitiveness. The Committee also harmonized several priorities with its strategy Europe 2020. In more developed regions the majority of investments will go to innovations, support of small and middle business, energetic effectiveness and sustainable sources, while in the least developed regions these priorities will be balanced with the ratio 50:50 or development in the field of employment, education and the poverty rate lowering.

CONCLUSION

In this paper authors use the apparatus of fuzzy sets introduced in a natural way, based on economic theories, the index of economic and social globalization. Finally, authors created clusters of countries with a similar level of globalization and income inequality. In the first cluster are economically and socially highly globalized countries with a relatively high income inequality, with an average trade globalization and lower financial globalization. The migration of the countries from one cluster to another can be explained by our model. This confirms its accuracy.

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