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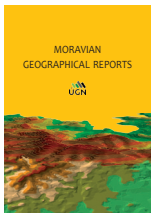

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Changes in the geographical distribution of youth poverty and social exclusion in EU member countries between 2008 and 2017

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Abstract

With respect to the fulfillment of the objectives of the Europe 2020 strategy, the threat of poverty and social exclusion has not been sufficiently reduced in the European Union (EU) over the past decade, and large regional disparities persist. Young people are the most affected by the problems of income poverty, material deprivation and labour market exclusion, which are the three dimensions of poverty and social exclusion. In this article, we focus on comparing the EU countries in terms of the three listed dimensions, while revealing similarities and differences in the incidence and severity of these social phenomena among youth. In addition to measuring dimensions by the currently used AROPE (at risk of poverty or social exclusion) rate, we also use a larger spectrum of relevant indicators for a more comprehensive analysis. While the AROPE aggregate indicator uses the same methodology for the population of young people as for the whole population, our approach includes indicators that are specific to young people. We assume that all dimensions affect each other, so we apply multi-dimensional statistical methods such as principal components and cluster analysis to analyse them. These methods have revealed that some dimensions affect poverty and social exclusion to a greater extent and others to a lesser extent than might appear to be the case, based on AROPE's partial rates. Moreover, we present quantified integral indicators that together with the results of the multivariate methods, provide a rather complex picture concerning the geographical distribution of poverty and social exclusion, as well as their dimensions in the EU, for the population of persons aged 18–24 years in 2008 and 2017.

Key words: *youth, poverty, social exclusion, principal component analysis, cluster analysis, Europe 2020 Strategy, European Union*

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1. Introduction

Poverty and social exclusion affect the health and well-being of many people and limit their opportunities to achieve their full potential. Without effective educational, health, social, tax-benefit and employment systems, the risk of poverty is passed on from one generation to the next. This causes poverty to persist, creating more inequality that can lead to the long-term loss of economic productivity from whole groups in society and hamper any inclusive and sustainable economic growth (Eurostat, 2018g, p. 104). Income poverty and social exclusion is a serious problem addressed by the Europe 2020 strategy, and social inclusion is one of the five key quantitative targets for smart, sustainable and inclusive growth. In the fight against poverty and social exclusion, however, one item with the least progress has been made so far in the Europe 2020 strategy, and regional disparities have not been reduced either (Eurostat, 2019b, p. 9; Eurostat, 2019c). In this strategy, the European Union has set itself the goal of reducing the population at risk of poverty or social exclusion to 20 million, so that the EU population has not more than 95.908 million poor or socially excluded people (Atkinson et al., 2017, p. 47). Progress in achieving the above-mentioned key target is monitored by Eurostat through an aggregate indicator AROPE (the 'at risk of poverty or social exclusion' rate), combining three rates: the at-risk-of-poverty rate (AROP); the severe material deprivation rate (SMD); and the very low work intensity

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rate (VLWI). This three-dimensional concept of poverty and social exclusion, reflecting these three dimensions of income poverty, material deprivation and exclusion from the labour market, is used in this article as well.

The objective of the Europe 2020 strategy in the fight against poverty and social exclusion will no longer be met with certainty, which is confirmed by the fact that from the reference year 2008 to 2017, the AROPE rate has only decreased by 1.3 percentage points, and in the EU-27 and EU-28, there were 111.894 million, or 112.978 million Europeans at risk of poverty or social exclusion. In 2017, more than 1/5 of the EU population (22.4%) was at risk of poverty or social exclusion, and nearly 1/3 of them were simultaneously affected by two dimensions or even all three dimensions. The estimated population in the EU at risk of poverty in 2017 and/or severely materially deprived and/or living in households with very low work intensity, still exceeded the target threshold (approximately 96 million inhabitants) by over 15 million people. While there has been some progress in the entire population and also in the population of children under 18 and in the post-productive population, between 2008 and 2017 the proportion of people at risk of poverty or social exclusion in the population of young people aged 18–24 in the EU-27 increased by 0.9 percentage points, and in 2017 it was 29.1% (authors' calculation based on the database from Eurostat, 2020). Several authors, such as Camilleri and Camilleri (2016) and Pastore (2017), point to the unsatisfactory social inclusion of young Europeans, and to the difficulties in applying them to the labour market in relation to deficiencies in the education system. Publications that rely on official Eurostat statistics or national statistics classify young people as risky groups, as evidenced by the statement:

> "The most vulnerable groups appear to be the same across all three dimensions of poverty, inactive persons, single parents, households of only one person, people with low educational attainment, foreign citizens born outside the EU, and those residing in rural areas." (Eurostat, 2018g, p. 12).

Eurostat is currently using the above-mentioned three-dimensional concept (AROPE) to measure poverty and social exclusion. Despite the relatively broad spectrum of indicators characterising income poverty, material deprivation and labour market exclusion, the aggregate AROPE indicator, which assess these social phenomena comprehensively, using only three measures, provides only a partial picture of poverty and social exclusion. The aim of this research is to build a new integral indicator that will more comprehensively assess the poverty and social exclusion of young people in any year under review, with the individual dimensions of this multidimensional phenomenon captured by partial factors. Each factor will be based on a number of relevant indicators that characterise the incidence and depth of the respective dimension of poverty and social exclusion among young people. Such an approach will ensure that the partial factors will more comprehensively assess the dimension as one measure (AROP, SMD or VLWI), as used in the current concept. Based on such constructed factors using cluster analysis, the article will reveal similarities and differences in poverty and social exclusion of young people aged 18–24 in the EU area. As the fight against poverty and social exclusion is one of the priorities of the Europe 2020 strategy, through the above-mentioned factors and the integral indicator, we map the progress of EU countries in the various dimensions of the multidimensional phenomenon under review, from the Europe 2020 reference year (2008) up to the present (at the time of writing, the most recent available data was for 2017).

Based on this analysis, the European Union and its individual member states may identify the dimensions on which they should concentrate in the forthcoming period in the fight against poverty and social exclusion of young people (the most vulnerable age group), and thus contribute to the Europe 2020 strategy as well as to the current Agenda 2030.

2. Motivation and background

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, emphasises the urgency of intensifying social inclusion, mainly through its first objective: No Poverty. In addition, within its 17 Sustainable Development Goals, it pays particular attention to youth employment in the labour market. For example, the 4th Goal: Quality Education, aims, among other things, to increase the number of young people with the appropriate skills to adequately engage in the labour market, and the 8th Goal for Decent Work and Economic Growth, pays special attention to job creation for young people not in the area of education, employment and training in order to avoid being discouraged from finding a job. According to Eurostat (2018h), which assesses progress in achieving the EU's 2030 Sustainable Development Goals, the population of young people aged 18–24 was most at risk of poverty or social exclusion in 2016. In addition, the situation of young people aged 18–24 has deteriorated the most compared to other age groups since 2010. Chen et al. (2018) rated inequality and poverty across generations in the EU and found that the generation of young people was the most affected by poverty in the different geographical areas of the EU between 2007 and 2015, and was significantly higher in the 18–24 age group than in other age groups.

According to Eurostat (2018h) and Chung et al. (2012), young people are among the most vulnerable groups because they are more likely to face low employment rates and more job insecurity. Jobs for young people are important for their social, economic and political inclusion. Young people who are not in employment or in education and training (NEET), are mostly exposed to an even higher risk of not applying to the labour market and experiencing social exclusion. The intense relationship between NEETs and the risk of poverty and social exclusion in the young population in EU countries was confirmed by Ruesga-Benito et al. (2018). According to Eurostat (2018f), the general pattern is that the development of youth unemployment reflects the evolution of unemployment across the population, but younger people are often more affected by rising unemployment than older people. The employment of young people during the last decade has been significantly influenced by the financial and economic crisis and its consequences (Carcillo et al., 2015). As Bradford and Cullen (2014) point out, austerity measures and cuts during the financial and economic crisis have had a significant impact on youth policies, with negative consequences for poverty and social exclusion among young people. The most affected countries were in southern Europe (Poulou, 2014, p. 1163), which showed the highest youth unemployment rates (especially in Spain, Greece and Italy), the highest share of persons employed involuntarily on a part-time or temporary basis (Greece, Spain, Italy

and Cyprus), and the highest proportion of over-qualified young people (Spain, Cyprus, but also Ireland). Kretsos (2014) confirmed that drastic labour market and welfare state reforms in Greece during economic crises severely weakened the protection of young people from the risk of unemployment and other stressors. Soler et al. (2014) showed the dramatic impact on unemployment of the financial and economic crisis in Spain, while the disparities between the unemployment rate among young people and the population as a whole increased significantly – to the disadvantage of youth between 2009 and 2012.

According to Aassve et al. (2013), by far the worst prospects for reducing unemployment during the recession were young people aged 18–24. That is why, in 2013, all EU countries committed themselves to the Youth Guarantee Program, in which the European Council underlines the need to effectively improve the situation of NEETs and overcome the problem of youth unemployment in the EU (2013). It has to be said that, for example, according to the European Commission (2018), improvements have recently been made in the labour market, resulting in a significant decrease in the proportion of young people who are neither in employment nor in education or training (NEET).

As this article focuses on the geographical distribution of poverty and social exclusion among young people in the EU, two recent scientific articles (Pickard and Bessant, 2018; Skattebol and Redmond, 2019), dealing with a spatial analysis of the phenomena, must be acknowledged. Skattebol and Redmond (2019) found that young people who have grown up in poverty and especially in isolated suburbs, have limited access to out-of-school activities that could be beneficial for improving their communication skills, teamwork skills and other soft skills. Such social exclusion for geographic reasons significantly eliminates the possibility for young people to acquire new knowledge and skills. Pickard and Bessant (2018) noted that, due to the austerity measures during the recession, there was a disproportionate impact on particular demographic groups and especially young people. The authors have shown that greater exposure to the risk of poverty, material deprivation and youth unemployment in Eastern Europe, compared to the core of Europe, is associated with lower political participation by young people. The authors found that young people on the periphery of Europe (especially in Eastern Europe) tend to refrain from any involvement in political events. Therefore, poverty and the social exclusion of young people have a negative impact on decision-making processes in the democratic system.

These studies confirm that the issues of applying young people in the labour market and combating poverty and social exclusion among young people, are very timely, and they inspired us to analyse the incidence and severity of poverty and social exclusion of young people aged 18–24 in the EU geographical area in 2017, an a comparison to 2008.

Studies are increasingly appearing in the professional and scientific literature that do not assess the individual dimensions of poverty and social exclusion in isolation, but also assess their interaction. For example, relationships between household joblessness, income poverty and deprivation were analysed by de Graaf-Zijl and Nolan (2011), who found that the joblessness of households significantly affects the other two dimensions, although household labour intensity does not show a consistent pattern in groups of countries categorised together in terms of welfare regimes or in geographical terms. Income poverty in relation to material deprivation was also assessed by several authors: Guio and Maquet, 2006; Horáková et al., 2013; Labudová et al., 2010; Nolan and Whelan, 2010; and Želinský, 2010. The influence of labour market exclusion or low work intensity of households on poverty was demonstrated by Guagnano et al. (2013), Kis and Gábos (2016) and Mysíková et al. (2015). Ayllón and Gábos (2017) and Řezanková and Želinský (2014) confirmed the impact of very low work intensity and the joblessness of households on material deprivation in Central and Eastern Europe and the Czech Republic, respectively. The results of analyses presented by Šoltés et al. (2018), Šoltés and Ulman (2016), and Šoltés and Vojtková (2018) showed that there is a significant correlation between certain dimensions of poverty and social exclusion, such as income poverty, material deprivation and exclusion from the labour market.

The results of previous research have motivated us to consider the dimensions of poverty and social exclusion interdependently, and to analyse them comprehensively as part of a single phenomenon. Moreover, in the analyses presented in this article, we are not confining ourselves to the AROPE aggregate indicator and its sub-measures, but we also use other indicators to map and compare not only the incidence of income poverty and social exclusion, but also the depth of these negative phenomena in the young population in EU countries.

3. Data and methods

The research results presented in this article are based on timely and internationally comparable data that are publicly available on Eurostat's website. The geographical unit is a country, as most of the indicators are monitored or published by Eurostat for countries and, exceptionally, for territorial units broken down by classification NUTS2. In this article, a spatial as well as a temporal comparison of poverty and social exclusion of young people in the EU is presented. In order to make the results of the analyses for the years 2008 and 2017 comparable, in 2017 we do not consider Croatia, although since 2013 it is an EU member state. So, in both years we are observing the same group of EU-27 countries. The tools for analysis of the data are the multidimensional statistical methods outlined in Section 3.2.

3.1 Statistical data

The basic indicators mapping poverty and social exclusion in the EU include the above-mentioned partial indicators: AROP = at-risk-of-poverty rate; SMD = severe material deprivation rate; and VLWI = very low work intensity rate, making up the aggregate indicator AROPE, which maps "only" the occurrence of poverty and social exclusion, but not the depth of those negative phenomena. Therefore, we have decided to use some additional indicators that characterise the dimensions of poverty and social exclusion from different perspectives (including their severity). Such an approach should lead to the creation of a more objective and more complex picture of the observed phenomena. This dimension of poverty and social exclusion was captured in this project by the following indicators:

The dimension of Income poverty (IP)

- At-risk-of poverty rate after social transfers (Eurostat, 2018c) – AROP
- Persistent at risk of poverty rate (Eurostat, 2018c) – Persistent_P

- In work at risk of poverty rate (Eurostat, 2018a) – In-work_P
- Housing cost overburden rate (Eurostat, 2014a) – HC_ overburden

The dimension of Material deprivation (MD)

- Severe material deprivation rate (Eurostat, 2018d) – SMD
- Severe housing material deprivation rate (Eurostat, 2014c) – SHD
- Overcrowding rate (Eurostat, 2014b) – Overcrowd

The dimension of Labour market exclusion (LME)

- Unemployment rate (Eurostat, 2010) – UN
- Long-term unemployment rate (Eurostat, 2015) – Long_ UN
- Share of unemployment young adults living with their parents (Eurostat, 2018b) – UN_YALWP
- Young people neither in employment nor in education and training (Eurostat, 2019a) – NEET

The above-mentioned indicators will be labelled later as source indicators. It is to be noted that our preliminary analyses revealed that the very low work intensity rate (Eurostat, 2018e) of the AROPE aggregate indicator was not an appropriate measure for assessing the poverty and social exclusion of young people in 2008 and 2017, and it is therefore not included in the list of source indicators. The irrelevance of this measure may be related to the findings of a European social inclusion monitoring (Atkinson et al., 2017), according to which in the population of young adults there is a relatively low occurrence of households with very low work intensity and a relatively high incidence of income poverty, while the opposite is true for older adults.

Employment does not protect large numbers of young adults from poverty, while many older adults are not catapulted into poverty because of a lack of employment (Atkinson et al., 2017, p. 340). Moreover, as in this scientific work, many authors, e.g. Carcillo et al. (2015) and Chung et al. (2012), prioritised indicators such as unemployment rate and NEET rate in analysing the problem of young people entering the labour market and retaining employment.

3.2 Statistical methods

To achieve the main objectives of this project – to reveal the current similarities and differences in the incidence and severity of poverty and social exclusion among young people in the EU – it is possible to apply advanced methods of multivariate statistical analysis (Hair et al., 2018; Hebák et al., 2005; Johnson and Wichern, 2002; Khattree and Naik, 2000). In Section 4, correlation analysis and principal component analysis will be applied to verify the suitability of the source indicators, and to prepare for the cluster analysis, and to create an integral indicator as presented in Section 5 (respectively 5.1 and 5.2).

At the beginning, we will examine the relationships between source indicators using correlation analysis. If the source indicators are interdependent, it is necessary to apply a method to find hidden relationships, e.g. the principal components method. Principal components analysis is technique for forming new variables which are linear composites of the original variables (source indicators). The maximum number of new variables is equal to the number of the original source variables, and the new variables are not correlated, i.e. a set of independent variables is created.

If $\sum$ is the variance-covariance matrix of p variables X_1, ... X_p, then the total variance of these variables is defined as tr ($\sum$) (the trace of matrix $\sum$), which is the sum of all diagonal elements of the matrix $\sum$. The first principal component of p by 1 vector $\mathbf{x} = (x_1 ... x_p)^T$ is the linear combination:

$$\boldsymbol{a}_1^T\boldsymbol{x} = a_{11}x_1 + \cdots + a_{1p}x_{1p}$$

where $\mathbf{a}_1 = (a_{11} \ldots a_{1p})^T$, with $\mathbf{a}_1^T\mathbf{a}_1 = 1$ and such that var $(\mathbf{a}_1^T\mathbf{x})$ is the maximum among all linear combinations of x, with the coefficient vector having unit length. The eigenvalues (λ) of $\sum$ are the variances of the corresponding principal components. In that case, it is advised to start with the correlation matrix, because the measurements of different variables are not on the same scale.

Then either the principal component scores or representative variables from each component can be used to perform cluster analysis. Cluster analysis is a technique used for combining observations into groups or clusters such that:

- Each group or cluster is homogeneous or compact with respect to certain characteristics. That is, observations in each group are similar to each other; and
- Each group should be different from other groups with respect to the same characteristics.

To measure the similarity of objects in individual clusters, we will use the squared Euclidean distance, which assumes the non-correlation of source indicators.

Cluster analysis involves a wide range of methods, and in this project we chose the common application of Ward's hierarchical clustering method. This method forms clusters by maximising within-cluster homogeneity. That is, the Ward's method tries to minimise the total within-group or within-cluster sums of squares. Clusters are formed at each step such that the resulting cluster solution has the fewest within-cluster sum of squares. More formally, let $\overline{\mathbf{x}}_h$ and $\overline{\mathbf{x}}_{h'}$ be the cluster mean vectors. This measure reduces distance of clusters $\boldsymbol{C}_h$ and $\boldsymbol{C}_{h'}$ to:

$$\mathrm{D}(C_h, C_{h'}) = \frac{n_h n_{h'}}{n_h + n_{h'}} \left(\overline{\mathbf{x}}_h - \overline{\mathbf{x}}_{h'}\right)^{\mathrm{T}} \left(\overline{\mathbf{x}}_h - \overline{\mathbf{x}}_{h'}\right)$$

where $\boldsymbol{n}_h$ and $\boldsymbol{n}_{h'}$ are numbers of objects in clusters. For clusters with a single element in each of them, it reduces to half to the squared Euclidean distance between them. Ward's method tends to join clusters with a small number of observations, and it is strongly biased toward producing clusters with roughly the same number of observations.

In the last part of this analysis, we will focus on creating an integral indicator of poverty and social exclusion, which we will construct as a weighted arithmetic average of the principal components. For a particular component, we will use the ratio of variability of the source indicators that is explained by this component.

4. Analysis of source indicators suitability and preparation for next analyses

The assumption that the monitored phenomena often pertain to the same groups of people, especially if they belong to the same dimension, is confirmed by significant positive dependences among the source indicators which

were revealed by correlation analysis. Those dependences are displayed on correlation maps of source indicators (see Fig. 1).

While in 2017 we see the strongest correlation between indicators from the labour market exclusion dimension (the last 4 indicators), in 2008 the indicators from this dimension showed only a mild to moderate inter-dependence. Among the rates that characterise income poverty (the first 4 indicators), we quantified a moderate to strong linear dependence in both years.

The exception is the Persistent at risk of poverty rate in 2008 and Housing cost overburden rate for 2017, which had a rather weak linear relationship with indicators from this dimension. When comparing the years 2008 and 2017, the most consistent results were recorded for material deprivation, where we confirmed a relatively strong linear dependence in both years. Among the indicators from different dimensions, the intensity of dependence was significantly weaker and in many cases was not statistically significant.

For cluster analysis, where we used the Euclidean distance as a measure of dissimilarity of individual countries, it was necessary to transform the original interdependent source indicators into uncorrelated factors. Principal component analysis was implemented to serve that purpose. We attempted to create such factors that would be determined by those source indicators which would facilitate their interpretation. Simultaneously, we wanted to decrease the number of factors, i.e. to achieve a reduced number of factors compared to the source indicators, while those factors would still comprise at least 75% of information provided by the source indicators.

In order to assess the suitability of source indicators for principal component analysis, we applied the Kaiser-Meyer-Olkin measure (Stankovičová and Vojtková, 2007). The KMO statistics (Tab. 1) showed average to above-average suitability of the source indicators for further analysis.

While in 2008 the eligibility values of individual source indicators were at an acceptable level (exceeding 0.5), in 2017 the Housing cost overburden rate was not suitable for principal component analysis (value of Kaiser-Meyer-Olkin measure for "Housing cost overburden rate" was less than 0.5). Thus, in the further analyses for 2017, we did not consider this indicator. The overall adequacy of input data reached the value 0.590 in 2008 and the value of 0.713 in 2017.

On basis of Kaiser's rule for eigenvalues (Fig. 2) in correlation matrices, which states that only factors with eigenvalues greater than average eigenvalue should be used (the average eigenvalue of a correlation matrix is 1), we decided to set the number of factors to three in both years. The first three principal components account for 76.55%

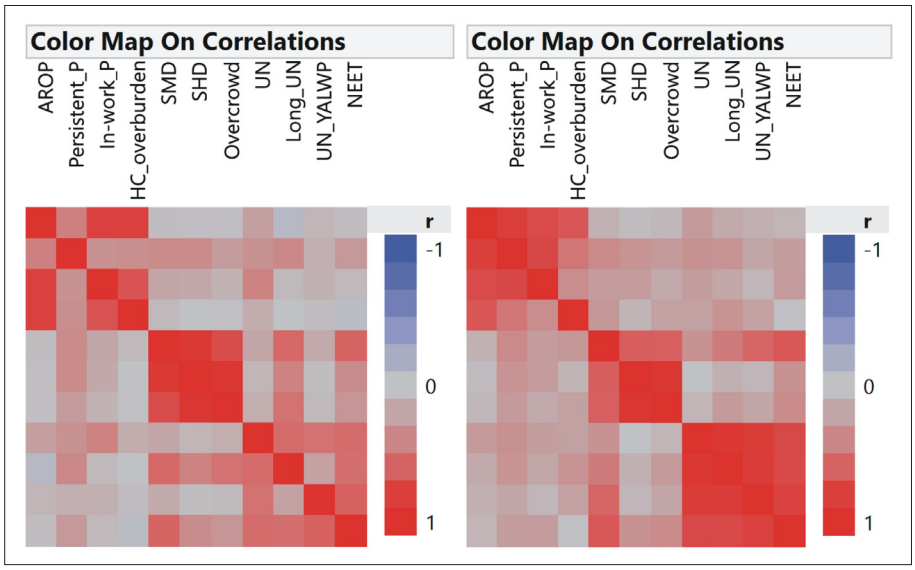

Fig. 1: Correlation maps of source indicators for 2008 (left) and 2017 (right)
Source: Eurostat data; authors' computations using SAS JMP

Kaiser's Measure of Sampling Adequacy:
Year 2008: Overall MSA = 0.590
Year 2017: Overall MSA = 0.713

Year	AROP	Persistent_P	In_work_P	HC_overburden	SMD	SHD	Overcrowd	UN	Long_UN	UN_YALWP	NEET
2008	0.548	0.514	0.583	0.725	0.684	0.520	0.534	0.634	0.544	0.612	0.700
2017	0.568	0.715	0.741	–	0.730	0.579	0.609	0.728	0.787	0.739	0.873

Tab. 1: Values of Kaiser-Meyer-Olkin measure for source indicators for 2008 and 2017
Source: Eurostat data; authors' computations in SAS Enterprise Guide

Eigenvalues

Number	Eigenvalue	Percent	20 40 60 80	Cum Percent
1	4.1180	37.436		37.436
2	2.5794	23.449		60.885
3	1.7233	15.666		76.551
4	0.7314	6.649		83.201
5	0.6237	5.670		88.871
6	0.3876	3.524		92.395
7	0.3694	3.358		95.753
8	0.2226	2.023		97.777
9	0.1409	1.281		99.057
10	0.0692	0.629		99.687
11	0.0345	0.313		100.000

Eigenvalues

Number	Eigenvalue	Percent	20 40 60 80	Cum Percent
1	4.5715	45.715		45.715
2	2.1398	21.398		67.113
3	1.8990	18.990		86.102
4	0.4218	4.218		90.320
5	0.3557	3.557		93.877
6	0.2049	2.049		95.926
7	0.1549	1.549		97.475
8	0.1176	1.176		98.651
9	0.0736	0.736		99.388
10	0.0612	0.612		100.000

Fig. 2: Eigenvalues of the correlation matrices (PCA method) for 2008 (top) and 2017 (bottom)
Source: Eurostat data; authors' computations in SAS JMP

Rotated Factor Loading

	Factor 1	Factor 2	Factor 3
AROP	-0.033830	0.951403	0.048513
Persistent_P	0.332888	0.435283	0.250618
In-work_P	0.131660	0.827523	0.105338
HC_overburden	-0.046433	0.827010	-0.005224
SMD	0.837164	0.060023	0.340253
SHD	0.996508	0.060441	0.057603
Overcrowd	0.881005	0.043261	0.071366
UN	0.038406	0.253797	0.694705
Long_UN	0.394037	-0.065072	0.560444
UN_YALWP	-0.007807	0.063720	0.682023
NEET	0.324822	-0.012051	0.827999

Rotated Factor Loading

	Factor 1	Factor 2	Factor 3
AROP	0.085950	-0.058608	0.906586
Persistent_P	0.163566	0.225266	0.880602
In-work_P	0.078026	0.173135	0.796313
SMD	0.452568	0.631788	0.146984
SHD	-0.020977	0.985139	0.121492
Overcrowd	0.120430	0.879900	0.089708
UN	0.899187	-0.015567	0.225889
Long_UN	0.890355	0.138557	0.144229
UN_YALWP	0.919010	0.101681	0.039283
NEET	0.795002	0.343404	0.077666

Fig. 3: Factor loadings after Equamax rotation for 2008 (top) and 2017 (bottom)
Source: Eurostat data; authors' computations in SAS JMP

of the total variability in 2008, and in 2017 for 86.10% of the variance information provided by the source indicators. These principal components are linearly independent and they provide the required amount of information (over 75%). In order to adequately interpret them, however, we performed some rotations and the results of an orthogonal rotation by the Equamax method are shown in Figure 3.

From the values of the rotated component loadings (Fig. 3), we can see correlations between the source indicators and the rotated principal components or factors. After rotation, the principal components were formed in such a way that they significantly correlate with the indicators of one dimension compared to the indicators of the other two dimensions. As we can see from this table, income poverty is presented by the second factor for 2008 and the third factor for 2017. The material deprivation dimension is represented by the first factor for 2008 and the second factor for 2017. The labour market dimension exclusion is characterised by the third factor in 2008 and the first factor in 2017. For the sake of clarity, txhe further representatives of income poverty will be referred to as IP, and MD will be used to indicate the material deprivation factor, and the LME is the factor for labour market exclusion. Although these factors are convincingly determined by measures of the relevant dimension, some indicators have a positive moderate correlation with other dimensions. In 2008, the long-term unemployment rate correlates with the MD factor. In both years, the indicators of persistent risk of poverty and the NEET rate show moderate positive dependence with MD. The LME factor is positively related to the severe material deprivation rate.

5. Results

Although the results of the correlation analysis and principal component analysis have brought some interesting findings, in Section 4 they have been mainly used as a tool for transforming the source indicators into new variables appropriate for further analysis. The principal components analysis resulted in three independent factors, each representing one dimension of poverty and social exclusion. These factors (precisely, the factor scores) will be used in Sections 5.1 and 5.2 as input variables for cluster analysis and for the creation of an integral indicator, respectively.

5.1 Results of a cluster analysis of EU member countries in terms of income poverty and the social exclusion of youth in 2008 and 2017

The factor scores we have obtained in Section 4, are appropriate for cluster analysis with the aim to create clusters of EU member countries, where countries falling into a common cluster would be most similar in terms of poverty and the social exclusion of young people, while countries in different clusters would be significantly different. To make the cluster analysis not self-purposeful, we will characterise individual clusters based on factors each representing one of the IP, MD, or LME dimensions. The characteristics of the clusters will provide an overview of the state of poverty and the social exclusion of young people in the countries under review, without having to deal with each country separately. Since the sophisticated procedures used in the cluster analysis ensure relatively high within-group homogeneity, so the cluster characterisation also well describes the state of the countries included in the cluster. It should be kept in mind, however, that there are also differences between countries within a single cluster. Cluster analysis will

therefore give us a clear picture of the weaknesses as well as the strengths of the social inclusion of young people in EU countries. Moreover, by comparing the results for 2008 and 2017, we can see whether the EU countries under review have made progress in combating poverty, deprivation and labour market exclusion among young people, or conversely, the inclusion of youth in that country has deteriorated compared to other EU countries.

Using Ward's method (Hebák et al., 2005), which due to its excellent results is the most popular of hierarchical clustering procedures (Loster and Pavelka, 2013), we obtained the dendrograms represented in Figure 4. The dendrogram is supplemented by the so-called 'heat maps' of the three factors: IP, MD and LME respectively. The spatial distribution of income poverty, material deprivation and labour market exclusion in the youth population in 2008 and 2017 is provided by heat maps in Figure 5.

The results of the cluster analysis (Fig. 4) and the factors themselves (Fig. 5) obtained by principal components analysis provide some interesting information that we firstly interpret for 2008 and then for 2017.

In 2008, we found the most suitable results in the 4th cluster (the Czech Republic, Cyprus, Austria, Estonia, Slovenia, Malta), which had no major problems in any dimension of poverty and the social exclusion of young people aged 18–24, which are confirmed by the above-average good (in some cases average) values of the factors IP, MD, LME shown in heat maps in Figure 4. The 4th cluster was characterised by the smallest threat of income poverty, and after the 5th cluster (Denmark, the Netherlands) the second smallest exclusion from the labour market.

As the second best cluster, we can mark the 1st cluster (Belgium, Luxembourg, United Kingdom, France, Portugal, Germany, Finland), in which young people, in comparison with other EU countries, were exposed to income poverty and exclusion from the labour market at approximately the average level. In the material deprivation dimension, this cluster recorded above-average good results (average results for Portugal).

Other clusters of countries were characterised by problems in one or more of the dimensions of poverty and the social exclusion of young people. The material deprivation of young people affected the 6th cluster of countries (Bulgaria, Hungary, Latvia, Lithuania, Poland, Slovakia, Romania) to a much greater extent than other countries. In this cluster, Romania and Slovakia, which were the last joined to the clustering process, stand out. In 2008, young people in Romania were subjected to extreme material deprivation, while we see a large difference between Romania and the following Bulgaria, but the gap between Romania and the other 25 EU-27 countries (except Bulgaria) is particularly evident. Romania, unlike other countries in this cluster, has seen one of the greatest threats to income poverty among young people. On the contrary, Slovakia was doing very well in terms of income poverty among young people. In terms of income poverty and material deprivation, Slovakia was at a comparable level to that of countries in the 4th cluster, but recorded significantly worse results in the labour market exclusion dimension.

The 1st, 4th and 6th clusters include a total of 20 EU-27 countries in 2008. The remaining 7 countries are in the other 3 clusters. The 2nd cluster (Greece, Sweden) in 2008 was characterised by a high threat of relative income poverty (at the Romanian level) and above-average exclusion of young people from the labour market. In the income poverty dimension, however, the worst results were identified in the 5th cluster of countries (Denmark, the Netherlands), in which we mainly attribute this to Denmark. The biggest problems with the participation of young people in the labour market have been revealed in the 3rd cluster of countries (Ireland, Spain, Italy). The 5th and 3rd cluster of countries have had significant social inclusion problems and the struggle against youth poverty only in one dimension

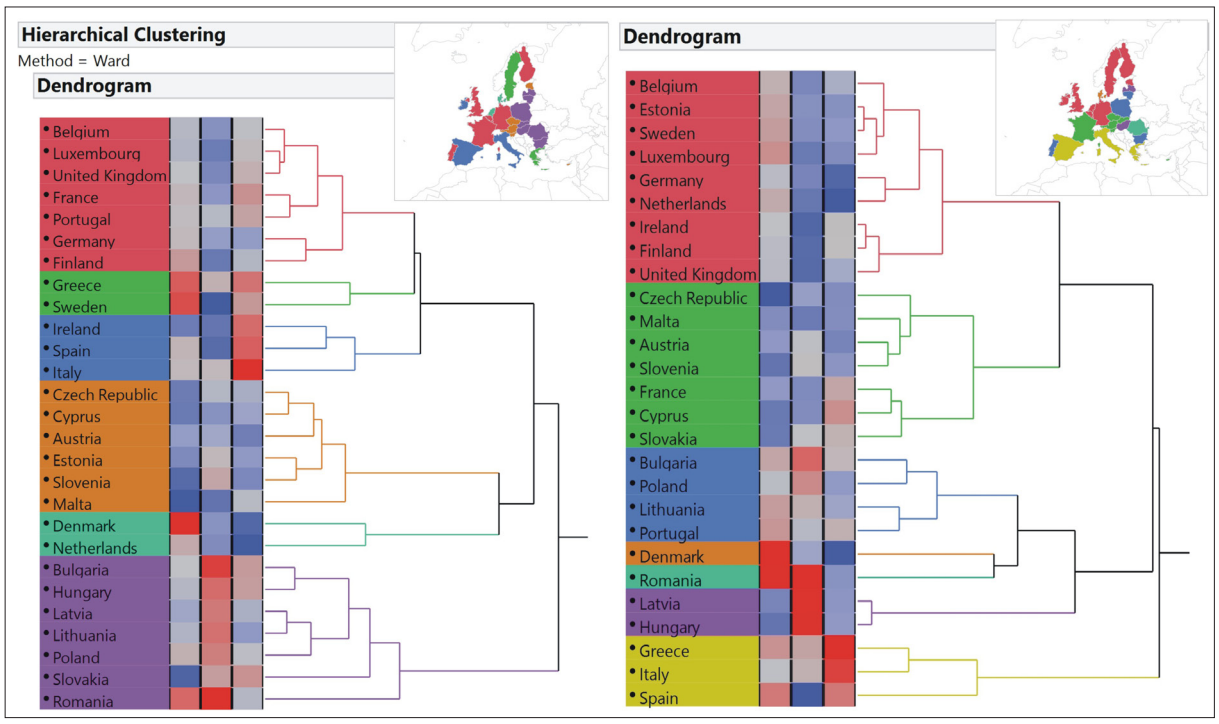

Fig. 4: Dendrograms of EU country clusters according to factors of poverty and the social exclusion of youth in 2008 (left) and 2017 (right)
Source: Eurostat data; processed by the authors in SAS JMP

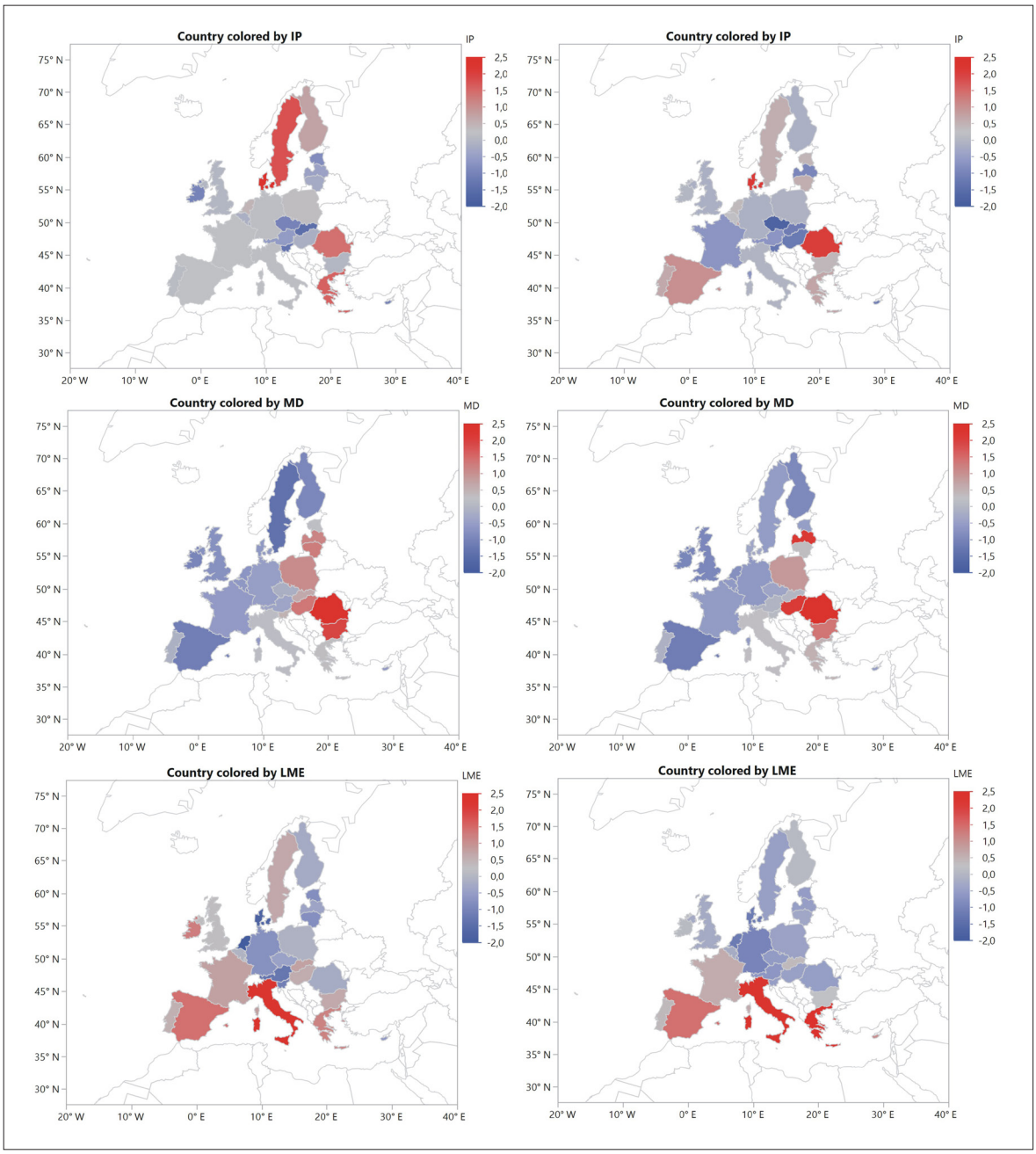

Fig. 5: Heat maps of factor: IP – Income Poverty (first row); factor MD – Material Deprivation (second row); and factor LME – Labour Market Exclusion (third row), for the population of young people (18–24 years old) in 2008 (left) and 2017 (right). Sources: Eurostat data; processed by the authors in SAS JMP

that we have mentioned, and in the other two dimensions they have achieved at least average results in the EU-27 geographic area.

In 2017, the best results were diagnosed in the 1st cluster (Belgium, Estonia, Sweden, Luxembourg, Germany, the Netherlands, Ireland, Finland and the United Kingdom) and in the 2nd cluster (the Czech Republic, Malta, Austria, Slovenia, France, Cyprus and Slovakia).

In the 2nd cluster of countries, the population of young people among all the clusters had the least threat of income poverty and it showed no major problems in the material deprivation dimension. Looking at the clustering process within cluster 4 in the dendrogram in Figure 4 (on the right), we see that four countries (Czech Republic, Malta, Austria, Slovenia) were merged into one group, which achieved better than average results in 2017 in all three dimensions, and that three countries (France, Cyprus and Slovakia) were merged into another group, in which we diagnosed the problem of getting young people into the labour market in 2017.

The 1st cluster is characterised by the smallest material deprivation of young people and by average to above average good results in the LME dimension. Most countries in this cluster, however, report an above-average threat of income poverty among young people.

The first two clusters include 16 countries from the 26 EU countries under review. These two clusters consist of almost the same countries as the 1st and 4th cluster of 2008, which we also rated positively. The first two clusters of 2017, unlike clusters 1 and 4 of 2008, do not include Portugal, but include Sweden, the Netherlands, Ireland and Slovakia. Sweden and Ireland in international comparisons

in 2017 did not show such problems with participation of young people in the labour market as in 2008, and Slovakia managed to reduce problems in this dimension, in particular by eliminating the long-term unemployment of young people.

The 3rd cluster (Bulgaria, Poland, Lithuania and Portugal) is characterised by considerable material deprivation of young people in 2017, with the most critical situation in Bulgaria. Similarly to the countries of the 1st cluster, as well as the countries in the 3rd cluster, they reported an above-average threat of income poverty in the population of young people in 2017. In the LME dimension, the 3rd cluster reached approximately average values.

The other four clusters are very specific. Romania (5th cluster) had extreme material deprivation of young people in 2017, but unlike Bulgaria, this was mainly due to severe housing deprivation, but also (as in Bulgaria) a high rate of overcrowding. What made Romania significantly different from other clusters, was that the risk of income poverty for young people was extremely high. In this dimension, the differences between Romania and other EU countries in 2017 deepened in comparison with 2008. Moreover, if we realise that the at-risk-of-poverty rate and its derived measures, such as the persistent at-risk-of-poverty rate and in-work at-risk-of-poverty rate measure, and relative poverty with respect to the median of national income, the income poverty in Romania is even more acute. To be precise, the poverty risk threshold is set at 60% of the median equivalent disposable income.

The alarming state of poverty in Romania is underlined by the fact that this country has the lowest at risk of poverty threshold among all EU countries. In 2017, this threshold was 1,645 euro per year in Romania, while in Western and Northern Europe it was 8 to 9 times higher. Even countries with a relatively low median income (Bulgaria and Hungary) had a significantly higher at risk of poverty threshold (2,154 euro per year and 2,993 euro per year, respectively) than Romania. In the context of this, poor results of Denmark (4th cluster) in the income poverty dimension are not so surprising. Denmark had the second highest at risk of poverty threshold after Luxembourg (17,630 euro per year), which is approximately 10.5 times higher at risk of poverty threshold than in Romania. The only dimension in which Romania has achieved relatively good results in the youth population was the labour market exclusion dimension. In the LME dimension, Denmark, similar to the Netherlands, achieved the best results in the EU-27.

The 6th cluster consists of Latvia and Hungary. In these two countries, young people faced severe deprivation in 2017, especially in the housing sector. In the other two dimensions, the population of young people in these two countries was above average.

The countries of the 7th cluster in 2017 (Spain, Italy, Greece) faced the challenge of participating young people to the labour market, with the worst situation in Greece. In 2017, young Greeks had more problems in this dimension than in the pre-crisis period, while in Italy and Spain the situation in 2017 was comparable to 2008. The threat of income poverty, however, increased significantly in Spain. As regards the material deprivation of young people, in 2008 Spain achieved very good results and in 2017 it was even the leader in this dimension. If we look at the 2017 clustering process (Fig. 4, on the right), Spain was the last among all the countries analysed to be clustered. Thus, in 2017, Denmark, Romania and Spain were characterised by the least similarity with other EU countries in the field of poverty and social exclusion of young people.

5.2 Evaluation of poverty and social exclusion of youth in EU member countries based on integral indicators in 2008 and 2017

In the previous section, on the basis of the factors resulting from the principal components analysis, we have created clusters of countries in terms of youth social exclusion. The values of these factors served to create cluster profiles and, above all, to reveal the strengths and weaknesses of individual clusters. In this section, we present the values of an integral indicator of poverty and social exclusion, which we constructed as a weighted arithmetic average of the factors IP, MD and LME, separately for 2008 and 2017. For a particular factor, we used the ratio of variability of the source indicators that was explained by this factor. For example, according to Figure 2 (on the left) in 2008, the first factor explained 37.44%, the second factor explained 23.45%, and the third factor explained 15.67% of the total variance of the original indicators. Together they explained 76.55%. The first factor (factor MD) was therefore assigned an absolute weight of 37.436, which corresponds to a relative weight of 0.489 (37.436/76.551). The other factors (IP and LME) were assigned an absolute weight of 23.449 (relative weight of 0.306) and 15.666 (relative weight of 0.205), when calculating an weighted arithmetic average core. Values of integral indicators are captured in heat maps in Figure 6, where we also present the values of the aggregate indicator AROPE rate.

By comparing the ranking of the EU countries evaluated for 2017 on the basis of the AROPE rate and that on the basis of the integral indicator, we found that the lowest threat of poverty and social exclusion of young people in 2017 was in the Czech Republic. According to both approaches, the fight against poverty and social exclusion is the worst for Greece. Greece is followed by Bulgaria and Romania, while in the case of an assessment based on an integral indicator, the order of these countries is opposite and, in addition, among these countries Italy is also included. The main reason for these differences is that more source indicators have been used in our approach than in the AROPE-based approach. The second important reason is that in the relevant year 2017, the LME dimension was more weighted in the construction of the integral indicator, especially at the expense of the IP dimension. The latter has resulted in an assessment where in our approach countries with a high level of poverty risk are less "penalised" due to poor IP performance than in the AROPE-based approach. Among these countries, let us mention Denmark or the Netherlands, which ranked significantly better by ranking compiled according to the integral indicator than by the AROPE rate (see Fig. 6) in 2017.

On the other hand, in an approach based on an integral indicator, countries with poor results in the LME dimension were more "penalised". For example, in Italy in 2017, young people were at high risk of not applying to the labour market. For this reason, the assessment of poverty and the social exclusion of young Italians under our approach, was considerably worse than according to the official AROPE rate, which is also evident in Figure 6.

The advantage of our approach compared to the AROPE-based approach, is that it takes into account a wider range of relevant indicators and is not limited to only three measures

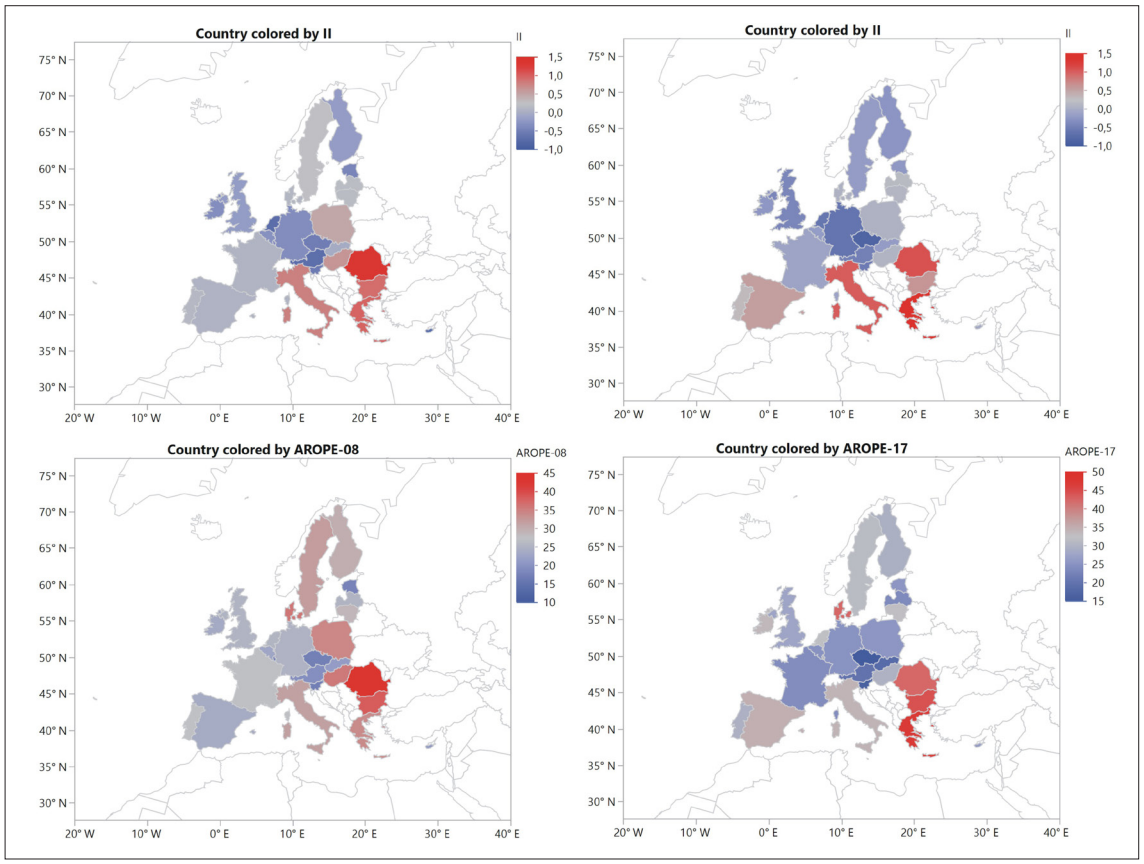

Fig. 6: Heat maps of integral indicator of poverty and social exclusion (first row) and AROPE rate (second row) for population of young people (18–24 year olds) in 2008 (left) and 2017 (right)
Sources: Eurostat data; processed by authors in SAS JMP

that only assess the occurrence of three sub-phenomena (income poverty, material deprivation and labour market exclusion). In our approach, we look at these phenomena from a different perspective. One of the perspectives, which we believe to be very important, is the severity or depth of the phenomena being monitored. In our approach, the severity of the observed phenomena is incorporated through the persistent at risk of poverty rate, the severe material deprivation rate and the long-term unemployment rate. In addition, in our approach we consider indicators that are specific to the population of young people.

This approach has therefore given us a more objective picture of young people's poverty and social exclusion than in the AROPE-based approach. In the case of the AROPE-based approach, we have to realise that the occurrence of individual phenomena can overlap, which means that income poverty, material deprivation and labour market exclusion can affect the same group of people. Therefore, the sub-measures of the AROPE aggregate indicator cannot adequately quantify the contribution of individual dimensions to the overall incidence of poverty and social exclusion. The advantage of our approach is that we use linear independent factors, each representing one dimension of poverty and social exclusion. Each of these factors contributes to the formation of an integral indicator according to its proportion to explain the variability of the source indicators. In our approach, we can therefore quantify which dimension has greater impact and which has less impact on poverty and social exclusion. In the population aged 18–24 years, the LME dimension has been shown to have a greater impact on poverty and social exclusion than might appear to be the case based on the VLWI rate included in the AROPE indicator.

6. Discussion and conclusions

In this article, we assess the poverty and social exclusion of young people in the EU countries based on 11 source indicators of poverty and social exclusion, the relevance of which has been confirmed by Ayllón and Gábos (2017), Chen et al. (2018), Chung et al. (2012), de Graaf-Zijl and Nolan (2011), European Commission (2018), Eurostat (2018h), Mysíková et al. (2015), Ruesga-Benito et al. (2018), and Šoltés et al. (2018). Through multivariate statistical procedures, a substantial part of the information contained in these indicators is transformed into three uncorrelated factors. These three factors represent the three dimensions of poverty and social exclusion, confirming the merits of three-dimensional concept of poverty and social exclusion, which is currently also used for the AROPE aggregate indicator for monitoring poverty and social exclusion in the Europe 2020 strategy. The weakness of the AROPE aggregate, however, is that each of the dimensions - income poverty (IP), material deprivation (MD) and labour market exclusion (LME) – is captured by only one measure, which evaluates that dimension from a single perspective.

In addition, the above measures (AROP, SMD and VLWI) assess only the occurrence of the social phenomenon under consideration and do not take into account the severity of these phenomena, which we try to capture in our analysis through other available indicators. By comparing the results obtained with our approach and the AROPE-based approach, we found that in the relevant years (2008 and 2017), the labour market exclusion dimension had a more significant impact on poverty and social exclusion among young people than how it was quantified by the AROPE indicator. The

AROPE aggregate indicator is currently used for the whole population, as well as for the population of young people. The measurement of poverty and social exclusion in the population of young people, however, has certain specific characteristics, particularly concerning the LME dimension. In our approach, these specifics have been captured at least partially by the chosen source indicators.

As mentioned above, from the spectrum of the original correlated indicators characterising poverty and social exclusion of young people in the EU-27 countries, linear independent factors representing the three dimensions of poverty and social exclusion of the population under review were created separately for the reference year 2008 and the most recent year 2017. By using a weighted average of the factors, we have obtained an integral indicator for 2008 and 2017. Based on the above, this integral indicator assesses the poverty and social exclusion of young people aged 18–24 years more comprehensively than the currently-used the AROPE aggregate indicator.

The factors computed in this analysis and the construction of the integral indicator make it possible to identify the weaknesses and strengths of the EU-27 countries in terms of poverty and the social exclusion of young people, and to map the progress of countries in this area with respect to fulfilling the Europe 2020 strategy. Since poverty and social exclusion is a multidimensional phenomenon and different countries may have problems in different dimensions, we used cluster analysis to reveal the different patterns of the three partial phenomena of poverty and social exclusion. Interpreting the resulting clusters of countries through factor values was an effective tool for diagnosing the bottlenecks of the EU-27 countries in the fight against poverty and the social exclusion of young people. The integral indicator designed for 2008 revealed countries that had to face the greatest poverty and social exclusion of young people at the strategy Europe 2020 starting line in the geographical space of the EU-27. The values of the integral indicator created for 2017 and their comparison with the values of the integral indicator for 2008, showed which countries just before the end of the Europe 2020 strategy, still have significant problems with poverty and the social exclusion of young people, and they revealed which countries achieved the most progress in the period, eventually failed in the subject area.

For clarity, let us point out the basic differences between the AROPE aggregate indicator and the integral indicator. The AROPE aggregate indicator is made up of three sub-measures (poverty risk rate, severe material deprivation rate and very low work intensity rate), while the labour market exclusion dimension is represented by a population living in very low work intensity households [(quasi-) jobless households]. The general pattern of decomposition of AROPE is that the (quasi-) jobless population is the smallest part of the population at risk of poverty or social exclusion. On the other hand, the largest share is the population, which according to Eurostat methodology, is at risk of income poverty. In our 2017 analysis, which took into account a larger range of relevant source indicators, however, it turned out that the factor representing the dimension of labour market exclusion was the first principal factor, meaning that from all the factors this one accounted for the largest proportion of the total common variance; thus in creating an integral indicator, we have given this factor the greatest weight. On the contrary, the factor representing the income poverty dimension in 2017 was evaluated as the third factor, and therefore we had to give it the least weight among all three relevant factors, given its contribution.

Our analyses have shown that the exclusion of young people from the labour market has a greater impact on poverty and social exclusion than might appear to be the case on the basis of the very low work intensity rate in the aggregate indicator AROPE. Based on statistical procedures, we found that when assessing the exclusion of young people from the labour market, it is appropriate to replace the standard 'very low work intensity rate', with measures such as unemployment rate, long-term unemployment rate or NEET rate. The suitability of these measures is also confirmed by Carcillo et al. (2015) and Chung et al. (2012). In addition, the unemployment rate and the NEET rate complement each other, because according to Dietrich and Möller (2016), unemployment statistics ignore some young unemployed and the NEET concept seeks to correct this deficiency and include inactive youth in a broader sense.

A lower weight was estimated for the income poverty dimension in our analysis, compared to the AROPE rate-based approach. Within this dimension, we have highlighted questionable international comparability of the 'at-risk-of-poverty', which, given the relative poverty concept on which it is based, identifies a relatively high level of poverty risk also in economically advanced countries such as Denmark, the Netherlands, Sweden or Luxembourg. Many times, however, this does not correspond to the good results in the field of social inclusion, which other statistics point to. Poverty rates currently in use only take into account a country's income, which does not always reflect the cost of living, and therefore they do not always correctly identify people affected by poverty. We agree with the proposal of Copus et al. (2015) that Eurostat and national statistical offices should include standard cost of living indicators in the EU-SILC survey, and use them to adjust the AROP rate. Copus et al. (2015) also justify the importance of using regional at-risk-of-poverty rates, and they have constructed a map of these rates at NUTS 3 across 20 European countries. Due to considerable regional disparities in the area of income poverty, Dvornáková (2012) and Faura-Martínez et al. (2016) propose to set regional 'at risk of poverty' thresholds, and thus to more objectively quantify the risk of poverty in a given country as well as across the EU. We assume that if our approach was applied to territorial units broken down by NUTS 2 classification or NUTS 3 classification, based on 'regional at-risk-of-poverty' thresholds for income poverty assessment, more homogeneous clusters would be generated and disparities revealed between territorial units within individual EU countries. At present, however, only a limited number of poverty and social exclusion indicators at NUTS 2 or NUTS 3 level are currently being monitored and therefore such an analysis could not be carried out.

The results of our research based on the cluster analysis and construction of the integral indicators have confirmed the findings of several scientific papers (Aassve et al., 2013; Andriopoulou et al., 2017; Carcillo et al., 2015; Chen et al., 2018; Pastore, 2017) that some EU countries, especially from southern Europe, have still failed to cope with the consequences of the economic crisis, and these consequences were felt by the younger generations in 2017. The most important findings from our analysis of changes in the geographical distribution of poverty and social exclusion are presented below.

In 2017, we expressed quantitatively the largest social exclusion of the younger generations in southern and eastern Europe, namely Greece, subsequently Romania, Italy and Bulgaria, followed by Spain. We must emphasise, however, that poverty and the social exclusion of young people in Greece were significantly higher than in other EU countries. While in the countries of southern Europe (Greece, Italy, Spain), this was mainly due to considerable problems with the entry of young people into the labour market, in the case of Eastern European countries (Romania and Bulgaria) it was due mainly to high material deprivation, and in the case of Romania also the very high threat of youth monetary poverty. Hungary and Latvia also have (since 2008) to face the great threat of material deprivation of young people. In addition to Romania, the fight against income poverty among young people should also be made more effective by Spain and Denmark.

The best social inclusion of young people for 2017 was expressed quantitatively on the basis of our integral indicator in the Czech Republic, Malta, Germany, the Netherlands, Slovenia and Austria. With the exception of the Netherlands, which has a relatively high risk of income poverty, all of these countries have had above average good results in all three dimensions. The Czech Republic and Slovenia have achieved the lowest threat of income poverty, followed by Hungary, Cyprus and Slovakia. Young peoples in the Netherlands, Germany and Austria, compared to other EU countries, had excellent conditions in labour market entry in 2017. Denmark achieved comparatively good result in the labour market exclusion dimension as in the Netherlands, but due to the high threat of income poverty, it was only at an average in the EU rankings.

In 2017, in comparison with 2008, the situation with respect to poverty and the social exclusion of young people aged 18–24 years has deteriorated mainly in Cyprus, Greece and Spain. In the case of Cyprus and Greece, this negative change was mainly due to an increase in the exclusion of young people from the labour market, which was the largest among the EU Member States in these two countries. The negative impact of the deteriorated labour market situation for young Greeks has been offset in the definitive values of the integral indicator by significant progress in the fight against monetary poverty. On the contrary, Spain has seen a negative development in this dimension (IP), with only Estonia, Ireland, Luxembourg and Lithuania recording a greater deterioration.

Between 2008 and 2017, poverty and the social exclusion of young people were largely eliminated in Hungary, Sweden, Poland, the Czech Republic, Bulgaria, Germany and Romania. We see that this group is dominated by the countries of Central Europe and especially the Visegrad Group (except Slovakia). Some significant achievements of Hungary and Sweden in the income poverty and labour market exclusion dimensions have been dampened by an increase in material deprivation among young people, the largest in the EU in the two countries in question. Poland, the Czech Republic and Germany have seen less progress in all dimensions, but this has resulted in a remarkable overall elimination of young people's poverty and social exclusion. Bulgaria's and Romania's significant progress in the material deprivation and labour market dimensions have been partially reduced by the deterioration in income poverty.

Nowadays in the European Union, the youngest generation is the most affected by poverty and social exclusion. On the other hand, the expectations of economists for the younger generation are increasing, which is related to 'unfavourable' demographic development, the basic feature of which is an aging population. The social inclusion of the younger generation therefore must be included among the key objectives of the European Union. The results of the analyses presented in this article may contribute to this inclusion. The social policies of the EU countries under review could also be based on the results of our analyses, which reveal the phenomena to which the country should focus, in an effort to ensure the social inclusion of young people. As poverty and social exclusion of young people have specific features compared to the older population, appropriate methodologies, for measuring the individual partial phenomena of poverty and social exclusion, need to be put in place. These methodologies should provide the most accurate picture of the various dimensions of poverty and social exclusion of the relevant population. This article highlights some of the weaknesses in measuring poverty and social exclusion through the AROPE rate and its sub-indicators for the population of young people, and it presents an approach that assesses poverty and the social exclusion of youth more comprehensively and more objectively.

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References:

AASSVE, A., COTTINI, E., VITALI, A. (2013): Youth prospects in a time of economic recession. Demographic Research, 29: 949–962.

ANDRIOPOULOU, E., KARAKITSIOS, A., TSAKLOGLOU, P. (2017): Inequality and poverty in Greece: Changes in times of crisis. GLO Discussion Paper, No. 119, Global Labor Organization (GLO), Maastricht [online]. [cit. 15.04.2019]. Available at: https://www.econstor.eu/handle/10419/168569

ATKINSON, A. B., GUIO, A. C., MARLIER, E. (2017): Monitoring social inclusion in Europe–2017 edition. Luxembourg, Publications Office of the European Union.

AYLLÓN, S., GÁBOS, A. (2017): The interrelationships between the Europe 2020 poverty and social exclusion indicators. Social Indicators Research, 130(3): 1025–1049.

BRADFORD, S., CULLEN, F. (2014): Youth policy in austerity Europe. International Journal of Adolescence and Youth, 19(sup1.): 1–4.

CAMILLERI, M. A., CAMILLERI, A. (2016): Education and social cohesion for economic growth. International Journal of Leadership in Education, 19(5): 617–631.

CARCILLO, S., FERNÁNDEZ, R., KÖNIGS, S., MINEA, A. (2015): NEET Youth in the aftermath of the crisis: Challenges and policies [online]. OECD Social, Employment and Migration Working Papers, No. 164, OECD Publishing [online]. [cit. 21.03.2019]. Available at: https://www.oecd-ilibrary.org/docserver/5js6363503f6-en.

CHEN, T., HALLAERT, J.-J., PITT, A., QU, H., QUEYRANNE, M., RHEE, A., SHABUNINA, A., VANDENBUSSCHE, J., YACKOVLEV, I. (2018): Inequality and poverty across generations in the European Union. Staff Discussion Notes No. 18/01. Washington, DC, International Monetary Fund.

CHUNG, H., BEKKER, S., HOUWING, H. (2012): Young people and the post-recession labour market in the context of Europe 2020. Transfer: European Review of Labour and Research, 18(3): 301–317.

COPUS, A., MELO, P. C., KAUP, S., TAGAI, G., ARTELARIS, P. (2015): Regional poverty mapping in Europe – Challenges, advances, benefits and limitations. Local Economy: 30(7): 742–764.

DE GRAAF-ZIJL, M., NOLAN, B. (2011): Household joblessness and its impact on poverty and deprivation in Europe. Journal of European Social Policy, 21(5): 413–431.

DIETRICH, H., MÖLLER, J. (2016): Youth unemployment in Europe – business cycle and institutional effects. International Economics and Economic Policy, 13(1): 5–25.

DVORNÁKOVÁ, T. (2012): At-risk-of-poverty threshold. Statistika, 49(2): 44–61.

EUROPEAN COMMISSION (2018): Social protection committee annual report 2018. 2018 SCP review of the social protection performance monitor and developments in social protection policies. Luxembourg, Publications Office of the European Union.

EUROPEAN COUNCIL (2013): Council Recommendation of 22 April 2013 on establishing a Youth Guarantee, 2013/C120/01 [online]. [cit. 11.04.2019]. Available at: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2013:120:0001:0006:EN:PDF

EUROSTAT (2010): Glossary: Unemployment [online]. [cit. 13.03.2019]. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Unemployment_rate

EUROSTAT (2014a): Glossary: Housing cost overburden rate [online]. [cit. 13.03.2019]. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Housing_cost_overburden_rate

EUROSTAT (2014b): Glossary: Overcrowding rate [online]. [cit. 13.03.2019]. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Overcrowding_rate

EUROSTAT (2014c): Glossary: Severe housing deprivation rate [online]. [cit. 13.03.2019]. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Severe_housing_deprivation_rate

EUROSTAT (2015): Glossary: Long-term unemployment [online]. [cit. 13.03.2019]. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Long-term_unemployment

EUROSTAT (2018a): EU statistics on income and living conditions (EU-SILC) methodology – in-work poverty [online]. [cit. 13.03.2019]. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/EU_statistics_on_income_and_living_conditions_(EU-SILC)_methodology_-_in-work_poverty

EUROSTAT (2018b): EU statistics on income and living conditions (EU-SILC) methodology - population structure [online]. [cit. 13.03.2019]. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/EU_statistics_on_income_and_living_conditions_(EU-SILC)_methodology_-_population_structure#Description

EUROSTAT (2018c): Glossary: At-risk-of-poverty rate [online]. [cit. 13.03.2019]. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:At-risk-of-poverty_rate

EUROSTAT (2018d): Glossary:Material deprivation [online]. [cit. 13.03.2019]. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Material_deprivation

EUROSTAT (2018e): Glossary: Persons living in households with low work intensity [online]. [cit. 13.03.2019]. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Persons_living_in_households_with_low_work_intensity

EUROSTAT (2018f): Key figures on Europe. Luxembourg, Publications Office of the European Union.

EUROSTAT (2018g): Smarter, greener, more inclusive? Indicators to support the Europe 2020 strategy. Luxembourg, Publications Office of the European Union.

EUROSTAT (2018h): Sustainable development in the European Union. Monitoring report on progress towards the SDGs in an EU context. Luxembourg, Publications Office of the European Union.

EUROSTAT (2019a): Glossary: Young people neither in employment nor in education and training (NEET) [online]. [cit. 13.03.2019]. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:NEET

EUROSTAT (2019b): Smarter, greener, more inclusive? Indicators to support the Europe 2020 strategy. Luxembourg, Publications Office of the European Union.

EUROSTAT (2019c): Smarter, greener, more inclusive? How is the European Union progressing towards its Europe 2020 targets? [online]. [cit. 22.01.2020]. Available at: https://ec.europa.eu/eurostat/documents/2995521/10133668/1-07102019-BP-EN.pdf/2e56ad51-82cb-0912-fd3d-81770eff251a

EUROSTAT (2020): Database [online]. [cit. 22.01.2020]. Available at: https://ec.europa.eu/eurostat/data/database

FAURA-MARTÍNEZ, Ú., LAFUENTE-LECHUGA, M., GARCÍA-LUQUE, O. (2016): Risk of poverty or social exclusion: Evolution during the economic crisis and territorial perspective. Revista Española de Investigaciones Sociológicas (REIS), 156(156): 59–76.

GUAGNANO, G., SANTARELLI, E., SANTINI, I. (2013): Subjective poverty in Europe: The role of household socioeconomic characteristics and social capital. Working paper No. 113. SAPIENZA University of Rome [online]. [cit. 19.04.2019]. Available at: http://eprints.bice.rm.cnr.it/5182/1/Subjective_poverty_in_Europe_wp113.pdf

GUIO, A., MAQUET, I. E. (2006): Material deprivation and poor housing. What can be learned from the EU-SILC 2004 data? How can EU-SILC be improved in this matter? Draft paper from the conference: Comparative EU statistics on income and living conditions: issues and challenges [online]. [cit. 15.03.2019]. Available at: https://www.stat.fi/eusilc/guio_maquet.pdf

HAIR, J., BLACK, W., BABIN, B., ANDERSON, R. (2018): Multivariate Data Analysis (8th ed.). New York, Cengage Learning EMEA.

HEBÁK, P., HUSTOPECKÝ, J., PECÁKOVÁ, I., PRŮŠA, M., ŘEZANKOVÁ, H., SVOBODOVÁ, A., VLACH, P. (2005): Vícerozměrné statistické metody (3). Praha, Informatorium.

HORÁKOVÁ, M., JAHODA, R., KOFROŇ, P., SIROVÁTKA, T., ŠIMÍKOVÁ, I. (2013): Příjmová chudoba a materiální deprivace v České republice podle indikátorů EU – vývoj v důsledku krize, fiskální konsolidace a sociální reformy (1st ed.). Praha, Výzkumný ústav práce a sociálních věcí.

JOHNSON, R. A., WICHERN, D. W. (2002): Applied multivariate statistical analysis. Upper Saddle River, New Jersey, Prentice hall.

KHATTREE, R., NAIK, N. D. (2000): Multivariate data reduction and discrimination. North Carolina, John Wiley & Sons.

KIS, B. A., GÁBOS, A. (2016): Consistent poverty across the EU. Corvinus Journal of Sociology and Social Policy, 7(2):3–27.

KRETSOS, L. (2014): Youth policy in austerity Europe: the case of Greece. International Journal of Adolescence and Youth, 19(sup1.): 35–47.

LABUDOVÁ, V., VOJTKOVÁ, M., LINDA, B. (2010): Application of multidimensional methods to measure poverty. E-M: Ekonomie a Management, 13(1): 6–22.

LOSTER, T., PAVELKA, T. (2013): Evaluating of the results of clustering in practical economic tasks. In: 7th International Days of Statistics and Economics. Conference proceedings (pp. 804–818). Prague, University of Economics in Prague.

MYSÍKOVÁ, M., VEČERNÍK, J., ŽELINSKÝ, T. (2015): Impact of the low work intensity on poverty in the Czech Republic and the Slovak Republic. Ekonomický časopis, 63(6): 555–575.

NOLAN, B., WHELAN, C. T. (2010): Using non-monetary deprivation indicators to analyze poverty and social exclusion: Lessons from Europe? Journal of Policy Analysis and Management, 29(2): 305–325.

PASTORE, F. (2017): Getting it right: youth employment policy within the EU. CESifo Forum 18(2): 26–33.

PICKARD, S., BESSANT, J. [eds.] (2018): Young people re-generating politics in times of crises. Basingstoke, Palgrave Macmillan.

POULOU, A. (2014): Austerity and European Social Rights: How Can Courts Protect Europe's Lost Generation? German Law Journal, 15(6): 1145–1176.

RUESGA-BENITO, S., GONZÁLEZ-LAXE, F., PICATOSTE, X. (2018): Sustainable development, poverty, and risk of exclusion for young people in the European Union: The case of NEETs. Sustainability, 10(12): 4708.

ŘEZANKOVÁ, H., ŽELINSKÝ, T. (2014): Factors of material deprivation rate in the Czech Republic by household type. Ekonomický časopis, 62(4): 394–410.

SKATTEBOL, J., REDMOND, G. (2019): Troubled kids? Locational disadvantage, opportunity structures and social exclusion. Children's Geographies, 17(1): 76–89.

SOLER, P., PLANAS, A., FEIXA, C. (2014): Young people and youth policies in Spain in times of austerity: between juggling and the trapeze. International Journal of Adolescence and Youth, 19(sup1.): 62–78.

STANKOVIČOVÁ, I., VOJTKOVÁ, M. (2007): Viacrozmerné štatistické metódy s aplikáciami. Bratislava, Iura Edition.

ŠOLTÉS, E., HURBÁNKOVÁ, Ľ., KOTLEBOVÁ, E., ŠOLTÉSOVÁ, T., VOJTKOVÁ, M. (2018): Chudoba a sociálne vylúčenie v EÚ a v SR v kontexte stratégie Európa 2020. Pardubice, Univerzita Pardubice, Fakulta ekonomicko-správní.

ŠOLTÉS, E., ULMAN, P. (2016): Material deprivation in Poland and Slovakia – a comparative analysis. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie, 11(947): 19–36.

ŠOLTÉS, E., VOJTKOVÁ, M. (2018): Work intensity in Slovakia in relationship with socio-economic characteristics of households. Entrepreneurial Business and Economics Review, 6(1): 115–134.

ŽELINSKÝ, T. (2010): Analysis of poverty in Slovakia based on the concept of relative deprivation. Politická ekonomie, 58(4): 542–565.

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