DOI: 10.52950/ES.2022.11.1.009

A MULTIDIMENSIONAL COMPARATIVE ANALYSIS OF POVERTY STATUSES IN EUROPEAN UNION COUNTRIES

ALEKSANDRA ŁUCZAK, SŁAWOMIR KALINOWSKI

Abstract:

The main purpose of this paper is to compare the poverty statuses of European Union countries in 2010 and 2018. The specific purpose is to assess levels of poverty and material deprivation for EU countries. The study relied on the positional TOPSIS (Technique for Order Preference by Similarity to an Ideal Solution) approach. With these methods, it is possible to determine the poverty statuses: persistent conspicuous poverty, poverty without serious material deprivation, material deprivation without severe poverty, and no severe poverty. Three types of poverty status were identified in EU countries: persistent conspicuous poverty, transient unnoticeable poverty and no severe poverty. Central and Eastern European countries (especially Romania, Latvia, Bulgaria and Poland) witnessed a clear improvement in their statuses in 2010–2018. A large number of countries had a transient unnoticeable poverty status. In turn, no countries had experienced a clear deterioration their status. Eurostat data provided an empirical basis for this study.

Keywords:

poverty, material deprivation, poverty status, positional TOPSIS, bilinear ordering

JEL Classification: I32, P46, C10

Authors:

ALEKSANDRA ŁUCZAK, Poznań University of Life Sciences, Faculty of Economics, Poland, Email: aleksandra.luczak@up.poznan.pl
SŁAWOMIR KALINOWSKI, Polish Academy of Sciences, Institute of Rural and Agricultural Development, Poland, Email: skalinowski@irwirpan.waw.pl

Citation:

ALEKSANDRA ŁUCZAK, SŁAWOMIR KALINOWSKI (2022). A multidimensional comparative analysis of poverty statuses in European Union countries. International Journal of Economic Sciences, Vol. XI(1), pp. 146-160., 10.52950/ES.2022.11.1.009

Introduction

Nowadays, poverty and social exclusion are key world issues. They can almost be considered an anomalous part of the present day. These notions have appeared many times and for many years in scientific research and in EU and UN documents. More than 120 years have passed since Rowntree (1901) first considered poverty, and no solutions have been found that would effectively counteract its emergence. Sawhill (1988) and Brady (2019) also deplored it. It is therefore not surprising that many scientists are looking for the reasons for its formation, as well as for effective tools to prevent the deprivation of needs. However, these studies are usually fragmentary, focusing one or several selected causes. Brady and Burton (2016) indicate that there is too little interdisciplinary research, which leads to a lack of generalisation apart from selected poverty issues discussed in individual studies. Schiller (1989) indicates three causes of poverty – flawed character, restricted opportunity and Big Brother. Bradshaw (2007) suggests that it is the effect of individual deficiencies, geographical disparities, and cumulative and circumstantial origins. However, this does not exhaust the whole range of reasons for exclusion and falling below the poverty line. Some scientists indicate that these result from unproductive behaviour (Bertrand et al. 2004), place of residence (Lichter et al. 2012, Binder, 2014, Kalinowski 2015, Allard 2017), demographic reasons (Pearce, 1978; Lister 2007, Lewis & Campbell 2008, Cruz & Ahmed 2018, Ku et al. 2018), individual disabilities (Sen, 1999, Emerson, 2007), or structural determinants (Brady 2019). An important cause is unfavourable random events (Krishna 2011), including the effects of the COVID-19 pandemic, which has been the main cause of poverty in the last two years, having had an extreme impact on the socio-economic situation (Kalinowski & Łuczak, 2021, Kalinowski et al. 2022). On the other hand, Brady (2019) put the causes in three theoretical contexts – behavioural theories, structural theories and political theories. Their role and importance is varied, although some authors emphasise the special role of political issues in shaping poverty (Darby 1966).

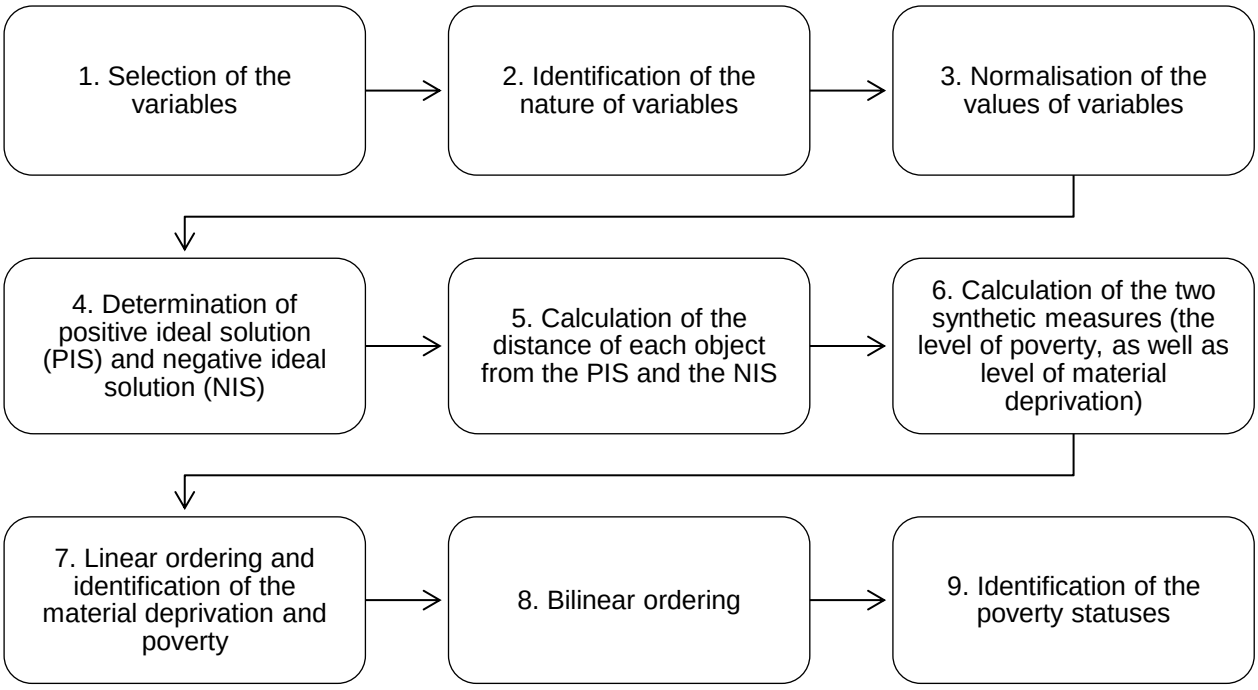
The importance of poverty and exclusion is evidenced by the fact that the eradication of poverty was given first place in the Sustainable Development Goals (SDG) of the 2030 Agenda. A UN General Assembly resolution on 25 September 2015, seeking to transform the world and introducing activities for well-being, adopted the aim of eradicating extreme poverty worldwide by 2030 (extreme poverty measured as people living on less than $ 1.25 a day). It has also been assumed that in accordance with national policies the percentage of men, women and children suffering from poverty in all its dimensions will be reduced by at least half. Individual countries have been obliged to implement appropriate systems and social-protection mechanisms for all, including the lowest social classes, and to include as many poor and excluded people as possible. One of the goals assumes that by 2030 all women and men, especially the poor and excluded, will have equal rights to access economic and natural resources, basic services, property and control over land and other property, inheritance, appropriate new technologies and financial services, including microfinance. The agenda also points to the need for action to build the resilience of the poor and excluded to extreme climate phenomena as well as economic, social and environmental shocks and natural disasters. However, building these is not possible without recognising the statuses of poverty and social exclusion. The aim of the paper is therefore to assess and compare the poverty statuses of EU countries in 2010 and 2018, a the specific purpose is to assess levels of poverty and material deprivation for EU countries. Social and economic changes taking place in EU countries provide a good reason to investigate the changes in poverty statuses and levels of material deprivation and poverty. The poverty status shows the situation of different EU countries against the background of other members, and specifies whether a country has a persistent or a transient situation. The level specifies the degree (intensity, depth) of material deprivation or poverty in a country in a defined period. Due to the complexity and importance of this problem, a comprehensive methodological approach needs to be adopted. The study relied on a positional version of the TOPSIS (Technique for Order Preference by Similarity to an Ideal Solution) (Hwang & Yoon 1981) using the Weber median (Lira et al. 2002, Młodak 2009, Łuczak &

Wysocki 2013). This made it possible to identify the poverty statuses and levels of material deprivation and poverty in different countries. Eurostat data provided an empirical basis for this study.

Research methods

The approach was based on TOPSIS (Technique for Order Preference by Similarity to an Ideal Solution) (Hwang and Yoon 1981) together with the Weber spatial median (Lira et al. 2002) to assess the poverty status of EU countries. In positional formulation, the TOPSIS procedure comprises the following nine steps (Figure 1).

Figure 1: Stages of procedure for the identification of poverty statuses



Source: Own adjustment based on Wysocki (2010), Łuczak (2016).

In the first stage, two independent sets of variables are used to describe the poverty and material deprivation aspects (criteria) in EU countries. In this stage a decisive role is played by substantive analysis supported by a statistical analysis. The second stage consists of identification of the nature of the variables selected. These are classified as stimulants, destimulants and nominants. Stimulants are variables that increase the level of the phenomenon, and destimulants decrease it. Moreover, nominants have a dual nature: they are stimulants in a certain range of values and destimulants in others.

In third stage, the variables for each criterion are normalised. The normalisation consists in rescaling the variables and unifying their orders of magnitude. There is a multitude of methods for the normalisation of variables (see Walesiak 2014). Variables considered to be destimulants may be converted into stimulants by a negative coefficient transformation (see eg. Łuczak, Wysocki 2013):

$$x_{ik} = a - b \cdot x_{ik}^{D},\ (i = 1,"\ 2, \dots,\ N;\ k \in I_D) \quad (1)$$

where: x_{ik}^{D} – value of *k*-th variable, identified as a destimulant, for *i*-th the EU country, *a* and *b* – constants set arbitrarily (usually, *a* = 0, *b* = 1), *N* – number of objects (EU countries), I_D – a set of

subscripts for destimulants.

In the process of assessing the poverty of EU countries, variables with atypical values or strong asymmetry of variables can occur. These affect the quality of synthetic measures. This problem can be solved by using positional standardisation with the Weber spatial median, which is robust to outliers (Lira et al. 2002, Młodak 2009, Łuczak, Wysocki 2013):

$$z_{ik} = \frac{x_{ik} - m\tilde{e}d_k}{1.4826 \cdot m\tilde{a}d_k} \quad \left(i = 1, 2, \ldots, \mathrm{N};\ k = 1, 2, \ \ldots, K^{(\bullet)}\right) \tag{2}$$

where: x_{ik} (z_{ik}) – value of *k*-th variable (normalised variable) for *i-th* EU country, *N* – number of EU countries; $K^{(\bullet)}$ – number of variables selected; $(\bullet)$ means *M* for material deprivation and *P* for the poverty; $m\tilde{e}d_k$ – component of the Weber median vector $\boldsymbol{\theta}$ for *k*-th variable, $m\tilde{a}d_k = m\tilde{e}d_i|x_{ik} - m\tilde{e}d_k|$ – absolute median deviation; 1.4826 is the constant scaling coefficient (see Młodak 2006, 2009).

The fourth stage consists in determining the positive ideal solution (PIS):

$$A^{(\bullet)+} = \left(\max_i(z_{i1}) \ ,\max_i(z_{i2}), \ldots, \max_i\left(z_{iK^{(\bullet)}}\right)\right) = \left(z_1^+, z_2^+, \ldots, z_{K^{(\bullet)}}^+\right) \tag{3}$$

and the negative ideal solution (NIS):

$$A^{(\bullet)-} = \left(\min_i(z_{i1}), \min_i(z_{i2}), \ldots, \min_i\left(z_{iK^{(\bullet)}}\right)\right) = \left(z_1^-, z_2^-, \ldots, z_{K^{(\bullet)}}^-\right). \tag{4}$$

The fifth stage is calculating the L_1 distances (Manhattan distances) for each country from the PIS:

$$d_i^{(\bullet)+} = \sum_{k=1}^{K^{(\bullet)}} |z_{ik} - z_k^+| \tag{5}$$

and from the NIS:

$$d_i^{(\bullet)-} = \sum_{k=1}^{K^{(\bullet)}} |z_{ik} - z_k^-|. \tag{6}$$

The sixth stage is the calculation of the two synthetic measures (the level of poverty; as well as level of material deprivation) based on the TOPSIS aggregation formula (Hwang, Yoon 1981):

$$S_i^{(\bullet)} = \frac{d_i^-}{d_i^+ + d_i^-}, \ (i = 1, 2, \ldots, N). \tag{7}$$

where $(\bullet)$ means *M* for the material deprivation and *P* for the poverty. The values of synthetic measure $S_i^{(\bullet)}$ range from 0 to 1. The higher the synthetic measure, the higher the level of material deprivation or poverty of the EU country.

Then the general multidimensional of poverty measure is calculated as:

$$S_i = \frac{S_i^M + S_i^P}{2}, \ (i = 1, 2, \ldots, N), \ 0 \leq S_i^{(\bullet)} \leq 1. \tag{8}$$

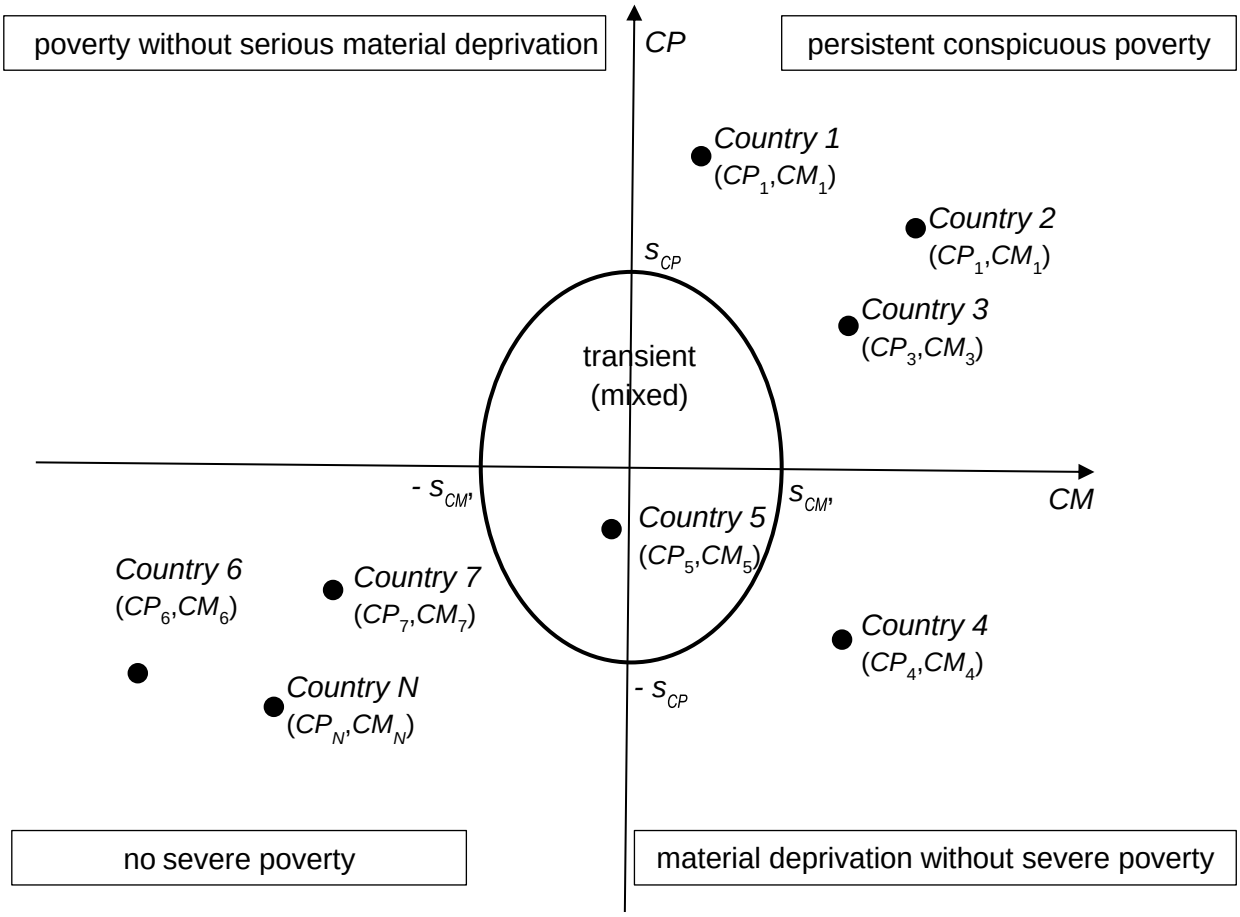
In the seventh stage, values of the synthetic measure S_i provide a basis for the creation of typological classes. This paper used the arbitral approach with the following numeric intervals for S_i values (table 1).

Table 1: Classes and names of levels depending on values the synthetic measure

Class number	1	2	3	4	5	6
Name of level	very high level	high level	medium-high level	medium-low level	low level	very low level
S_i	⟨0.8, 1.0⟩	⟨0.6, 0.8)	⟨0.5, 0.6)	⟨0.4, 0.5)	⟨0.2, 0.4)	⟨0.0, 0.2)

Source: Own adjustment based on Wysocki (2010).

Figure 2: Main poverty statuses



Source: Own adjustment based on Łuczak (2016).

Based on the values of synthetic measures S_i^M and S_i^P, EU countries can be ordered bilinearly to represent them in two-dimensional Euclidean space. The method proposed for bilinear ordering makes it possible to determine the poverty status of EU countries in relation to other Union members, and to identify their poverty types in combination with material deprivation. In this approach, the coordinates of a location relative to the material deprivation (CM_i) and poverty (CP_i) can be calculated as follows:

$$CM_i = S_i^M - IM,\ CP_i = S_i^P - IP, \tag{9}$$

where: IM and IP are the reference values for the material deprivation and poverty respectively,

which can be calculated as the means (medians) of measures S_i^M and S_i^P.

Four main poverty statuses can be identified depending on which of the values of synthetic measures predominate, i.e. (M+P+): persistent conspicuous poverty (above-average levels of the material deprivation and poverty); (M−P+): poverty without serious material deprivation (above-average level of the poverty); (M+P−): material deprivation without severe poverty (above-average level of the material deprivation); (M−P−): no severe poverty (below-average levels of the material deprivation and poverty). The poverty status of countries may be considered transient (mixed) within area bounded by ellipse:

$$CM = s_{CM}\cos t \text{ and } CP = s_{CP}\sin t \text{ for } 0 \leq t \leq 2\pi \quad (10)$$

where s_{CM}, s_{CP}– standard deviations of the coordinate values of the material deprivation (CM_i) and poverty (CP_i). Figure 2 shows a graphic visualisation of poverty statuses.

Results of the research

The research on the poverty statuses of EU countries relied on 2010 and 2018 Eurostat data. The study was carried out in 28 countries × two years' layout (N = 56), making it possible to perform comparative analyses. In the first step, the variables providing a description of material deprivation and poverty in EU countries were selected. The material deprivation field is described by the variables:

– inability to afford one week's annual holiday away from home (x_1);

– inability to afford a meal with meat, chicken, fish (or vegetarian equivalent) every other day (x_2);

– inability to keep home adequately warm (x_3);

– inability to face unexpected financial expenses (x_4);

– arrears (mortgage or rent, utility bills or hire purchase) from 2003 onwards (x_5);

– persons who cannot afford a colour TV (x_6);

– persons who cannot afford their own car (x_7);

– persons who cannot afford a washing machine (x_8);

– persons who cannot afford a telephone (x_9);

– persons who cannot afford a computer (x_{10}).

The poverty field was represented by the variables:

– persons living in households with very low work intensity in % population (x_{11});

– inequality of income distribution (x_{12});

– in-work at-risk-of-poverty rate (x_{13});

– long-term unemployment rate (x_{14});

– young people neither in employment nor in education and training (x_{15});

– at risk of poverty or social exclusion rate for elderly (65+) (x_{16});

– Gini coefficient of equivalised disposable income (x_{17});

– inability to make ends meet (x_{18});

– people at risk of poverty or social exclusion as a % of total population (AROPE) (x_{19});

– in-work at-risk-of-poverty rate by work intensity of the household (population aged 18 to 59 years) (x_{20});

Table 1: Values of synthetic measures of material deprivation and poverty and coordinates of the location of EU countries in 2010 and 2018

Country	Years	S_i^M	S_i^P	S_i	CM_i	CP_i	Level of		
							material deprivation	poverty	general poverty
Bulgaria	2010	0.734	0.625	0.680	0.620	0.310	high	high	high
Romania	2010	0.831	0.524	0.677	0.720	0.210	medium-high	medium-high	high
Latvia	2010	0.501	0.537	0.519	0.390	0.220	medium-high	medium-high	medium-high
…	…	…	…	…	…	…	…	…	…
Portugal	2010	0.237	0.387	0.312	0.120	0.070	low	low	low
Poland	2010	0.239	0.360	0.300	0.120	0.050	low	low	low
Slovakia	2010	0.227	0.320	0.274	0.110	0.010	low	low	low
…	…	…	…	…	…	…	…	…	…
Sweden	2010	0.059	0.206	0.132	-0.060	-0.110	low	low	very low
Netherlands	2010	0.044	0.126	0.085	-0.070	-0.190	very low	very low	very low
Luxembourg	2010	0.013	0.139	0.076	-0.100	-0.180	very low	very low	very low
Bulgaria	2018	0.478	0.560	0.519	0.360	0.250	medium-high	medium-high	medium-high
Romania	2018	0.378	0.465	0.422	0.260	0.150	medium-low	medium-low	medium-low
Greece	2018	0.249	0.552	0.400	0.130	0.240	medium-high	medium-high	medium-low
…	…	…	…	…	…	…	…	…	…
Slovakia	2018	0.166	0.231	0.199	0.050	-0.080	low	low	very low
Poland	2018	0.115	0.260	0.187	0.000	-0.050	low	low	very low
Belgium	2018	0.099	0.273	0.186	-0.020	-0.040	low	low	very low

…	…	…	…	…	…	…	…	…	…
Slovenia	2018	0.084	0.172	0.128	-0.030	-0.140	very low	very low	very low
Netherlands	2018	0.045	0.176	0.111	-0.070	-0.140	very low	very low	very low
Czechia	2018	0.051	0.076	0.064	-0.060	-0.240	very low	very low	very low
Mean	2010	0.210	0.331	0.270	IS=0.115	IE=0.315			
Mean	2018	0.134	0.309	0.222					
min	2010	0.013	0.126	0.076		×	×	×	×
min	2018	0.026	0.076	0.064					
max	2010	0.831	0.625	0.680					
max	2018	0.478	0.560	0.519					

Source: own calculations based on Eurostat data.

The second step assumed that only one of the variables is a destimulant (x_{12}) while others are stimulants. The destimulating variable was converted into stimulant by a negative coefficient transformation. The set of variables retained for the study includes variables which demonstrate a strong and very strong asymmetry. This is especially true for variables x_2, x_3 and x_6-x_{11}. The positional method was therefore used, as it is robust against variable values that are not typical. The variables were normalised using the Weber median standardisation (stage 3). The calculations of this median were performed using R in the robustX package (Stahel, Maechler 2019). Following this, L_1 distances from each object (EU country) to the positive ideal solution and negative ideal solution were used to calculate the synthetic measures of material deprivation and poverty (stages 4-6).

The values of synthetic measures of material deprivation and poverty of EU countries are shown in Table 1. The synthetic measure of general poverty in these countries was calculated as the mean of sub-measures (Table 1), and varied from 0.076 to 0.680 in 2010 and from 0.064 to 0.519 in 2018. This made it possible to identify five material deprivation types for EU countries in 2010 (from very low to high) and four types in 2018 (from very low to medium-high) (Tables 1 and 2). Five types of poverty were also in 2010 (from very low to high) and four types in 2018 (from very low to medium-high). It should be emphasised that from 2010 to 2018, the levels of poverty and material deprivation decreased, which was also reflected in the general poverty measure.

Table 2: Typological classification of EU countries by poverty and material deprivation levels in 2010 and 2018

Typological class	Value of synthetic measure	Level of											
		material deprivation				poverty				general poverty			
		2010		2018		2010		2018		2010		2018	
		N_c	%	N_c	%	N_c	%	N_c	%	N_c	%	N_c	%
1 (very high)	⟨0.80, 1.00⟩	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
2 (high)	⟨0.60, 0.80)	1	3.6	0	0.0	1	3.6	0	0.0	2	7.1	0	0.0
3 (medium-high)	⟨0.40, 0.50)	2	7.1	2	7.1	2	7.1	2	7.1	1	3.6	1	3.6
4 (medium-low)	⟨0.50, 0.60)	6	21.4	5	17.9	6	21.4	5	17.9	0	0.0	2	7.1
5 (low)	⟨0.20, 0.40)	14	50.0	16	57.1	14	50.0	16	57.1	15	53.6	10	35.7
6 (very low)	⟨0.00, 0.20)	5	17.9	5	17.9	5	17.9	5	17.9	10	35.7	15	53.6

N_c – the number of objects in c-th class (c =1, ..., 6).

Source: own calculations based on Eurostat data.

The method proposed is also suitable for determining the poverty statuses of EU countries in relation to each other. This made it possible to identify the relevant statuses of poverty by calculating the coordinates of the countries' location.

Table 3: Statuses and levels of poverty of EU countries in 2010

Poverty statuses	General poverty level	Countries
Persistent conspicuous poverty (significantly above averages in EU countries) (M+P+)	high	Bulgaria, Romania
	medium-high	Latvia
	low	Lithuania, Croatia, Hungary, Cyprus, Greece, Estonia
Transient unnoticeable poverty (CM_i and CP_i close to 0)	low	Portugal, Poland, Slovakia, Spain, Italy, Ireland, Malta, Belgium, United Kingdom
	very low	Germany, Slovenia, Austria, France, Denmark, Sweden
Non severe poverty (significantly below averages in EU countries) (M–P–)	very low	Finland, Czechia*, Netherlands, Luxembourg

* very low positive material deprivation.

Source: own calculations based on Eurostat data.

Table 4: Statuses and levels of poverty of EU countries in 2018

Poverty statuses	General poverty level	Countries
Persistent conspicuous poverty (significantly above average in EU countries) (M+P+)	medium-high	Bulgaria
	medium-low	Romania, Greece
	low	Latvia, Cyprus
Transient unnoticeable poverty (CM_i and CP_i close to 0)	low	Lithuania, Croatia, Italy, Estonia, Spain, Portugal, Hungary, United Kingdom
	very low	Slovakia, Poland, Belgium, Malta, Ireland, Germany, Denmark, France, Sweden, Luxembourg, Austria
No severe poverty (significantly below averages in EU countries) (M–P–)	very low	Finland, Slovenia, Netherlands, Czechia

Source: own calculations based on Eurostat data.

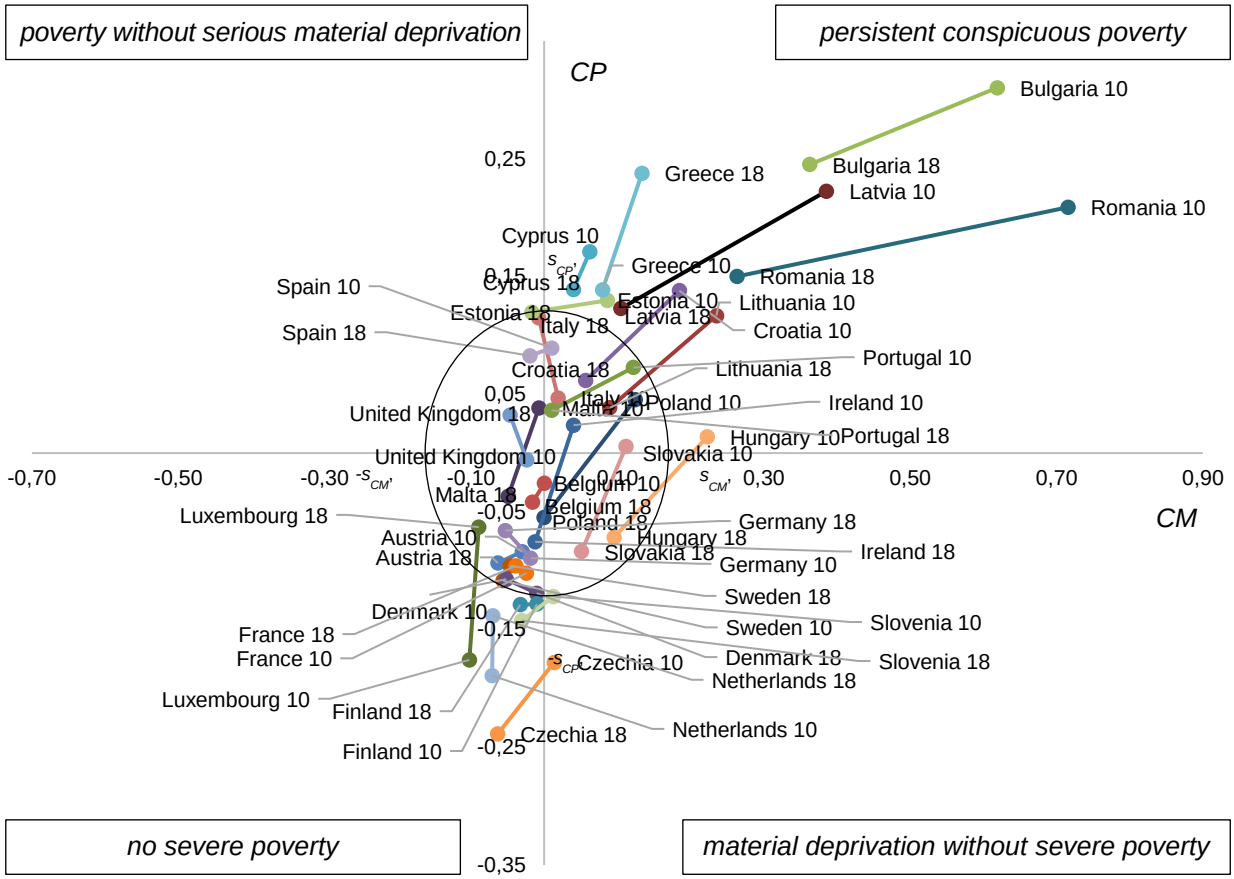
Three main types of poverty status were identified based on the prevalence of the material deprivation and poverty levels. In 2010, nine EU countries were afflicted by a persistent

conspicuous poverty type (M+P+) (Table 3). These were two countries at a high level of general poverty – (Bulgaria and Romania), one country – Latvia – at medium-high level and six countries at a low general poverty level. In 2018, five countries had a persistent conspicuous poverty status (Table 4). A large number of countries had a transient unnoticeable poverty status, in 2010 this type was identified in fifteen countries, and in 2018 in nineteen countries. The no severe poverty type (M–P–) was recorded in four EU countries in 2010 and 2018.

It should be noted, that the incidence of poverty without serious material deprivation status (M–P+) and material deprived without severe poverty status (M+P–) was not explicitly identified. Only certain tendencies towards these statuses have emerged. For example, in 2010 Czechia had coordinates CM_i =0.010, and CP_i=–0.180, which points to poverty without a serious material deprivation status. There may be several reasons for this, but one of the most important is that household income is not rising as fast as the price of goods and services. For example, Hromada and Cermakova (2021) note that "in recent years, there has been a significant increase in the prices of all types of real estate". Other reasons include institutional environment (Cermakova et al. 2020) and social safety in work and family life of women (Jasova & Kaderabkova 2019). It is interesting that in the Czechia, the impact of institutional factors on unemployment is not as strong as could be expected (Jasova et al. 2016) However, we can rather consider a no severe poverty status, because the level of material deprivation is very low, close to 0. In 2010 and 2018 countries with a transient unnoticeable poverty status had trends towards these statuses, but CM_i and CP_i were close to 0.

It is also worth mentioning that random effects strongly influence countries' situations. It should be noted that sometimes countries without severe poverty (e.g. Czechia, Slovenia) coped better with this type of difficult situation than countries with persistent conspicuous poverty (e.g. Greece). This is confirmed by the research by Łuczak and Kalinowski (2022) on the epidemiological situation and its changes at the beginning of the pandemic in European countries. However, this conclusion is not unequivocal. It is also noted that countries with many difficult experiences, i.e., Poland, where transient unnoticeable poverty was identified, also coped well and had a stable situation.

Figure 3: Changes in the poverty statuses of EU countries between 2010 and 2018



s_{CM} , s_{CP} – standard deviations of location coordinates of EU countries relative to the material deprivation and poverty fields, with s_{CM}= 0.157 and s_{CP} = 0.126 respectively. The area bounded by an ellipse means countries with a transient status (average status in UE).

Source: own elaborations based on and Eurostat data.

Figure 3 shows the changes in the development statuses of EU countries in 2010 and 2018. The countries with the greatest change (above 0.1 of $S_i^M$and S_i^P) were Latvia and Poland. In addition, it should be noted that Romania showed the greatest change in the material deprivation level (above 0.45), and there was a significant change (above 0.25) in Latvia and Bulgaria.

Summary

This paper proposed an approach to the multidimensional analysis of poverty based on positional TOPSIS and bilinear ordering. Bilinear ordering allows the projection of EU countries described by variables in a multidimensional space onto the Euclidean plane. Such a geometric approach is helpful in determining the poverty position of each country in relation to others. With these methods, it was possible to determine the poverty levels and material deprivation levels. The above provided a basis for identifying three types of poverty statuses of EU countries, i.e.: persistent conspicuous poverty, transient unnoticeable poverty and no severe poverty. This study made it possible to assess and compare EU countries by poverty status in 2010 and 2018. Central and Eastern

European countries (especially Romania, Latvia, Bulgaria and Poland) witnessed a clear improvement in their statuses between 2010 and 2018. In turn, no countries who experienced a clear deterioration their status were identified.

The main methodological premise of the presented methods is their adaptability. Designated states and levels of poverty can be the basis for the construction of poverty reduction programs. Programming activities at the country level cannot be a one-off act and it is by nature a continuous process, in which changes in the situation of individual countries and their expectations require appropriate adjustments in the strategic anti-poverty programs. Moreover the programming activities should be harmonised with other strategic programs and the budget.

The presented research results are an introduction to the ongoing discussion on the relationship between poverty and deprivation of needs. It is worth noting that the components of severe deprivation have changed since 2021. Other variables indicating a forced non-fulfillment of needs were also taken into account. Instead of 4 out of 7 items of deprivation, the lack of fulfillment of needs is currently reflected in the lack of fulfillment of at least 7 out of 13 of these items (6 related to the individual and 7 related to the household). This change can contribute to further shifts in the status of individual countries. Before the next analyzes that the authors will undertake, the question arises, to what extent will the new indicators of material deprivation more thoroughly indicate the areas of social exclusion.

References

ALLARD, S.W. (2017) *Places in Need*. New York: Russell Sage.

BERTRAND, M., Mullainathan S. (2001) Do People Mean What They Say? Implications for Subjective Survey Data, *American Economic Review, Papers and Proceedings* 91(2), pp. 67-72.

BINDER, P. (2014) *Młodzi a bieda. Strategie radzenia sobie w doświadczeniu młodego pokolenia wsi pokołchozowych i popegeerowskich* (Young and poor: Strategies of coping with the experience of the young generation of the post-kolkhoz farm and post-state collective farm villages). Warszawa: Instytut Filozofii i Sociologii PAN.

BRADSHAW, T.K. (2007) Theories of Poverty and Anti-Poverty Programs in Community Development, Community Development, 38:1, pp. 7-25, https://doi.org/10.1080/15575330709490182.

BRADY, D. & BURTON, L.M., eds. (2016). *The Oxford Handbook of the Social Science of Poverty*. Oxford, UK: Oxford Univ. Press.

BRADY, D. (2019) Theories of the causes of poverty. *Annu. Rev. Sociol*. 45, pp. 155-175. https://doi.org/10.1146/annurev-soc-073018-022550.

CRUZ, M.S., AHMED, A. (2018) On the impact of demographic change on economic growth and poverty. *World Dev.* 105, pp. 95–106, https://doi.org/10.1016/j.worlddev.2017.12.018.

CERMAKOVA, K., PROCHAZKA, P., KUREKOVA, L., & ROTSCHEDL, J. (2020) Do Institutions Influence Economic Growth? *Prague Economic Papers*, *29*(6), pp. 672-687, https://doi.org/10.18267/j.pep.749.

DARBY, M. R. (1996) Facing and Reducing Poverty. In: M. R. Darby (ed.), *Reducing Poverty in America: Views and Approaches* (pp. 3–12). Thousand Oaks, California: Sage.

EMERSON, E. (2007) Poverty and people with intellectual disabilities. Ment. Retard. Dev. Disabil. Res. Rev. 13(2), pp. 107-113, https://doi.org/10.1002/mrdd.20144.

EUROSTAT (2018) ec.europa.eu/eurostat/data/database (access: 7.04.2020).

HWANG C-L. & YOON K. (1981) *Multiple attribute decision making: Methods and applications*. Berlin: Springer.

HROMADA, E. & CERMAKOVA, K. (2021) Financial unavailability of housing in the Czech Republic and recommendations for its solution. *International Journal of Economic Sciences* X(2), pp. 47-57, https://doi.org/10.52950/ES.2021.10.2.003.

JASOVA, E., CERMAKOVA, K., KADERABKOVA, B. & PROCHAZKA, P. (2016) Působení institucionálních faktorů na strukturální a cyklickou nezaměstnanost v zemích Visegrádské skupiny. (Influence of Institutional Factors on Structural and Cyclical Unemployment in the Countries of the Visegrad Group], *Politická ekonomie* 64(1), pp. 34-50, https://doi.org/10.18267/j.polek.1053.

JASOVA, E. &, KADERABKOVA, B. (2019). Analýza vlivu slaďování rodinného a pracovního života žen prizmatem míry nezaměstnanosti neakcelerující inflaci v České republice (Analysis of Effects of Reconciliation of Family and Work Life of Women Through the Prism of Non-accelerating Inflation Rate of Unemployment in the Czech Republic), *Politická ekonomie* 67(3), pp. 316-332, https://doi.org/10.18267/j.polek.1216.

KALINOWSKI, S. (2015) *Poziom życia ludności wiejskiej o niepewnych dochodach* (The living standards of the rural population with uncertain income). Warszawa: Państwowe Wydawnictwo Naukowe.

KALINOWSKI, S. & ŁUCZAK, A. (2021). Social (in)security – the ambivalence of villagers' perceptions during COVID-19. Problemy Polityki Społecznej, 54, pp. 48-67. https://doi.org/10.31971/pps/145154.

KALINOWSKI, S., ŁUCZAK, A. & KOZIOLEK, A. (2022) "The Social Dimension of Security: The Dichotomy of Respondents' Perceptions during the COVID-19 Pandemic" Sustainability 14(3), 1363. https://doi.org/10.3390/su14031363

KRISHNA, A. (2011). *One Illness Away.* Oxford, UK: Oxford Univ. Press.

KU, I., LEE, W., LEE, S. & HAN, K. (2018). The role of family behaviors in determining income distribution: the case of South Korea. *Demograph*y 55, pp. 877–99.

LEWIS, J. & CAMPBELL, M. (2007) UK work/family balance policies and gender equality, 1997-2005. *Soc. Polit. Int. Stud. Gend. State Soc.* 14(1), pp. 4-30. https://doi.org/10.1093/sp/jxm005.

LICHTER, D.T., PARISI, D. & TAQUINO, M.C. (2012) The geography of exclusion: race, segregation and concentrated poverty. *Soc. Probl.* 59, pp. 364–88.

LIRA, J., WAGNER, W. & WYSOCKI, F. (2002) Mediana w zagadnieniach porządkowania obiektów wielocechowych (Median in the ordering problems of multi-feature objects). In: *Statystyka regionalna w służbie samorządu terytorialnego i biznesu* (Regional statistics in the service of local government and business), ed. Jan Paradysz, pp. 87-99. Poznań: Akademia Ekonomiczna w Poznaniu.

LISTER, R. (2007) *Bieda*, Wydawnictwo Sic!, Warszawa.

ŁUCZAK, A. (2016) *Wielokryterialne metody ilościowe w diagnozowaniu i modelowaniu rozwoju lokalnego* (Multicriteria quantitative methods in diagnosing and modeling local development). Poznań: Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu.

ŁUCZAK, A. & KALINOWSKI, S. (2022) Fuzzy Clustering Methods to Identify the Epidemiological Situation and Its Changes in European Countries during COVID-19. *Entropy* 24(1), 14. https://doi.org/10.3390/e24010014.

ŁUCZAK, A. & WYSOCKI, F. (2013) Zastosowanie mediany przestrzennej Webera i metody TOPSIS w ujęciu pozycyjnym do konstrukcji syntetycznego miernika poziomu życia (The application of spatial median of Weber and the method TOPSIS in positional formulation for the construction of synthetic measure of standard of living). *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu* 278, pp. 63-73.

MŁODAK, A. (2006). *Analiza taksonomiczna w statystyce regionalnej* (Taxonomic analysis in regional statistics). Warszawa: Difin.

MŁODAK, A. (2009). Historia problemu Webera (History of Weber's problem). *Matematyka Stosowana* 10, pp. 3-21.

PEARCE, D. (1978) The feminization of poverty: Women, welfare and work. *Urban Soc. Change Rev*. 11(1-2), pp. 28-36.

ROWNTREE, B.S. (1901) *Poverty: A Study of Town Life*. London.: Macmillan.

SAWHILL, I.V. (1988) Poverty in the U.S.: Why is it so persistent? *J. Econ. Lit*. 26:pp. 1073–1119

SCHILLER, B. (1972) *The Economics of Poverty and Discrimination*. 1st ed. New Jersey: Prentice-Halle.

SEN, A. (1999). *Development as Freedom*. New York: Anchor Books

STAHEL, W. & MAECHLER, M. (2019) robustX: 'eXtra' / 'eXperimental' Functionality for Robust Statistics; R package, Version 1.2-4. Available online: https://cran.r-project.org/web/packages/robustX/index.html (access 4.05.2020).

WALESIAK, M. (2014) Przegląd formuł normalizacji wartości zmiennych oraz ich własności w statystycznej analizie wielowymiarowej (Data normalization in multivariate data analysis. An overview and properties). *Przegląd Statystyczny* 61 (4), pp. 363-372.

WYSOCKI, F. (2010) *Metody taksonomiczne w rozpoznawaniu typów ekonomicznych rolnictwa i obszarów wiejskich* (Taxonomic methods in recognizing economic types of agriculture and rural areas). Poznań: Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu.