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## **Disparities in employment and education across European Union member states**

### *Abstract*

The article focuses on disparities in education and employment. The main aim is to evaluate scope and scale of disparities in education and employment among the EU Member States. The spatial scope of the research covers 27 EU Member States. The time scope of the research covers the period 2016–2023 (selected four years, in particular: 2016, 2019, 2020, 2023). The following hypothesis was verified during the research: Disparities in education and employment between EU countries are widening. The study was carried out using two selected methods of multivariate comparative analysis, namely Hellwig taxonomic measure of development (TMD) and standard deviations' method of grouping linearly ordered objects.

The significance of balanced development was stressed numerous times in the EU documents. The EU Action Plan for European Pillar of Social Rights emphasized the need to achieve high employment rate, reduce gender employment gap, lower early school leavers from education and training rate, promote tertiary education attainment and adult participation in learning. The necessity to solve the problem of young people NEET was also underlined.

The conducted research confirmed the truth of the hypothesis assuming increasing disparities in employment and education across EU countries. The largest employment and education disparities are between the Scandinavian countries and Romania, Greece, Italy, Spain. The Scandinavian countries are distinguished by high employment rates, really low gender employment gaps, extremely high enrollment in higher education and life-long learning, relatively low NEET rates. As for the countries that make up the G1 group, their situation is due to coupled problems such as low employment rates, high NEET rates, relatively high unemployment rates, as well as large gender employment gaps and extremely low intensity of adult participation in training.

The persistence and rise of disparities in education and employment between EU Member States is a serious problem for the EU, as this situation makes it difficult to create a more cohesive and convergent European Union. Therefore, active actions should be advocated to promote education and greater professional activity in those EU countries that struggle most with the problem of low employment and education.

*Keywords:* disparities, employment, education, European Union, EU Member States.

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## Dysproporcje w zatrudnieniu i edukacji pomiędzy państwami członkowskimi Unii Europejskiej

### *Abstrakt*

Artykuł koncentruje się na problemie dysproporcji w zatrudnieniu i edukacji. Głównym celem jest zbadanie zakresu i skali dysproporcji z zakresu zatrudnienia i edukacji między państwami członkowskimi UE. Zakres przestrzenny prowadzonych badań to 27 państw członkowskich UE. Zakres czasowy prowadzonych analiz to okres 2016–2023 (wybrane cztery lata, a w szczególności: 2016, 2019, 2020, 2023). W trakcie badań weryfikowano hipotezę, zakładającą, że: Nierówności z zakresu edukacji i zatrudnienia występujące między krajami UE pogłębiają się. Badanie przeprowadzono z wykorzystaniem dwóch wybranych metod wielowymiarowej analizy porównawczej, a mianowicie taksonomicznej miary rozwoju Hellwiga (TMD) oraz metody odchyłeń standardowych jako metody grupowania obiektów uporządkowanych liniowo.

Znaczenie zrównoważonego rozwoju było wielokrotnie podkreślane w dokumentach unijnych. W Planie Działania UE na rzecz Europejskiego Filaru Praw Socjalnych podkreślono potrzebę osiągnięcia wysokiego wskaźnika zatrudnienia, zmniejszenia różnic w zatrudnieniu kobiet i mężczyzn, obniżenia wskaźnika osób przedwcześnie kończących edukację i szkolenia, promowania zdobywania wyższego wykształcenia i uczestnictwa dorosłych w uczeniu się. Podkreślono również konieczność rozwiązania problemu młodzieży NEET.

Przeprowadzone badania potwierdziły prawdziwość hipotezy zakładającej narastanie dysproporcji w zatrudnieniu i edukacji między państwami UE. Największe różnice w zatrudnieniu i edukacji występują między krajami skandynawskimi a Rumunią, Grecją, Włochami i Hiszpanią. Kraje skandynawskie wyróżniają się wysokimi wskaźnikami zatrudnienia, bardzo niską genderową luką w zatrudnieniu, wyjątkowo wysokim poziomem uczestnictwa w szkolnictwie wyższym i kształceniu ustawicznym oraz stosunkowo niskimi wskaźnikami NEET. Sytuacja państw tworzących skupienie G1 wynika z wielu powiązanych problemów, takich jak niski poziom stopy zatrudnienia, wysoki poziom wskaźnika NEET, stosunkowo wysoka stopa bezrobocia, a także duża genderowa luka w zatrudnieniu oraz bardzo niska intensywność kształcenia ustawicznego.

Utrzymywanie się oraz wzrost dysproporcji w obszarze edukacji i zatrudnienia pomiędzy państwami członkowskimi UE stanowi poważny problem dla UE, gdyż taka sytuacja utrudnia tworzenie bardziej spójnej i konwergentnej Unii Europejskiej. Dlatego też należy postulować aktywne działania na rzecz promocji edukacji i większej aktywności zawodowej w tych krajach UE, które najbardziej borykają się z problemem niskiego zatrudnienia i wykształcenia.

*Słowa kluczowe:* dysproporcje, zatrudnienie, edukacja, Unia Europejska, państwa członkowskie UE.

JEL: D63, I24, O57.

## INTRODUCTION

The article focuses on education and employment in European Union Member States. The main aim is to evaluate scope and scale of disparities in employment and education across the EU Member States with the implementation of selected methods of multivariate comparative analysis. The following hypothesis was verified during the research: Disparities in education and employment among EU countries

are widening. The studied research problem is actual and of vital importance due to the fact that increasing instability in the global economy in the 21<sup>st</sup> century – resulting from both economic and non-economic factors – is causing cascading and accumulating problems for the EU, disrupting and disturbing the process of balanced development of the economies of the EU. Hence, the need to reduce disparities, repeatedly emphasized in EU documents, still persists and requires the development of a new approach.

## LITERATURE REVIEW

Considerable evolution of the perception of socioeconomic disparities and inequalities is observed. Rawls (1994), Sen (1995), Piketty (2014) addressed the inequality problem in equity theory. They argued that equity sets in motion a mechanism to reduce inequality by facilitating access to goods and services through an increase in the economic powers of the state (Rawls, 1994; Sen, 1995; Piketty, 2014). Atkinson (2018) states that inequality is not inevitable; on the contrary, it results from conscious behavior. Milanovic (2016) studied trends in global income disproportions (both between and within nation-states) and stated that economic history of the world was actually history of inequality, the inequality which resulted from both economic and political factors. According to Boushey (2021), huge disparities created during the last 50 years have made economy less efficient and less resilient to shocks; reducing disparities can, therefore, form the right key to ensuring future prosperity. CASE listed the following global and regional drivers of multidimensional inequality: a. Dominant narratives and corresponding policies; b. Values, norms, practices and structures perpetuating discrimination and intolerance, especially discrimination against women; c. Financialization, including power of capital and global elites; d. Power of global corporations and lack of effective regulation; e. Lack of financial transparency and ineffective global tax governance; f. Distorted structure of global trade; g. Climate change and environmental degradation; h. Conflict, global displacement and international migration policies; i. Distorted technological development, scientific progress and innovation; j. Lack of effective global governance (CASE at LSE, 2024). Breunig and Majeed (2020) analyzed how both inequality and poverty influence economic growth. Franzini and Raitano (2013), as well as Neidhöfer (2019) studied correlation between inequality and its intergenerational transmission. Gajardo (2016) focused on the impact of disparities on development. Links between digital technology and e-commerce development and economic disparities exemplified by China were studied by Liu, Qian, Gu and Li (2024). Association between economic complexity and income disproportions was analyzed by Hu and Hoang (2020).

Income differences between and within subregions in Europe from 1980 to 2021 were studied by Neef and Sodano (2022). The problem of large income disparities

in Europe was also surveyed by Yanatma (2024), as well as Faggian, Mechelangeli and Tkach (2018). The research on relation between income disproportions and socioeconomic development in the EU was conducted by Litwiński (2019). Pawlas (2016) studied disparities in socioeconomic development in the EU from 2003 to 2014. The impact of the COVID-19 pandemic on disparities in the EU was surveyed by Eurofound (2023), as well as Palomino, Rodriguez and Sebastian (2020). Brunori (2017) analyzed the perception of inequality of opportunity in Europe.

The issue of disparities and need for more balanced growth and development has been stressed in the EU (earlier: the European Communities) treaties (The Treaty of Rome, 1957, Article 2; Single European Act, 1987, Article 130a, 130b, 130, 130c, 130Q; Treaty on European Union, 1992, Article 3, 3A, 103; Article 1; Treaty of Amsterdam, 1997; The Treaty of Lisbon, 2007, Article 2, 163). Moreover, the importance of disparities' reduction was included in the Europe 2020 Strategy (European Commission, 2010). The need to promote human capital development and increase employability was indicated in *A New Skills Agenda for Europe. Working together to strengthen human capital, employability and competitiveness* (European Commission, 2016). *A Roadmap for Recovery. Towards a More Resilient, Sustainable and Fair Europe*, was the EU's first response to the outbreak of COVID-19 pandemic and possible increase of disparities caused by it (European Council, 2020). Once again, the issue of economic and social differences and the need to reduce the disproportions were raised in the European Pillar of Social Rights and the Action Plan dedicated to it (European Commission, 2021).

The reviewed theories and prior research indicated the significance of the problem of disparities and rising inequalities due to its effect on processes of economic development, impact on poverty reduction, social cohesion, political stability, economic policy and international cooperation. The increased emphasis on education and employment in the EU documents, strategies and plans indicated the need for a more thorough examination of disparities in education and employment across the EU Member States.

## RESEARCH METHODS AND INPUT DATA

Disparities among EU Member States can be studied in regard to several areas including income, employment, education, health. Due to a limited scope of the article, the conducted research was limited to employment and education disparities across the EU Member States. The first step was to select the set of diagnostic variables. Initially the decision was taken to describe situation in the EU Member States with the use of eight diagnostic variables:

- X1 – employment rate,
- X2 – unemployment rate,

X3 – gender employment gap,

X4 – early school leavers from education and training,

X5 – tertiary education attainment,

X6 – young people neither in employment, nor in education or training,

X7 – adult participation in learning in the last four weeks,

X8 – individuals who have basic or above basic overall digital skills (the so called Digital Skills Indicator 2.0, i.e. a composite indicator, based on selected activities related to internet or software use that individuals aged 16–74 perform in five specific areas (a. Information and data literacy, b. Communication and collaboration, c. Digital content creation, d. Safety, and e. Problem solving).

Variables X1, X2 and X3 described the employment situation. Variables 4, 5, and 7 allowed for comparison of the situation in the area of education. Variable 7 combined both areas, i.e. education and employment. Variable X8 described the digital skills which seemed important having in mind the gradual advancement of digital economy. Finally, however, variable X8 was excluded due to the fact that it was not possible to collect complete data set (statistical information regarding Digital Skills Indicator 2.0 was available for 2021 and 2022 only). Therefore, the multivariate comparative analysis was based on seven variables (X1–X7). It should be stressed here that the EU Action Plan for European Pillar of Social Rights highlights the importance of EU Member States achieving better results in all the above-mentioned variables.

The study was carried out using two selected methods of multivariate comparative analysis, i.e. Hellwig taxonomic measure of development (TMD) and standard deviations' method of grouping linearly ordered objects. Methods of multivariate comparative analysis allow for comparison of objects described by many variables. Hellwig TMD method makes it possible to hierarchize the studied objects (i.e. to rank 27 EU Member States according to their education and employment situation). The application of the standard deviations' method allows for the division of the studied objects into four clusters containing similar objects (i.e. the division of the 27 EU Member States into four groups containing similar objects in regard to education and employment situation).

After selecting the set of diagnostic variables, the character of each of the variables was determined. Three variables were considered stimulants (X1 – employment rate, X5 – tertiary education attainment and X7 – adult participation in the last four weeks) while the remaining four were variables were considered destimulants (X2 – unemployment rate, X3 – gender employment gap, X4 – early school leavers from education and training, as well as X6 – young people neither in employment, nor in education or training). Variables were standardized and development model was constructed – a model unit, where diagnostic of variables were determined according to the rule, where:  $z_{0j} = \max_i(z_{ij})$  for stimulants or  $z_{0j} = \min_i(z_{ij})$  for destimulants. The distance of  $i$ -unit from the

development model was calculated using Euclid's measure:  $d_{\phi} = \sqrt{\sum_{j=1}^m (z_j - z_p)^2}$

TMD was calculated according to the formula (Hellwig 1968; Pluta 1986):

$$\text{TMD}_i = 1 - \frac{d_{\phi}}{d_o}, \quad i=1,2,\dots, n,$$

where:  $d_o = \bar{d}_o + 2S_o$ , and  $\bar{d}_o = \frac{1}{n} \sum_{i=1}^n d_{\phi}$ ,  $S_o = \sqrt{\frac{1}{n} \sum_{i=1}^n (d_{\phi} - \bar{d}_o)^2}$ , while:  $\text{TMD}_i \in [0; 1]$ .

Then, the analyzed EU Member States were hierarchized according to TMD (the higher the position of a state, the better the situation in regard to education and employment).

Finally, cluster analysis was implemented in order to identify groups of EU Member States with a similar level of employment and education. The application of the standard deviations' method of grouping linearly ordered was us to divide 27 EU Member States into four groups (clusters), according to the following classification rule (Pawlas, 2018):

$$G_1 : s_i < \bar{s} - S(s),$$

$$G_2 : \bar{s} > s_i \geq s_i - S(s),$$

$$G_3 : \bar{s} + S(s) > s_i \geq \bar{s},$$

$$G_4 : s_i \geq \bar{s} + S(s),$$

where:  $\bar{s}$  – arithmetic mean of synthetic variable (in this study: arithmetic mean of TMD), while  $S$  – standard deviation of synthetic variable (in this study: standard deviation of TMD),  $s_i$  – value of the synthetic variable of the object  $i$  (in this study: TMD value in  $i$  EU member State). G4 brings together EU countries with the most favorable situation in the area of education and employment, while group G1 gathers EU countries with the worst situation in the two analyzed areas.

The research was conducted for the selected years from 2016 to 2023: 2016 was the 1<sup>st</sup> year taken into consideration due to the fact that A New Skills Agenda for Europe was introduced by the EU in 2016, 2019 (the last pre-pandemic year), 2020 (the first year of COVID-19 pandemic), 2023 (the last year for which complete data set was available). Statistical information used for the research was taken from EUROSTAT database. Input data are presented in tables 1 and 2.

**Table 1. Input data – year 2016 and 2019**

Economy	2016							2019						
	X1	X2	X3	X4	X5	X6	X7	X1	X2	X3	X4	X5	X6	X7
Belgium	67.7	7.9	9.3	8.8	45.6	12.2	7.0	70.5	5.5	8.0	8.4	47.5	11.2	8.2
Bulgaria	67.0	8.6	6.8	13.8	33.8	22.4	2.2	74.3	5.2	8.1	13.9	32.5	16.7	2.0
Czechia	76.7	4.0	16.0	6.6	32.8	11.1	8.8	80.3	2.0	15.0	6.7	35.1	9.8	8.1
Denmark	76.0	6.0	6.9	7.5	46.7	8.4	28.0	78.3	5.0	7.2	9.9	49.4	9.6	25.3
Germany	77.6	3.9	8.1	10.3	33.2	10.0	8.5	79.6	3.0	8.0	10.3	35.5	8.6	8.2
Estonia	77.0	6.8	6.8	11.4	43.3	13.3	15.3	80.5	4.5	6.0	11.2	44.0	9.7	19.6
Ireland	71.3	8.4	12.2	6.0	54.6	14.5	6.5	75.0	5.0	12.5	5.1	55.4	11.4	12.6
Greece	55.9	23.9	19.5	6.2	42.7	21.9	4.0	60.8	17.9	20.7	4.1	43.1	17.5	3.9
Spain	63.9	19.6	11.5	19.0	40.1	18.1	9.4	68.0	14.1	11.9	17.3	44.7	14.9	10.6
France	70.7	10.1	6.1	8.8	43.7	13.6	18.8	72.3	8.4	5.9	8.2	47.5	12.4	19.5
Croatia	61.4	13.1	9.6	2.8	29.3	19.5	3.0	66.7	6.6	10.5	3.0	33.1	14.2	3.5
Italy	61.4	11.7	19.9	13.8	26.2	24.4	8.3	63.5	9.9	19.4	13.3	27.8	22.3	8.1
Cyprus	68.7	13.0	9.7	7.6	53.4	18.0	6.9	75.7	7.1	11.6	9.2	58.8	14.1	5.9
Latvia	73.0	9.7	2.8	10.0	42.8	13.3	7.3	77.3	6.3	3.7	8.7	45.7	10.2	7.4
Lithuania	75.2	7.9	1.9	4.8	58.7	10.7	6.0	78.2	6.3	1.6	4.0	57.8	10.9	7.0
Luxembourg	70.7	6.3	11.0	5.5	54.6	6.8	16.8	72.8	5.6	9.1	7.2	56.2	6.5	19.1
Hungary	73.7	5.0	9.7	12.4	33.0	12.0	6.3	77.6	3.3	11.0	11.8	33.4	11.0	5.8
Malta	71.1	4.7	25.5	15.6	32.0	9.4	7.8	75.6	4.1	22.0	14.2	39.9	8.5	11.8
Netherlands	77.9	7.0	10.5	8.0	45.7	6.9	18.8	81.0	4.4	8.9	7.5	51.4	6.3	19.5
Austria	74.8	6.5	7.8	6.9	40.1	9.3	14.9	76.8	4.8	8.8	7.8	42.4	8.6	14.7
Poland	68.2	6.3	13.4	5.2	44.6	14.0	3.7	72.6	3.3	14.6	5.1	47.0	11.4	4.9
Portugal	69.5	11.5	6.5	14.0	34.6	12.8	9.6	75.5	6.7	6.9	10.6	36.2	9.2	10.5
Romania	60.3	7.2	17.7	18.5	25.6	24.3	1.2	65.1	4.9	19.2	15.3	25.8	20.9	1.3
Slovenia	69.5	8.0	6.5	4.9	44.2	9.3	11.6	75.9	4.4	6.5	4.6	44.9	7.5	11.2
Slovakia	71.8	9.6	9.2	7.4	31.5	15.1	2.9	75.6	5.7	7.7	8.3	40.1	13.7	3.6
Finland	72.4	8.9	3.2	7.9	46.1	11.2	26.4	76.2	6.8	3.3	7.3	47.3	9.1	29.0
Sweden	80.8	7.1	4.1	7.4	51.0	6.7	29.6	81.7	6.9	5.2	6.5	52.5	5.9	34.3

Legend: X1 – employment rate, X2 – unemployment rate, X3 – gender employment gap, X4 – early school leavers from education and training, X5 – tertiary education attainment, X6 – young people neither in employment, nor in education or training, X7 – adult participation in learning in the last four weeks.

Source: EUROSTAT (2024a; 2024b; 2024c, 2024d; 2024e; 2024f; 2024g).

Table 2. Input data – year 2020 and 2023

Economy	2020							2023						
	X1	X2	X3	X4	X5	X6	X7	X1	X2	X3	X4	X5	X6	X7
Belgium	69.7	5.8	8.1	8.1	47.8	11.3	7.4	72.1	5.5	7.6	6.2	50.2	9.6	11.1
Bulgaria	72.7	6.1	8.3	12.8	33.3	18.2	1.6	76.2	4.3	7.3	9.3	35.0	13.8	1.4
Czechia	79.7	2.6	15.3	7.6	35.0	11.0	5.5	81.7	2.6	13.9	6.4	34.9	10.1	9.9
Denmark	77.8	5.6	7.0	9.3	49.8	10.2	20.0	79.8	5.1	5.6	10.4	52.7	8.6	30.5
Germany	78.2	3.7	7.5	10.1	36.6	9.6	7.7	81.1	3.1	7.7	12.8	41.0	8.8	8.3
Estonia	79.1	6.9	4.4	8.5	41.5	11.1	16.6	82.1	6.4	2.4	9.7	47.3	9.6	23.2
Ireland	72.1	5.9	12.7	5.0	58.1	14.1	11.0	79.1	4.3	9.9	4.0	63.7	8.5	12.3
Greece	58.3	17.6	19.4	3.8	43.9	18.5	4.1	67.4	11.1	19.8	3.7	45.1	15.9	3.4
Spain	65.7	15.5	11.4	16.0	44.8	17.3	11.0	70.5	12.2	10.3	13.7	50.6	12.3	15.8
France	72.1	8.0	5.7	8.0	48.8	13.4	13.0	74.4	7.3	5.5	7.6	51.5	12.3	14.9
Croatia	66.9	7.5	11.2	2.2	34.7	14.6	3.2	70.7	6.1	7.8	2.0	38.9	11.8	6.4
Italy	61.9	9.3	19.7	14.2	27.8	23.5	7.1	66.3	7.7	19.5	10.5	29.2	16.1	11.6
Cyprus	74.9	7.6	12.0	11.5	59.8	15.3	4.7	78.9	6.1	9.0	10.5	66.1	13.8	11.0
Latvia	76.9	8.1	3.7	7.2	49.2	11.9	6.6	77.5	6.5	3.1	7.7	47.4	10.0	10.7
Lithuania	76.7	8.5	1.7	5.6	59.6	13.0	7.2	78.5	6.9	1.5	6.4	59.5	13.5	10.7
Luxembourg	72.1	6.8	7.1	8.2	62.2	7.7	16.3	74.8	5.2	6.8	6.8	61.9	8.5	16.2
Hungary	77.5	4.1	11.2	12.1	33.2	12.3	5.1	80.7	4.1	9.2	11.6	32.2	10.9	9.6
Malta	76.0	4.9	18.9	13.0	40.1	9.7	10.8	81.7	3.1	14.2	10.0	43.4	7.5	16.5
Netherlands	80.8	4.9	8.4	7.0	54.0	6.3	18.8	83.5	3.6	7.8	6.2	54.3	4.7	26.4
Austria	74.8	6.0	8.4	8.1	41.6	9.9	11.7	77.2	5.1	7.8	8.6	44.0	9.4	17.1
Poland	72.8	3.2	14.8	5.3	47.7	12.5	3.8	77.9	2.8	11.8	3.7	49.2	9.1	8.7
Portugal	74.2	7.0	5.7	9.1	39.0	11.0	9.8	78.2	6.5	5.6	8.0	39.2	8.9	13.4
Romania	65.2	6.1	19.3	15.6	26.4	20.6	1.0	68.7	5.6	19.1	16.6	22.8	19.3	6.7
Slovenia	74.8	5.0	5.9	4.1	46.9	7.9	8.4	77.5	3.7	6.1	5.4	40.0	7.8	19.9
Slovakia	74.6	6.7	7.3	7.6	39.7	14.4	2.8	77.5	5.8	7.7	6.4	41.1	11.2	10.5
Finland	75.5	7.7	3.3	8.2	49.6	9.8	27.3	78.2	7.2	0.2	9.6	43.1	9.2	26.1
Sweden	80.2	8.5	5.3	7.7	52.2	6.9	28.6	82.6	7.7	4.7	7.4	58.0	5.7	38.8

Source: EUROSTAT (2024a; 2024b; 2024c; 2024d; 2024e; 2024f; 2024g).

RESULTS AND DISCUSSION

The first step was to conduct an introductory descriptive statistical analysis in regard to each variable. Table 3 presents the results of the preliminary descriptive statistical analysis.



**Table 3. Results of preliminary descriptive statistical analysis (years 2016, 2019, 2020, 2023)**

Variable	X1	X2	X3	X4	X5	X6	X7
Variable character	S	D	D	D	S	D	S
YEAR 2016							
Mean	70.526	8.989	10.081	9.300	41.107	13.674	10.726
Standard deviation	5.909	4.379	5.517	4.131	8.884	5.143	7.726
Range	24.9	20.0	23.6	16.2	33.1	17.7	28.4
Minimum value	55.9	3.9	1.9	2.8	25.6	6.7	1.2
Economy min.	Greece	Germany	Lithuania	Croatia	Romania	Sweden	Romania
Maximum value	80.8	23.9	25.5	19.0	58.7	24.4	29.6
Economy max	Sweden	Greece	Malta	Spain	Lithuania	Italy	Sweden
YEAR 2019							
Mean	74.348	6.211	10.122	8.870	43.519	11.559	11.689
Standard deviation	5.366	3.260	5.277	3.617	8.801	4.072	8.274
Range	20.9	15.9	20.4	14.3	33.0	16.4	33.0
Minimum value	60.8	2.0	1.6	3.0	25.8	5.9	1.3
Economy min.	Greece	Czechia	Lithuania	Croatia	Romania	Sweden	Romania
Maximum value	81.7	17.9	22.0	17.3	58.8	22.3	34.3
Economy max	Sweden	Greece	Malta	Spain	Cyprus	Italy	Sweden
YEAR 2020							
Mean	73.378	7.022	9.767	8.737	44.567	12.667	10.041
Standard deviation	5.523	3.168	5.154	3.447	9.487	4.104	7.092
Range	22.5	15.0	18.0	13.8	35.8	17.2	27.6
Minimum value	58.3	2.6	1.7	2.2	26.4	6.3	1.0
Economy min.	Greece	Czechia	Lithuania	Croatia	Romania	Netherlands	Romania
Maximum value	80.8	17.6	19.7	16.0	62.2	23.5	28.6
Economy max	Netherlands	Greece	Italy	Spain	Luxembourg	Italy	Sweden
YEAR 2023							
Mean	76.844	5.763	8.589	8.193	46.011	10.626	14.485
Standard deviation	4.674	2.237	5.009	3.238	10.452	3.186	8.310
Range	17.2	9.6	19.6	14.6	43.3	14.6	37.4
Minimum value	66.3	2.6	0.2	2.0	22.8	4.7	1.4
Economy min.	Italy	Czechia	Finland	Croatia	Romania	Netherlands	Bulgaria
Maximum value	83.5	12.2	19.8	16.6	66.1	19.3	38.8
Economy max	Netherlands	Spain	Greece	Romania	Cyprus	Romania	Sweden

Legend: S – stimulant, D – destimulant

Source: own calculations.

Already the results of the preliminary statistical analysis showed large disparities between EU Member States in all the variables included in the study. The highest employment rates were observed in Sweden (2016 and 2019) and the Netherlands (2020, 2023), while the lowest employment rates characterized Greece (2016, 2019 and 2020) and Italy (2023). The average employment rate for the EU27 increased by over 6 p.p., while the range was reduced by over 7 p.p. from 2016 to 2023. The unemployment rate was lowest in Germany (2016) and the Czech Republic (2019, 2020 and 2023). The highest unemployment rate was noted for Greece (2016, 2019 and 2020) and Spain (2023). The average unemployment rate for the EU27 amounted to 9% in 2016 and 5.8% in 2023. What is more, the range of unemployment rate was reduced by over 10 p.p. in the analyzed period of time (from 20 in 2016 to 9.6 in 2023). Gender employment gap was the highest in Malta (2016, 2019), Italy (2020) and Greece (2023). The lowest level of gender employment gap was noted in Lithuania (2016, 2019, 2020) and Finland (2023). The average gender employment gap was slightly reduced in the analyzed period of time (from over 10% in 2016 and 2019 to 8.6 in 2023). At the same time the range of gender employment gap was reduced by 4 p.p. (from 23.6 to 19.6). The indicator of early school leavers from education and training measures the share of the population aged 18 to 24 with in majority lower secondary education who were not involved in any education or training (EUROSTAT, 2024b). The problem of leaving education system too early was most serious in Spain (2016, 2019, 2020) and Romania (2023); it practically did not exist in Croatia. The range of the indicator of early school leavers from education and training amounted to 16.2% in 2016, and 14.6% in 2023, so the reduction in range was marginal only. Tertiary education attainment measures the share of the population aged 30–34 years who have successfully completed university or university-like (i.e. tertiary-level) education. The highest tertiary education attainment level was characteristic for Lithuania (2016, 56.7%), Cyprus (2019 and 2023 – 58.8% and 66.1% respectively), and Luxembourg (2020 – 62.2%). The average value of tertiary education attainment increased by almost 5 p.p. (from 41.1% to 46.0%) in the analyzed period of time; the range of this indicator, however, increased even more – by 10 p.p. (from 33.1% to 43.3%). Young people neither in employment, nor in education or training (NEET) is the next variable taken into consideration; this indicator measures the share of the population aged 15 to 29 who is not employed and not involved in education or training. The lowest level of NEET indicator was noted in Sweden (2016, 2019 – 6.7% and 5.9% respectively) and the Netherlands (2020, 2023 – 6.3% and 4.7% respectively), while the highest value of NEET indicator was characteristic for Italy (2016, 2019, 2020 – 24.4%, 22.3% and 23.5% respectively) and Romania (2023 – 19.3%). The average value of NEET indicator was reduced by 3 p.p. and its range decreased by 3.1 p.p. in the analyzed period of time. The indicator of adult participation in learning measures the share of people aged 25 to 64 who stated that they received formal or non-formal education and training in the four

weeks preceding the survey in the total population of the same age group, excluding those who did not answer to the question regarding participation in education and training (EUROSTAT, 2024). Sweden was the absolute leader in regard to adult participation in learning (the value of this indicator in Sweden amounted to 28.4% in 2016, and it was even higher in the years to come, so that in 2023 it equaled 37.4%). Minimum values of adult participation in learning (less than 1.5%) were noted in the case of Romania (2016, 2019, 2022) and Bulgaria (2023).

The next step was to calculate the TMD and develop a ranking of the EU27 countries by its value. Finally, the standard deviations' method was applied in order to divide the 27 EU Member States into four groups (clusters) gathering EU Member States with a similar level of employment and education. The results of multivariate comparative analysis with the application of Hellwig TMD method are presented in table 4, while the results of cluster analysis are shown in table 5.

**Table 4. Ranking of EU Member States according to TMD (years 2016, 2019, 2020, 2023)**

Position	2016		2019		2020		2023	
	Economy	TMD	Economy	TMD	Economy	TMD	Economy	TMD
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>
1	Sweden	0.830	Sweden	0.787	Netherlands	0.728	Netherlands	0.715
2	Denmark	0.768	Finland	0.715	Sweden	0.712	Sweden	0.683
3	Finland	0.709	Netherlands	0.706	Finland	0.685	Denmark	0.617
4	Netherlands	0.691	Denmark	0.684	Denmark	0.662	Slovenia	0.580
5	Luxembourg	0.683	Luxembourg	0.657	Luxembourg	0.647	Ireland	0.574
6	Austria	0.644	Slovenia	0.621	Slovenia	0.616	Luxembourg	0.568
7	Lithuania	0.642	Estonia	0.619	Estonia	0.603	Estonia	0.565
8	Slovenia	0.614	Lithuania	0.600	Lithuania	0.573	Finland	0.539
9	Estonia	0.611	Austria	0.600	Austria	0.557	Austria	0.508
10	France	0.609	Ireland	0.584	France	0.551	Poland	0.490
11	Ireland	0.546	France	0.569	Ireland	0.550	Latvia	0.481
12	Latvia	0.539	Latvia	0.546	Latvia	0.545	Lithuania	0.474
13	Germany	0.525	Belgium	0.505	Belgium	0.509	Portugal	0.470
14	Belgium	0.519	Germany	0.497	Portugal	0.509	Malta	0.469
15	Czechia	0.488	Portugal	0.485	Germany	0.496	Belgium	0.464
16	Poland	0.478	Poland	0.471	Poland	0.467	France	0.455
17	Cyprus	0.474	Czechia	0.470	Slovakia	0.437	Slovakia	0.445
18	Hungary	0.457	Cyprus	0.467	Czechia	0.434	Cyprus	0.413
19	Portugal	0.430	Slovakia	0.448	Cyprus	0.419	Czechia	0.407
20	Slovakia	0.422	Hungary	0.413	Malta	0.388	Germany	0.396

1	2	3	4	5	6	7	8	9
21	Bulgaria	0.310	Malta	0.351	Hungary	0.387	Croatia	0.357
22	Croatia	0.295	Croatia	0.347	Croatia	0.363	Hungary	0.355
23	Malta	0.282	Bulgaria	0.302	Bulgaria	0.289	Bulgaria	0.293
24	Spain	0.227	Spain	0.223	Spain	0.192	Spain	0.213
25	Italy	0.167	Italy	0.093	Greece	0.096	Greece	0.103
26	Greece	0.117	Romania	0.087	Romania	0.084	Italy	0.102
27	Romania	0.105	Greece	0.084	Italy	0.067	Romania	0.024

Source: own calculations.

Sweden was the unquestioned leader in regard to synthetic measure of TMD in 2016 and 2019, while the Netherlands took the lead in 2020 and 2023. Sweden, Denmark, Finland and the Netherlands formed the four countries with the highest TMD levels in 2016, 2019 and 2020 (they constituted a 4-element G4 cluster in these years). In 2023, however, the situation was slightly changed: Finland was no longer inside a G4 cluster.

**Table 5. Result of grouping EU countries into clusters by level of synthetic TMD measure (years 2016, 2019, 2020, 2023)**

2016		2019		2020		2023	
Economy	Cluster	Economy	Cluster	Economy	Cluster	Economy	Cluster
1	2	3	4	5	6	7	8
Sweden	G4	Sweden	G4	Netherlands	G4	Netherlands	G4
Denmark	G4	Finland	G4	Sweden	G4	Sweden	G4
Finland	G4	Netherlands	G4	Finland	G4	Denmark	G4
Netherlands	G4	Denmark	G4	Denmark	G4	Slovenia	G3
Luxembourg	G3	Luxembourg	G3	Luxembourg	G3	Ireland	G3
Austria	G3	Slovenia	G3	Slovenia	G3	Luxembourg	G3
Lithuania	G3	Estonia	G3	Estonia	G3	Estonia	G3
Slovenia	G3	Lithuania	G3	Lithuania	G3	Finland	G3
Estonia	G3	Austria	G3	Austria	G3	Austria	G3
France	G3	Ireland	G3	France	G3	Poland	G3
Ireland	G3	France	G3	Ireland	G3	Latvia	G3
Latvia	G3	Latvia	G3	Latvia	G3	Lithuania	G3
Germany	G3	Belgium	G3	Belgium	G3	Portugal	G3
Belgium	G3	Germany	G3	Portugal	G3	Malta	G3
Czechia	G2	Portugal	G3	Germany	G3	Belgium	G3
Poland	G2	Poland	G2	Poland	G3	France	G3
Cyprus	G2	Czechia	G2	Slovakia	C2	Slovakia	G3

1	2	3	4	5	6	7	8
Hungary	G2	Cyprus	G2	Czechia	G2	Cyprus	G2
Portugal	G2	Slovakia	G2	Cyprus	G2	Czechia	G2
Slovakia	G2	Hungary	G2	Malta	G2	Germany	G2
Bulgaria	G2	Malta	G2	Hungary	G2	Croatia	G2
Croatia	G2	Croatia	G2	Croatia	G2	Hungary	G2
Malta	G1	Bulgaria	G2	Bulgaria	G2	Bulgaria	G2
Spain	G1	Spain	G1	Spain	G1	Spain	G1
Italy	G1	Italy	G1	Greece	G1	Greece	G1
Greece	G1	Romania	G1	Romania	G1	Italy	G1
Romania	G1	Greece	G1	Italy	G1	Romania	G1

G1 – the worst situation in terms of education and employment; G4 – the highest level of employment and education.

Source: own calculations.

At the other extreme, the situation looked as follows: the lowest value of TMD was noted for Romania (2016 and 2023), Greece (2019) and Italy (2020). A 4-element G1 cluster was formed by Romania, Greece and Italy together with Spain in 2019, 2020 and 2023. In 2016 the G1 cluster included one more EU Member State, i.e. Malta. It should be emphasized that the range of the value of the synthetic indicator TMD considerably increased – in 2016, the TMD for Romania accounted for 12.6% of the value of the TMD of Sweden, and in 2023, the TMD of Romania accounted for only 3% of the TMD of the Netherlands.

The conducted research allowed for the confirmation of the hypothesis assuming that disparities in education and employment across the EU Member States are widening (e.g. in 2016 the value of synthetic measure TMD was 7.9 times higher for the highest-ranked Sweden than for the lowest-ranked Romania, while in 2023 the value of synthetic measure TMD for the leading Netherlands was 29 times higher than for the 27<sup>th</sup> Romania).

The obtained results coincide with the conclusions regarding the issue of disproportions of various character across EU countries drawn by Brunori (2017), Faggian, Mechelangeli and Tkach (2018), Litwiński (2019), Neef and Sodano (2022), Eurofound (2023), Yanatma (2024). The obtained results also fall in line with EU recommendations regarding the need to take more active actions to eliminate disparities of various nature within the EU (both across EU countries and at the regional level within the EU). It is worth noting here a significant rise in education and employment disparities across the EU Member States following the COVID-19 pandemic. The persistent and even growing education and employment disparities between EU Member States in the analyzed period of time constitute a significant barrier to achieving greater coherence and convergence

in the EU. Reducing the education and employment disproportions can be perceived as a challenge for the EU. The European Commission is aware of the challenge. Therefore, The Action Plan setting out concrete initiatives aiming at turning the European Pillar of Social Rights into reality by 2030 was introduced (European Commission, 2021). Moreover, the European Commission underlined the importance of education, skills and employment in the process of twin digital and green transition the EU's facing (European Commission, 2023).

## CONCLUSIONS

Socioeconomic disparities include – among others – financial, income, wealth, political, gender, participation, employment, education, generation, territorial differences. The EU aims at reducing disparities of various character (this objective is underlined in EU treaties and other EU documents). The study focused on employment and education disparities across the EU Member States. The EU Action Plan for European Pillar of Social Rights emphasizes the significance of high employment rate, reduction of gender employment rate, strengthening education and training by reducing the rate of early school leavers from education and training, promoting tertiary education attainment, as well as adult participation in learning. Moreover, the need to solve the problem of young people neither in employment, nor in education or training is stressed in the aforementioned Action Plan.

The conducted research and analyses allowed for a positive verification of the hypothesis assuming deepening educational and employment disparities among the EU Member States. The largest employment and education disparities have been found between the Scandinavian countries and Romania, Greece, Italy and Spain. Scandinavian countries are distinguished by high employment rates, a really low gender employment gap, extremely high enrollment in higher education as well as life-long learning, and relatively low NEET rates. As for the countries that make up the G1 group, their situation is due to coupled problems such as low employment rates, high NEET rates, relatively high unemployment rates, as well as large gender employment gaps and extremely low intensity of adult participation in training.

The obtained results fall in line with the goals of the current European agenda and have clear policy implications. The persisting and growing disparities in the area of education and employment across the EU Member States constitute a serious problem for the EU due to the fact that such a situation makes it difficult to create a more cohesive and convergent European Union. Differences in education and employment across the EU Member States may lead to deepening disproportions in the level of development of EU economies (both education and employment are considered important factors of economic development). Moreover, rising employment and education disparities may adversely affect social stability in the

EU. Therefore, it is necessary to postulate active actions to promote education and greater professional activity in those EU countries that are most struggling with the problem of low employment and education. It seems that the disparities in education and employment across the EU Member States partly result from cultural differences. Hence, changes are difficult and take time. The process of regional integration within the EU is all the more important, as it allows for the exchange of experiences and good practices, which may turn out to be a driving force for positive changes in countries like Romania, Greece, Spain, Italy.

Research limitations were related to limited access to statistical information. Moreover, due to the limited volume of the study, it was necessary to abandon some of the more in-depth analyses. Subsequent studies should focus on a more detailed analysis of disproportions across EU Member States in terms of living conditions, health and healthcare, gender, generation. Subsequent studies should also include an assessment of the course of implementation of the EU's Action Plan for the European Pillar of Social Rights.

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