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Intracountry Regional Inequalities in the Context of the Socioeconomic Status of Selected European Countries

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KEYWORDS

- coefficient of variation
- Gini coefficient
- Gross Domestic Product
- Income of Household
- socioeconomic status
- intracountry regional inequalities

ABSTRACT

The paper deals with the issue of intracountry inequalities in selected European countries with attention paid to the analysis of potential connections between the level of identified regional inequalities in the assessed countries and their socioeconomic status. Two frequently employed indicators were chosen to assess regional inequalities: Gross Domestic Product per capita in PPS and Income of Households per capita in PPS, employing the Gini coefficient and the coefficient of variation as the basic statistical measures. The obtained results refer to the highest level of regional inequalities in the countries of the former Socialist Bloc, while the strong influence of capitals was also confirmed in these countries on the level of inequalities. At the same time, the presumption that the decreasing socioeconomic status of the countries caused the increasing level of intracountry regional inequalities was largely confirmed.

Introduction

Social development is significantly determined by the quality and the level of imbalance of social systems, particularly their subsystems, elements, nodes, and networks, the imbalance of their energies, inputs, outputs, etc. Development is mainly possible thanks to the existence of nonlinearities, asymmetries, contrasts, and imbalance. On one hand, we strive to put the social system in outer and inner balance but, on the other hand, we are aware, thanks to thermodynamic laws, that the disbalance of the system is a regular phenomenon, inevitable for a new movement, new arrangement, self-arrangement, for further system development (Ivanička et al., 2014).

If, however, the differences are too big, numerous authors recommend introducing to make measures to stop their increase (Gurgul & Lach, 2011), because big differences in regional development are not favourable for the socio-economic development of the whole country, and what is more, they are damaging (Czyż & Hauke, 2011). Excessive efforts made to reduce inequalities, however, may cause the stagnation of the socioeconomic development of the whole country (Blažek & Csank, 2007).

The paper focuses on intracountry regional inequalities in selected European countries and their assessment with regard to the socioeconomic status of the countries. Ezcurra (2019) states, that regional inequalities in development across the EU have drawn significant interest from both researchers and politicians over the past two decades. We were therefore curious about the extent to which

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the socioeconomic status of the countries impacts the regional inequalities and their level; we paid particular attention to the capital cities with their specific positions in terms of spatial structure and their impact on the size of the regional inequalities.

Theoretical framework

Regional inequalities are a relatively frequently discussed topic and are looked at and characterised in different ways. They are defined by Kutscherauer et al. (2010) as divergence of characters, phenomena or processes, the identification and comparison of which make some rational sense (cognitive, psychological, social, economic, political, etc.). Matlovič & Matlovičová (2011) understand regional inequalities as differences in the degree of socioeconomic development of regions that are the consequences of its unevenness. Its manifest themselves through differences between the level of incomes per capita and determine, at a given moment, a chain reaction from public and private sector representatives, inhabitants, etc. aimed at counteracting their increase (Antonescu & Florescu, 2023). Regional inequalities arise when certain regions outperform others, resulting in an uneven distribution of well-being across different geographic areas. Consequently, regional inequalities are identified when researchers, through regional analysis, detect variations in comparable well-being indicators between regions, or when, after accounting for individual characteristics, disaggregated data still reveals persistent differences in well-being between people living in different regions (Maggino, 2023).

The issue of regional inequalities can be found in the works of many authors employing various approaches (for example the model proposed by Panzera & Postiglione (2021) extends the spatial specification of Mankiw-Romer-Weil by introducing regional income inequality as a determinant of economic growth while Boschma et al. (2023) deal with innovation, industrial dynamics and regional inequality) and assessment indicators in their evaluations. The basic and most frequently used indicator is Gross Domestic Product (GDP) and was used in the evaluations of regional inequalities by Paas & Schlitte (2007), Kallioras (2010), Klamár (2016), Arestis & Phelps (2019), Belinska et al. (2020), Klamár et al. (2020), Neszmélyi et al. (2022), Capello & Cerisola (2023) etc. Despite certain limitations when using this indicator (e.g. in works by Adler Braun, 2009, Buček et al., 2010, Laurent, 2017), the application of GDP per capita as the basic indicator of the social-economic level of a region may be ascribed to the availability of data on the regional level in the whole EU (Michálek, 2013). The second relevant socioeconomic indicator is disposable income per inhabitant, used when assessing inequalities by e.g. Källström (2012), Klamár (2016), Cörves & Mayhew (2021), Dauderstädt (2021), Neszmélyi et al. (2022), Savoia (2024), Bareith & Csizmadia (2025) etc.

Both above indicators are, together with their complexity and meaningfulness, also easily available for both individual European countries and their regions (Eurostat databases – identical methodologic procedure of processing statistical data), knowledge of which is an inevitable precondition for assessing regional inequalities on this hierarchic level (e.g. works by Wishlade & Yuill, 1997, Boldrin & Canova, 2001, Paas & Schlitte, 2007, Smętkowski & Wójcik, 2012, Källström, 2012, Iammarino et al., 2019, Fifeková et al., 2021, Neszmélyi et al., 2022).

The particular analyses and evaluations show that on one hand there are economically prosperous regions of the countries of Western and Northern Europe and on the other hand there are the countries of the former Eastern Bloc that, during the last three decades, have gone through a difficult transformation process and development within already "expanded" Europe. Iammarino et al. (2019) divided European regions based on the level of their development into four groups, specifically of low, medium, high, and very high development. Almost all the regions of the former Eastern Bloc countries (exclusive of the regions of their capitals) fell into the category of low development. In this context, Fifeková et al. (2021) pointed out the fact that the EU can be seen as a grouping of performance-differentiated countries, where the converging countries will no longer be able to narrow the performance gap with the rest of the EU with the passage of time. The above statement was also accepted by Boldrin & Canova (2001). In their opinion, the main reason for regional inequalities is the process of real convergence of the EU Cohesion countries compared to the Community average that has not always resulted in the reduction of regional inequalities. As the authors indicate, 50 of 211 regions (the number of EU NUTS 2 regions according to Eurostat) show an income per capita lower than 75% of the average. The ratio between the GDP per capita of the richest and the poorest US state is slightly less than 2, while in the EU it is more than 5. As presented by Fifeková et al. (2021), the studies of regional inequalities of converging European economies provide evidence that comply with Williamson´s hypothesis (Williamson, 1965) that the growing economic performance in the given European countries firstly led to the growth of regional inequalities, as a rule below the level of the middle income and then the regional inequalities tended to fall (Szörfi, 2007, Neszmélyi et al., 2016, Kisiała & Suszyńska, 2017).

The problem of intraregional and interregional inequalities within the context of the extending EU was dealt with by Szörfi (2007) who, apart from verifying the presumptions of Williamson´s hypothesis, found out that some factors have a larger impact on regional inequalities than the national income. He mentions EU accession, the process of transition to a new grouping (the speed of changing the economic structure, the ability to recover), eco-

nomic and monetary union involving the transparency of markets and increased competition, ability to use financial resources from the EU structural funds and the cohesion fund to build effective institutions that would enable more decentralized planning.

Regional inequalities can be seen not only between the regions but also within them (Boschma, 2022). Big cities are able to attract a relatively high number of highly and less qualified workers (Eeckhout et al., 2014). They may increase the demand for local services which can show itself in new vacancies with lower wages (Moretti, 2010). A particular influence on inequalities in this context is made by capitals. Szörfi (2007) pointed to a notable difference between the capital and the rest of the country in the countries of Central Europe and he also accented that Western European countries are more balanced in this respect. Matlovič & Matlovičová (2011), Psycharis et al. (2020), Klamár et al. (2020), Neszmélyi et al. (2022) etc. also discussed the effect of a capital city in their analyses and evaluations.

Meliciani (2016) also adds to the previous statements. She argues that the growing significance of innovation and human capital is a key factor contributing to the widening income and employment disparities among the older EU member states, particularly following the 2008 financial crisis. In contrast, she emphasizes that in the newer member states, regional disparities are primarily driven by broader socio-economic factors. While capital regions are increasingly aligning with Western European standards, other regions – especially former industrial and peripheral areas – continue to lag behind in terms of development.

Methodology

In the first step of the analyses, attention was paid to quantitative evaluation of the level of intracountry regional inequalities in the selected countries of Europe. As presented by Matlovič & Matlovičová (2011), when evaluating regional inequalities, it is important to define the evaluated territorial units, to determine the selection of adequate indicators and statistical measurement rates.

In the paper, attention is focused on 25 selected countries of Europe – Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden and Switzerland. Their selection depended on the availability of statistical data in the Eurostat databases on the NUTS 2 level that was determined as the observation level (the most data are available on this level) as well as on the country having a minimum of two or more NUTS 2 regions for the purposes of the comparison (that is why countries whose territory was represented by only one NUTS 2 region were excluded from the evaluation). In total, 254 regions were included in the analysis.

Another step to take was to choose suitable indicators. Considering availability, representativeness and complexity, two basic and frequently employed indicators were chosen – Gross Domestic Product (GDP) per capita in Purchasing Power Standards (PPS) and Income of Households per capita in PPS. GDP and Income of Households were also selected for analysis due to the availability of data at the NUTS 2 level and the uniform data collection methodology applied across all analysed European countries, which ensures cross-country comparability.

After defining territorial units and selecting the evaluation indicators we proceeded to select statistical measurement rates. Felsenstein & Portnov (2005), Matlovič & Matlovičová (2011), Ancuţa (2012), Hamada (2016), Klamár (2016), Klamár et al. (2020), Egri & Lengyel (2024), Kanó et al. (2025) mention more measurement rates such as the coefficient of variation, Gini coefficient, Theil index, Atkinson index, Hoover coefficient or the method of distance from a fictive object etc.

The most frequently used are the coefficient of variation and the Gini coefficient. Dauderstädt (2021) utilizes the coefficient of variation as a primary indicator to express relative income inequality both among EU member states and at the regional level (NUTS 1/NUTS 2). Savoia (2024) utilizes both the Gini coefficient and the coefficient of variation to analyse income inequality across EU regions. He reports descriptive statistics showing increases in both measures Gini and CV between 1990 and 2013. Balakrishnan et al. (2022) use the coefficient of variation as the main indicator for measuring regional inequalities among EU countries. Antonescu & Florescu (2023) explicitly utilize the Gini coefficient to measure regional income inequality at the NUTS 2 level during the COVID-19 period. This indicator is analysed in relation to GDP per capita in Purchasing Power Standards, which serves as a proxy for the economic development of EU regions. Borowski et al. (2025) in their analysis of inflation synchronization in the Eurozone, applied a range of indicators to measure inequality, including the Gini coefficient and the coefficient of variation.

In our analysis, we also used the Gini coefficient and the coefficient of variation, their application being justified due to both their statistical properties and their interpretative clarity. The Gini coefficient is particularly advantageous as it is independent of the number of observational units (e.g., regions) and takes into account differences between all possible pairs of values. The coefficient of varia-

tion, thanks to its dimensionless nature, is an ideal indicator for comparing inequalities across different types of indicators that may vary in scale or units of measurement. Both indicators offer a complementary perspective on regional differentiation. While the Gini coefficient captures overall inequality of the distributional within a dataset, the coefficient of variation reflects the dispersion of values around the mean. Compared to alternative measures such as the Theil index and Atkinson index, both the Gini coefficient and the coefficient of variation offer significant advantages in terms of lower computational complexity, more intuitive interpretation, and wide acceptance in international research.

The coefficient of variation (CV) is a tool for comparative analyses and is a relative rate of dispersion derived from a standard deviation σ (the ratio of the standard deviation and the average).

$$cv = \frac{\sigma}{\overline{x}} = \frac{\sqrt{\sum_{i=1}^{n}\left(x_i - \overline{x}\right)^2}}{\overline{x}}$$

The coefficient of variation enables mutual comparison of variability of variables with different values (reducing the standard deviation by the average value). The second used statistical rate was the Gini coefficient (GI) that originated as a tool to measure income inequality. It oscillates between 0 (maximal equality) and 1 (maximal inequality)

$$GI = \frac{1}{2n^2\overline{x}}\sum_{i=1}^{n}\sum_{j=1}^{n}\left(x_i - x_j\right)$$

n is the number of territorial units, x_i is the value of monitored indicator in i –territorial unit, x_j is the value of the monitored indicator in j - territorial unit and $\overline{x}$ is the arithmetic average of the monitored indicator x.

At this initial stage of the evaluation, we pronounced hypothesis H1 saying that the highest rate of intracountry regional inequalities will be recorded in the countries of the former Socialist Bloc. This is based on the fact, highlighted by Rauhut & Humer (2024), that mature economies display fewer regional inequalities and a higher degree of regional economic convergence than developing economies. According to Williamson (1965), regional inequality is generated during the early development stages, while mature growth produces regional convergence. In the next step, we were researching to what extent their capitals contributed to the level of the identified regional inequalities in the assessed countries. The impact of capitals on the size of regional inequalities was indicated by e.g. Smętkowski (2014), Matlovič et al. (2018), Klamár et al. (2020), Psycharis et al. (2020) etc. Based on the abovementioned, we present hypothesis H2 which presumes a significant decrease of regional inequalities in the countries after their capitals were excluded. The most significant decrease of inequalities after the exclusion of the capitals was expected again in the former socialist countries, which serves as hypothesis H3. This premise is based on the fact that the capital cities in these countries have had and continue to have a significantly dominant position within the settlement structure of the country with the cumulation of economic and decision-making functions. Reinl et al. (2023) state that the adjusted income per capita according to purchasing power of cities like Bratislava or Prague is comparable to incomes in Paris or the Oberbayern region (Germany), but peripheral regions of Czechia or Slovakia lag much further behind in term of income convergence than peripheral regions of France or Germany.

Finally we researched the connection between the level of established regional inequalities in the individual countries and their socioeconomic status. Following the work by Szörfi (2007), who assessed the relation between regional disparities and the development of the countries in the extended EU, we formulated hypothesis H4 stating that the growth of socioeconomic status of the countries would cause the decrease of their intracountry regional inequalities. Socioeconomic status presents a complex indicator in the evaluation (e.g. Klamár et al., 2019), whose construction comes out of the point method. As many as 13 global economic and social indexes were comprised in the assessment aiming to achieve maximum objectivity (the selected indexes are representative, have been monitored and evaluated over a long period, are methodologically well-defined and inherently quite complex – containing multiple sub-indicators, and most of these indexes evaluate almost every countries in the world): the KOF Globalisation Index (KGI), Global Competitiveness Index (GCI), Global Innovation Index (GII), Global Entrepreneurship Index (GEI), Inclusive Development Index (IDI), Easy Doing Business (EDB), Index of Economic Freedom (IEF), Digital Platform Economy Index (DPE), Corruption Perception Index (CPI), Human Development Index (HDI), Social Progress Index (SPI), Gross Happiness Index (GHI) and Legatum Prosperity Index (LPI). As the basis for comparison in each index the highest reached level in some of the countries was selected. The highest level was assigned 100 points and it represented the basic quantity in comparisons to other countries; the values reached within each index in the rest of the countries were compared to it. The value of each country was achieved by adding the values per individual indexes and the maximum was 1,300 points.

To express the relation (dependence) between the socioeconomic status of the countries and the level of their regional inequalities regression analysis and the correlation analysis, where the socioeconomic status of a country was

an independent variable and the size of regional inequalities (in both variants – Gini coefficient and coefficient of variation) was a dependent variable, were both used. The Pearson correlation coefficient R was the rate of considering the strength of linear dependence, whose absolute values approaching 1 indicated the increased strength of the relation between the status of a country and the size of regional inequalities. The determination coefficient R^2 expressed the percentage of the variability of the dependent variable expressible by the variability of the independent variable. Assessment of the suitability of the linear regression model was also part of the testing.

Research result

The level of intracountry regional inequalities in the countries

In the selected countries of Europe, regional inequalities were evaluated using two basic indicators, namely GDP per capita in PPS and Income of Households per capita in PPS.

In the case of the first evaluated indicator – GDP calculated for 2020 (Fig. 1), the highest inequalities were recorded in Slovakia (GI – 0.2579, CV – 0.6329). Slovakia together with Croatia, Serbia, Ireland, Romania and Hungary represented a group of countries with GI above 0.20 and CV around 0.50. It is evident from the summary of the countries that countries of the former Eastern Bloc prevailed here. The second group consisted of countries with a medium level of regional inequalities with GI from 0.10 to 0.20 and CV in most cases from 0.20 to 0.50. From the total of 11 countries in this group, slightly more than one third were represented by former socialist countries (Czechia, Bulgaria, Poland, Lithuania) and the level of their inequalities was in case of GI 0.14 and higher and as for CV around 0.40 and higher. Most of the remaining countries from this group recorded a lower level of inequalities (Italy, France, Denmark, Germany, Netherlands and Spain).

In the last group with the lowest level of inequalities (GI below 0.10, CV in most cases less than 0.20) the only country from the former socialist countries was Slovenia with

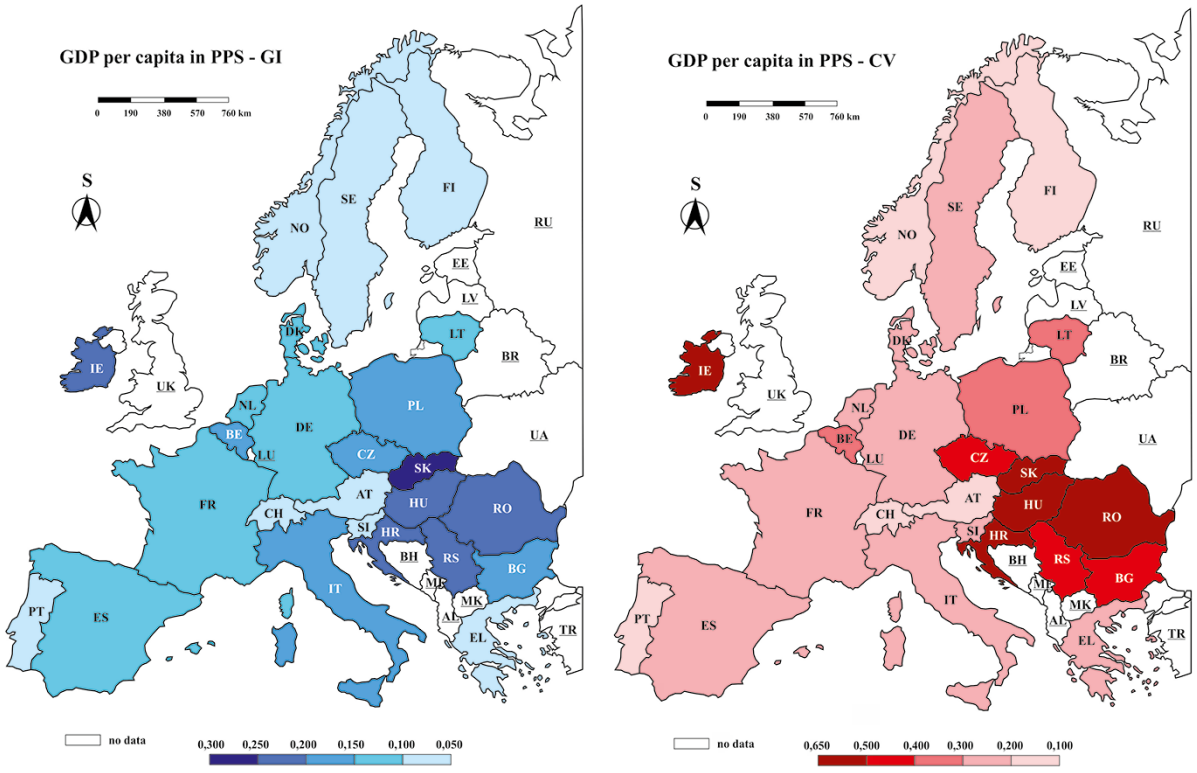

Figure 1. The Gini coefficient (GI) and the coefficient of variation (CV) within GDP per capita in PPS in the selected European countries in 2020

Note: Austria (AT), Belgium (BE), Bulgaria (BG), Croatia (HR), Czechia (CZ), Denmark (DK), Finland (FI), France (FR), Germany (DE), Greece (EL), Hungary (HU), Ireland (IE), Italy (IT), Lithuania (LT), Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Serbia (RS), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH), LV – country without data

Source: Author's calculations based on the Eurostat data

GI 0.0907, but its CV was as high as 0.2567. This group was dominated by Scandinavian countries together with Austria, Portugal and Switzerland (GI – 0.0631, CV – 0.1257).

The second chosen indicator – Income of Household (Fig. 2) was, due to unavailable data for 2020, evaluated for 2019 and 23 countries participated in the evaluation (no data were available for Switzerland and Serbia). In total, the level of inequalities was lower in this indicator (GI up to 0.15 and CV up to 0.33) than in the case of GDP.

The highest level of regional inequalities was observed in the group of five countries whose GI was higher than 0.10 and CV higher than 0.19. As many as four former socialist countries, specifically Hungary, Bulgaria, Slovakia, and Romania, belonged to the group, while the last one recorded the highest regional inequalities (GI – 0.1406 and CV – 0.3280). The second group was formed by 10 countries with a medium level of disparities (GI from 0.05 to 0.10 and CV from 0.09 to 0.16). This group was represented by 4 former socialist countries, Croatia, Poland, Lithuania and Czechia, which recorded the lowest inequalities (GI – 0.0642, CV – 0.1406). The other countries were Ireland, Portugal, and Belgium.

The last group, the one with the lowest inequalities (GI below 0.05 and CV below 0.09) was created by the countries of Western Europe and Scandinavia. Slovenia was an exception, since it recorded the lowest inequalities, more precisely GI – 0.0086 and CV – 0.0243 (the level of regional inequalities was influenced by the fact that there are only two NUTS 2 regions in the country).

The level of intracountry regional inequalities after excluding capital cities

The level of regional inequalities is influenced by several factors one of the most significant being the influence of their capital cities. In most countries, capitals are not only the administrative centres of the particular countries, but at the same time the largest and economically most powerful city where strong economic subjects concentrate, and branches of foreign companies are located. For this reason, follow-up analyses addressed the level of inequalities after the exclusion of capitals.

In terms of the first indicator, GDP, we recorded a significant drop of inequalities (Fig. 3). The most notable drop was recorded in Bulgaria (GI dropped by 82.6%, CV by 87.0%), Slovakia (79.4%, 77.8%) and Czechia (72.8%, 80.1%). Only Finland approached the three former socialist countries with its drop by 74.8% (GI) and 77.8% (CV). It is

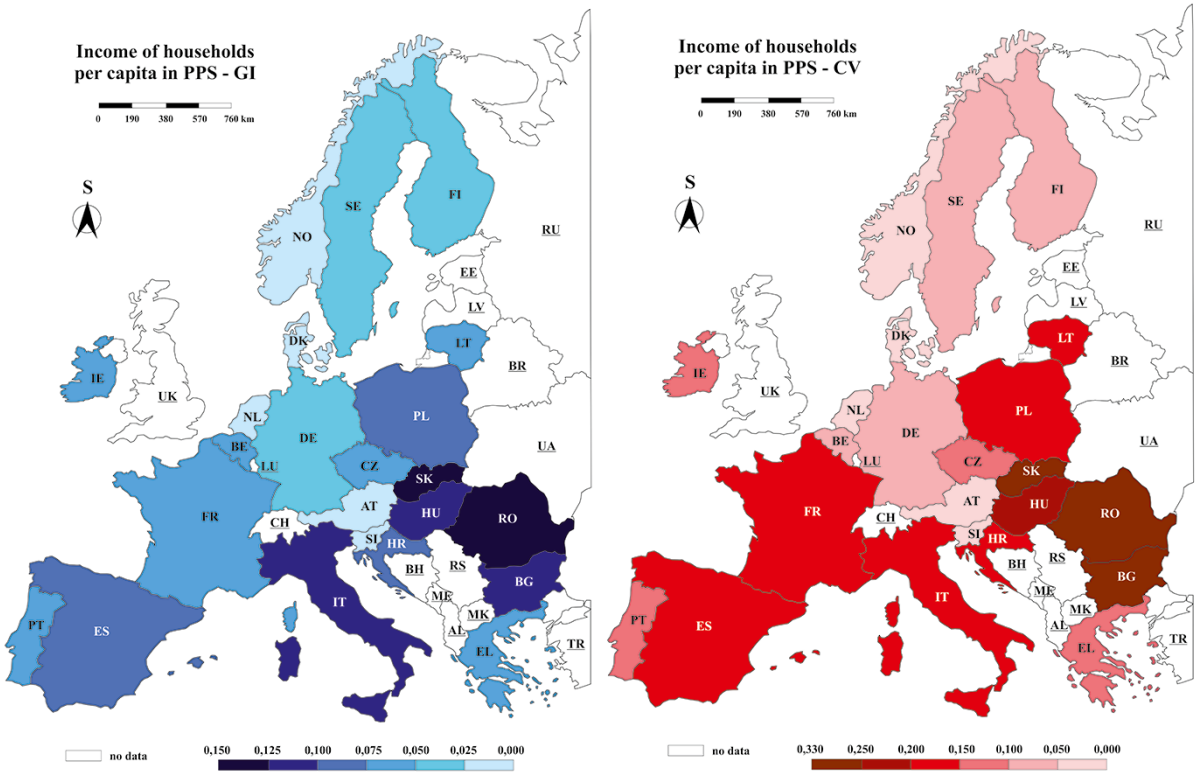

Figure 2. The Gini coefficient (GI) and the coefficient of variation (CV) within Income of household per capita in PPS in the selected European countries in 2019

Note: Austria (AT), Belgium (BE), Bulgaria (BG), Croatia (HR), Czechia (CZ), Denmark (DK), Finland (FI), France (FR), Germany (DE), Greece (EL), Hungary (HU), Ireland (IE), Italy (IT), Lithuania (LT), Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Serbia (RS), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH), LV – country without data

Source: Author's calculations based on the Eurostat data

evident that metropolises such as Prague, Sofia, Bratislava and Helsinki enjoy an outstanding economic position in their countries.

In the next group of countries, the drop in inequalities was between 50 - 70%. Except for another Scandinavian country - Sweden (drop of 58.8%, 65.5%) and Portugal (63.8%, 66.4%) the group again consisted almost exclusively of the countries of the former Socialist Bloc, specifically Hungary (drop by 62.5%, 70.8%), Romania (61.9%, 70.5%), Croatia (67.0%, 67.6%) and Serbia (59.1%, 54.3%). The strong effect of a capital city again strongly manifested itself (Budapest, Bucharest, Ljubljana and Belgrade). This group also includes Poland (41.6%, 57.2%), where the impact of Warsaw was not that notable thanks to the polycentric structure of other big Polish cities such as Krakow, Katowice, Poznan, Wroclaw and Gdansk.

The third group consisted of the countries with a drop from 10 to 50%, represented by Denmark, Greece, Norway, France, Belgium, Netherlands and partially Spain, whose drop results were slightly below 10% (GI and CV by 9.2%). The fourth group was created by countries in which only a mild drop of inequalities was recorded, namely Switzerland (by 2.1%, 0.4%) and Austria (1.8%, 0.7%) or a slight growth as in the case of Germany (1.2%, 1.4%) and Italy (2.1%, 2.5%).

The only country, where a more notable growth of inequalities was recorded, was Ireland with 23.3% GI and 47.9% CV.

The second evaluated indicator Income of Household also confirmed the decrease of regional inequalities in most of the countries after excluding their capitals (Fig. 4). Also in this case there were two countries, Bulgaria (GI

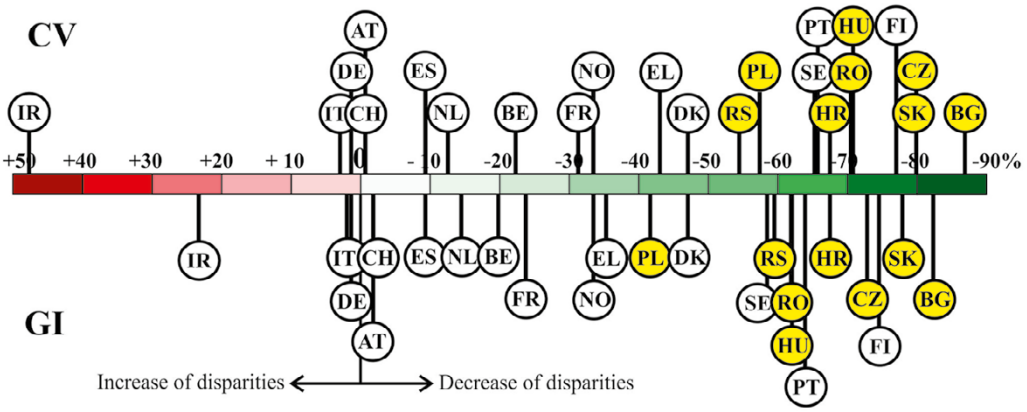

Figure 3. The increase or decrease (%) of the Gini coefficient (GI) and the coefficient of variation (CV) in GDP per capita in PPS after excluding capitals in 2020

Note: the yellow circles represent former socialist countries

Source: Author's calculations based on the Eurostat data

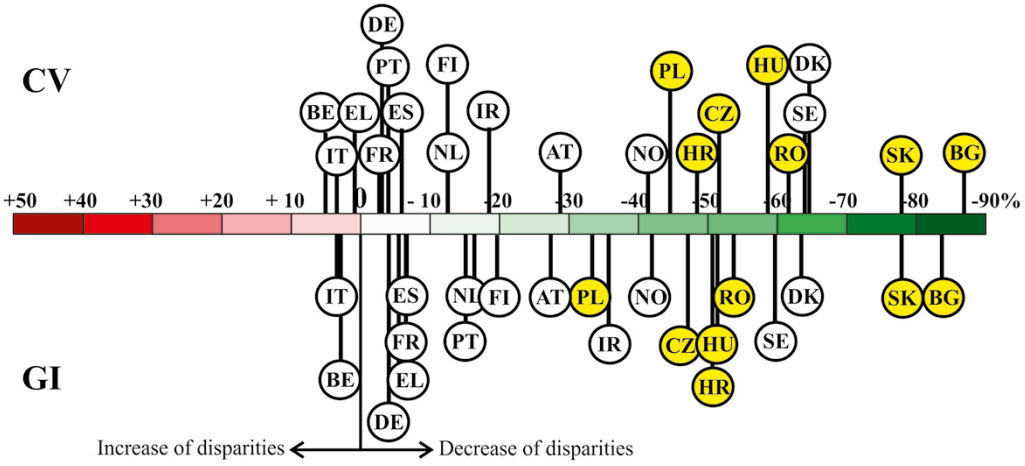

Figure 4. The increase or decrease (%) of the Gini coefficient (GI) and the coefficient of variation (CV) in Income per capita in PPS after excluding capitals in 2019

Note: the yellow circles represent the former socialist countries

Source: Author's calculations based on Eurostat data

drop of 83.9%, CV of 87.2%) and Slovakia (79.5%, 79.6%), which again confirmed the strong position of Sofia and Bratislava.

The second group with decreased inequalities from 40 to 65% is made up of three Nordic states, namely Denmark (63.5%, 64.1%), Sweden (59.2%, 64.0%) and Norway (41.9%, 41.3%) and five former socialist countries – Romania (53.7%, 61.4%), Czechia (46.9%, 51.4%), Hungary (51.2%, 58.9%), Croatia (50.5%, 48.1%) and Poland (33.1%, 44.5%). Together with Bulgaria and Slovakia, the dominant position of former socialist capitals was confirmed.

The third group was formed by Austria, Ireland, Finland and Netherland, whose decrease of inequalities is milder, in most cases from 10 to 35%.

The last group was represented by countries that recorded only a slight drop of inequalities (Spain, France, Germany, and Portugal) or only a mild drop (Belgium, Italy). Only in Greece did GI show decreased inequalities by 5.4% and CV increase by 0.4%.

Socioeconomic status and its connection with the level of regional inequalities

Socioeconomic status, as a result of evaluation of a set of 13 global indexes, is in the selected countries substantially differentiated (Table 1). The highest value within this complex indicator was reached by Switzerland (1271.4 points). Leaving aside the EDB (Easy Doing Business) index, it was

Table 1. Socioeconomic status in the assessed European countries in 2020

Country	KGI	GCI	GII	GEI	IDI	EDB	IEF	DPE	CPI	HDI	SPI	GHI	LPI	Σ points
Switzerland	100.0	99.9	100.0	100.0	99.5	89.7	100.0	92.6	96.6	99.8	98.6	96.0	98.7	1271.4
Denmark	96.7	98.5	87.0	96.5	95.6	100.0	95.5	86.3	100.0	98.2	99.3	93.9	100.0	1247.5
Sweden	97.8	98.5	94.6	85.4	94.7	96.0	91.3	93.2	96.6	99.0	98.8	94.4	98.5	1238.9
Netherlands	98.9	100.0	89.0	88.0	92.3	89.1	93.9	100.0	93.2	96.8	98.2	94.9	97.2	1231.4
Finland	95.6	97.3	86.2	85.4	87.7	93.9	92.3	83.6	96.6	98.0	99.1	100.0	98.5	1214.2
Norway	93.4	94.8	74.6	68.2	100.0	96.7	89.5	90.3	95.5	100.0	100.0	94.2	99.3	1196.5
Germany	96.7	99.3	85.6	81.1	86.7	93.3	89.6	78.2	90.9	99.0	97.7	89.9	96.1	1184.0
Ireland	94.5	91.1	80.3	86.7	89.5	90.0	98.7	80.1	81.8	99.8	97.4	90.0	95.0	1175.0
Austria	96.7	93.0	75.8	79.0	88.0	92.2	89.2	69.2	86.4	96.3	96.5	91.6	95.3	1149.0
Belgium	98.9	92.7	74.3	75.7	84.5	87.8	84.0	75.8	86.4	97.3	96.5	87.1	90.2	1131.3
France	95.6	95.6	81.2	81.6	83.1	89.7	80.5	77.2	78.4	94.1	95.7	85.5	90.6	1128.9
Spain	93.4	91.4	69.0	57.1	72.4	91.2	81.6	64.9	70.5	94.5	95.7	82.9	89.8	1054.4
Czechia	93.4	86.0	73.1	52.9	83.7	89.3	91.2	59.3	61.4	94.0	93.5	88.5	86.6	1053.0
Slovenia	87.9	85.2	64.9	79.7	81.1	89.6	82.7	54.7	68.2	95.8	64.6	84.8	88.4	1027.6
Lithuania	89.0	83.0	59.3	53.6	79.9	95.6	93.5	53.8	68.2	92.2	90.6	82.5	83.2	1024.3
Portugal	93.4	85.4	65.8	56.3	65.3	89.6	81.7	61.7	69.3	90.3	94.7	77.5	87.8	1018.8
Italy	91.2	86.8	69.1	54.9	70.9	85.4	77.8	55.9	60.2	93.2	94.2	82.7	85.1	1007.4
Poland	89.0	83.6	60.5	60.2	75.8	89.5	84.3	49.3	63.6	92.0	90.9	78.3	81.9	998.9
Slovakia	91.2	81.1	60.1	51.8	80.6	88.5	81.5	49.2	55.7	89.9	89.7	81.7	82.7	983.7
Hungary	92.3	79.0	62.8	56.2	78.0	85.9	81.0	46.6	50.0	89.2	87.4	77.9	78.3	964.6
Romania	86.8	78.2	54.5	47.0	72.9	85.8	85.0	40.0	50.0	86.5	84.2	82.9	76.9	930.7
Croatia	89.0	75.1	56.4	42.3	73.7	86.2	75.9	42.2	53.4	89.7	88.3	78.4	78.9	929.5
Greece	91.2	76.0	55.7	43.1	60.9	80.1	73.0	43.6	56.8	91.2	92.5	76.1	80.0	920.1
Bulgaria	86.8	78.8	60.5	36.6	72.5	84.3	85.6	42.5	50.0	85.3	86.1	68.7	76.3	914.0
Serbia	85.7	73.9	51.9	34.8	60.9	88.6	80.5	33.4	43.2	84.2	81.5	79.0	74.1	871.7

Note: dark colour – 5 countries with the highest index value, light colour – 5 countries with the lowest index value; KGI - KOF Globalisation Index, CGI - Global Competitiveness Index*, GII - Global Innovation Index, GEI - Global Entrepreneurship Index*, IDI - Inclusive Development Index**, EDB - Easy Doing Business, IEF - Index of Economic Freedom, DPE - Digital Platform Economy Index, CPI - Corruption Perception Index, HDI - Human Development Index, SPI - Social Progress Index, GHI - Gross Happiness Index, LPI - Legatum Prosperity Index; * - data available for 2019; ** - data available for 2018.

Source: Author's calculations based on the data of 13 selected global indexes (KOF Globalisation Index, 2020; Schwab, 2019; Dutta et al., 2020; Ács et al., 2019; Inclusive Development Index, 2018; World Bank, 2020; Miller et al., 2020; Ács et al., 2020; Corruption Perception Index, 2020; Human Development Report, 2020; Green et al., 2020; Helliwell et al., 2022; Legatum Prosperity Index, 2020)

always in the first "five" or in the TOP group of the best assessed countries. Other highly evaluated countries were the Scandinavian countries and the Netherlands. Denmark (1247.5 p.) was placed in the TOP group 11-times and Sweden (1238.9 p.) as many as 12-times. High positions were also reached by the Netherlands (1231.4 p., 8-times in TOP), Finland (1214.2 p., 6-times in TOP) and Norway (1196.5 p., 8-times in TOP).

Another group consisted of the countries of Western Europe (Germany, Ireland, Austria, Belgium and France), whose assessment of socioeconomic status reached 1100 points and more. Germany (1184.0 p.) appeared twice in the "five" of the best countries in indexes GCI, HDI, Ireland (1175.0 p.) was in TOP 3-times (GEI, IEF, HDI) and Belgium (1131.3 p.) once (KGI).

The next group (with socioeconomic status from 1000 to 1100 p.) was noticeably hybrid. It consisted not only of countries of Southern Europe, such as Spain (1054.4 p.), Portugal (1018.8 p.) and Italy (1007.4 p.), but also of the best assessed countries of the former Eastern Bloc – Czechia (1053.0 p.), Slovenia (1027.6 p.) and Lithuania (1024.3 p.) which was the only one of the countries in this group to reach the TOP group twice (EDB, IEF).

The weakest group (up to 1000 p.) was almost exclusively formed by former socialist countries. The best evaluated country was Poland (998.9 p.) followed by the other V4 countries (Slovakia – 983.7 p., Hungary – 964.6 p.), while the weakest ones were Bulgaria (914.0 p.) and Serbia (871.7 p.) which were in almost all indexes among the last five countries.

The only country in this group not part of the Socialist Bloc was Greece. It achieved only 920.1 p. and ended up in 23rd place.

In the last part we focused on the research of the dependence between the level of intracountry regional inequalities in the particular countries (expressed by CV and GI) and their socioeconomic status. The input values when calculating CV and GI were GDP data and information on the household income expressed in PPS for the EU countries. Since the values of the socioeconomic status of a country were calculated for the whole territory of the country, it was not possible to establish the dependence between the above-mentioned indicators with exclusion of the capitals.

When monitoring the correlation dependence between regional inequalities (calculated from GDP data) and socioeconomic status, strong negative correlation dependence was confirmed (R= -0.62 for CV calculated from GDP data for 25 EU countries) (Fig. 5). The best course of the dependence was represented by Sweden, France, and Poland. A remote value was achieved by Ireland. A similar situation happened when calculating the intensity of dependence between inequalities expressed by GI (Fig. 6). Also, in this case the hypothesis that higher socioeconomic status causes decreased value of regional inequalities (R= -0.58) was confirmed. The determination index was from 33% (in GI) to 35% (in CV). The abovementioned reveals that the change of an independent variable - in this case the level of socioeconomic status – influences the change of a dependent variable (inequalities) by more than 30%. The suitability of

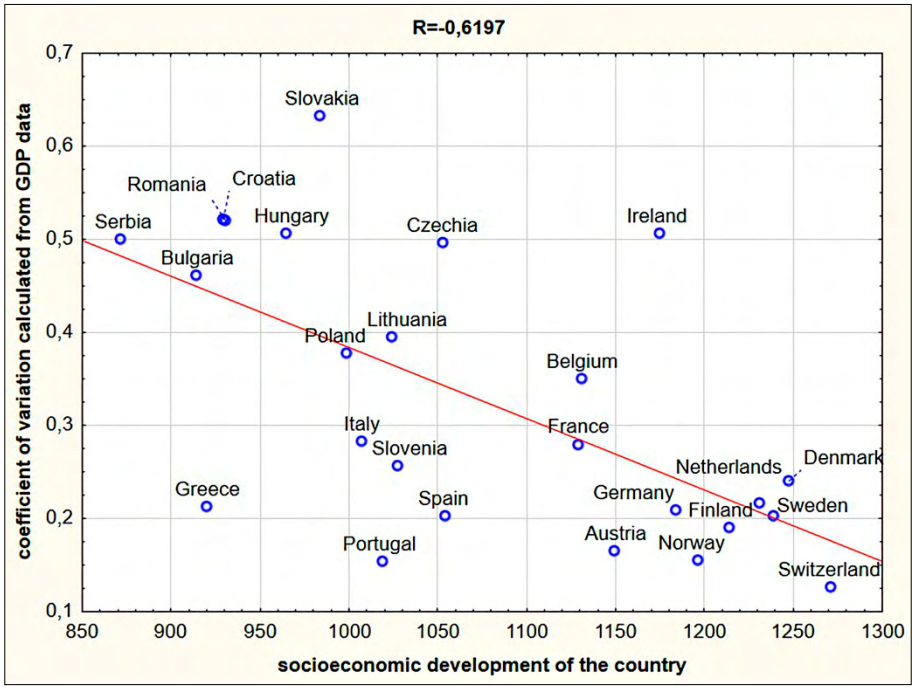

Figure 5. The degree of dependence between socioeconomic status and intracountry regional inequalities expressed by GDP per capita in PPS (coefficient of variation)

Source: Author's calculations based on the Eurostat data

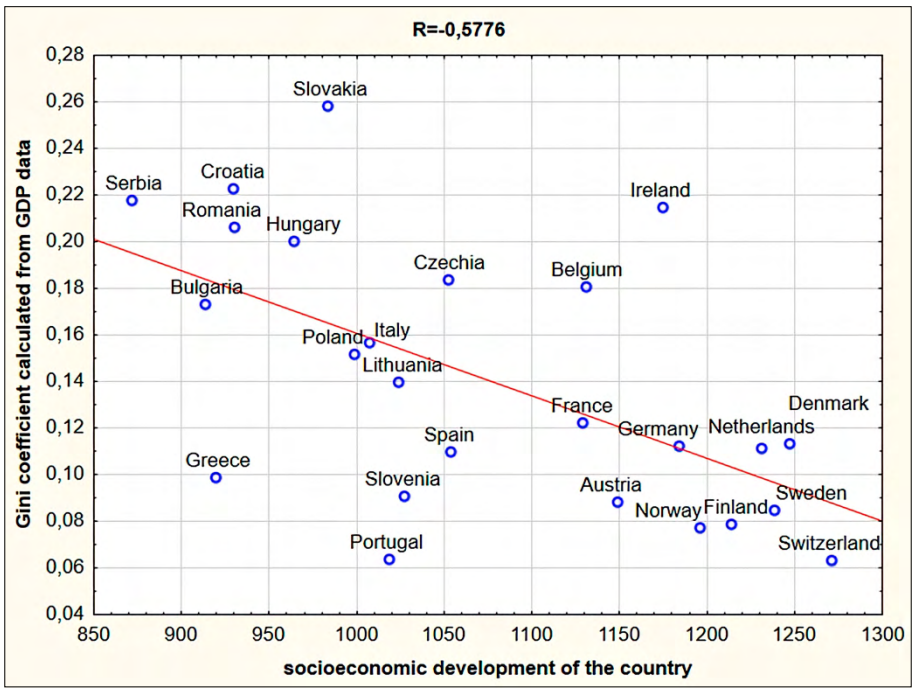

Figure 6 . The degree of dependence between socioeconomic status and intracountry regional inequalities expressed by GDP per capita in PPS (Gini coefficient)

Source: Author's calculations based on the Eurostat data

the linear regression model was confirmed in both inequalities expressed by CV and inequalities calculated by GI. The course of linear dependence for inequalities expressed using GI was best presented in the case of Germany and Italy. A remote value was again achieved by Ireland.

An efficient indicator to analyse inequalities also proved to be the differences in Income of Household per capita in individual countries expressed by Purchasing Power Standards. Since data for Serbia and Switzerland were not available for the year concerned, only 23 countries have been an-

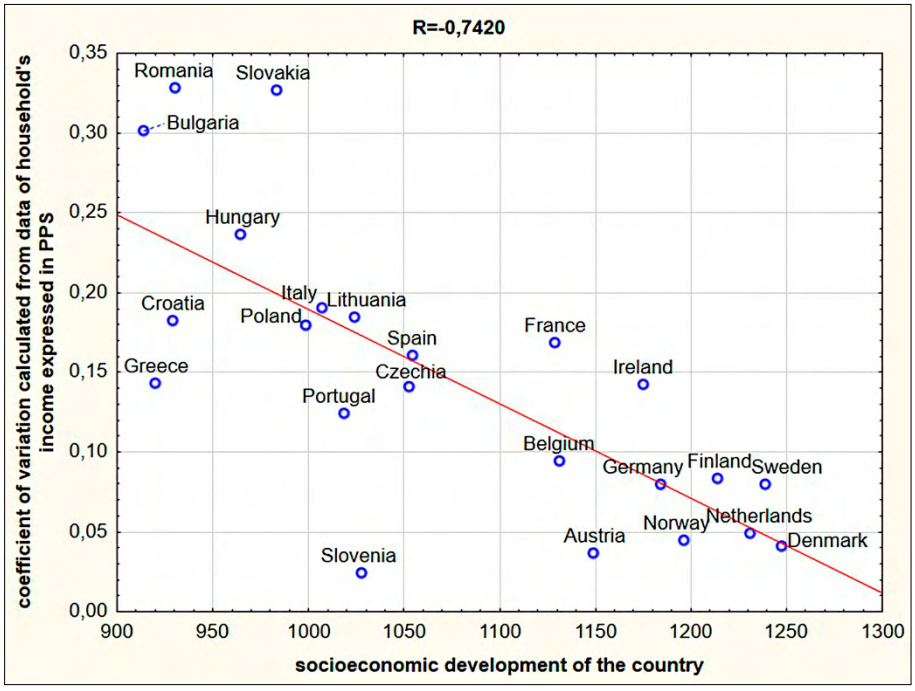

Figure 7. The degree of dependence between socioeconomic status and intracountry regional inequalities expressed by Income of Household per capita in PPS (coefficient of variation)

Source: Author's calculations based on the Eurostat data

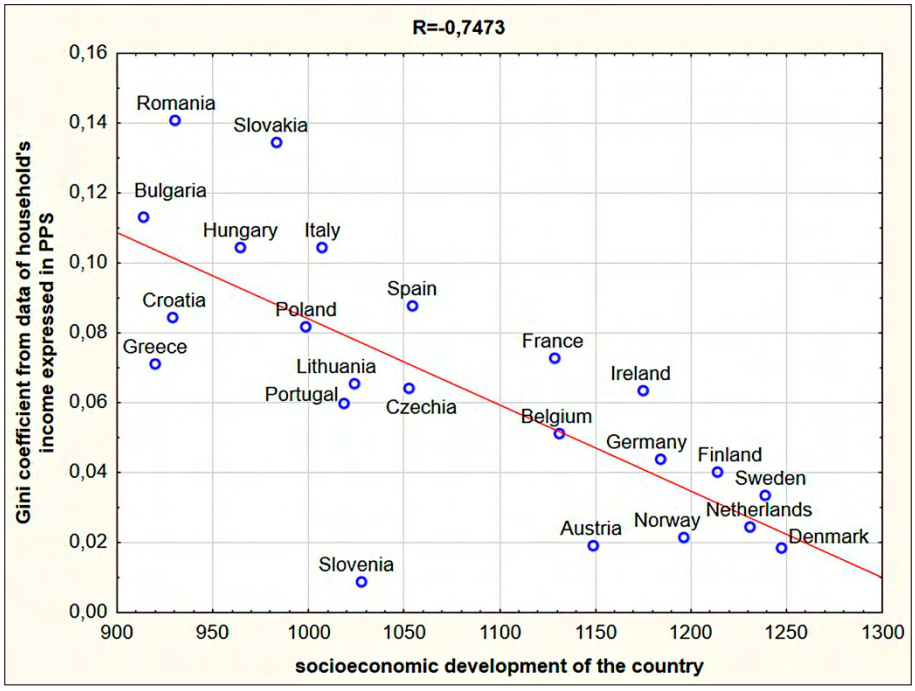

Figure 8. The degree of dependence between socioeconomic status and intracountry regional inequalities expressed by Income of Household per capita in PPS (Gini coefficient)

Source: Author's calculations based on the Eurostat data

alysed. The results of the correlation analysis confirmed even stronger correlation dependence than in the case of CV and GI calculated from GDP data (R= -0.74 for CV, R= -0.75 for GI, Fig. 7, 8). The hypothesis that a growth of socioeconomic status causes a decrease in regional inequalities was repeatedly confirmed. The graph of dependency between the socioeconomic status of a country and inequalities expressed by CV shows Slovenia and Slovakia as remote cases. Slovenia was the only country which showed dependency between socioeconomic status and inequalities expressed by GI. A suitability of the linear regression model was confirmed in disparities expressed by both, CV and GI. The determination index pointed to a distinctive influence of change in incomes on the change of regional inequalities (R^2=0.53 in the case of dependence between socioeconomic status and regional inequalities expressed by CV and R2= 0.54 in the case of dependence between socioeconomic status and regional inequalities expressed by GI).

Discussion

The assessment of regional inequalities within selected countries of Europe shows that the highest degree of regional differences was observed in the countries of the former Eastern Bloc (Fig. 1, 2). Rácz & Egyed (2023) also pointed out the following: they claim that the slow catching-up of Central and Eastern European countries with the EU average is evident at the national level (similarly Gianini & Martini, 2024), however, integration has resulted in fragmentation and increased heterogeneity at the subnational level. Also Scutariu (2017) states that the regional disparities in the Central and Eastern European countries are still quite high. Similar results are reported by Leško (2025), according to whom significant regional disparities persist among EU countries with the least developed areas located in Southern, Central and Eastern Europe.

The results of our research confirm that in the case of both monitored indicators, Slovakia, Hungary and Romania had the highest regional inequalities; in the case of GDP they were joined by Croatia, Serbia and in the case of Income by Bulgaria. Also, in the case of other former socialist countries such as Poland, Lithuania, and Czechia we recorded a relatively high level of regional inequalities. Based on the obtained results it is possible to declare that hypothesis H1 has been fully confirmed. Regional data on GDP per capita in the former socialist countries prove that the intensity of real convergence markedly differs in the regions (Tvrdoň & Skokan, 2011). With respect to the V4 countries, the named authors have proved that the existing regional inequalities increased after the admission of the new EU members, the main cause deemed to be the uneven pace of their economic development. In Belgrade

and Novi Sad further factors were the digital economy, opening scientific parks, financing start-ups and ineffective regional policy of subsidies for less developed regions (Uvalić & Bartlett, 2021), a finding already confirmed by Živanović & Gatarić (2017) in the sense that the level of development from north to south significantly decreases.

The above trend of growing regional inequalities is also confirmed by the research of Török (2019), from which it is evident that the economic development of Romania, conditioned by the admission to the EU (January 2007) and inflow of foreign investments, was accompanied by increasing polarisation. It showed that regional differences between Romanian counties intensified during the monitored period 1998-2015. While in 1998 the differences between the best (Bucharest) and the worst (Vaslui) assessed county according to GDP per capita and a share in the national average were threefold, by 2015 they were almost twice that amount. Concerning Hungary, significant regional inequalities were confirmed by Kebza et al. (2015). As for Slovakia, Rusnák et al. (2023) identified within the meaning of the Kuznets-Williamson´s inverted U-curve hypothesis growing inequalities in 1997-2008 with a significant spatial pattern of the east-west gradient; in 2012-2016 the previous phase continued after the outer shock caused by the economic crisis with selective dynamics in the regions successfully adapting and growing, while the last period 2016-2021 was accompanied by decreased inequalities.

Overall, growth in Central and East European countries is, territorially, significantly unbalanced, more so than in most other parts of the European Union. This polarised economic and territorial development within Central and East European countries poses challenges not only for the respective countries, but also for European cohesion (Smętkowski, 2013).

Similarly, when evaluating the impact of capital cities on intracountry regional inequalities (therefore on their drop too) hypothesis H2 has been confirmed, while only in one case, GDP in Ireland did we record a more significant increase in regional inequalities after excluding Dublin. The detailed assessment of the impact of the capitals (Fig. 3, 4) shows a drop of regional inequalities most visibly in Bulgaria and Slovakia, where the drop in both monitored indicators was as much as by 80% and more. Other former socialist countries also recorded a significant drop in inequalities, regarding GDP in Czechia (by more than 70%), Hungary, Romania, Croatia (by more than 60%) and Serbia by more than 50%. As for Income, the decrease in inequalities was slightly lower – from 50% and higher (Romania, Hungary, Czechia, and Croatia). As for the rest of the European countries, only Scandinavian countries (Finland, Sweden) and Portugal recorded a higher decrease in GDP and Sweden and Denmark in Income. It is evident from the above facts that mainly after excluding the former socialist metropolises Sofia, Bratislava, Prague, Budapest, Bucharest and Zagreb, the inequalities dropped most notably and so it is possible to state that hypothesis H3 has been confirmed to a large extent. The results for the strong influence of capitals on regional inequalities confirmed the conclusions reached in papers by Smętkowski (2014), Marošević & Sekur (2018), Matlovič et al. (2018), Klamár et al. (2020), Neszmélyi et al. (2022), etc. Szörfi (2007) mentioned the strong impact of metropolises in the countries of Central Europe, where a great difference can be seen between the capital and the rest of the country. While in the central part of Hungary the GDP level per capita was slightly above the EU average, in the poorest regions it was just a little more than 40%. Noticeable differences can be also seen in Slovakia, notably between the Bratislava region and the poorest Prešov region that was, according to numbers, three times poorer. In his opinion, it was also evident that the countries of Western Europe are more balanced in this way, a statement which has also been confirmed by our evaluation. The strong position of Prague and Bratislava as capital cities in terms of income per capita according to purchasing power was also pointed out by Reinl et al. (2023).

As the final step, we evaluated the connection between the established level of intracountry regional inequalities in the selected countries of Europe and their socioeconomic status. Within both evaluated indicators we have found medium strong or strong dependence, but in the case of GDP the Pearson correlation coefficient was -0.62 for CV and -0.58 for GI and in the case of Income as much as -0.74 for CV and -0.75 for GI. The negative values of the correlation coefficient show negative dependence which means that the growth of socioeconomic status decreases the level of their national regional inequalities which confirms the last H4 hypothesis. The connection between the level of regional inequalities and socioeconomic status was highlighted by Klamár et al. (2020) when assessing the V4 countries (Czechia, Poland, Hungary, Slovakia), Croatia and Serbia as well as by Neszmélyi et al. (2016), whose analyses confirmed that internal regional inequalities were higher in countries with lower GDP than in countries with higher GDP.

Ezcurra (2019) also confirms that within-country inequality is an important component of overall inequality across European regions with regional inequality having increased in most EU countries throughout the study period. Advances in national GDP per capita initially increase regional inequality, but beyond a certain threshold the link turns from positive to negative, with richer countries tending to experience lower levels of regional inequality. Fulterer & Lungu (2018) also state that the research results generally point to convergence at the country level but to increasing divergences between regions within countries.

Conclusion

The implemented analyses and assessments validated a notable socioeconomic differentiation of Europe in the form of highly developed regions in its northern and western part and, by contrast, the slower development of a considerable part of Southern Europe as well, notably, as the countries of the former Eastern Bloc. Duran et al. (2025), based on earlier work by Ertur & Koch (2006), state that regional disparities in the EU-15 were characterised by a persistent North-South direction (with a core comprising regions of the United Kingdom, France and Germany), while after the accession of the Central and Eastern European regions spatial orientation of disparities changed, creating a new North-West/East polarisation.

Socioeconomic maturity as an aggregate indicator based on a set of 13 global indexes confirmed this spatial polarisation, while pointing to the under-development of most of the former socialist countries. These countries mostly presented the highest level of domestic regional disparities (assessed using GDP and Income) with the regions of their capitals dominant. This was demonstrated by the most distinctive drop of regional disparities in all assessed European countries after excluding their capitals from the assessment. To conclude, it is possible to say that, to a large extent, the presumption has been confirmed that with decreasing socioeconomic maturity, the level of their domestic regional disparities has grown. Hopefully, there will be no more intensification of regional disparities within the countries in the period to come (mainly in the former socialist ones), as well as between the European countries themselves and the fear brought to our attention by Fifeková et al. (2021) that converging countries would not be able to narrow the performance gap in respect of the EU average, will not come true.

A positive finding in this regard at least is one of the conclusions of the study by Duran et al. (2025), which suggests that the spatial poles of prosperity are likely to change in the future. It is expected that most regions of Southern Europe will continue to lag behind, while many Eastern European regions will experience an increase in prosperity. Regions of Northern and Central Europe are likely to maintain their prosperous position.

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