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Spatial diversification of social benefits in Poland

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Abstract. The paper investigates the spatiotemporal distribution of advancements in social assistance, focusing on child benefits support in Polish counties from 2013 to 2023. The analysis is based on data acquired from the database of Statistics Poland (the Central Statistical Office of Poland). The condition of families was assessed using the Multiplicative Indicator of Poverty Intensity (*MIPI*), which helped identify locations of high and low-intensity phenomena. Spatial dependence testing techniques, such as Moran's global and local autocorrelation measures, were applied to identify spatial clustering. This led to an analysis of the convergence of spatial distributions using the Hellinger distance by time and administrative division. Finally, an attempt was made to establish a spatial association between the situation of Polish families and local labour markets and wage levels by applying Florence's location coefficient. The results of *MIPI* values indicated the most positive situation of families was for the city of Warsaw throughout the study period. Surprisingly, an unexpected link was found between the situation of families and the labour market and wage levels, despite existing theories of these links.

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1. Introduction

The problem of poverty has been analysed through various dimensions over the years, often within the context of marginalisation and social exclusion, which began in the early years of the systemic socio-economic transformation that began in the 1980s in Poland and persist to the present day. These analyses have been conducted from both quantitative/statistical and qualitative perspectives (Sen, 1999; Stiglitz, 2012; Piketty, 2015; Banerjee & Duflo, 2011, 2019). Statistics Poland's (the Central Statistical Office of Poland) quantitative analyses of the distribution, scale, and structural features of poverty are significant. These studies utilise substantial representative research samples to recognise and thoroughly evaluate the scale, magnitude, dynamics, depth, and reach of poverty, employing different poverty thresholds and examining the income and consumption patterns of households most at risk of falling into poverty.

Jewczak et al. (2018) took a similar approach, combining poverty lines with household data from the Social Diagnosis dataset to estimate poverty depth at the sub-regional level. Poverty research also considers welfare categories beyond economic welfare, including classic dimensions of social differentiation (age, gender, education, and place of residence). Additionally, it investigates household attitudes and behaviour in relation to the prevailing norms and social values, allowing for an estimation of subjective welfare levels (Zwierzchowski & Panek, 2020; Jewczak & Korczak, 2023).

However, one of the most problematic and controversial aspects of these analyses is formulating a definition of poverty, which generally relates to the level of satisfaction of needs considered desirable. Poverty can be perceived in both absolute and relative terms. From an absolute perspective, it is based on the concept of satisfying specific quantitative and qualitative needs. Individuals (individuals, families, or households) are defined as poor when their needs are not sufficiently met, meaning they the basic necessities like food, clean water, adequate housing, sufficient clothing, or medicine, and struggle to survive (UN, 1988).

In contrast, the comparative approach relates the satisfaction of needs to the level of satisfaction of other members of society. This occurs when the standard of living and income of some people deviate significantly from the general norm of their country or region, making it difficult for them to participate normally in economic, social, and cultural life. While absolute poverty can potentially be alleviated through economic growth, relative poverty cannot be completely eliminated but only reduced by addressing inequalities in the satisfaction of needs (Panek, 2011).

Initially, research on poverty focused on two objective financial metrics: household income and expenses. However, starting in 2004, assessments of material deprivation began to incorporate indicators related to social inclusion policies, aligning with Eurostat standards and Poland's integration into the EU's social inclusion strategy. In this context, poverty is viewed as an insufficiency of resources to meet needs, while social exclusion is characterised as a multifaceted process that encompasses various adverse aspects of unmet needs (Wóycicka & Grabowski, 2007).

The traditional financial metrics of income and expenses have been supplemented with indicators for assessing poverty and social exclusion, focusing on the availability or scarcity of resources needed to satisfy particular needs (Golinowska, 2018). Consequently, Statistics Poland's statistical evaluations, which rely on multidimensional poverty frameworks, consider the extent of deprivation regarding both fundamental and secondary necessities, as well as participation in social, political, and cultural activities (Panek, 1996). This perspective on poverty is embedded in Statistics Poland's quality of life and social cohesion surveys. The quality of life surveys assess material conditions (household income, housing conditions, equipment with durable goods), along with satisfaction with life, social capital, social exclusion and subjective perception of one's situation.

In contrast, studies of social cohesion measure income poverty, living conditions and household budget imbalances. Similarly, the concept of poor living conditions, which is in line with material deprivation, is called living conditions poverty. An index of poor living conditions is used here, where households are considered poor if they score at least 10 out of 30 sub-indices (Golinowska, 2018: 35).

The aim of the paper is to investigate the poverty enclaves in Polish counties, focusing on selected social benefits in Poland. To assess the changing situation of Polish families regarding child support allowances, the Multiplicative Indicator of Poverty Intensity (*MIPI*) was used to determine the extent of the phenomenon over time and its spatial distribution. The paper considers selected group of beneficiaries and bring the analysis to a lower level of data aggregation. Similar examples of analysis are practically missing in the literature, especially for Poland, although the result of Euroreg (Smętkowski et al., 2015) can be recalled here, which concentrated on the level of deprivation in synthetic, overall term. One of our objectives was to show the possibilities

and functionality of a very flexible and easy-to-construct tool, which can be implemented in the evaluation of other areas of social assistance.

Our findings will be useful in developing local or regional social strategies and policies. In the article, the following hypotheses were verified. First hypothesis posits that poverty attracts poverty and that the inheritance of poverty is a noticeable phenomenon. Second hypothesis assumes that not every spatial object converges with the trends of change recorded at the macro level. Third one considers the situation of Polish families and the concept of social welfare effectiveness that the position of families should be improving in time.

2. Research background

The socio-moral dimension encompasses non-material aspects of poverty. While material issues remain important – since a lack of satisfaction of basic necessities often accompanies the various forms of poverty – issues such as social position, social status, respect for dignity, stigmatisation, and civil rights inequalities play a crucial role and are seen as more fundamental causes than material deprivation (Banerjee & Duflo, 2011).

This broader perspective aligns with Sen's concept of opportunities and capabilities, which emphasises moral considerations such as the nature of equality and freedom – both formal and real – understood as the ability to pursue one's goals and make meaningful choices (Sen, 1999, 2000). Therefore, poverty is not merely about low income or living standards but also about occupying a social position that restricts one's ability to choose a different/better life due to status constraints or lack of resources or competence. Sen even argues that opportunity, rather than achievement, should be the essential measure of poverty.

The concept of social exclusion has fundamentally expanded the traditional framework for studying poverty. In addition to the individual, social, and economic areas, it now includes political, spatial (modern ghettoisation), group (the vulnerability of specific groups to social exclusion), institutional (the quality of public institutions), and environmental dimensions. Although definitions of poverty vary between countries, empirical research identifies common characteristics of poverty in developed countries (Sutkowska & Kandefer, 2013).

A major factor that influences the extent of poverty is unemployment or inactivity. A lack of work, with its associated lack of income, often makes it impossible to meet basic needs. The material situation of household members depends on the economic activity of the household head. The risk of living in poverty is significantly higher in households where the head of the family is unemployed than in those where the head of the family is working. Furthermore, inactivity among household heads has an even greater impact on the poverty of household members than unemployment.

Poverty is undoubtedly linked to unemployment, as participation in the labour market is a key means of protection against poverty. Employment provides a regular income, and although it may not always be sufficient for a decent standard of living, it usually prevents deprivation. Additionally, employment grants access to the social security system, which is designed to protect against the negative effects of various social risks, such as the inability to work for health reasons, job loss, old age, or the death of the family breadwinner. Furthermore, work is not only a means of income but a fundamental avenue for social participation and personal development. However, while a lack of employment does not necessarily lead to poverty, and having a job does not completely remove the risk of falling into poverty, the correlation remains noticable.

When analysing poverty, geographic location is also a key consideration (eg. Milbourne, 2004). Studies indicate that people living in rural areas are more prone to poverty than urban residents, with farmers more frequently affected than those in the service or industrial sectors. The higher prevalence of absolute poverty in rural areas is mainly due to lower wages, which stem from lower labour productivity and fewer hours worked. Thus, rural unemployment is a major driver of poverty.

3. Data and methods

3.1. Dataset

This paper investigates social benefits levels, focusing specifically on family benefits. The data source was Statistics Poland, and the dataset comprised total benefit expenditures, the number of families receiving child benefits, the number of children for whom parents receive child benefits, and the total population of a spatial unit. The analysis covers the total amount of family benefits for children,

including one-off birth grant, parental benefit, care allowance, single parent allowance or education and rehabilitation allowance for a disabled child, regardless of the source of funding according to the Act of 28 November 2003 on Family Benefits (Ustawa z dnia 28 listopada 2003 r. o świadczeniach rodzinnych (Dz.U. 2024 poz. 323)). The analysis covered the period 2013–2023 and was conducted at the county level of spatial data aggregation.

The selection of the time sample was intentional and dictated by two aspects. Firstly, the year 2023 was the most recent observation period available at the date of the analysis, while we chose to assess the variability of family benefits from 2013 onwards, as this gave an analysis of a full decade and allowed for an equal continuous set of spatial objects. Another reason for starting the analysis in 2013 was to achieve some comparability of outcomes of the results with Euroreg 2015 publication (Smętkowski, et al., 2015), that were completed that year. Due to ongoing changes in county boundaries, the period guarantees data comparability in both spatial and time manner. The total number of spatial units analysed was 380. For presentation purposes, we selected a regular period of five years that covered 2013, 2018 and 2023.

3.2. Research procedure

The spatial diversification of social benefits was performed using *MIPI* (Jewczak et al., 2018). In this case, *MIPI* consists of 4 components:

- total benefits expenditures (*A*),
- the number of families receiving child benefit (*B*),
- the number of children for whom parents receive child benefit (*S*),
- the total population of a spatial unit (*C*).

MIPI is expressed by the following formula:

$$MIPI = \frac{B * S * A}{C^3}$$

The indicator is expressed in absolute values. The highest value of *MIPI* indicates a worse situation for people benefiting from social assistance, while the lowest value reflects a better position of families in terms of receiving child benefits. The crucial significant quality of *MIPI* index is it's 0 value indicating: no beneficiaries, or families eligible to apply for state aid. This is featured by the design of the measure itself, as this is the only place where the index can be zeroed, which implies the very good condition of the beneficiaries due to their absence or lack of entitlement to payment.

Another advantage of the proposed indicator is its universality and elasticity, allowing it to use different classes of variables. In this context, it is not a rigid formula dedicated to one set of variables, e.g. statutory poverty, or related to the ability to fulfill specific needs material deprivation. The *MIPI* measure does not only use material variables in its construction. In the standardisation, it takes into account the internal conditions of the spatial unit, by the subjects of the family entitled to social assistance, the direct beneficiaries, as the children who are entitled to the benefit, and the absolute population of the region that can be identified according to potential analysis as mass variable. As it is a highly relative measure, it represents to some extent the capacity of a spatial unit, giving a value per citizen showing the relative burden of social support provided. Due to the structural flexibility of *MIPI*, and the possibility of compiling the components which are of interest to the researcher, gives a better picture of the situation than the rigidly defined measures.

To achieve the objectives of the study, the *MIPI* indicator was first estimated at the NUTS-4 (county) level. This allowed us to examine the spatial distributions of changes in the level of the indicator over time to identify clusters of similar values of its advancement. Here, *I* Moran's statistics were considered at the global and local levels. Subsequently, an analysis was conducted to determine in which counties the distribution of the *MIPI* index followed a similar pattern over time as in the given years in Poland. For this purpose, the properties of the Hellinger distance (*HD*) was used, which makes it possible to investigate the covariance of the empirical distributions. With the indications already obtained, we related and assessed the degree of distribution of the *MIPI* index in counties in Poland in relation to economic categories. Two variables were used: the unemployment rate and the average salary in the national economy, which are very likely to be regulators of the social benefits situation in households. In this aspect, the spatial association Florence coefficient was used. Synthetic indicator analysis is often used to assess social assistance when evaluating complex phenomena, such as poverty (Kaczmarski & Frączek, 2021). The reason for verifying spatial distributions with tools such as Hellinger distance and Florence coefficient is mainly due to the lack of the necessity to use other distributions of the analysed variables as

the empirical distribution, which makes the tool itself convenient to use.

3.3. *I*-Moran's spatial autocorrelation

The global *I*-Moran's spatial autocorrelation statistic was used to assess the degree of clustering of the analysed variable in the spatial distribution at the county level in Poland (Moran, 1950; Suchecki, 2010). Locally, Local Indicators of Spatial Association (*LISA*) were implemented to identify regional similarities/differences between counties in terms of the levels of the *MIPI* indicator, providing a basis for seeking consistency in the spatial distribution of the analysed phenomena. *LISA* indicators allow the proportion of global spatial autocorrelation to be found for each of the locations in the area under analysis, identifying clusters of high and low values of the variable under study and atypical observations.

Based on the scheme described by the standardised weight matrix **W**, in a queen contiguity of the first degree, if we assume that a variable x with observed values of x_i occurs in n different regions i = (1,2, …, n), the value of the global spatial autocorrelation statistic is defined as follows:

$$I_W = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}^{*}(x_i-\bar{x})(x_j-\bar{x})}{\sum_{i=1}^{n}(x_i-\bar{x})^2} = \frac{\mathbf{z^T W * z}}{\mathbf{z^T z}}$$

where:

- n is the number of observations,
- x_i and x_j are the values of variable x in the i-th and j-th regions,
- $\bar{x}$ is the arithmetic mean of all observations for all regions x_i,
- w*ij are the elements of the weight matrix **W** standardised by rows,
- **z** is a column vector with elements $z_i = x_i - \bar{x}$.

The statistical significance of the Moran's I statistic was verified with the hypothesis formulation

- H_0: observed values of the variable are randomly distributed between locations (no spatial autocorrelation)
- H_1: values are located in a non-random way, with spatial autocorrelation occurring.

The null hypothesis was verified each time with a 999-permutation test, with an assumed significance level of *pseudo*-p = 0,05. The same empirical pattern was adopted at both global and local levels. The local *I* Moran's spatial autocorrelation statistics were used to identify the poverty enclaves in Polish counties.

3.4. Hellinger distance

HD was applied to investigate changes in distributions both year-on-year and for individual counties in relation to the central tendency level for Poland. The *HD* measures the distance between two discrete probability distributions and is defined as follows:

$$HD(V_1, V_2) = \sqrt{\frac{1}{2}\sum_{i=1}^{K}\left(\sqrt{\frac{n_{1i}}{N_1}} - \sqrt{\frac{n_{2i}}{N_2}}\right)^2}$$

where:

- V_1 and V_2 are comparable 1st and 2nd data sets,
- K is the total number of valid fields in the contingency table,
- n_{1i} and n_{2i} are the frequencies of the i-th field in the 1st and 2nd data sets, respectively,
- N_1 and N_2 are the total sizes of the data sets.

The *HD* is a metric in the space of probability distributions that takes values between zero and $\sqrt{}_2$. It is used to measure the degree of similarity between two distributions. When the distance equals 0, the distributions are identical, and as it approaches 1, the variation between the distributions increases. Usually, an *HD* value greater than 0,5 indicates significant differences between the two distributions. HD was used to assess the covariance of the empirical distributions of the *MIPI* index estimated for counties in Poland in relation to national median values as well as its changes over time. The main benefit of implementing the *HD* coefficient is its ability to assess distributions with large number of units.

3.5. Assessment of spatial distribution

There are situations in which certain phenomena – such as unemployment, poverty, or the percentage of the population belonging to a certain local community – vary widely across regions. The *MIPI* indicator is not in itself a snapshot of a cause-and-effect model, but merely a measure for assessing the health of a given facility by taking into account the values characterising the facility. For example, in some regions, the unemployment rate is very low, while in others, it is very high. Due to its concentration

and dispersion, the Florence location index was defined as follows:

$$F = \frac{\sum_{i=1}^{k}(S_i - U_i)}{100}$$

where:

- S_i – the percentage share of the first phenomenon under study,
- U_i – the percentage share of the second phenomenon under study by spatial unit,
- i = 1, 2, ..., k - the number of spatial units.

The Florence index takes values in the range $0 \leq F \leq 1$. In a situation with a very similar spatial distribution of phenomena, the value of the coefficient is close to zero, while in the case of a very high diversity of variables, the value of the indicator approaches 1.

For interpretation purposes, the following scale is recommended:

- $F < 0{,}25$ – the phenomenon has a high degree of distribution (low spatial concentration), meaning the phenomenon is non-localised.
- $0{,}25 \leq F \leq 0{,}49$ – the phenomenon has a medium degree of distribution (medium territorial concentration), meaning the phenomenon is moderately localised.
- $F > 0{,}49$ – the phenomenon has a low degree of distribution (high spatial concentration), meaning the phenomenon is highly localised.

The Florence location indicator provides information on whether the *MIPI* distribution across counties between 2013 and 2023 follows the spatial distribution of the unemployment rate and the average wage in the national economy.

4. Results

First, the *MIPI* indicators were calculated at the county level for the years 2013–2023. The obtained values were then assessed in terms of average and median values, as well as the variability of the indicators in each of the analysed periods. This assessment aimed to determine whether the process is changing or remains relatively constant over time. In terms of both mean and median, the average levels of the indicator have been decreasing over time, with a relatively similar variation across the country from year to year of approximately 80%. The descriptive statistics show that 2023 was characterised by the highest variability, with a coefficient of variation (V_x) of 90%.

Further, the *MIPI* levels were investigated in terms of spatial association. Because the main variable is associated with the economic conditions of local societies, a search was conducted for connections between this measure and wages, as well as the situation of the employed and unemployed. The Florence location indicator was applied, providing grounds for more sophisticated analyses of spatial distribution in terms of spatial autocorrelation and clustering. Before proceeding with these analyses, however, we estimated the situation over time in each county to identify where spatial trends in time change of social assistance are in line with the average trend for Poland. The median of the *MIPI* index in individual years was taken as a point of reference to compare its course with the levels of individual counties, for which the *HD* was adopted. The result of this comparison is presented in Figure 1.

The results primarily mostly show that, over time, the local structure of *MIPI* index differs from the average level for Poland. The *HD* values helped identify counties undergoing intense transformation (in red), which include the county cities of Wałbrzych, Opole, Ruda Śląska, Poznań, Sosnowiec, Bytom,

Table 1. Descriptive statistics of the *MIPI* indicator

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Mean value	0,78	0,61	0,58	0,82	0,83	0,79	0,66	0,54	0,40	0,30	0,23
Median	0,67	0,51	0,47	0,69	0,71	0,68	0,57	0,45	0,33	0,23	0,16
Coefficient of variation Vx	83%	84%	85%	81%	79%	75%	76%	82%	85%	87%	90%
Positioned coefficient of variation Vq	76%	80%	74%	59%	64%	63%	63%	68%	78%	83%	91%

Source: own elaboration

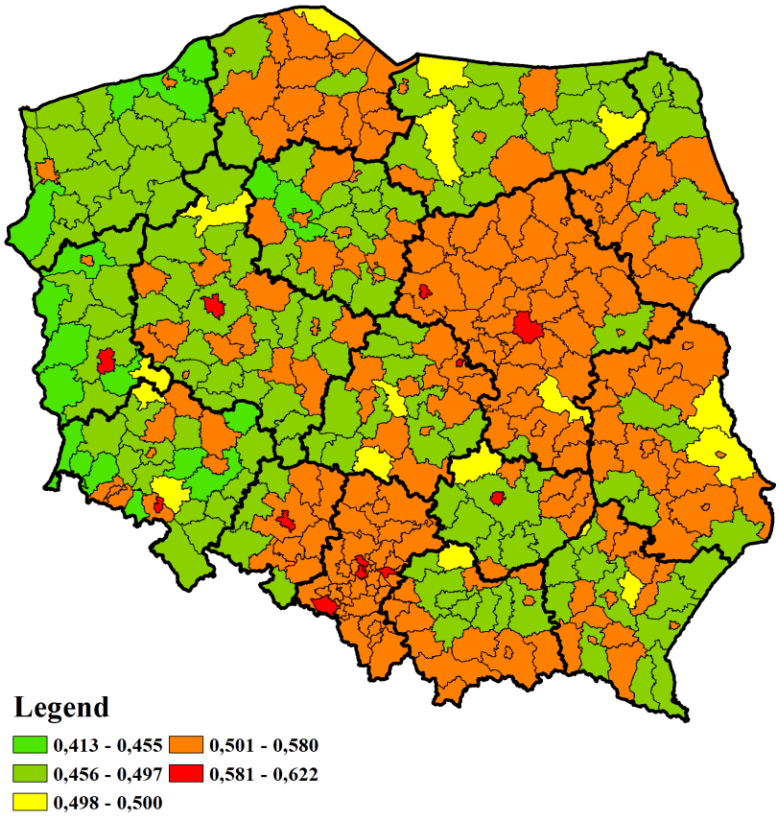

Fig. 1. Hellinger's distance of *MIPI* for regional boundaries
Source: own elaboration

Płock, Warszawa, Zielona Góra, Skierniewice, Kielce, Świętochłowice, Konin, Zabrze, Piekary Śląskie, Białystok, Rybnik, Siemianowice Śląskie as well as Wodzisławski and Pruszkowski counties. This list indicates that the highest disproportions relative to the average are mostly found in cities with county rights, which are characterised by higher population density that directly translates into greater social assistance needs due to the more complex structure of local communities.

Based on the *HD* summary, it can be stated that in most counties, the situation of families receiving benefits changed over time when using the median level of *MIPI* for Poland as a reference point. However, from the NUTS-2 perspective, there is one region, Opolskie, that presents a completely different scenario. This region serves as an example of unique behaviour in the dataset. The results of the main map for Hellinger distance (Fig. 1) indicates that the spatiotemporal pattern of the change in *MIPI* values was significantly different in Opolskie from the overall tendency expressed by median level for Poland. This is a key feature of using *HD* distances, for example, for the planning of specific locally tailored social policies, for places with a completely different structure than adopted at the macro level.

HD identified regions that require closer investigation, employing methods such as LISA and *I* Moran's statistics. Local spatial autocorrelation statistics use colour to indicate the nature of a spatially localised variable relative to neighbouring locations, according to the W spatial weighting matrix scheme (Fig. 2). Specifically, red identifies a statistically significant *LISA* value for an object with a high value of an analysed characteristic neighbouring an object with a similarly high value. Conversely, dark blue identifies a statistically significant LISA value for an object with a low value of the analysed characteristic neighbouring an object with a similarly low value. This situation is illustrated by quadrants I (high-high) and III (low-low) of the Moran's scatterplot. The remaining quadrants, II and IV, identify neighbouring locations with high-low and low-high values of the analysed phenomenon, respectively.

At a global level, the level of spatial dependence for the *MIPI* index in the selected years varied among counties between 0,46-0,49. When verifying the significance of the spatial dependence

using a 999 permutation test, the *pseudo* p-value obtained was consistently lower than 0,001, which allows the null hypothesis to be rejected in favour of the alternative hypothesis. This confirms the occurrence of positive spatial dependence, i.e. the clustering of similar *MIPI* index values in the county distribution across Poland. The strength of this relationship is assessed as moderate. The results are summarised in cluster maps and Moran's scatter plots, which were generated using a standardised **W** spatial weighting matrix based on first-order queen contiguity (Fig. 2).

The clustering presented in Figure 2 does not exhibit a significant change in intensity, as indicated by the strength of the spatial dependence, summarised by *I* Moran's statistic. However, it is noteworthy that during the analysed periods, some objects undergo changes in their characteristics. A clear example is central Poland and the area surrounding the city of Łódź, as well as regions of south-eastern and south-western Poland. These changes may be influenced by the ongoing military conflict in Ukraine. There is a notable cluster of high *MIPI* levels in north-eastern Poland, which spills over into four regions: Warmińsko-Mazurskie, Podlaskie, Mazowieckie and Kujawsko-Pomorskie. Similarly, a cluster of low-value *MIPI* counties can be identified adjacent to low-value counties, which spills over Poland's southern and western borders and tends to join with counties in Zachodniopomorskie. The identified patterns may be strongly influenced by the

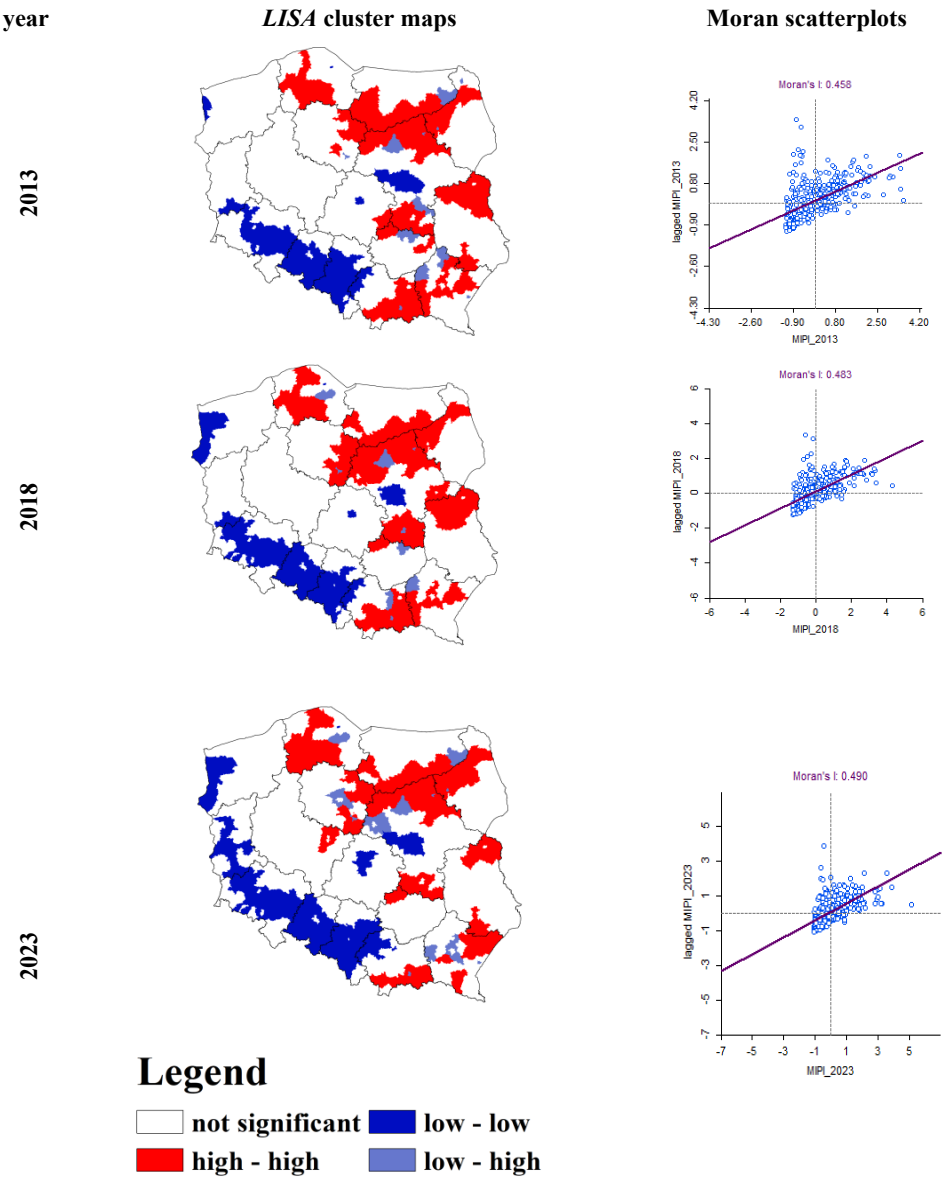

Fig. 2. *LISA* cluster maps and Moran's scatterplots for *MIPI* in 2013, 2018, and 2023
Source: own elaboration

natural environment, which includes lake areas, major river systems and mountain ranges, as well as the course of international borders.

The analyses based on the clustering of similar MIPI values allowed us to assess the degree of spatial association between *MIPI* and the spatial distribution of unemployment rates and wages in the economy. The Florence coefficient, estimated over time (Fig. 3), indicated a high degree of distribution for both unemployment and wages, suggesting a low spatial concentration (i.e., the phenomena are non-localised). The patterns of spatial association are quite similar and stable over time. However, the association between the *MIPI* and wage levels is stronger in absolute terms, which is expected given the link between social benefits and household income levels. The gradual rather than abrupt changes make the analysed relations easier to understand and could contribute to more effective planning of social assistance strategies for families. The results also indicate a noticeable, though not significant, impact of abnormal situations, such as the COVID-19 pandemic, on the *MIPI* index.

The primary reason for the existence of absolute poverty is the low level of economic development. However, even in countries with significantly higher income levels, there is a small area of absolute poverty, and its prevalence is not directly related to the country's wealth (Szulc, 2019). This suggests that factors beyond the level of *per capita* income influence the differences. The study of poverty at the beginning of the 20th century set the paradigm for identifying poverty using statistical indicators of income. To this day, material deprivation remains central to poverty definitions (Golinowska & Broda-Wysocki, 2005: 21; Lister, 2007: 19–21).

The analysis confirmed, regarding to the effectiveness of social policy hypothesis that the situation of families has improved. Over time, the values of the indicator decreased (Tab. 1), which, according to its properties, indicates an improvement in the situation of the analysed objects. While investigating diversity of spatial units the results confirmed that not every spatial object was convergent with the trends of change recorded at the macro level. As indicated by the *HD* distance, it is possible to identify a specific entity whose trends of transformation deviate significantly or substantially from the results recorded at the macro level. Last but not least, question often asked by sociologists on poverty inheriting the *LISA* cluster maps and *HD* coefficients confirmed that the distributions of *MIPI* for counties did not change significantly at least even once over time. It means that it is higly likely that children who become adults in 2012 or 2013 automatically fall into the patern of their parents' lives and follow it.

5. Discussion

Government social policies aim to reduce poverty while also addressing income disparities. Our research has identified specific counties where the situation of families did not change over time – either improving or worsening – due to local social characteristics and their attitudes towards state aid (Golczyńska-Grondas & Potoczna, 2024). A basic response of many modern states to poverty is income redistribution (Golinowska, 2018), whereby governments transfer income from the wealthy to the poor. Without social transfers, poverty levels in Poland would increase Poland significantly, with children being most affected by the lack of state

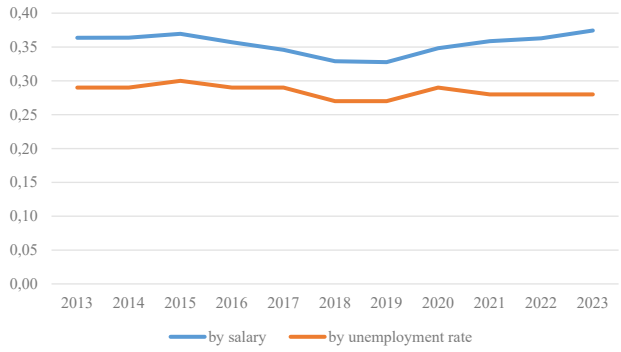

Fig. 3. Florence indicator for *MIPI* by salary and unemployment rate
Source: own elaboration

support. Considering these factors, the analysis focuses on a specific group – the young – to assess their situation concerning poverty, their ability to meet needs, and their local quality of life.

When comparing the results of the analyses by Smętkowski et al. (2015) who determined the county deprivation index in their analyses, the obtained indications of the *MIPI* index overlap with those of the authors mentioned above with the difference that our proposed analysis assesses the statistical significance of the distribution of locations through *LISA* statistics, which extends the analysis of geolocalisation by value alone. This can be seen, for example, among the counties located on the line of borders of three regions: Mazowieckie, Podlaskie and Warmińsko-Mazurskie, where mentioned Authors identified areas of high deprivation intensity, as well as in the southern part of the Mazowieckie region, and among the locations of districts on the border of Podkarpackie and Małopolskie voivodeships. On the other hand, the low levels of the deprivation index are again similarl to central and southern regions of the Opolskie, Śląskie and Dolnośląskie voivodeships. One can therefore conclude that the advancement of family benefits is related to the condition of the regions and the overall deprivation or level of recorded poverty. This might create an analytical doorway for further analysis of the economic potential of counties and voivodeships and the search for links between this potential and e.g. implemented family policy strategies, especially in terms of local government programmes operating in a given location.

A key advantage of the *MIPI* indicator is that it does not rely on any predefined poverty categories (such as extreme, absolute or statutory poverty) that automatically classify households into social assistance programs. Instead, it contextualises each individual's situation within their specific environment and family circumstances. The analysis offers a multidimensional perspective on poverty, addressing complexities that are often difficult to capture with traditional approaches (Golinowska, 2018). Typically, measures of poverty are based on rigid ideas, e.g. comparing the income per person in the household with a certain predicted value, as in the case of extreme or statutory poverty, or the failure to meet some specific living needs, as in the case of material deprivation. In the case of the proposed *MIPI* measure, many different socio-economic categories can be introduced into its components, as, for example, has been done within analysis of housing allowances (Jewczak, et al., 2018). The measure, in its flexible design, recalculates and standardises the nominal values and compares the relationships of the selected quantities. These can be, for example, family benefits, as shown here, expenditure for specific purposes, etc. It, therefore provides the opportunity for a highly flexible approach of assessing deprivation according to a chosen key, with an easy assessment against the zero level, which indicates a situation with no beneficiaries, no entitled to receive allowances and no state aid in monetary units.

6. Conclusions

There are many theories about the causes of poverty, ranging from the simplest explanations, which attribute it to individual characteristics such as laziness, to more complex factors like family conditions (e.g., inappropriate child-rearing practices, large family size, unstable family life, various dysfunctions, illness, a lack of education) and broader societal issues (e.g., state policy or economic development level). Following the general concepts of Banerjee and Duflo (2011), who claimed that in order to understand the poverty dimensions better one should focus on the lowest possible, individual level of data. This attitude stands in line with Sens's (2000) approach towards the seeing the situation through the lens of the individual and not the general population. To some extent the ideas of Banerjee, Duflo, and Sen were implemented in the analysis. The identified spatial dependencies of the Multiplicative Indicator of Poverty Intensity, which evaluates social assistance in the form of family allowances, allowed for an assessment of the situation of families in Polish counties. This approach moved beyond strict income categories, focusing instead on the importance of the family, the number of children requiring assistance, and the extent of this assistance.

A research question arose regarding whether the distribution of the *MIPI* indicator by county changed over time during the analysed years. To address this, Hellinger Distance was used. The results showed that the phenomena were quite predictable, with *HD* values ranging between values 0,02 to 0,03, indicating a nearly complete correspondence of the distributions of the indicator by county over time. Between 2013 and 2023, the city county of Warsaw had the most positive rating with a *MIPI* of approximately 0,01. In contrast, the most unfavourable assessment of social benefits was identified in Kartuzy County in 2013 and 2018, with *MIPI* values of 3,10 and

3,34, respectively, and in Lipno County in 2023, with a *MIPI* of 1,28. However, in the last analysed period, there was an improvement in the situation of families in Kartuzy County, as the indicator fell below 1, reaching 0,90.

Considering the sources of change in the *MIPI* index over time, the trends of the main construct variables were analysed. A convergence close to 100% of trends was observed for the number of families and the number of children receiving family benefits, although the overall average annual rate of change was negative at –9,26% and –7,97% respectively. At the same time, there was a significant increase in the amount of family benefits paid for children with an average annual rate of change of 5,16%, indicating an annual increase of PLN 512 000. The volatility of the mass variable, which also determines the level of the *MIPI* index, is also an important factor – when analysing the level of the population, it is noted that it is decreasing, on average from year to year by -0,23%.

MIPI results can be easily adopted to rate social policy in the following ways. By combining the results of the index at the local county or even municipal level, it is possible to assess the convergence of the distribution characterising a given location with macrolevel trends - here, thanks to the functionality of the Hellinger's distance, it provides an opportunity for pointing directly to dissimilarity of a given location from the general tendencies. Furthermore, when the *MIPI* analysis is joined with an assessment of the economic potential of spatial units, e.g. through the proposed Florence coefficient on a similar basis as shown in the case of the unemployment rate and salaries, it would be possible to better match the strategy to the potential of the spatial unit, which has a certain autonomy in creating its local social policy to a certain extent.

On the basis of the presented multifaceted approach, it can be concluded that the scientific objective of the study, which was to investigate the poverty enclaves in Polish counties, focusing on selected social benefits in Poland has been achieved. The study led to the identification of spatial patterns and to indications as to which of the analysed counties should definitely design their social policies for selected benefits differently from the national level. The study also made it possible to assess the effectiveness of family benefits, showing that the situation of families and their children has been improving over the analysed decade. There was also a convergence of results with other studies on a similar topic (Smętkowski et al., 2015), regarding clusters of similar quality of enrolment. This was the basis for the conclusion that the situation of families depends both on the received family benefits and on the condition of the spatial unit itself and the level of poverty or material deprivation recorded there.

The main limitation of the analysis is the data aggregation which is not so much due to the availability of downstream data, but results from the total level of family benefit amounts. Certainly, a breakdown of the total amount into the individual components under the Act would provide a better picture of the state of families and their children. Due to the nature of family benefits, the lack of information on the characteristics of the family, whether it was alone parent or perhaps a multifamily household, can be also perceived as a limitation.

The proposed study has the potential for further expansion. Plans include modifying the analysis to compare regions and relating county *MIPI* levels to the achieved index for the province in which the county is situated rather than the national index. This will allow for a better assessment of a county's situation relative to its superior NUTS unit, allowing for more accurate projections of social policies. In the next step, the analysis will extend to a lower level of territorial division, assessing the situation of social welfare beneficiaries at the municipal level with the possibility of spatial interpolation for the national level. This would allow for an analysis of the phenomenon across administrative divisions.

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