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1. INTRODUCTION

The aim of this publication is to develop the multidimensional index of deprivation of Polish gminas (communes), as well as to define the degree of concentration of deprivation on the poviat (county) and city level. The studies use conceptualisaton of the deprivation phenomenon and its operationalisation presented in the report entitled "Poviats threatened by deprivation: state, trends and prospects" (Smętkowski et al. 2015)[1]. Therefore, such issues as e.g. defining dimensions of deprivation and methods of its measurement, which were presented in detail in the abovementioned report, were omitted in this publication. It focuses on discussing the importance of spatial concentration of deprivation and on comparing different ways of its measurement. It should be noted that the degree of spatial concentration of deprivation determines numerous social and economic phenomena and it should be taken into account within the public authorities' actions, including in the scope of health care policy.

The spatial concentration of deprivation should be considered as extremely important for several reasons. The main reason is the interaction between deprivation considered in both, individual and environmental dimensions. Individual dimension of deprivation is related to *inter alia* the level of income, participation in the labour market and the level of education. Environmental dimension constitutes a context of development of an individual and is related to social interactions, impeded access to goods and services as well as their lower quality, which may be true for example in the case of high concentration of people at risk of poverty.

Exceeding a certain critical threshold of concentration of deprivation in the area may lead to creation of an enclave which, in extreme cases, may become a ghetto. Poverty enclaves are negatively perceived in the collective consciousness, which leads to enforcing segregation processes and growing real and perceived separation of this area from the remaining part of habitat. This process has characteristics of cumulative causation, thus the character of such neighbourhood is usually long-lasting. It results from the fact that deprived areas are perceived as being of little attractiveness for living, which causes the outflow of more wealthy people. As a result, in the case of lack of appropriate capital expenditure for maintaining the housing stock, the conditions of living of inhabitants of such enclave deteriorate.

In enclaves of poverty the process of inheriting deprivation by subsequent generations of inhabitants is very frequent. Especially children being raised in pathological environment are deprived of socially desired patterns of behaviour and, as a result, they frequently follow the model of life of their parents and neighbours.

It is extremely difficult to prevent the process of spatial concentration of deprivation after a given critical threshold has been exceeded. Moreover, sometimes the policy of local authorities may contribute to creation of such enclaves, e.g. in a situation where people at risk of deprivation settle in a given area, e.g. as a result of inappropriate housing policy. On the other hand, the attempts to revitalise such areas are quite often limited to modernisation of technical infrastructure and renovation of buildings. Due to the lack of accompanying actions targeted at solving social and economic problems, the efficiency of the implemented infrastructural projects is significantly limited. On the other hand, if such an area falls within the scope of

[1] At the same time the Central Statistical Office of Poland (GUS) developed their publication on this issue (2015). The outcome of both publications is very similar in many aspects.

interest of the private capital – in the case where public authorities are not adequately engaged – some negative aspects of gentrification process may appear.

The abovementioned factors result in spatial polarisation, which is reflected in a different manner in urban and rural areas, and is usually more visible in the first context (Lister 2007).

It happens relatively often, that the visibility of social and spatial polarisation in a city increases with the wealth of its residents. This is due to the fact that segregation processes also result in the corresponding spatial concentration of wealthy people. In literature, the city resulting from such a division is referred to as a dual city (Castells 1989, Harvey 1996). Such a city is characterised by the co-existence of guarded residential areas inhabited by metropolitan class and enclaves of poor people, including classic ghettos often inhabited by emigrants from developing countries. As a result, as B. Jałowiecki and W. Łukowski (2007) conclude, the increasing "*ghettoization of space causes persons with similar level of education, income, cultural capital to live in enclaves where they have very little possibility to contact other people.*" Such a situation may incite adverse social tensions and decrease the level of safety in the city.

In recent years a number of publications in Poland discussed the issue of social and spatial polarisation and urban deprivation both in comparative perspective for various urban centres (e.g. Węcławowicz 2001), and presenting them from the perspective of individual metropolises, with the study conducted in Warsaw (Węcławowicz 1997, Jałowiecki et al. 2003, Smętkowski 2009), Łódź (Grotkowska-Leder 2001), or Poznań (Weltrowska, Kisiała 2014) among them.

The processes of concentration of deprivation in rural areas are different in their character. In this context deprivation may be deepen by the peripheral character of individual settlement units, which results from their low accessibility impeding the development of social and economic interactions (see Taylor 1999, Sobala-Gwosdz 2004, Smętkowski 2003).

The specific deprivation areas in Polish conditions are the areas of former State Agricultural Farms, which were the first to suffer as a result of Polish transformation. Liquidation of State Agricultural Farms led to structural unemployment of inhabitants of these regions, where they constituted a dominating element of agricultural economy. It resulted in creation of environments deprived in terms of income, work and education (Domańska 2011). These areas turned out to be a long lasting element of diversification of the Polish social and economic space, especially marked by the abovementioned problem of inheriting deprivation (Marks-Bielska 2006).

Concentration of deprivation on the local scale is becoming increasingly important in the overall diversification of this phenomenon in Poland, which is proved by a number of studies conducted for various levels. For example, according to studies conducted by W. Okrasa and G. Gudaszewski (2013) spatial diversification of deprivation in Poland resulted to a greater extend from differences between gminas, than from the diversification on the poviat level. In dynamic terms, according to these studies, one may observe a clear increase in concentration of inequality on the gmina level, while diversification between poviats has decreased.

The overview of the abovementioned literature points at the need for diagnosis of spatial polarisation of the deprivation phenomenon which has significant implications for public policies. Therefore this publication attempts to develop a multifaceted (i.e. using various methods) assessment of spatial concentration of social and economic phenomena in the poviat and city scale.

2. CONCENTRATION MEASUREMENT METHODS

The aim of this chapter is to present various methods of concentration measurement and to indicate their application, which may serve as the basis for selecting appropriate measures for concentration of deprivation in spatial terms.

To begin with it should be noted, that the notion of concentration itself has many meanings, and that the measures for defining it are diversified. Depending on the context, concentration may be understood as inequality, convergence, and from the spatial perspective as polarisation, that is the level of centralisation of a certain phenomenon in defined territorial system. Therefore it is necessary to select the appropriate method for measurement. For example, while measuring convergence, a coefficient of variation based on standard deviation is often used or Theil index which has this advantage, that it offers possibility of division of diversification within group and between group variances. In income inequality measurement, on the other hand, the Gini coefficient is commonly used. To define the degree of concentration on a given market, the Herfindahl-Hirschman index is used. To measure the social and spatial segregation in the urban scale a number of coefficients are used, such as segregation, isolation, interaction indexes, or coefficient of localization, the use of which evolves and it depends on the research approach (Grzegorczyk, Jarczewska 2015).

It is often emphasised, that the abovementioned measurements are effective only in defined contexts (e.g. Hall, Tideman 1967; Czemaps 2012; Binderman et al. 2013). Some authors point out that the choice is not about the alternative measurement methods, but about the selection of one among many definitions of the inequality phenomenon (e.g. Allison 1978). As for the spatial perspective, the measurement is additionally disrupted by differences between the territorial units under study related to the number of inhabitants and the area. Difficulties are also related to territorial units which usually correspond to administrative units, however these may also constitute geometrical units (e.g. square grid) (see Kostrubiec 1972). Moreover, depending on the aim of studies, the data may be relativised in terms of spatial density or the level of phenomenon in a population. Another problem is the possibility to apply different spatial scale, which may lead to apparent paradoxes, when one hierarchical level is characterised by high degree of concentration of a given phenomenon, while another hierarchical level might be characterised by deconcentration (see e.g. Opensaw, Alvanides 1999, Smętkowski 2013). Therefore, in case of spatial approach, it is rational to present both, the value of concentration measure and appropriate maps presenting the distribution of the phenomenon under study. Geographical research frequently apply the spatial autocorrelation methods which enable defining both, the general measure of spatial interdependence – Moran's *I* statistics, and statistically significant clusters of elements under study (Anselin 1995).

The most popular statistical dispersion measure is the standard deviation and the coefficient of variation constituting its relativization in relation to mean average, which enables making comparisons between variables of different values. To measure concentration of data distribution, a kurtosis is used which shows its flatness in relation to normal distribution.

To measure *sigma* convergence in economic research, which means changing in time the diversification of income per capita between regions and countries (Baro, Sala-i-Martin 1991), normalised standard deviation is used. In turn, in order to assess inequality, the Lorentz curve of concentration is used most frequently, as well as Gini coefficient based on this curve (e.g. Atkinson 1970). This coefficient shows inequality of distribution of a given variable and it most

often refers to population income. Its value is within the scope between 0 and 1, where 0 means equal distribution of income of individuals under study and it forms so called perfect equality line, while 1 indicates a concentration of all income by one object under study. Empirically observed values of concentration coefficient on the country level usually falls within the scope between 0.20 and 0.65. The higher the indicator's values, the higher the inequality. At the same time it should be born in mind, that the Gini coefficient is quite heavily affected by the population size (N), therefore in the case of a small population size it is recommended to normalise it by using the formula GINI* = GINI / ((n-1)/n).

However in spatial studies the Theil index is often used (Theil, 1979), based on the entropy phenomenon. It is characterised by the formula:

$$T_T = T_{\alpha=1} = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{x_i}{\overline{x}} \cdot \ln\frac{x_i}{\overline{x}}\right)$$

The advantage of this measure consists in possibility of its decomposition on various hierarchical levels (inequality between and within groups) and in defining its contribution into overall concentration measure of a given phenomenon (Shorrocks, Wan, 2004; Cowell 2005). Then the formula is:

$$T = \sum_{i=1}^{m} s_i \ln\left(\frac{y_i}{\overline{y}}\right) + \sum_{i=1}^{m} s_i \ln\left(\frac{y_{ij}}{y_i}\right)$$

Theil index takes the value from the scope between 0 and LN(n), where 0 means full spatial equality of distribution of a given phenomenon, while LN(n) means concentration of this phenomenon in a selected territorial system. To enable comparison between different populations it is necessary to normalise it through division of the index value by LN(n).

Indicators of market concentration are another group of indices, which use as its basis the Herfindahl-Hirschman index (HHI). In this perspective, concentration is defined by the sum of squares of individual entities share on a given market characterised by a formula:

$$H = \sum_{i=1}^{N} s_i^2$$

The value of this indicator may fall within the scope between 1/n and 1 (where n is the number of entities on a given market). In the case of perfect competition, that is the equal share of individual entities on the market, the index value is 1/n, and in the case of monopoly, its value is 1. It may be interpreted as the degree of density indicting the scale of market competition. This indicator is not standardised in case of little amount of objects. Therefore it is rational to apply its transformations by using the formula proposed by K. Kukła (1996) or its simpler standardisation according to the formula (Binderman et al. 2013):

$$HHI^* = \frac{HHI - \frac{1}{n}}{1 - \frac{1}{n}}$$

Certain studies using various measures of concentration (Atkinson 1970, Avila et al. 2013) show, that indices based on standard deviation are correlated with Gini coefficient and Theil index, while those based on Herfindahl-Hirschman index constitute a separate group. Some researchers suggest, that in the light of lack of correlation between them, several different

indicators should be applied (e.g. Binderman et al. 2013). Such a solution has been assumed in this publication, with an attempt to assess the appropriateness of measurement methods presented above with the studied issue of spatial polarisation of the deprivation phenomenon in various territorial scales.

3. MULTIDIMENSIONAL INDEX OF LOCAL DEPRIVATION

In this part of the report the rules of construction of the multidimensional index of local deprivation are presented. It uses the concept of index of deprivation presented in the report entitled “Poviats at risk of deprivation: conditions, tendencies and forecast” (Smętkowski et al. 2015). The variables used for the construction of the index of local deprivation, as well as differences in the approach to simplified index on the poviat level are presented below. Further a specificity of administrative division of Poland on the local level is shown together with its impact on the results of the conducted studies. Finally, a detailed method of index construction is presented.

3.1. Dimensions of deprivation and deprivation rates

Dimensions of deprivation considered in creating the index of local deprivation include: population’s income, employment, living conditions, education and access to goods and services. Considering the availability of data illustrating these issues, the rationality of their application on the local level and relations between variables, it was necessary to introduce several modifications compared to the simplified poviat index of deprivation (see Annex 1).

For the income deprivation, the report uses the indicator of own income of gminas and cities with poviat rights which constitute a share in personal income tax (PIT) per capita. This variable enables estimation of the level of income of residents of a given gmina, which they achieve from their work outside agriculture.[2] However the author does not use another income deprivation rate, namely the share of persons in a household who benefit from social assistance, as there is a very high correlation (r=0.99) with the unemployment rate illustrating the labour market deprivation.[3]

To illustrate employment deprivation the author uses the registered unemployment indicator which compares the number of unemployed to the number of working-age persons in a given gmina. This measure constitutes an equivalent of unemployment rate, as the data on economically active population on the local level are not available. However, in spite of discrepancies between the data on unemployment based on register and based on labour force survey, this indicator shows the scale of problems on the local labour market. Another indicator illustrating the approximate hidden unemployment rate in the form of the number of persons working in agriculture sector per 100 ha of agricultural land was not used on the local level. This was due to the fact that the study encompassed all territorial units including cities, where the number of persons working in agriculture is marginal.

In the living conditions deprivation domain, the percentage of flats with bathrooms was used, as the lack of the bathroom indicates the substandard housing conditions. It should be noted that in Poland, in spite of the growing number of flats equipped with installation, the significant spatial differences in this scope are still present.

[2] It was not justified in these studies to include the agricultural tax, which has negative correlation with the income from PIT due to low work efficiency in agricultural sector.

[3] The correlation between this indicator and the unemployment rate on the poviat level amounted in 2013 to r=0.71, which was in line with conditions defined for the poviat index of deprivation construction (see Smętkowski et al. 2015).

For education deprivation domain, due to lack of data on education on the local level, the results of the lower-secondary school final exam (part on mathematics and natural sciences) serve as the indicator. On the one hand it reflects the state of human capital in a given territorial system, on the other, it shows the quality of educational institutions at the elementary stage. At the local level the indicator is characterised to a certain extend by a weakness related to different degree of catchment, due to the fact, that part of the children commute to school in another gminas, which is especially visible in vicinity of large cities.

For the access to goods and services dimension it has been decided to use two indicators, i.e. the number of persons per flat and the percentage of children covered by the preschool education. The first one may indirectly indicate the availability of flats in a given territorial unit. The second one indicates the availability of childcare and education services, and indirectly it may provide information on the overall availability to social services on the local level. In this case it may also show a certain weakness of this indicator related to the fact, that some children may attend nursery schools located outside the given gmina.

3.2. The spatial units under study

On the local level, the Polish administrative division is characterised by a certain weakness from the construction of local deprivation rate perspective, which is related to different ways of considering cities and their surroundings. This is due to the fact, that there are three types of gminas in Poland based on the administrative criterion: urban gminas, urban-rural gminas and rural gminas[4]. Such a solution results in a diversified situation in the urban-rural context. Some cities constitute autonomous gminas, while others are joined with surrounding rural areas, constituting urban-rural gminas. Rural gminas surrounding cities may also, in their turn, form various systems. Firstly, it may concern a situation, in which an urban gmina is surrounded by a rural gmina (whose name is the same). It usually implies that the rural gmina inhabitants use various types of services, including public services, offered in a city. The second case is when a city is adjacent to many gminas which may have different status (most often rural or urban-rural). Those gminas may be included or not into their functional area, depending on the size of the city and its position in the national settlement system.

Towns and cities selected on the basis of administrative criteria are strongly diversified as for the population size, starting with Warsaw with over 1.7 million inhabitants, ending with Wyśmierzyce with less than 1 thousand inhabitants. There is also a number of arbitrary boundaries dividing large cities from towns usually between 50–100 thousand inhabitants (see e.g. Gorzelak 2016, Smętkowski et al. 2009), and small towns from bigger towns.

Due to the abovementioned diversified situation it is difficult to aggregate gminas into units, which would be characterised by higher analytical value. Therefore it has been decided to use the existing administrative division for the purpose of the studies.

The study conducted on the local level is also characterised by a problem of diversified degree of closure of social and economic processes within administrative boundaries. For the purpose of presenting certain phenomena it would be better to use larger functional territorial units (e.g. labour markets, school catchment areas). However, the difficulty consists in different range of these units depending on the aspect under consideration. As a result it has been assumed,

[4] In 2013 there were 2479 gminas in Poland, 306 of which had the urban status, 602 urban-rural status, and 1571 were rural gminas.

that the variables selected for the purpose of studies enable to present – at least to a certain extent – the scale of deprivation at the local level.

Moreover it should be noted, that although the deprivation phenomenon is individual in its character, its analysis on the local level concerns aggregated values. Additionally it presents the average indicators' values without possibility to assess their distribution in a population. Therefore the index of local deprivation *de facto* means the degree of risk of deprivation for inhabitants of a given gmina. Thus the term gminas at risk of deprivation was used in the description. This means that in gminas with the high index value the probability of inhabitants being deprived is higher than in gminas with the low index values. At the same time it cannot be assumed that there is no deprivation phenomenon in the last ones. It may concern e.g. particular social groups or smaller territorial units (e.g. district, estates, rural areas, villages). Considering the above, while calculating the coefficient of concentration of deprivation on the poviat level, the transposition of the index of local deprivation into the share of gmina inhabitants at risk of deprivation has been applied with unitarization of this index values and assigning appropriate percentage values to them.

However, in the case of cities with poviat rights it was not possible to use the gmina level for the assessment of concentration of deprivation inside the city. At the same time it should be noticed, that public statistics do not conduct the systematic observation of spatial diversification on the lower level of aggregation than the gmina level, eventually with division into urban and rural parts. The data from the 2011 census, in their turn, are not available on the level of census regions or areas and even for gminas. As a result, the only possibility to conduct studies in this scope was to use the data developed for capital cities of voivodeships in the grid of squares presented in the report "Identification of special areas in capital cities of voivodeships ..." (GUS 2015). At the same time it should be noted, that adoption of the grid of squares irrespective of existing functional areas in the form of districts or urban sub-areas poses a risk related to a certain degree of randomness of the results obtained (dividing the existing functional areas with grid lines). Nevertheless it has been decided to apply these data for the purpose of approximate concentration analysis inside the cities, as well as with the aim to indicate problems related to conducting such type of studies in Polish context.

3.3. Construction method for the index of deprivation[5]

The synthetic indicator, that is the index of deprivation on the local level, was constructed in an analogous way as the poviat index of deprivation, i.e.

- it was defined if a given variable is a stimulant or a destimulant of deprivation;
- the standardisation of variables was carried out by using the formula:
  - for stimulant: $s_i = \frac{xi - \overline{X}}{\sigma x}$,
  - for destimulant: $s_i = \frac{\overline{X} - xi}{\sigma x}$;
- the impact of extreme values of variables on the index value for a given gmina was reduced (standardised values were arbitrarily limited to the scope <-3; 3>);

[5] This chapter presents the construction method for the index of local deprivation analogous to the method developed for the poviat index of deprivation (Smętkowski et al. 2015) .

- the standardised values of variables after reduction were summed up and divided by the number of variables in order to receive a local index of deprivation: $W_{DEP\_L} = \frac{\sum si}{n}$;

To create the index, the "z-scores" method was used (Smith 1972), which is often referred to in Polish literature as the Perkal's indicator (see e.g. Chojnicki, Czyż 1991; Szymańska et al. 2011). It consists in summing up the standardised values of individual partial variables. It has an advantage that little information is lost in the aggregation process, in contrast to e.g. alternative method of principal components analysis. This method uses statistical measures of mean average and standard deviation. For creating the index of deprivation its modification was used consisting in limiting the impact of extreme values (so called "tails" of statistical distribution) of individual variables on index value.[6] Based on probability distribution under the normal distribution, the standardised values of variables were limited to the scope from -3 to 3 (99.8% of cases in a normal distribution). This procedure did not have any significant impact on the overall distribution of Perkal's indicator value in the population under study, while it eliminated the impact of highly extreme observations on the partial index value for individual gminas, which might have distorted their ranking position in an uncontrolled and random way.

Further, the categorisation of index of deprivation was conducted, which resulted from the assumption, that belonging to a class of gminas characterised by similar index values better illustrates a situation of a given gmina that its ranking position. The categorisation was conducted with the use of so called natural breaks method (see Jenks 1967). This method seeks to simultaneously minimise the variance within groups and maximise the variance between groups. As a result it ensures high homogeneity of selected groups, while each class remains considerably different than the others. This method may be used iteratively by dividing the group into growing number of subgroups starting from the two, in order to indicate the most frequent divisions (see Smętkowski et al. 2009). However, for the purpose of this study the arbitrary division for 10 classes in the case of multidimensional index of local deprivation has been used, and the division for 5 classes in the case of partial variables.

[6] There are various ways to solve this problem – for example A. Sobala-Gwosdz (2004) eliminated two extreme values for each gmina, sometimes the winsorized mean method is also used (Gosh, Vogt 2012).

4. GMINAS AT RISK OF DEPRIVATION: TRENDS AND DIMENSIONS

This part of the report presents the diversification of the value of index of deprivation in Polish gminas, which has been illustrated with the use of cartograms by classes according to the natural breaks method. The dynamics of the local deprivation phenomenon was also presented, as well as dimensions and spatial diversification of variables constituting the index of deprivation.

4.1. General description

The index of deprivation in Polish gminas amounted to values from the scope from 1.6 to -2.2, with the average value amounting to 0 and standard deviation of 0.56. At the same time, the higher was the index value, the greater was the probability for the inhabitants of a given gmina of being at risk of deprivation. In 1370 gminas the index was positive, and in 1109 gminas it was negative, which means that the division shows a slight skewness towards left (skewness coefficient of -0.48).

Index of local deprivation indicated a rather high degree of correlation with the most of partial variables (after their standardisation, modification into deprivation stimulants and reduction of their extreme values) (Table 1). A very high correlation was especially between the index value and the gminas' income from PIT as well as the percentage of children attending nursery schools. A high correlation was also observed between index of local deprivation and the unemployment indicator as well as the percentage of flats with bathrooms, and the results of the lower-secondary school final exam (part on mathematics and natural sciences). Relatively lowest correlation was observed between the index value and the number of flats per 1000 inhabitants.

Correlations between the individual partial variables of the index were significantly weaker. A relatively high degree of correlation (from 0.42 to 0.57) was present only in the case of three variables: gminas' income from PIT, percentage of flats with bathrooms and percentage of nursery school children. The degree of correlation for other variables was lower. However it should be emphasised, that the income from PIT was highly correlated with all other variables used in the studies.

The analogous index for the same six variables calculated for poviats had a very high degree of correlation with the poviat index of deprivation (Pearson correlation coefficient amounted to 0.96). On this basis it is possible to assume, that the local index correctly included various dimensions of the deprivation phenomenon.

Table 1. The value of coefficient of correlation between the variable components* and index of deprivation

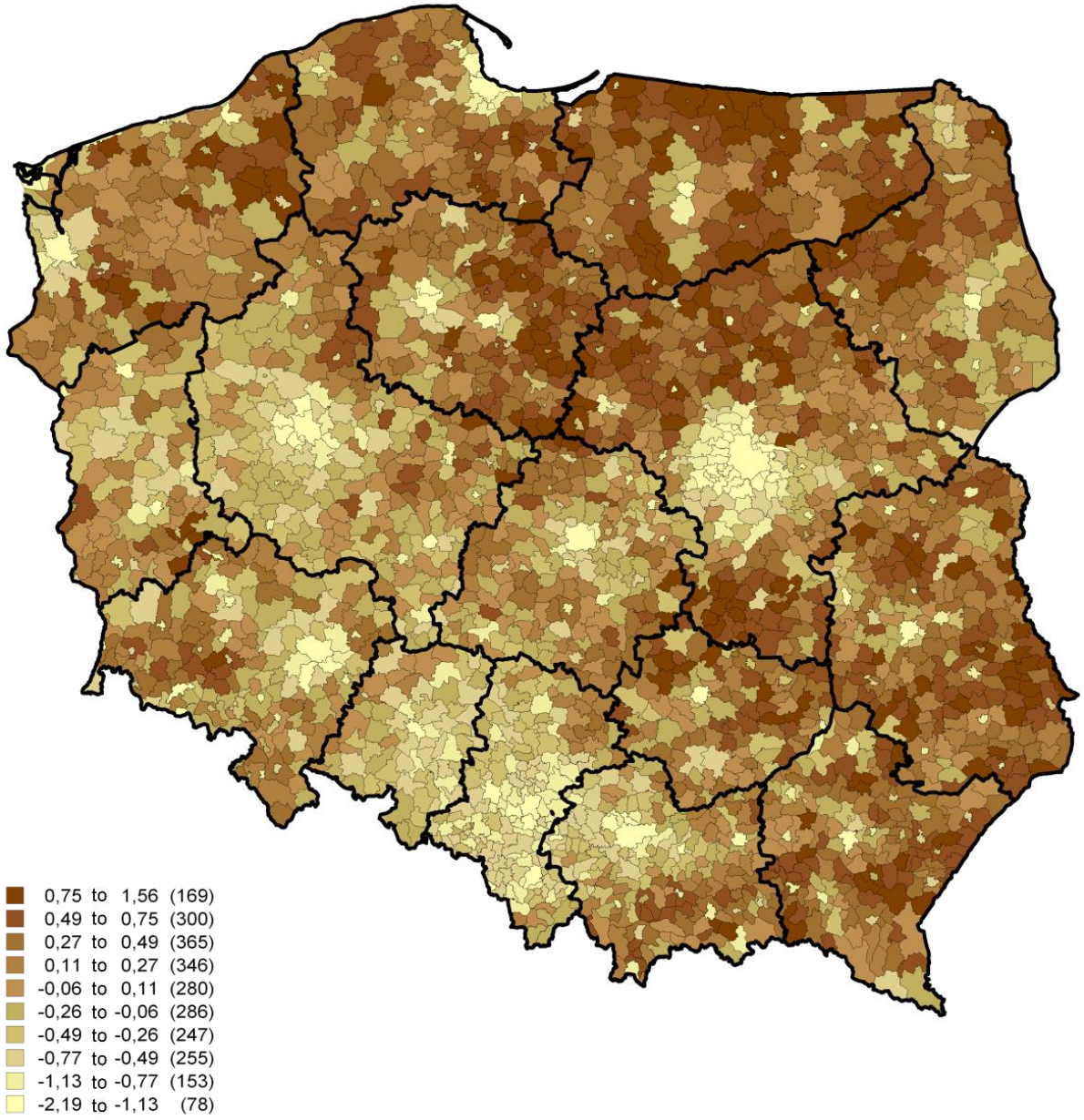
	Gminas' income from the share in PIT	Unemployment indicator	Percentage of flats with bathrooms	Results of the lower-secondary school final exam	Number of flats per capita	Percentage of nursery school children
Unemployment indicator	0.40					
Percentage of flats with bathrooms	0.57	0.21				
Results of the lower-secondary school final exam	0.27	0.23	0.10			
Number of flats per capita	0.37	0.00	-0.07	0.03		
Percentage of nursery school children	0.51	0.35	0.42	0.26	0.25	
Index of local deprivation	0.80	0.60	0.59	0.52	0.42	0.76

* after the standardisation taking into account modification of variables into stimulants of deprivation and reduction of extreme values.
Source: own elaboration.

4.2. Spatial diversification of local deprivation

The division of gminas into 10 classes according to the value of the index of deprivation by the natural breaks method, when compared to the division into equal parts (deciles), highlighted certain differences consisting in limiting the size of the two extreme classes, that is the gminas which are at the highest and at the lowest risk of deprivation. In 2013, the first one amounted to 169 cases (6.8%), and the second one to 78 cases (3.1%). The first group included mainly rural gminas surrounding cities, while the second group consisted mostly of big cities, as well as gminas located in their functional areas. The last phenomenon is best highlighted in the case of Warsaw metropolitan area (Figure 1).

Figure 1. Gminas by the value of index of local deprivation in 2013*



* divided into 10 classes according to the natural breaks method.
Source: own elaboration.

As in the case of poviats, gminas at the greatest risk of deprivation were forming quite clearly concentrated groups. They included among others:

- the Northern Poland macro-region including (with exceptions) gminas of the voivodeships: Warmińsko-Mazurskie, Pomorskie, Kujawsko-Pomorskie, eastern part of Zachodniopomorskie voivodeship, and the northern parts of Mazowieckie and Podlaskie voivodeships excluding mainly gminas located in the neighbourhood of big and medium cities, such as: Trójmiasto, Bydgoszcz, Toruń, Olsztyn and Słupsk, Koszalin and Suwałki;
- the Southeastern Poland macro-region including (with exceptions) voivodeships: Lubelskie, Podkarpackie and Świętokrzyskie with the southern part of Mazowieckie and Małopolskie voivodeships excluding mainly gminas located in the surroundings of

regions' capitals, i.e. Lublin, Rzeszów and Kielce and part of gminas of the Vistula river near Puławy and Tarnobrzeg,

- to a lower extend part of gminas of the Polish western voivodeships – mainly located in the southern part of Zachodniopomorskie voivodeship, the southern part of Lubuskie voivodeship and the western part of Dolnośląskie voivodeship.

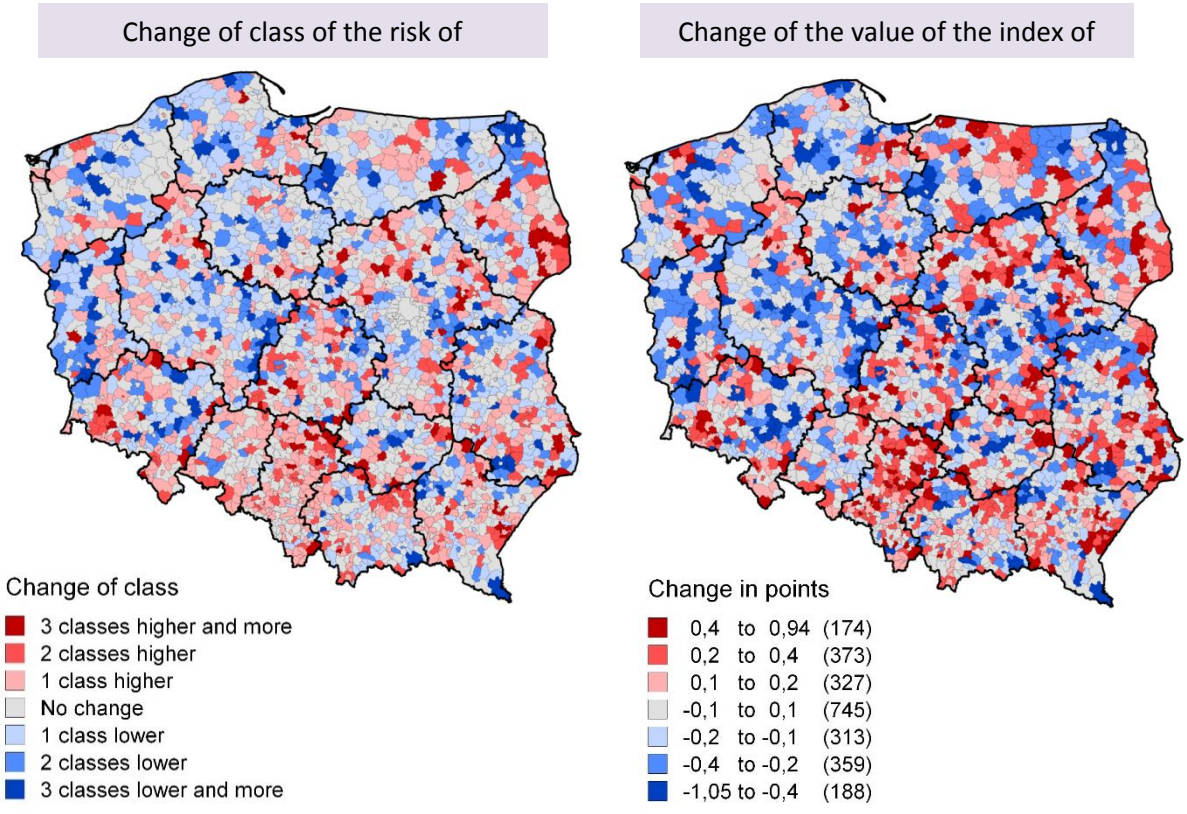
The other extreme consisting of gminas at the lowest risk of deprivation included mainly:

- gminas located in metropolitan areas of large cities, including especially Warsaw, Poznań, Gdańsk-Gdynia-Sopot, Łódź, Wrocław and Cracow,
- part of gminas neighbouring with the remaining voivodeship centres, which indicates the lower scale of impact of the latter,
- Śląskie voivodeship and the eastern part of Opolskie voivdeship,
- part of gminas of the central part of Lubuskie voivodeship.

4.3. Changes in the risk of deprivation for gminas in 2002-2013

In the years 2002–2013, the change in the spatial pattern of the risk of deprivation was relatively small. However, the detailed comparison of: a) gmina's changes of class according to its risk of deprivation; b) change in the index value measured in points, allow – in spite of a relatively high mosaic structure of the phenomenon – to indicate certain spatial regularities (Figure 2).

Figure 2. Change in risk of deprivation in the years 2002-2013



Source: own elaboration.

First of all it should be noted, that a relatively low percentage of gminas has changed their position by 2 or more classes. The position of around 11.5% of gminas has deteriorated, while 12.9% of gminas has raised their position in the ranking, however in each of these cases only every third gmina has changed its position by three or more classes. The situation has visibly deteriorated mainly in: the northern part of Śląskie voivodeship, the eastern part of Podlaskie voivodeship, the western part of Dolnośląskie voivodeship, as well as gminas located near the border of the voivodeships Małopolskie and Świętokrzyskie. The improvement has been observed to the highest degree in: the western part of Lubuskie voivodeship, the eastern part of Wielkopolskie voivodeship, the nordern part of Podlaskie voivodeship as well as the western part of Warmińsko-Mazurskie voivodeship.

Thanks to the analysis of the dynamics of the index value, the image has been extended by the information concerning the changes which have appeared within one class. As a result the spatial polarisation of the deprivation phenomenon could be observed. This stemmed from the improvement of situation in gminas located in metropolitan areas of Warsaw, Poznań and Wrocław, with the simultaneous relative increase of the risk of deprivation in gminas located in the northern and southern Mazovia and partly in gminas located in the southern part of Lubelskie voivodeship and the eastern part of Podkarpackie voivodeship as well as some areas of Warmińsko-Mazurskie voivodeship and Śląskie voivodeship.

It should be noted, that the relatively highest mosaic structure of the risk of deprivation concerned areas located on borders of different voivodeships. It may indicate the closure of social and economic phenomena within the existing regions, which is shown e.g. in the studies of M. Herbst (2009) on the example of impact zones of the academic centres.

4.4. Dimensions of the deprivation phenomenon

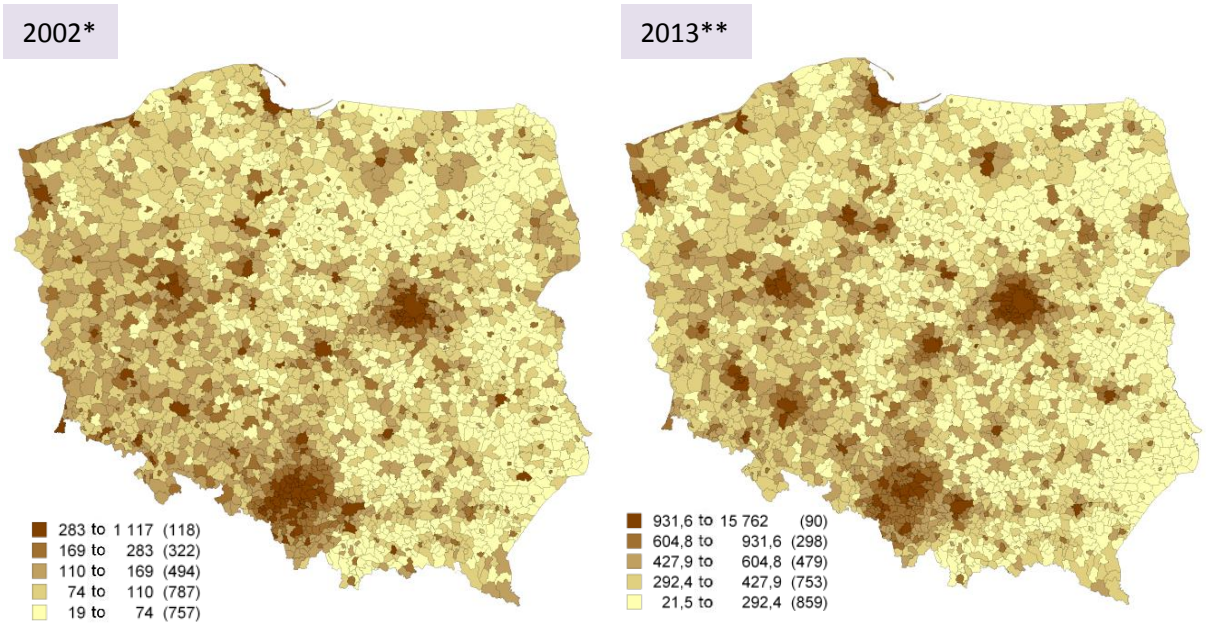
In this part of the publication the spatial diversification of variables constituting the index of local deprivation has been analysed. This was to facilitate the interpretation of the image presented by the synthetic index. The aim was to indicate both, the regularity of the spatial pattern in the case of each variable, and its vulnerability to changes.

4.4.1. Income

The value of the gmina's share in the PIT per capita indicated the polarisation of Polish space in two dimensions (Figure 3). The first dimension concerned the division between metropolitan areas and non-metropolitan areas, while the second concerned the division between the west and the east of the country. As a result, one extremity included gminas located in the neighbourhood of Warsaw, Poznań, Trójmiasto, Wrocław, Łódź, Silesian conurbation, as well as Szczecin, Bydgoszcz and Toruń, and to the lower extend also urban centres of the Eastern Poland: Białystok, Lublin, Rzeszów, Kielce and Olsztyn as well as gminas located in the Western Poland (approximately to the west from the line between Gdańsk-Gdynia-Sopot and Upper Silesian conurbation); the other extremity included peripheral gminas of individual regions, especially including those in voivodeships located in the eastern part of Poland.

When compared to the situation in 2002 it may be concluded, that the metropolitan dimension has grown in importance (excluding Silesia) and the importance of the dimension east-west has diminished, while the peripherization of the border east areas has increased, especially for the Lubuskie voivodeship.

Figure 3 Income of gminas from the PIT per capita [division into class according to the natural breaks method]



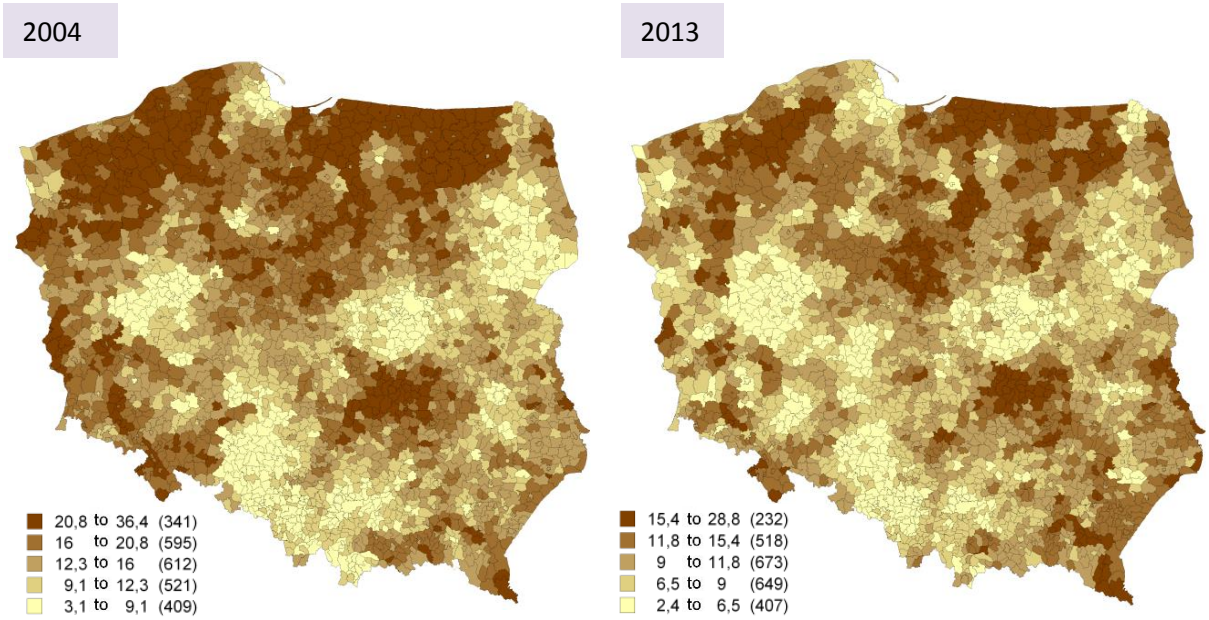
* data on the persons benefitting from the social assistance from 2008; data on the rent arrears from 2003.
** data on the large families from 2011.
Source: own elaboration.

4.4.2. Labour

The analysis of the spatial diversity of the registered unemployment indicators allows to indicate both, the problem areas and the territories where this problem is not that intensified (Figure 4). As for the first case, it includes first of all the selected areas of Zachodniopomorskie voivodeship, Warmińsko-Mazurskie voivodeship and Kujawsko-Pomorskie voivodeship, as well as the southern part of Mazowieckie voivodeship, the northern part of Świętokrzyskie voivodeship and the south-east part of Podkarpackie voivodeship. In the lower degree this problem is visible in gminas near state border in the Western and Eastern Poland.

The comparison between the situation in 2004 and that in 2013 affords a possibility to observe relatively clear changes in the spatial system of the phenomenon. The employment has increased relatively in the Western Poland – especially in the border and coastal gminas. The situation has relatively deteriorated in regards to registered unemployment in gminas along the eastern border. As for the situation in Warmińsko-Mazurskie voivodeship and Kujawsko-Pomorskie voivodeship, the polarisation has also increased.

Figure 4. Registered unemployment indicator [divided into classes according to the natural breaks method]



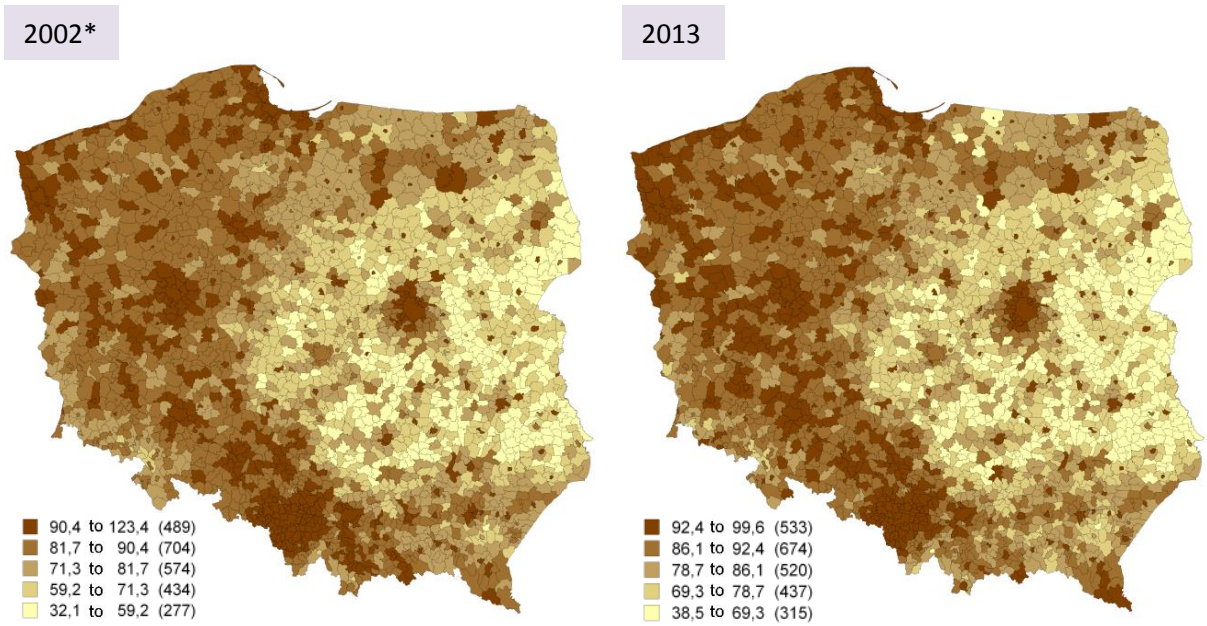
Source: own elaboration.

4.4.3. Living conditions

The spatial diversification in the percentage of flats with bathrooms highly reflected the 19th century partitions of territory of Poland (Figure 5). The highest values of the indicator were observed in gminas in the west and north of Poland, including Pomorze, Wielkopolska and Silesia. Also the gminas in the former Galicia were relatively well equipped in this scope. Gminas from the former Congress Kingdom of Poland, excluding cities, were characterised by the highest number of housing units without bathrooms.

In spite of the significant improvement of situation in Polish gminas in this scope, the spatial pattern existing in 2002 appeared to be lasting, which resulted in its replication in 2013 (see also Smętkowski, Płoszaj 2016).

Figure 5. Percentage of flats with bathrooms [divided into classes according to the natural breaks method]

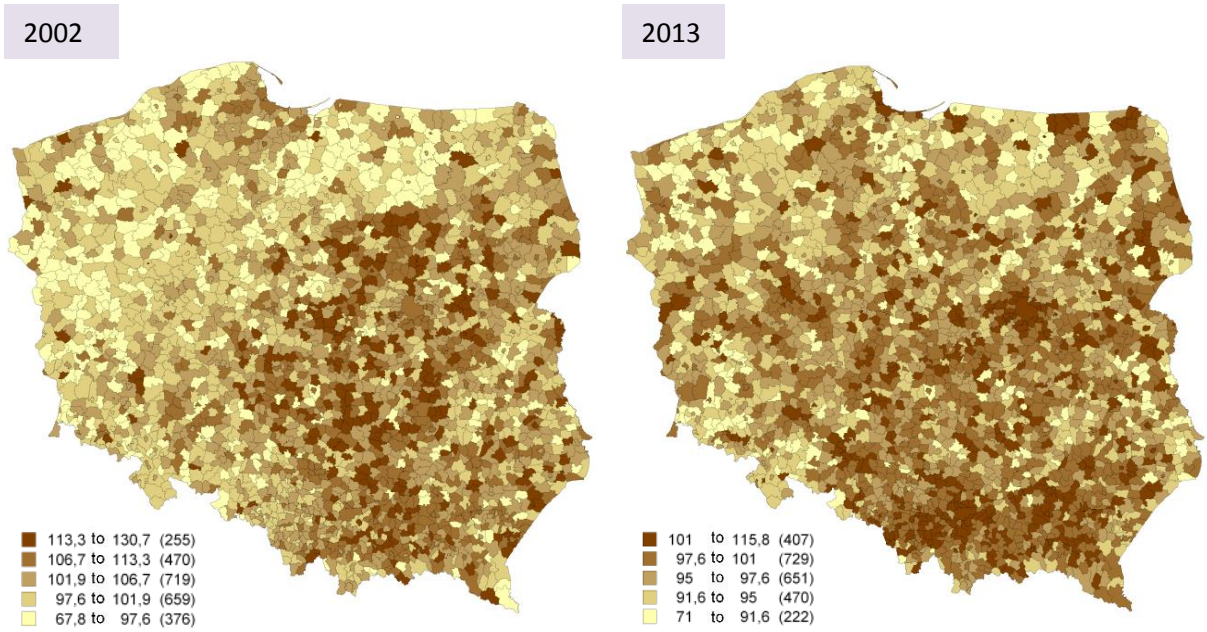


Source: own elaboration.

4.4.4. Education

Results of the lower-secondary school final exam may be interpreted as the indirect indicator of the human capital quality and of the efficiency of schools in a given gmina. As the exam has a national character, its results may be compared between different gminas. This concerns especially the part on mathematics and natural sciences, where the criteria for grading the answers' correctness are highly objective. The spatial distribution of the results of the lower-secondary school final exam has the mosaic pattern. However in 2002 (in the initial period of functioning of the lower-secondary school final exam), results were visibly better on the territories which represented former partitions under the Russian and Austrian ruling. In subsequent years this diversification has been gradually decreasing (Figure 6).

Figure 6. Average result of the lower-secondary school final exam, the part on mathematics and natural sciences [divided into classes according to the natural breaks method]



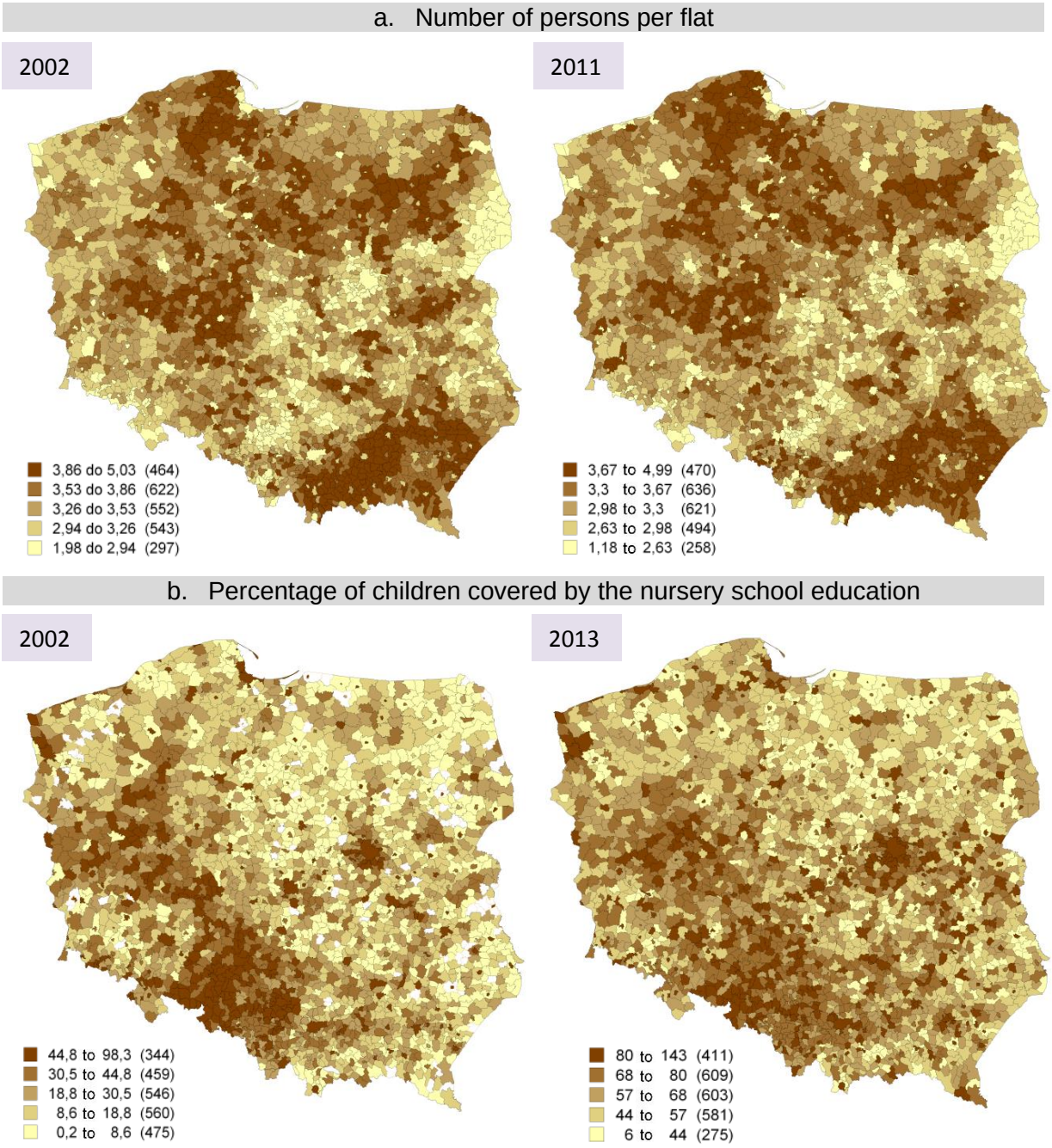
Source: own elaboration on the basis of data from the Educational Research Institute.

4.4.5. Access to goods and services

The number of persons per one flat clearly varies from the spatial perspective. The areas of concentration of gminas where the indicator is exceptionally high may be quite clearly indicated (part of Pomorskie voivodeship, Podkarpackie voivodeship, southeast part of Małopolskie voivodeship, Wielkopolskie voivodeship, Kujawsko-Pomorskie voivodeship, northern part of Mazowieckie voivodeship); this also concerns the areas where this indicator is exceptionally low (metropolitan area of Warsaw, southeast part of Podlaskie voivodeship, large areas of voivodeships Śląskie and Łódzkie). The said indicator has been registered to be very stable in the period under study (Figure 7a).

As for the percentage of children covered by the pre-school education, significant changes have occurred in the period under study. First of all, significant increase of the percentage of children attending nursery schools has been registered. These spatial differences were decreasing with the increase of the indicator; they were very clear in 2002, but in 2013 they were no longer that sharp (Figure 7b).

Figure 7. Number of persons per flat and percentage of children covered by the nursery school education [divided into classes according to the natural breaks method]



Source: own elaboration.

4.5. Conclusions

The own income of gminas constituting a share in personal income tax served as the most important variable indicating the scale of deprivation. This means, that the scale of the risk of deprivation was dependent on the degree of prosperity of the local society, which was highly correlated with both, the infrastructural equipment of flats and the pre-school attendance of children aged 3-5. However, the deprivation phenomenon is multifaceted, which is proved by the high correlation of the index also with the remaining variables under study.

The scale of deprivation varied significantly throughout the country. The one extremity of gminas at the relatively lowest risk of deprivation consisted mainly of gminas in functional urban areas. This may prove the existence of positive impact of large cities and selected urban centres of the medium size on their direct surroundings. On the other hand the range of positive impact of those cities did not generally exceed the distance of everyday commuting, i.e. about 30–40 km (less for smaller urban centres). Beyond such metropolitan areas the backwash effect of development resources dominated, including especially the migration outflow. This led to relative deterioration of situation in gminas located in peripheral parts of individual voivodeships. This also proves existence of polarisation within the metropolitan macro-regions observed in ther studies (e.g. Smętkowski 2003; Herbst, Wójcik 2013; Smętkowski et al. 2012; Okrasa, Gudaszewski 2013).

As a result it may be stated, that metropolisation was the key factor affecting the Polish space in regards to social and economic development level, translating into deprivation observed in the local scale. It mainly concerned the level of population income (PIT), labour market access, but also, although to a lesser extend, accessibility of flats. The standard of flats, in its turn, manifested as the flats having bathrooms, children in pre-school education, as well as the final exam results were explained also by the historical factors (including those related to the 19th century partitions of Poland territory) and specificity of individual Polish macro-regions (for more details see e.g. Smętkowski, Płoszaj 2016).

Diversification of gminas regarding the risk of deprivation was petrified in the period under study and the situation was also relatively stable from the spatial perspective. It probably stemmed from the fact, that the factor influencing situation of gminas were to a great extent exogenous in their character, i.e. they did not directly result from the actions undertaken in the framework of a given local unit. As a result territorial units of higher level (e.g. poviat level) divided by the borders of external impacts, e.g. related to the range of metropolitan development, should be expected to be the subject of polarisation.

5. CONCENTRATION OF DEPRIVATION IN POVIATS

Index of local deprivation may be used to assess the degree of concentration of this phenomenon on higher hierarchic levels. It is important if we assume that those levels (in Polish circumstances these are poviat or voivodeship) are better fitted to satisfy the demand for certain public services, e.g. health care. This may also be crucial in the case of developing and implementing policy instruments aiming at solving the deprivation problems. For example, the information about the higher degree of concentration of this phenomenon than in other units may lead the policy-makers to make place-based interventions. In those conditions these may be more efficient than the sectoral or horizontal actions.

In this part of the report the comparison of various measures of concentration of deprivation on the poviat level has been presented and the degree and dinamics of changes in this regard have been defined. Moreover, the existence of relationship between concentration of deprivation and its scale has been verified, and gmina and poviat decomposition of the index of deprivation on the national level has been conducted.

5.1. Concentration of deprivation in the light of various measurement methods

In line with the postulate formulated in the literature on this subject, the studies on concentration of deprivation in poviats used various measures of concentration in the form of: standard deviation (SD), Gini coefficient, Theil index as well as Herfindahl-Hirschman index (HHI)[7].

The average scale of concentration of deprivation within poviats in Poland was relatively small (Table 2). It is best proven by the value of the Gini coefficient, which is the easiest to be interpreted, and which amounted only to 0.08[8]. Moreover, the differences between poviats were relatively small in this scope, which is proven by the standard deviation amounting to 0.03. However the range of values was quite significant: from 0,220 in the poviat with the highest polarisation of deprivation, to the poviats, where no significant differences in the risk of deprivation were observed between gminas (the Gini coefficient value was 0,016).

Table 2. Value of concentration indicators in poviats in 2013 [normalised values]

Measures	Mean average	Standard deviation	Maximum	Minimum
SD	0.35	0.12	0.76	0.08
Gini	0.08	0.03	0.20	0.01
Theil*	0.43	0.41	4.95	0.03
HHI	0.07	0.07	0.45	0.00

* values rescaled by 10^2.
Source: own elaboration.

[7] In the case of Gini coefficient, Theil index and HHI, their unitarization was performed (for the scope from -3 to 3), which afforded a possibility to calculate the number of persons potentially at risk of deprivation for each gmina.

[8] The concentration of population income in Poland in 2013 according to the European study on income and life conditions amounted to 0,307. (GUS 2014).

It appeared that three among the applied measures were highly correlated, which concerned standard deviation, Gini coefficient and Theil index (Table 3). The Pearson correlation value between pairs of those indices amounted from 0.70 in the case of Gini coefficient and Theil index, through 0.71 for standard deviation and Theil index, to 0.85 between standard deviation and Gini coefficient. Only HHI was not correlated with other indices. This proves its low usefulness for the purpose of analysis of concentration of local deprivation. The value if this indicator is determined to a much greater extend by the unequal distribution of population between gminas of the given poviat, than by the spatial concentration of inhabitants at risk of deprivation. This is proved by the very low temporal variation of this indicator (autocorrelation of the indicator in the years 2002–2013 amounted to 0.99), which resulted from the high inertia of distribution of population in individual poviats.

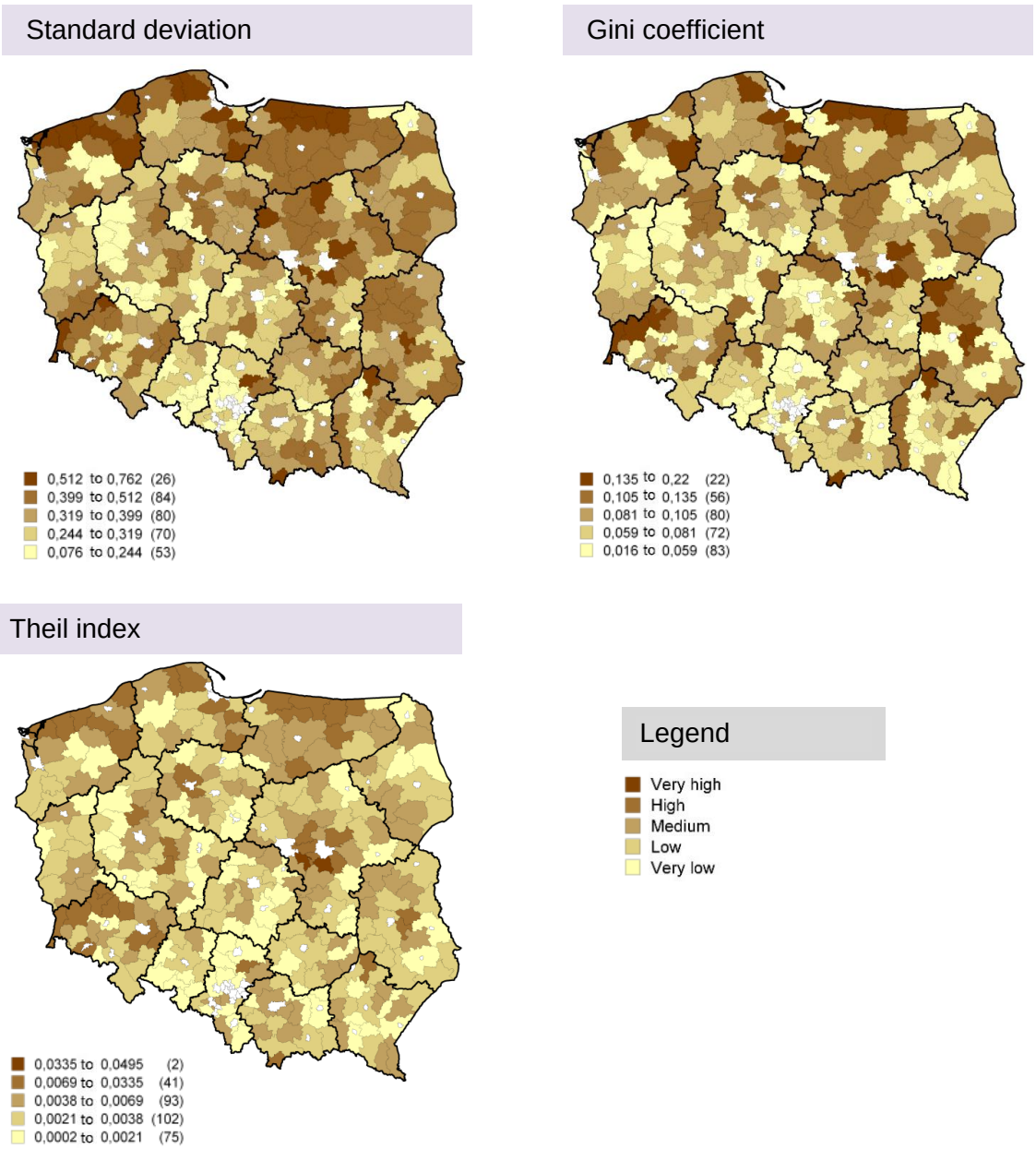
Table 3. Correlation between coefficients of concentration of local deprivation in poviats in 2013 [Pearson's r value]

Measure	SD	Gini	Theil	HHI
SD	X			
Gini	0.85	X		
Theil	0.71	0.70	X	
HHI	*-0.04*	*-0.08*	*0.12*	X

* italics were used for correlations which are statistically irrelevant on the level of $p<0.05$
Source: own elaboration.

From the spatial perspective it should be emphasised, that the distribution of values of the concentration of deprivation measures has a relatively mosaic pattern, and that the contrasts which are reflected in the neighbouring poviats of high and low scale of this concentration are quite clear (Figure 8).

Figure 8. Concentration of local deprivation in poviats in 2013 according to various measurement methods



Source: own elaboration.

In general, it might be assumed, that the areas characterised by the higher degree of concentration of local deprivation included:

- Costal poviats of Zachodniopomorskie and Pomorskie voivodeships, where a significant contrast is visible between gminas located directly by the sea and those located further in the inland areas. This was especially well visible in the case of standard deviation, while on the basis of Gini coefficient part of these poviats – probably due to differences in population density – was classified as those, where the scale of concentration may be assessed as low or medium.
- Poviats located in Warmińsko-Mazurskie voivodeship, especially in its northern and western parts (excluding poviats surrounding Elbląg and Olsztyn). To a certain extent

it may result from the characteristic of settlement systems reflected in the relatively well developed urban network, where the degree of risk of deprivation was lower compared to the surrounding rural areas, often those of former State Agricultural Farms. This also concerned the south-east part of Pomorskie voivodeship.

- Poviats located in the remaining areas of the significant risk of local deprivation, such as e.g. Lubelskie voivodeship, especially its north-east part, north-west part of Dolnośląskie voivodeship, or certain parts of Podkarpackie voivodeship.
- Poviats in the metropolitan area of Warsaw, which shows polarisation between gminas in the functional region of Warsaw and gminas located in greater distance from the capital, which still retain their rural character. This phenomenon is also visible to a certain extent in the mertopolitan areas of Gdańsk-Gdynia-Sopot and Wrocław.

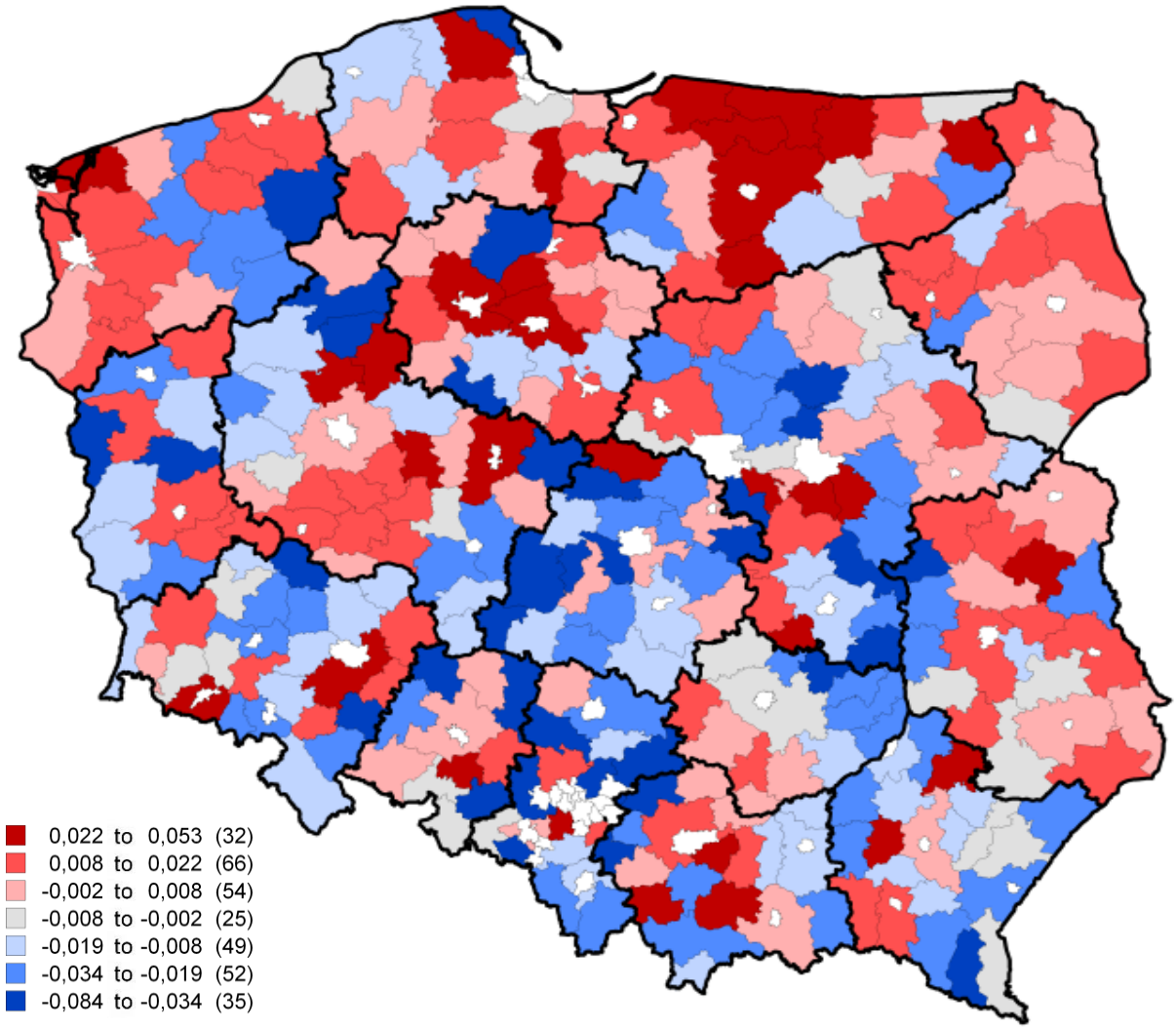
5.2. Concentration of deprivation dynamics

The assessment of the concentration of deprivation dynamics is especially important in the context of preventing the creation of social exclusion enclaves. On the basis of changes in coefficients of concentration values, the attempt was made to indicate poviats which are especially at risk of this phenomenon.

The measures under study were characterised by significant but diversified inertia expressed in the autocorrelation scale in the years 2002–2013. Although Gini coefficient and Theil index were characterised by similar degree of inertia (0.78 and 0.79 respectively), in the case of standard deviation this degree was lower and it amounted to (0.71). This signifies higher susceptibility of the latter to the change of situation in the small number of territorial units (e.g. in one gmina). As a result it may indicate, that the first two measures are more useful from the analytical perspective. It has been decided, that for the purpose of study on concentration of deprivation dynamics only the classic measure would be used, that is the Gini coefficient, while the Theil index has been used for the purpose of study on the decomposition of concentration of deprivation on the national scale.

The map presenting the change in Gini coefficient value for local deprivation on the poviat level is characterised by a highly mosaic pattern. However it allows to observe certain spatial regularities (Figure 9).

Figure 9. Change in Gini coefficient value for local deprivation on the poviat level in the years 2002–2013



Source: own elaboration.

First of all, it was possible to indicate polarisation in poviats located in the surroundings of big cities, which proved the shaping of functional areas including part of gminas located in the close neighbourhood of city. The increase in concentration of deprivation was also visible in the most of poviats in Lubelskie, Podlaskie, Warmińsko-Mazurskie, Pomorskie, Wielkopolskie and Kujawsko-Pomorskie voivodeships. This could indicate that size of the growth poles was limited, which results e.g. from the development of industries using local resources or from the spatially limited impact of external capital investments.

The convergence was visible in poviats located in central Poland. This mainly concerned Łódzkie voivodeship and its surroundings, i.e. southern and western parts of Mazowiecki voivodeship, western part of Lubelskie voivodeship, northern part of Świętokrzyskie voivodeship, eastern part of Wielkopolskie voivodeship and northern part of Śląskie voivodeship. This could result e.g. from the relative decrease of the scale of deprivation in rural areas in relation to situation observed in main cities of poviats. The factor contributing to such situation could consist in improvement of agricultural productivity or in incerase of transfers for farmers, as well as industralisation processes equally influencing the entire poviat area.

5.3. Scale of deprivation in relation to its degree of concentration at the poviat level

It is interesting to study, if there is a relationship between the risk of deprivation at the poviat level (measured Poviat Index of Deprivation in full and simplified version) and the degree and dynamics of spatial concentration of this phenomenon (Gini coefficient and Theil index were used).

By using the correlation coefficient it can be stated, that in the case of both concentration indices their slight, but statistically significant (especially in the case of Theil index) negative correlation with the values of poviat indices of deprivation could be observed for both years, 2002 and 2013. (Table 4). This means, that in the case of poviats of higher risk of deprivation, the phenomenon was spread more equally between individual gminas, while in poviats at lower risk of deprivation there were gminas with the clearly higher scale of risk of deprivation. This supports the initial conclusion formulated above, that the concentration of deprivation is higher in those poviats, where part of gminas use the exogenous sources of growth related to e.g. metropolis development processes, development of tourism or inflow of investments of the impact limited to a particular area.

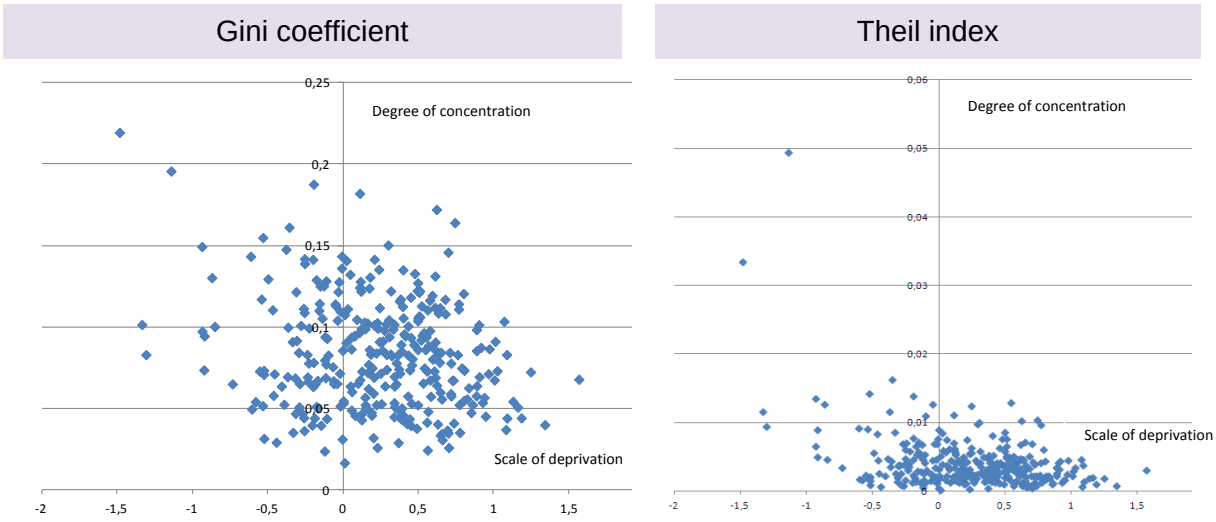
Table 4. Correlation between the value of concentration coefficient and the poviat index of deprivation

Measures	2002		2013	
	*PID**	*simplified PID*	*PID*	*simplified PID*
Gini	-0.36	-0.29	-0.25	-0.22
Theil	-0.46	-0.45	-0.37	-0.38

* Poviat Index of Deprivation.
Source: own elaboration.

On the other hand it should be noted (Figure 10), that this relationship was weak and it was to a great extent affected by a small group of poviats at the relatively low risk of deprivation that was responsible for it (mainly poviats surrounding big cities). Very often in such poviats there existed gminas of high risk of deprivation of population.

Figure 10. Risk of deprivation of poviat (simplified index) in relation to degree of spatial concentration in 2013



Source: own elaboration.

On the other hand the decrease of this relationship in time should be observed, which is also proven by positive correlation between the degree of risk of deprivation in 2002 and the change of the Gini coefficient and Theil index values in the years 2002–2013 (in this case also higher for the Theil index) (Table 5). This indicates stronger polarisation processes in those poviats which were at higher risk of deprivation, and greater convergence in poviats at lower risk.

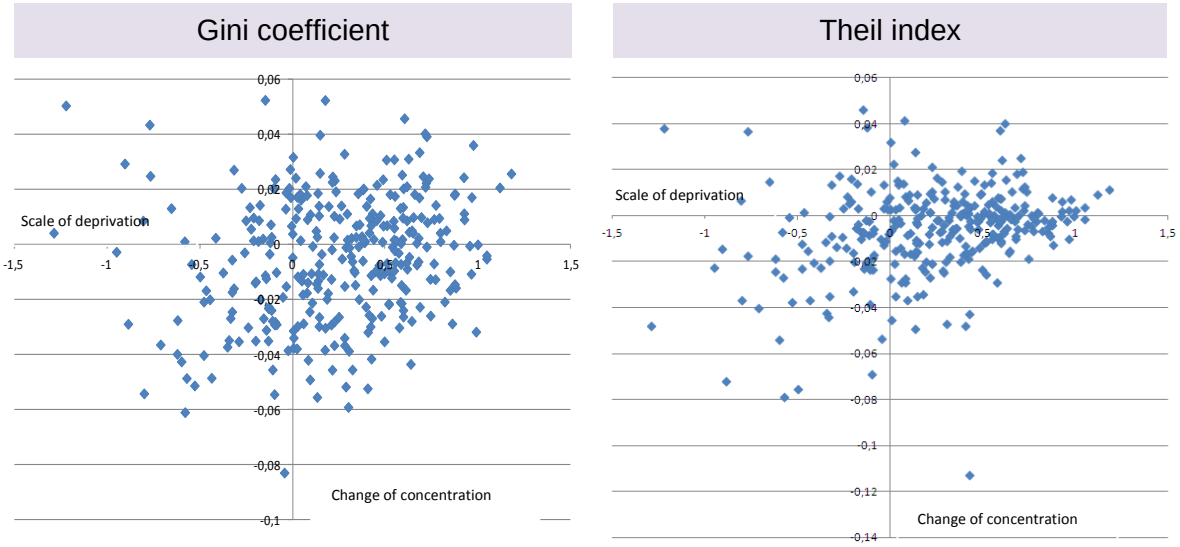
Table 5. Correlation between the change of value of concentration of deprivation measures in the years 2002–2013 and the Poviat Index of Deprivation in 2002

Change of indicators' value	Poviat Index of Deprivation	simplified PID
Gini	0.22	0.20
Theil	0.33	0.28

Source: own elaboration.

Based on the analysis of dispersion graphs it may be stated, that these were to a higher degree the spatial convergence processes in poviats of low risk of deprivation that were responsible for the observed correlation (Figure 11). This may mean that the positive spread effect of big urban centres on their regional surroundings is expanding (see e.g. Smętkowski 2014).

Figure 11. Dynamics of the spatial concentration of deprivation in relation to the scale of risk of deprivation



Source: own elaboration.

5.4. Decomposition of concentration of local deprivation in Poland

From the perspective of selecting the appropriate level to implement policies preventing the deprivation phenomenon it is crucial to define, if the national concentration on the gmina level results to a greatet extend from the diversification of situations between poviats, or within poviats.

The Theil index value for concentration of local deprivation has not changed significantly between 2002 and 2013 (Table 6). The situation was similar in the case of its decomposition. Concentration resulted only to a slightly greater extent from the diversification between poviats, than from the diversification within poviats.

Table 6. Decomposition of concentration of the Theil index of local deprivation broken into phenomenon between poviats (TB) and within poviats (TW)

	Theil	TB		TW	
Year	*Total*	*Between poviats*	**%**	*Within poviats*	**%**
2002	0.01860	0.01042	56.0	0.00818	44.0
2013	0.01804	0.01023	56.7	0.00781	43.3

Source: own elaboration.

This means that the scale of diversification of gminas in the scope of deprivation in Poland resulted equally from the state and changes on the poviat level and on the gmina level. This may indicate, that it is necessary to conduct simultaneous activities on the national level and on the voivodeship level as for the situation of poviats, as well as on the poviat level in order to improve the situation in those gminas, which were affected by this phenomenon to a greater degree.

5.5. Conclusions and recommendations

The assessment of scale and dynamics of the concentration of deprivation on the poviat level may be measured with the use of various indicators, which presents quite a similar image, as they are highly correlated. This does not concern the Herfidnhal-Hirshman index, which, as it has been shown in the studies, is not appropriate for the analysis of the degree of spatial concentration of the deprivation phenomenon. Applying the classic method for measuring concentration used in the studies of social inequalities, that is the Gini coefficient, has this advantage, that it is less influenced by the incidental changes, which cannot be ensured by the standard deviation in the case of small sample. This indicator based on the Lorenz curve has also this advantage, that it solves the problem of diversification of territorial units by the number of inhabitants. The Theil index has also proven its usefulness, as it could be applied for decomposition of concentration of deprivation between the units under study and within these units.

The scale of diversity within poviats in the scope of index of local deprivation was relatively low, independently of the method of measurement, as it was the case for its change. This may mean, that the impact of indicators influencing the situation of gminas in the scope of deprivation includes larger areas exceeding the poviat, and even voivodeship borders. Inertia in the scope of change of concentration could result from the general stability of the deprivation phenomenon observed on both, poviat and gmina level. Therefore both levels contributed to the scale of spatial diversification in the scope of concentration of local deprivation in Poland at a comparable level.

Cartographic analyses allows to indicate – in spite of the highly mosaic pattern of the spatial system – the poviats mostly deviating from the average in the scope of degree and dynamics of spatial concentration of deprivation. There also existed weak, but statistically significant relations between the scale of deprivation and the degree and dynamics of its concentration on the poviat level. Therefore it is possible to draft some general factors which could potentially influence the observed situation and processes. Among them may hypothetically be indicated:

- development of metropolis leading to formation of functional areas in the surroundings of big cities, with the relatively sharp border of positive influence of development of these cities; beyond this border, the processes of backwashing development resources dominated, which potentially contributed to creating deprivation enclaves;
- development of tourism in selected local systems leading to relative increase of concentration of deprivation on the poviat level, which mainly concerned costal areas, as well as other areas characterised by the high touristic attractiveness;
- crystallization of settlement network, which could happen in certain areas of the country and lead to relative increase of the concentration of local deprivation in the urban-rural dimension;
- development of urban-rural relations, which was potencially visible in certain areas of the country, which could result in the situation where gminas become similar in the scope of risk of deprivation of population.

The impact and relative importance of the abovementioned factors should be subject to further deepened quantitative and qualitative studies (i.e. besides the analysis of statistical data, including research on appropriately selected case studies). Making conclusions – especially in

the case of the two latter phenomena – is increasingly difficult, as it is hard to define, if the change resulted from the relative improvement, or from the deterioration of the situation in parts of a given poviat divided by towns and rural areas.

Based of the conducted studies it is possible to formulate some general recommendations for the social policy in the field of combating deprivation in both dimensions, national and local:

- territorially oriented policy should be implemented especially in those poviats, which were in the group of high degree of concentration of deprivation. As for the other poviats, because of the very low degree of concentration, sectoral or horizontal actions may be sufficient;
- special attention should be paid to the necessity of preventing polarisation processes in the scope of deprivation in poviats of the highest risk. This means, that the criteria for undertaking actions targeted territorially should also include poviats with the growing scale of concentration of local deprivation;
- the studies indicate, that it is necessary to conduct simultaneous activities on the national level and on the voivodeship level as for the situation of poviats, as well as on the poviat level in order to improve the situation in those gminas, which are affected by this phenomenon to a greater degree.

6. CONCENTRATION OF DEPRIVATION IN CAPITAL CITIES OF VOIVODESHIPS

6.1. Available data and methods of analysis

It is not possible to apply concentration coefficients of deprivation phenomenon while using index of local deprivation for cities on poviat rights. There are 66 such cities in Poland and they are called “grodzkie cities”. In their case the results of census from 2011 could serve as a source of information, but unfortunately the lowest level of aggregation for which these data are available is the poviat level.

In the light of the above, in the moment of the study being conducted, the only possibility to measure concentration of deprivation in grodzkie poviats (only for the capital cities of voivodeships) was to use the data developed for the needs of the project “Identification of special areas in capital cities of voivodeships and on their functional areas including demographic and economic situation of their inhabitants on the basis of spatial analyses using Geographic Information System (GIS)” implemented by GUS (2015). The squares grid with a side length of 0.5 km constituted the basis for the analysis. For each square with at least 11 inhabitants the relevant indicators were calculated on the basis of census data. Two variables were used for the purpose of anasyses:

- share of persons receiving unemployment benefit in the working age population,
- share of persons receiving social pension or social assistance in the overall population.

A significant analytical problem consisted in the lack of possibility to weight the importance of individual squares, as the number of their inhabitants was subject to statistical confidentiality. Therefore the analyses below are highly simplified, as the same number of inhabitants has been assumed equal for each of the territorial units under study.

As the two abovementioned variables were not highly correlated – which is surprising in the light of the studies on the gmina level (see chapter 3) – (however, one should also pay attention to their different definition scope), it was decided to use them independently to assess the degree of concentration of deprivation in cities. For this purpose the Gini measure was used complemented with auxiliary characteristics of the cities under study in the form of the number of squares where the studied phenomenon was observed (the limit value was different in individual cities due to the confidence intervals, but when averaged, it amounted to about 0.03%) as well as the information on the maximum value of the phenomenon.

6.2. Scale of concentration of deprivation in capital cities of voivodeships

Capital cities of voivodeships were among cities at the lowest risk of deprivation. Therefore the variables illustrating this issues had very low values. The use of not weighted data as well as the various definition scopes of variables clearly influenced the results in comparison with the official data from registers (Table 7). A the same time it should be emphasised, that there existed a correlation between the indicators values according to data from registers from 2013 and the not weighted mean average calculated on the basis of squares network based on the

census[9]. It should be noted, that the maximum values of the intensity of the phenomena under study were relatively low. In the case of unemployment they were in the range from 4.7% in Opole to 14.9% in Warsaw, and for persons benefiting from social assistance it was from 8.7% in Zielona Góra to 50.0% in Białystok. This clearly indicates potential problems resulting from the estimative character of the applied data.

Table 7. Characteristics of the capital cities of voivodeships by variables illustrating deprivation

City	Number of squares			Unemployment rate					Percentage of people benefitting from the social assistance				
	N	*Inhabited*	*%*	According to GUS	Average*	"0" value		Maximum	According to GUS	Average*	"0" value		Maximum
				2013	*2011*	*N*	*%*	*%*	*2013*	*2011*	*N*	*%*	*%*
Białystok	472	281	59.5	9.0	0.9	78	27.8	13.9	5.0	2.8	37	13.2	50.0
Bydgoszcz	822	364	44.3	6.3	1.1	104	28.6	10.1	3.4	2.5	57	15.7	16.7
Gdańsk	1210	579	47.9	4.8	0.8	212	36.6	9.3	2.6	1.8	126	21.8	21.6
Gorzów Wielkopolski	405	186	45.9	6.2	1.0	71	38.2	8.6	2.7	2.7	42	22.6	27.6
Katowice	768	326	42.4	5.9	0.7	97	29.8	11.5	3.3	2.3	42	12.9	18.2
Kielce	517	297	57.4	9.7	1.0	106	35.7	5.7	5.3	3.1	43	14.5	23.9
Cracow	1446	937	64.8	5.1	0.6	386	41.2	8.7	2.9	2.0	167	17.8	21.4
Lublin	680	422	62.1	8.0	0.2	270	64.0	13.3	4.3	2.5	78	18.5	15.3
Łódź	1285	879	68.4	9.6	1.1	337	38.3	7.6	5.2	2.5	203	23.1	25.0
Olsztyn	418	188	45.0	6.4	0.8	62	33.0	6.6	3.4	2.8	29	15.4	20.3
Opole	470	200	42.6	6.3	0.6	85	42.5	4.7	3.5	1.9	43	21.5	15.4
Poznań	1183	634	53.6	3.9	0.7	238	37.5	13.4	1.9	1.5	140	22.1	16.7
Rzeszów	552	362	65.6	7.9	0.8	155	42.8	5.2	4.7	1.6	86	23.8	18.2
Szczecin	1378	464	33.7	7.1	0.7	166	35.8	9.3	4.0	2.6	69	14.9	20.0
Toruń	547	237	43.3	7.2	1.0	75	31.6	7.0	3.7	4.6	24	10.1	27.3
Warsaw	2231	1504	67.4	5.2	0.6	573	38.1	14.9	2.8	1.4	343	22.8	17.4
Wrocław	1299	639	49.2	4.6	0.6	224	35.1	9.3	2.2	1.3	129	20.2	21.1
Zielona Góra	282	127	45.0	6.1	0.9	28	22.0	5.4	3.6	1.6	25	19.7	8.7

Source: own elaboration.

Setting aside the weaknesses of these data, the attempt was undertaken to asses the degree of spatial concentration of the phenomena under study with the use of Gini coefficient (Table 8).

[9] The correlation amounted to around 0.6 after excluding the extreme observations, i.e. Lublin in the case of unemployment rate and Toruń in the case of persons benefiting from social assistance. There was a clear difference between the number of squares in those cities where the lack of the phenomenon was demonstrated and the average value: in the case of Lublin this was 64% with the average amounting to 35%, and in the case of Toruń it was 10% with the average amounting to 19%.

Table 8. Value of Gini coefficient in capital cities of voivodeships for the squares network with a side length of 0.5 km

City	Gini coefficient people benefitting from the social assistance	Rank	Gini coefficient unemployed	Rank
Poznań	0.58	1	0.63	6
Warsaw	0.57	2	0.65	3
Gorzów Wielkopolski	0.56	3	0.64	5
Opole	0.56	4	0.61	8
Rzeszów	0.55	5	0.65	2
Łódź	0.55	6	0.61	7
Gdańsk	0.54	7	0.66	1
Wrocław	0.54	8	0.56	12
Olsztyn	0.54	9	0.57	11
Bydgoszcz	0.53	10	0.56	14
Cracow	0.53	11	0.65	4
Szczecin	0.52	12	0.59	9
Lublin	0.52	13		
Katowice	0.50	14	0.52	16
Białystok	0.50	15	0.56	15
Zielona Góra	0.50	16	0.44	17
Toruń	0.49	17	0.56	13
Kielce	0.48	18	0.58	10

Source: own elaboration.

Both indicators were correlated in the scope of the scale of spatial concentration (0.67) in spite of the fact, that their values in certain cities were not consistent with the observed relationship. Due to higher values of averages, the percentage of persons benefitting from social pension or social assistance should be considered as a better measure of the concentration of deprivation. At the same time it should be noted, that it is characterised by relatively low diversification (coefficient of variation 5.3%), while the diversification of the cities under study in the scope of unemployment is slightly higher (coefficient of variation 9.2%). This proves, that the characteristic feature of all cities is the existence of the areas of spatial concentration of negative phenomena related to deprivation. Examples of such areas for Warsaw have been presented in the annex 2.

The group of the highest spatial concentration in the scope of deprivation of population includes mainly big cities with Poznań and Warsaw among them in both dimensions, and Gdańsk and Cracow for the unemployment. Among smaller cities, on the other hand, Gorzów Wielkopolski and Rzeszów were characterised by the high concentration, as well as Opole, but to a lower extend and more in the scope of persons benefiting from the social assistance. Among the

cities with the lowest spatial polarisation of deprivation of population, Zielona Góra and Katowice may be indicated (especially in the scope of unemployment), as well as Białystok, Toruń and Kielce (more in the scope of persons benefiting from the social assistance).

The general level of wealth and the risk of deprivation in the scale of entire city may be indicated among the potential causes of existence of such diversification. As an example, by referring the concentration measures to poviat index of deprivation values or the level of wealth (the value of the share of gminas in PIT per capita), it was possible to note the weak, but statically significant correlation between these phenomena in the case of persons benefiting from social assistance (-0.44 and 0.42 respectively). This means, that the lower the risk of deprivation and the higher the level of wealth, the higher the concentration of deprivation in spatial perspective. This may potentially indicate the processes of social segregation, which were more visible in wealthier cities.

6.3. Conclusions and recommendations

First of all the attention should be paid to relatively low quality of the data used and on their limitations, which implies a number of methodological problems. They mainly include:

- certain randomness of assigning data to the squares grid (which was aside from the existing morphological or functional units (urban areas, districts)), which was deepened by the small number of phenomena under study in the scale of entire city (especially in the case of the unemployed receiving benefit);
- lack of information on the number of inhabitants in individual squares resulting from the statistical confidentiality lowering significantly the precision of the calculated indicators as a result of assuming the equal number of inhabitants of individual squares.

The relatively low quality of data may also be proven by the lack of correlation between the two variables under study, which were, in their turn, highly correlated on the gmina level in Poland (however with a different definition scope of indicators under study).

However, setting aside the quality of data and difficulties in appropriate application of concentration measures, it is possible to formulate on the basis of conducted analyses, some initial and approximate conclusions concerning the phenomenon of concentration of deprivation in capital cities of voivodeships:

- there were problems related to the existence of areas at higher risk of deprivation in all capital cities of voivodeships;
- the differences between capital cities of voivodeships could be explained to a certain extend by the general level of wealth and degree of the risk of deprivation – in the wealthier cities and those at the lower risk of deprivation, the spatial concentration of deprivation was higher;
- in the light of the observations above it can be expected, that the processes of social and spatial segregation may be strengthened with the increase of the level of wealth of inhabitants in all the cities under study.

However it is difficult to asses on the basis of these analyses the degree to which it is justified to formulate similar conclusions for the remaining grodzkie poviats in Poland. This issue would require performing additional studies.

The most important recommendations stemming from this analysis include those concerning the monitoring of the risk of deprivation in the urban scale for all grodzkie poviats. This requires creating fundaments for such an action. The list of potential indicators in this scope is as follows:

- income from PIT by the place of residence of taxable person per capita (Tax Office);
- people benefitting from the social assistance as the percentage of the number of inhabitants (Town Hall);
- the registered unemployed for the working-age persons (Employment Office);
- percentage of population with elementary education or with no education (census data);
- average result of the lower-secondary school final exam, the part on mathematics and natural sciences (Educational Research Institute / Ministry of Education);
- percentage of substandard flats (GUS census data);
- number of offences against life or health per 10 thousand inhabitants (Municipal Police Stations).

Attention should be paid to possibility of geocoding of data about the unemployed and persons benefiting from the social assistance on the current basis based on the address information (streets, postal codes) included in the registers above. Secondly, in order to increase the usefulness of this information, cities should be divided into appropriate units – urban areas or other functional units – which could be used by the public authorities to implement the spatially oriented policy. Thirdly, the possibilities offered by the censuses should be used in the future to verify and update the data based on the official registers.

7. WORKS CITED

Allison P., 1978, Measures of Inequality, American Sociological Review Vol. 43, pp. 865-880.

Anselin L., 1995, Local indicators of spatial association – LISA, Geographical Analysis, Vol. (27), pp. 93-115.

Atkinson A. B., 1970, On the measurement of inequality, Journal of Economic Theory, Vol. 2, pp. 244-263.

Ávila F., Flores E., López-Gallo F., Márquez J., 2013, Concentration indicators: Assessing the gap between aggregate and detailed data. IFC Bulletin No 36,Statistical issues and activities in a changing environment, pp. 542-559.

Bailey, D., and Boyle, S., 1971, "The Optimal Measure of Concentration". Journal of the American Statistical Association, Vol. 66, pp. 702-706.

Barro, R. and Sala-i-Martin, X., 1991, Convergence across states and regions. Brookings papers on Economic Activity Vol. 1, pp. 107-182.

Binderman Z., Borkowski B., Szczęsny B., 2013, Zastosowanie metryki minkowskiego do pomiaru zmian koncentracji, metody ilościowe w badaniach ekonomicznych Vol. XIV(3), pp. 27-38.

Castells M., 1989, The Informational City: Economic Restructuring and Urban Development. Oxford: Blackwell.

Cowell F., 2005, Theil, Inequality, Indices and Decompositions, ECINEQ Working Paper.

Czempas J., 2012, Współczynnik koncentracji K jako miara zróżnicowania dochodów i inwestycji gmin, Metody ilościowe w badaniach ekonomicznych, Vol XIII/1, 2012, pp. 69-81.

Domańska L., 2001, Deprywacja potrzeb byłych pracowników PGR w zakresie pracy, dochodów i edukacji dzieci [in:] Środowiska popegeerowskie – diagnoza stanu, Uniwersytet Warmińsko-Mazurski w Olsztynie.

Grotowska-Leder J., 2001, Łódzkie enklawy biedy: aspekt przestrzenny i dynamiczny, [in:] W. Warzywoda-Kruszyńska (ed.) (Żyć) na marginesie wielkiego miasta, Instytut of Sociology University of Łódź, Łódź, pp. 31-53.

Grzegorczyk A., Jarczewska B., 2015, Measures of social segregation in the context of Warsaw, Berlin and Paris metropolitan areas, Miscellanea Geographica – Regional Studies on Development Vol. 19(3), pp. 22-35.

GUS, 2014, European Union Statistics on Income and Living Conditions (EU-SILC) in 2013 r., Informational note 22.12.2014, Warsaw.

GUS, 2015, Identyfikacja obszarów specjalnych wewnątrz miast wojewódzkich oraz na ich obszarach funkcjonalnych uwzględniających sytuację demograficzną i ekonomiczną ich mieszkańców na podstawie analiz przestrzennych z wykorzystaniem Geographic Information System (GIS), Warsaw.

GUS, 2015, Research work entitled "Pomiar ubóstwa na poziomie powiatów (LAU 1) – etap II", Warsaw.

Hall, M., Tideman, N., 1967, Measures of concentration. Journal of the American Statistical Association, Vol. 62, pp. 162-168.

Harvey D., 1996, Justice, nature and the geography of difference. Wiley-Blackwell.

Herbst M., 2009, Tworzenie i absorpcja kapitału ludzkiego przez miasta akademickie w Polsce, Studia Regionalne i Lokalne No 4(38), pp. 21-38.

Herbst M., Wójcik P., 2013, Delimitacja dyfuzji rozwoju z miast metropolitalnych z wykorzystaniem korelacji przestrzennej, Studia regionalne i Lokalne Np 4(54), pp. 5-21.

Jałowiecki B., 2000, Społeczna przestrzeń metropolii, Wydawnictwo Naukowe Scholar, Warsaw.

Jałowiecki B., Krajewska M, Olejniczak K., 2003, Klasa metropolitalna w przestrzeni Warszawy. Studia Regionalne i Lokalne, No 1(11)/2003, pp. 59-74.

Jałowiecki B., Łukowski W., (ed.) 2007, Gettoizacja polskiej przestrzeni miejskiej, Wydawnictwo SWPS Academica/Wyd. Nauk. Scholar, Warsaw.

Kisiała W., Weltrowska J., 2014, Obszary koncentracji ubóstwa w strukturze przestrzennej miasta (na przykładzie Poznania), Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu.

Kostrubiec B., 1972, Analiza zjawisk koncentracji w sieci osadniczej. Problemy metodyczne, Prace geograficzne No 93, IG PAN, Warsaw.

Kuć-Czajkowska K., 2008, Nierówności społeczne w przestrzeni Warszawy, No 13 Nierówności społeczne a wzrost gospodarczy w kontekście spójności społeczno-ekonomicznej, Uniwersytet Rzeszowski pp. 193-210.

Kukuła K., 1996, Statystyczne metody analizy struktur ekonomicznych. Wydawnictwo Edukacyjne, Cracow.

Lister R., 2007, Bieda, Wydawnictwo Sic!, Warsaw.

Marks-Bielska R., 2006, Kapitał ludzki a kwestie ubóstwa w środowiskach popegeerowskich, Nierówności Społeczne a Wzrost Gospodarczy, Problemy globalizacji i regionalizacji. Vol. 2, pp. 429-439.

Okrasa W., Gudaszewski G., 2013, Metropolizacja i wykształcenie wyższe jako czynniki zróżnicowania dobrostanu społeczności lokalnych: wstępna dekompozycja nierówności, Acta Universitatis Nicolai Copernici, Ekonomia Vol. XLIV (2), pp. 231-259.

Opensaw S., Alvanides S., 1999, Applying geocomputation to the anaylsis of spatial distributions [w:] P. Longley, M. Goodchild, D. Maguire, D. Rhind, (eds.), Geographic Information Systems Volume I: Principles and Technical Issues, New York. John Wiley, pp. 267-282.

Rey S. J., 2004, Spatial Analysis of Regional Income Inequality, [in:] Goodchild M. F., Janelle D. G. (ed.), Spatially Integrated Social Science, Oxford University Press, Oxford, UK.

Skoczylas T., 2011, Wieś jako „przechowalnia biedy" w Polsce, [in:] M. Popow, P. Kowzan, M. Zielińska, M. Prusinowska, M. Chruściel (ed.) Oblicza biedy we współczesnej Polsce, Doktoranckie Koło Naukowe „Na Styku", pp. 235-246.

Smętkowski M., 2003, Polaryzacja procesów rozwoju w regionie metropolitalnym Warszawy? [in:] I. Jażdżewska (ed.), Funkcje metropolitalne i ich rola w organizacji przestrzeni, Łódź: Triada, pp. 53-71.

Smętkowski M., 2009, Zróżnicowania społeczno-przestrzenne Warszawy – inercja czy metamorfoza struktury miasta? Przegląd Geograficzny, Vol. 81, No 4, pp. 461-482.

Smętkowski M., 2013, Rozwój regionów i polityka regionalna w krajach Europy Środkowo-Wschodniej w okresie transformacji i globalizacji, Wydawnictwo Naukowe Scholar, Warsaw.

Smętkowski M., 2014, The Metropolisation Process on Different Territorial Scales: Focus on Capital City Regions in Central and Eastern European Countries, GRINCOH Working Paper Series, Paper No. 6.06.

Smętkowski M., Gorzelak G., Płoszaj A., Rok J., 2015, Poviats threatened by deprivation: state, trends and prospects, EUROREG Reports and Analyses, 7/2015. DOI: 10.13140/RG.2.2.22835.84004

Smętkowski M., Płoszaj A., 2016, Porównanie metropolitalnego i historycznego wymiaru zróżnicowań polskiej przestrzeni [in:] G. Gorzelak (ed.) Polska gmina, Wydawnictwo Naukowe Scholar.

Smętkowski M., Płoszaj A., 2016, Zróżnicowania społeczno-gospodarcze gmin według regionów historycznych [in:] G. Gorzelak (ed.) Polska gmina, Wydawnictwo Naukowe Scholar.

Sobala-Gwosdz A., 2004, The Change in the Rural Standard of Living During the Transformation Period in the Podkarpackie Province. [in:] M. Paszkowski (ed.) Effectiveness geographical space quality of life, Prace geograficzne IGiPG No 114, pp. 93-106.

Taylor Z., 1999, Przestrzenna dostępność miejsc zatrudnienia, kształcenia i usług a codzienna ruchliwość ludności wiejskiej, Prace geograficzne 171, IGiPZ PAN, Warsaw.

Theil H., 1979, Zasady Ekonometrii, PWN, Warsaw.

Węcławowicz G., 1997, Some aspects of income and social disparities in Poland – Regional and local scale [in:] Urban and regional development in Italy and Poland, pp.315-334.

Węcławowicz G., 2001, Przestrzeń ubóstwa – nowy czy stary wymiar zróżnicowania społeczno-przestrzennego w miastach Polski, Przegląd Geograficzny No 73(4), pp. 451-475.

Weltrowska J., Kisiała W., 2014, Obszary koncentracji ubóstwa w strukturze przestrzennej miasta (na przykładzie Poznania), Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu No 331, pp. 235-245.

8. ANNEXES

8.1. Annex 1. Included indices by deprivation domains

Income

- Share of gminas and cities on the poviat rights in taxes constituting the state's budgetary income – personal income tax – Local Data Bank 2002 and 2013

Labour

- Registered unemployment rate – Local Data Bank 2004 and 2013

Living conditions

- Percentage of flats with bathrooms – Local Data Bank 2002 and 2013

Education

- Average result of the lower-secondary school final exam, the part on mathematics and natural sciences – Educational Research Institute 2002 and 2013

Access to goods and services

- Number of persons per flat – Local Data Bank 2002 and 2013
- Percentage of children aged 3–5 covered by the nursery school education – Local Data Bank 2003 and 2013

8.2. Annex 2. Concentration of deprivation on the urban scale on the example of Warsaw

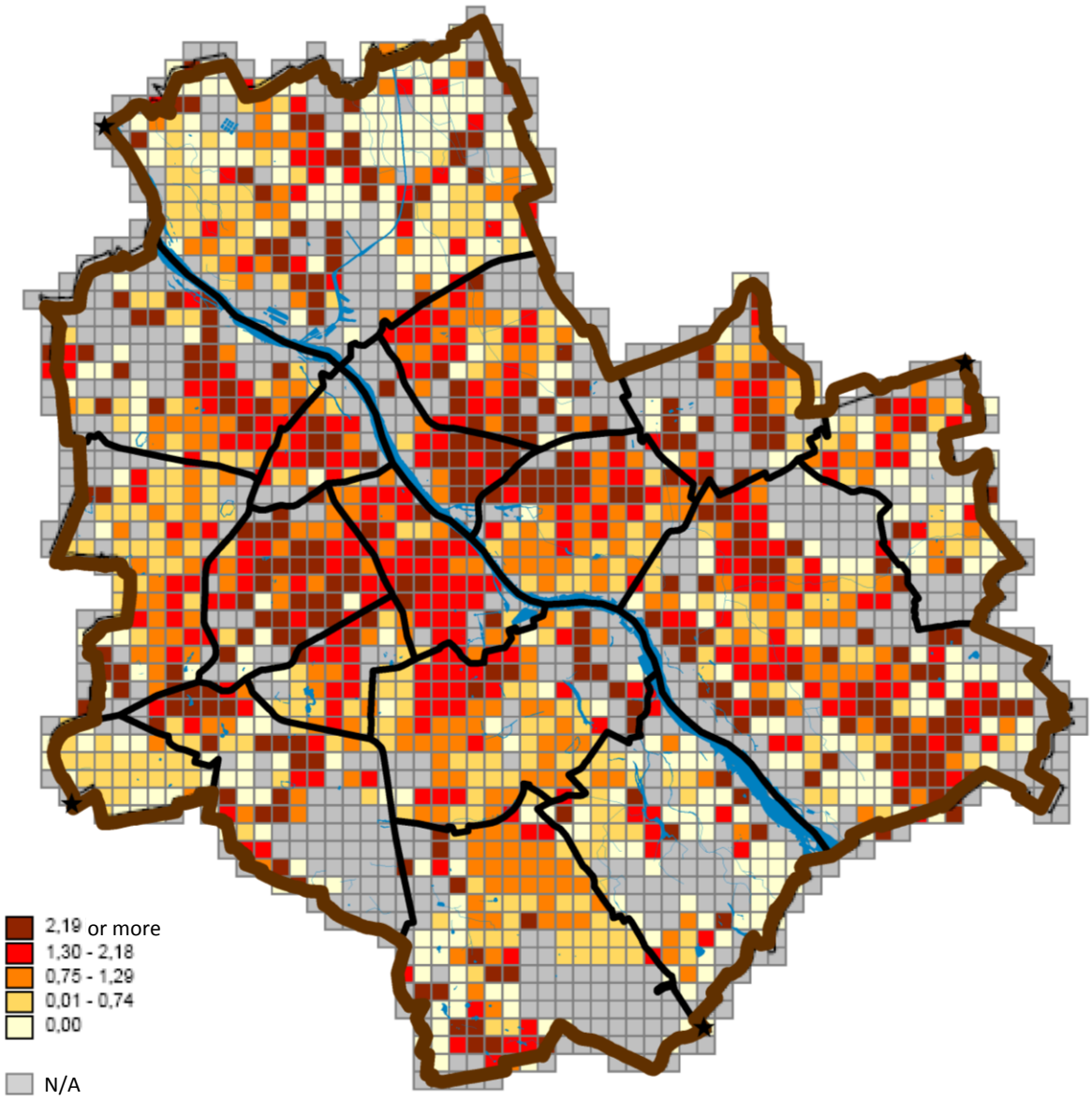
The assessment of the usefulness of indicators for studies from the analytical perspective has been conducted on the example of Warsaw, as for this city exist a number of publications allows to diagnose the areas of concentration of deprivation on the urban scale (e.g. Jałowiecki 2000, Węcławowicz 2001, Kuć-Czajkowska 2008, Smętkowski 2009).

The analysis of the first indicator from the studied indicators presenting the number of persons covered by social assistance (social pension paid by the Polish Social Insurance Institution (ZUS) to persons of full age who are incapable to work or the benefit paid by gmina to persons whose income is below a level provided for by the law) affords a possibility to observe a relatively clear spatial concentration of this phenomenon (Figure 12). The greatest scale of problems in district division concerned Praga Północ (the most of squares (inhabited by at least 11 persons) was in the highest class) and Wola (about half of squares was in this class). However in the majority of remaining districts it was also possible to indicate areas of clear spatial concentration of this problem. This concerned the following areas: Kamionek and Grochów (Praga Południe), Wrzeciono (Bielany), Stare Włochy (Włochy), Targówek Fabryczny (Targówek), Żerań (Białołęka), Czerniaków (Mokotów), as well as Falenica and Miedzyszyn (Wawer).

The distribution of the situation in the scope of the unemployed entitled to benefit has to a greater extend a mosaic pattern (Figure 13). This probably results from the low absolute values of this phenomenon. Relatively often high values concern the squares with the low number of inhabitants. Moreover, the concentration of problems in this scope is characteristic for the outskirts of the city, including especially Załuski and Opacz Wielka (Włochy) and selected areas of Ursynów, Wawer and Targówek. The probable cause could consist in restructuring of the industrial plants localised in these districts. In central districts the concentration of the unemployed is not that clear and the situation has rather a mosaic structure. However, also in this case the relatively most problematic districts may be indicated: Wola, Praga Północ and Praga Południe, as well as selected areas of Śródmieście and Żoliborz.

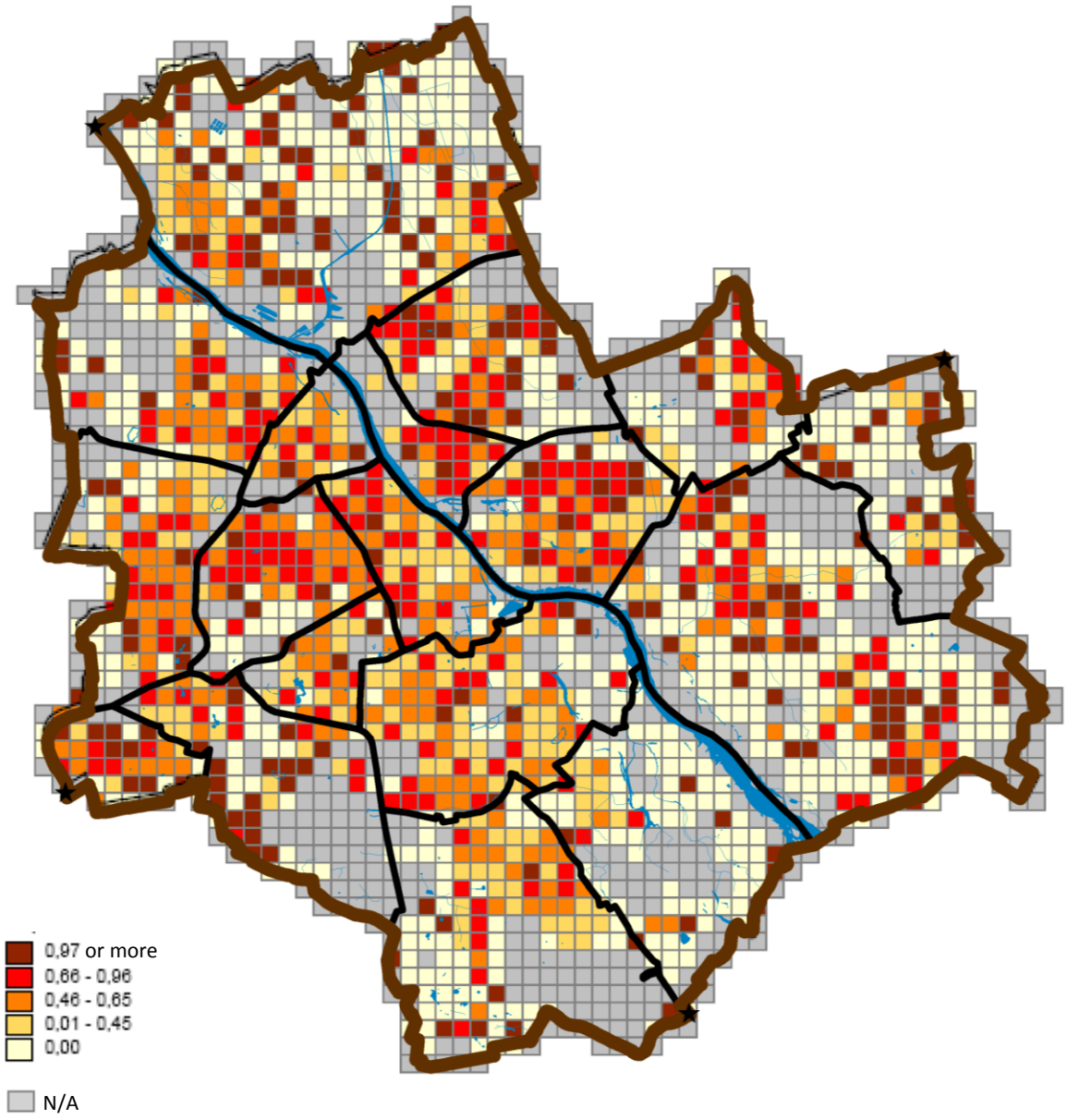
On the basis of the comparison of the received image with previous analyses it can be concluded, that the social and spatial diversification in Warsaw is lasting and multifaceted. This is especially true for the social marginalisation reflected (apart from the indicators under study) in the concentration of persons with elementary education, who usually have low-paid jobs which do not require qualifications (including in agriculture), live in substandard flats in neglected pre-war buildings (which are the property of gmina or of natural person) with the substantial share of large families (Smętkowski 2009).

Figure 12. Share of persons receiving social pension or social assistance in the overall population [%]



Source: (GUS 2015).

Figure 13. Share of persons receiving unemployment benefit in the working age population [%]



Source: (GUS 2015).