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**SOCIO-ECONOMIC STRUCTURE
OF LODZ METROPOLITAN AREA AND ITS CHANGES
IN THE LAST 20 YEARS
– CONTEXT OF TERRITORIAL COHESION**

Abstract: The main objective of this paper is the diagnosis of territorial cohesion of Lodz Metropolitan Area (LMA), based on analyzes of changes in disparities within its socio-economic structure (on the local level) in the period 1990-2009. The study involved municipalities comprising LMA in 2009, as well as communes neighboring to them (57 units in total). The research on the socio-economic development of municipalities comprising LMA in 1990 and 2009 has included a linear ordering on the basis of Perkal synthetic index (SI), which is the mean of the standardized values of selected variables. The chosen features are related to the socio-demographic, as well as economic structure of the considered area, but their selection was also dependent on the availability and comparability of statistical data for the analyzed period.

Key words: Lodz Metropolitan Area, socio-economic structure, territorial cohesion.

Introduction

Cohesion can be defined as a strict connectivity, the reason being that the individual elements constitute a whole system [Bartosiewicz, Pielesiak 2011; Bartosiewicz *et al.* 2012]. Social and economic cohesion is one of the overarching objectives of EU policy. Early as in the Rome Treaty of 1957, provisions on the need to strengthen the unity of the European economies and to ensure their development by reducing regional disparities, have been included. The purpose of striving for economic and social cohesion has been formulated in the Single European Act and took tangible form in 1988 with the adoption of the first regulations, which gave life to the cohesion policy [Hübner 2008]. The aim was therefore to achieve economic and social cohesion by providing compensatory measures to improve competitiveness of the weak and underinvested regions, including those, that accumulate a by-products of the restruc-

turing of traditional industries [Churski 2008]. The Treaties of Maastricht, Amsterdam and Nice emphasized the importance of the policy, and its scope was broadened in the Lisbon Treaty for a new territorial dimension. The European Council in 1988, 1992, 1999 and 2005 confirmed the significance of cohesion policy, allocating for this purpose a growing funds from the European budget [Hübner 2008].

As indicated above, several dimensions of cohesion are mentioned in the European Union's policy, including economic cohesion, which refers to reducing disparities in the level of economic development, arising, among others, from the condition and structure of the economy, as well as from infrastructure development, the competitiveness and innovativeness of enterprises, *etc.* The social cohesion is related to the level of social development, resulting from the access to the labor market, living conditions reflecting the level of income, and from existing social bonds. Reducing disparities in these aspects can be interpreted as an increasing economic and social cohesion [Dolata *et al.* 2009].

Territorial cohesion is a concept with several meanings, causing disputes both, in terms of terminology and methodology of research. The Polish Government accepted, that it should be seen in static and dynamic aspects. In the first meaning, it is a perfect state, which is the result of efficient economic processes, providing economically and socially rational allocation of resources [Bartosiewicz, Pielesiak 2011; Bartosiewicz *et al.* 2012]. Such a situation is equated with the achievement of a minimum level of development in selected domains, such as access to public services, or availability of communication. In the second, dynamic approach, the need for the simultaneous stimulation of economic and social cohesion (encouraging economic efficiency and reducing social differences) as a part of an integrated managing the socio-economic development, is emphasized [Baucz *et al.* 2009; Bartosiewicz, Pielesiak, 2011; Ogrodowczyk 2012].

Processes aimed at strengthening the territorial cohesion are characterized by a great complexity and therefore should be stimulated and implemented not only at European level but also in individual countries, regions and communities. The issue of territorial cohesion has been taken so far primarily on the macro scale, in relation to EU policy aimed at reducing the development gap between the old and new Member States, as well as among particular regions. Research on sub-scale territorial cohesion are taken relatively rarely, although this dimension of cohesion seems to be no less important than the analysis in the other spatial scales. This is due to the fact that the metropolitan areas, defined as the big cities and their hinterlands, functionally interdependent and complementary in economic and social terms, constitute key elements of the spatial structure of the country.

The main objective of the paper is the diagnosis of territorial cohesion of Lodz Metropolitan Area (LMA), based on analyzes of changes in disparities in its socio-economic structure in the period 1990-2009. The study involved municipalities comprising the metropolitan area in 2009, as well as communes neighboring to them (57 units in total). The boundaries of LMA are as delineated by Spatial Planning Office of Lodz Voivodeship [*Plan ... 2010*], thus they cover 5 districts (poviats): brzeziński, łódzki wschodni, pabianicki, zgierski and the city of Lodz (Fig. 1). Spatial differentiation of the local socio-economic development has been analyzed with taking into account the administrative changes, carried out in that period¹.

In order to achieve the main goal, the following specific objectives were determined:

1. Analysis of disparities in socio-demographic and economic development of areas forming LMA and neighboring municipalities in 1990 and 2009 (thus at the beginning of the political and economic transition, taking place throughout the country, and nowadays), on the basis of selected variables (features).
2. Classification of analyzed territorial units based on the value of the synthetic index, calculated for 1990 and 2009, in order to extract the groups of municipalities characterized by a similar socio-economic structure.
3. Diagnosis of socio-economic cohesion of LMA in the period 1990-2009, based on the analysis of changing disparities in socio-economic development of municipalities under studies.

In accordance with these particular objectives, in the first stage of the study the diagnostic features for the analysis of the socio-demographic and economic structure have been selected. Finally, eight following variables have been taken under consideration:

SI1 – population density,

SI2 – dependency ratio,

SI3 – natural growth rate per 1000 inhabitants,

SI4 – net migration per 1000 inhabitants,

SI5 – the share of non-agricultural employment in the total number of employees,

SI6 – entrepreneurship rates,

SI7 – local revenue *per capita*,

SI8 – dwellings completed per 1000 inhabitants.

The chosen variables are related to the socio-demographic, as well as economic structure of the considered area, but their selection was also dependent on the availability and comparability of statistical data for the analyzed period.

The next stage of the research on the socio-economic development of municipalities comprising LMA in 1990 and 2009 has included a linear ordering on the basis

¹ In 1992, Budziszewice commune was created from the former areas of Żelechlinek, in 1997 Ksawerów commune was founded in the rural areas of Pabianice, while in 2006, Rzgów regained its municipal rights (nowadays it is a part of the urban-rural community).

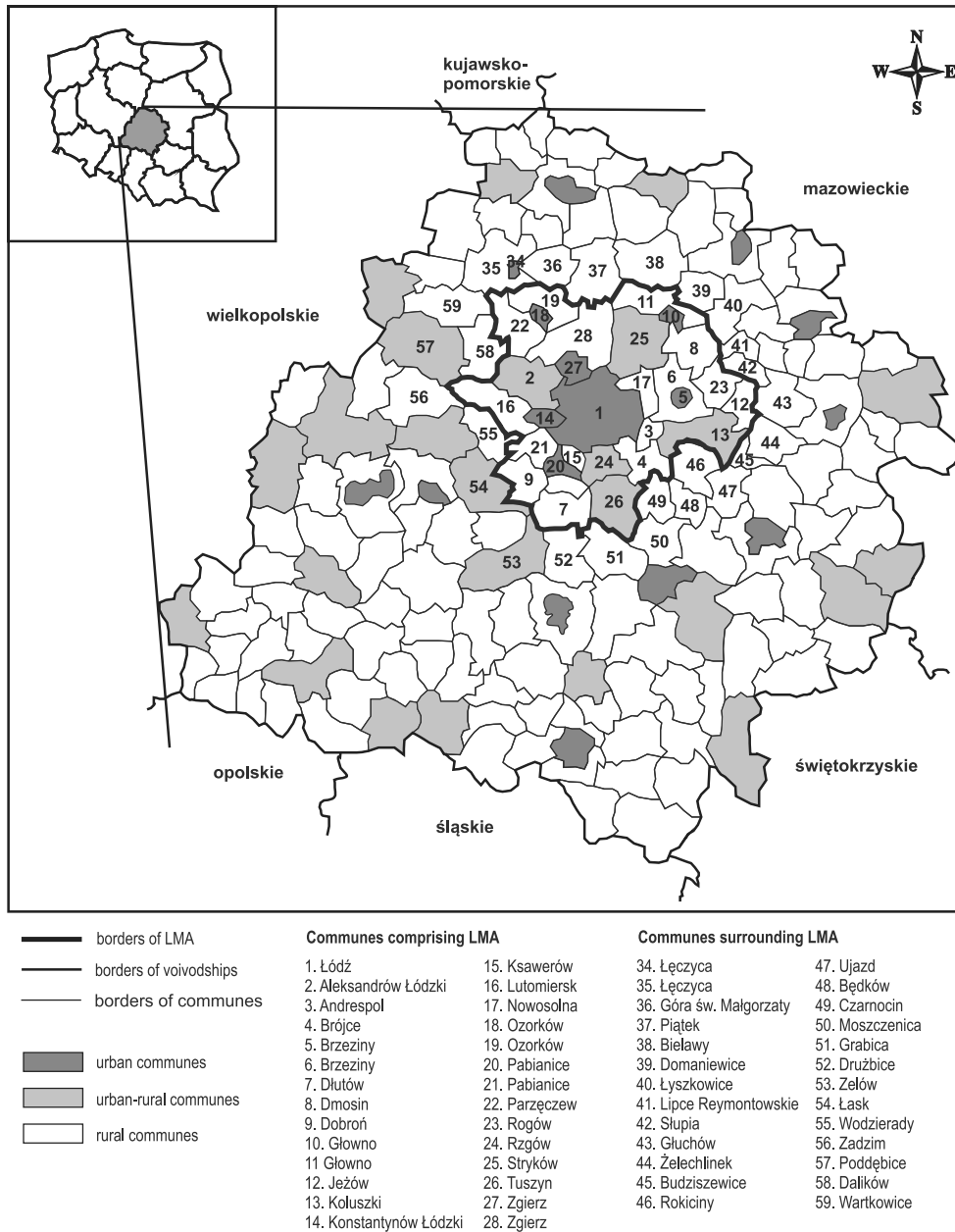


Figure 1. Research area within the borders of Lodz Voivodeship

Source: Own elaboration (Figs 1-3).

of Perkal synthetic index (SI), which is the mean of the standardized values of the sub-indices. Analyses were based on data collected in the CSO statistical yearbooks

for voivodeships of Lodz, Skierniewice, Piotrków, Sieradz and Płock, as well as on source materials from Voivodeship Statistical Office in Lodz (for the period 1990-1994) and available on-line by Local Data Bank (for the years 1995-2009).

2. Socio-economic structure of LMA – chosen aspects of changes (1990-2009)

The number of inhabitants and population density

At the beginning of the political and socio-economic transformation in Poland, the areas comprising contemporary Lodz Metropolitan Area was inhabited by over 1222 thous. people (including residents of Lodz, the number of which exceeds 848 thousand – 69.4% of the LMA's population). LMA was distinguished by a high rate of urbanization (89.5%), but its settlement network was dominated by small towns, with up to 20 thous. residents.

The whole metropolitan area was characterized by depopulation in 1990-2009 (population growth rate reached 91.71), which was undoubtedly influenced by the significant decline in the number of inhabitants (over 105 thous.), which was recorded in Lodz (population growth rate calculated without this city – 102.23). Merely three towns among the remaining urban areas were distinguished by population growth, confirming a general downward trend in terms of demographic changes in urban areas comprising LMA during the period under consideration (although in general, the decrease, excluding Lodz, was only about 3 thous. people – growth rate of 98.94). In contrast, most rural areas belonging to LMA were distinguished by favorable demographic situation (population growth rate of 107) – they form a consistent circle surrounding the major cities of Lodz agglomeration. In addition, it can be mentioned that the loss of urban population to rural areas of LMA in 1990-2009 has contributed to the reduction of the urbanization rate to 87.7%. Municipalities surrounding LMA lost in total over 14 thous. residents in the analyzed period (population growth rate at 93.13). Only the two of these units were characterized by population growth – rural commune of Łask (almost 900 people) and the town of Poddębice (less than 300).

Changes in the number of inhabitants have also influenced strongly the population density of the discussed area in 1990-2009. The largest decline, just as it was in the case of the population size, have been recorded in Lodz (from 2.8 to 2.5 thous. people/km²). For other urban areas comprising LMA, a decrease in population density (over 20 residents/km²) was also a characteristic feature. Rural communes of the metropolitan area have been distinguished by an increase in the value of the ratio (6.6/km²). As previously mentioned, in the period 1990-2009 communes located in the neighborhood of LMA were characterized by a general downward trend in terms of demographic

changes – it is also reflected in evolving population density – the average rate for this group of administrative units has decreased by about 20 persons per km².

The age structure of the population

At the beginning of 1990s. working age population was about 60% of the total number of LMA's residents, while the old-age dependency ratio (number of people of retirement age per 100 persons of working age) receive the value of 28.9. Already in 1990, all the municipalities comprising LMA (with the exception of Brzeziny urban area) could be described as old populations, according to a scale established by the demographer Rosset [1959], as well as to a United Nations scale (both taking into account the share of working age persons in the total population). This situation has even worsened over the next 20 years.

The changes that have been observed in the share of working age people in the total population of municipalities under studies have been associated with a decreasing proportion of the youngest inhabitants, which is reflected in the total dependency ratio (the number of non-working age per 100 persons of working age), recorded for 1990 and 2009. At the beginning of political and economic transformation in Poland, the ratio reached a level of 67 for the whole area of contemporary LMA, but a clear difference in terms of its value could be observed between urban and rural areas. In all cities of analyzed area (including Lodz), there were fewer than 70 people in the non-working age per 100 persons of working age (average of 63), while the indicators calculated for rural communities were generally higher (average of 76.5). A corresponding age dependency could be observed in the early 1990s. also in the immediate surroundings of LMA.

The systemic transition brought a demographic change of the metropolitan area, consisting of a significant decline in age dependency, both within the LMA (an average of about 11 people per 100 persons of working age) and its surroundings (about 16 people), especially in urban areas. Taking into account the old-age dependency ratio, it should be noted, that the decrease of the total dependency is mainly due to the shrinking of the young population.

Vital statistics and migration

During the period 1990-2009, the total population of Lodz Metropolitan Area decreased of about 200 thous. people as a result of the negative population growth (-9.04 per 1000 inhabitants, an average of about 10 thous. every year). It should be noted, however, that this loss was mainly due to the unfavorable demographic situation of urban areas (they lost almost 198 thous. people in 1990-2009), especially the city of Lodz, where the population in 2009 was 66.2% of LMA total population. Lodz lost in the period of analyzes about 184 thous. residents, which gives -12.4 per 1,000 population and accounts for 90% of the total population decline of LMA. Analysis of vital statistics for municipalities surrounding

the metropolitan area also have shown a general natural decrease in 1990-2009 (-7.3 thous. people in total; -1.9 per 1000 residents; an average of about 368 people per year). Urban areas located at the LMA borders was characterized in this case by more favorable demographics than the surrounding rural areas.

Migration processes are also an important factor contributing to the progress and dynamics of population aging. Analysis of migration in the study area in 1990-2009 revealed, that LMA was characterized by a positive, but low total net migration (10.7 thous. people, or 0.5 per 1000 inhabitants in 2009). It is the result of differentiation of the municipalities comprising LMA, particularly due to the influx of new inhabitants, observed in rural areas of the metropolitan area (total net migration for the period 1990-2009 exceeded 13.5 thous. people, while the average annual balance for 1000 residents reached 5.6).

When it comes to urban areas belonging to LMA, it can be concluded, that they are generally characterized by the lowest (negative) total net migration for the period 1990-2009 (-4.5 thous. people in total, -0.23 per 1,000 inhabitants). However, this is clearly a „merit” of the capital of the voivodeship, where the population declined in these years of 11.4 thous. people (0.8 per 1000 inhabitants) as a result of the migration processes. After excluding Lodz from the analyzed group, the total net migration have already achieved positive value (6.8 thous. people, 1.4 per 1000 inhabitants). Taking into account all the municipalities incorporated in LMA, it is worth noting, that the most attractive areas for immigrants were rural municipalities directly adjacent to Lodz borders: Aleksandrów Łódzki, Nowosolna and Rzgów, as well as rural commune Dobroń, located between the urban areas of Pabianice and Łask.

The surroundings of LMA exhibit lower diversity in terms of net migration rate. In this area rural communes predominate, of which in 1990-2009 emigrate over 5.4 thous. people (-1.9 per 1000 inhabitants). Only ¼ of mentioned units was distinguished by a positive total, and thus the average net migration per 1000 population (although, in all cases the value of the latter measure was less than 1). The largest population decline caused by the migration processes relates to the communities located at the limits of the metropolitan area from the north (Góra św. Małgorzaty and Domaniewice) and east (Lipce Reymontowskie and Żelechlinek). Taking into account the results of the analyzes and the dominant directions of migration within LMA and its surroundings, it can be concluded, that the period of 1990-2009 was marked by the suburbanization process, comprising the deconcentration of Lodz population, as well as the migration influx from other areas of the voivodeship.

The employment structure and enterprises

Considering the available statistical data relating to the occupational structure of the study area population in 1990 and 2009, it can be stated, that the last two decades were characterized by a quite small changes. At the beginning of the transformation taking place in Poland, areas forming contemporary Lodz Metropolitan Area

were generally characterized by a high share of employment in non-agricultural sectors (average: 90.1%), as well as municipalities in its neighborhood (92.4%). In 2009, the proportion reached 98.5% within LMA, and 96.1% in surrounding communities. After twenty years of economic transition the highest average share of non-agricultural occupations is a distinguish feature of urban areas belonging to LMA (99.7%) and located in its immediate vicinity (99.6%). Increase of the ratio (up to 97.8% within LMA and 95.6% outside it) could be also observed with regard to the analyzed rural areas, during the period of 1990-2009.

It should also be emphasized, that in the last twenty years the importance of the service sector in the employment structure of the study area population increased (from 54.1% in 1990 to 55.1% in 2009). However, it is mainly due to the growth of employment in services in areas at the borders of LMA (from 57.0% in 1990 to 60.1% in 2009), while the metropolitan area was marked out by a decline in the value of the ratio (from 51.4% in 1990 to 50.6% in 2009). The largest share of employment in the service sector in 2009 was a characteristic feature of rural communities located in LMA surroundings: Budziszewice, Dalików and Słupia (over 85%).

In the period 1990-2009, an increase in the number of enterprises was observed in the area under consideration (27.9 companies per 1000 inhabitants), which was slightly more intense in the vicinity of LMA (28.02) than within its borders (27.73). However, it should be noted, that in 2009 the average entrepreneurship rate for these group of communes was still lower by more than 1/3 (whereas in 1995 by about 1/2) than those, assigned to the territorial units comprising the metropolitan area (respectively 59,14 and 90,37 companies per 1000 inhabitants).

Taking into consideration urban areas, an increase of similarity between spatial units located inside and outside of LMA is noteworthy. In 1995, entrepreneurship rate for the cities of the metropolitan area was higher by more than 30 companies per 1,000 inhabitants, while in 2009, there has been a change in this respect in favor of the urban areas located in the immediate vicinity of LMA – entrepreneurship rate reached 105,36, while for the cities of the metropolitan area amounted to 104.01. Rural areas of LMA, next to the cities located in its surroundings, were characterized by the largest average increase in entrepreneurship rates (about 32,15 companies per 1000 inhabitants). The biggest increase of the ratio (over 40 enterprises per 1000 inhabitants) was recorded in rural areas at the borders of Lodz (Nowosolna, Brójce, Aleksandrów Łódzki) and in the rural part of Tuszyn.

3. Socio-economic cohesion of Lodz Metropolitan Area in 1990 and 2009

The first phase of research on socio-economic cohesion of communities comprising Lodz Metropolitan Area in 1990-2009, was the analysis of the internal dif-

ferentiation of the demographic and economic situation of designated territorial units, based on 1990 data. The aim of the study was to determine the level of this differentiation at the beginning of political and economic changes, taking place in Poland after the collapse of socialism, which is the starting point for further stages of studies on the cohesion of LMA. The analysis was conducted with Perkal synthetic index, calculated for individual municipalities. Particular values of the index have been sorted in descending order, to create a linear structure of the analyzed areas and their classification.

Synthetic index, calculated for the communes of the research area, reached a value from -1.03 to 2.06. The most differentiating feature was SI2 – dependency ratio (standardized variable variation – 12.2), while the least differentiating characteristics were SI3 (natural growth per 1,000 inhabitants), SI8 (the number of dwellings completed per 1000 inhabitants) and SI1 (population density) – the diversity at the level of 4.14, 4.16 and 4.17. Linear ordering based on the value of the synthetic index allowed the division of the examined communes to the classes of similar units, in

Table 1

Differentiation of Perkal synthetic index (SI) – classes of municipalities (1990)

Class (level of development)	Commune	Perkal synthetic index (SI)	Range	Mean	Standard deviation
I – the highest	Brzeziny (U), Pabianice (U), Tuszyn (U), Aleksandrów Łódzki (U), Konstantynów Łódzki, Zgierz (U), Łódź, Koluszki (U), Głowno (U), Poddębice (mU) Rzgów (R), Tuszyn (R)	1,51-2,06	0,55	1,80	0,17
II – high	Ozorków (U), Stryków (U), Andrespol, Aleksandrów Łódzki (R), Nowosolna, Głowno (R), Łask (U), Dobroń, Pabianice (R), Parzęczew, Koluszki (R), Łęczycza (U), Zgierz (R), Ozorków (R), Brójce, Rogów, Lutomiersk	0,80-1,44	0,64	1,08	0,23
III – medium	Dłutów, Stryków (R), Jeżów, Brzeziny (R), Żelów (U), Dmosin, Ujazd	0,27-0,72	0,45	0,58	0,16
IV – low	Lipce Reymontowskie, Łask (R), Będków, Gluchów, Dalików, Moszczenica, Łęczycza (R), Rokiciny, Łyszkowice, Wodzierady, Zadzim, Słupia, Czarnocin, Wartkowice, Piątek, Góra Świętej Małgorzaty	-0,3- -0,02	0,28	-0,24	0,14
V – the lowest	Żelechlinek, Poddębice (R), Grabica, Drużbice, Domaniewice, Żelów (R), Bielawy	-1,03- -0,54	0,49	-0,69	0,17

Source: Own elaboration (Tables 1, 2).

terms of their socio-economic situation (Tab. 1). Division into the relatively homogeneous classes was made in a subjective manner, taking into account the diversification of the index value. Finally, five classes of communities have been designated:

- I – the highest level of development ($SI \geq 1,5$),
- II – high level of development ($0,75 \leq SI < 1,49$)
- III – medium level of development ($0,00 \leq SI < 0,74$)
- IV – low level of development ($-0,49 \leq SI < -0,01$)
- V – the lowest level of development ($-0,50 \geq SI$)

Class I, of the highest level of development, contains 12 spatial units (Fig. 2), including the city of Lodz and almost all other urban areas within the confines of the current metropolitan area (with the exception of Ozorków and Stryków, located in the northern part of LMA), as well as one municipality neighboring LMA – a small town Poddębice, which is the county seat. The value of the synthetic index for the class was at the level of 1.51 to 2.06, with an average of 1.8.

Class II, of a high level of development, includes another 17 spatial units, of which 15 are located within the limits of the metropolitan area (small towns of Ozorków and Stryków and 13 rural communities) and the other two towns are situated outside LMA (Łęczyca and Łask).

Class III, of the average level of economic development, consists of seven territorial units, which are located both, within the current metropolitan area (mainly in its north-eastern part: rural communities of Brzeziny, Jeźów, Dmosin and rural part of

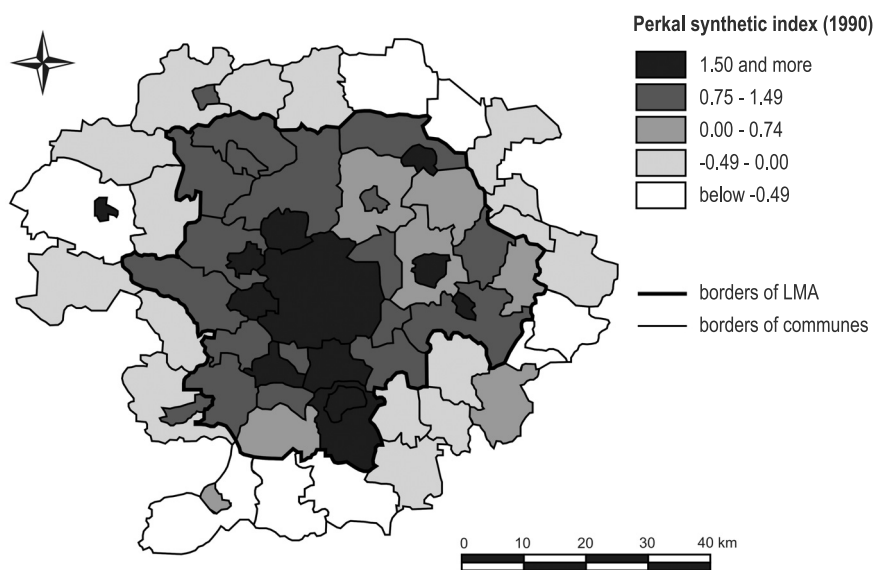


Figure 2. Spatial differentiation of Perkal synthetic index (SI)
– areas comprising and surrounding LMA (1990)

Stryków commune) and in its neighborhood (small town of Żelów and rural commune of Ujazd).

Class IV, of a low level of development, is represented by 16 rural communities located entirely outside the metropolitan area (3 municipalities of skierniewicki, łączycki and poddębicki districts, 2 municipalities of łaski, tomaszowski and piotrkowski districts and community of Łyszkowice, being a part of the łowicki district). Synthetic indicators for this group of units took negative values (from -0.3 to -0.02, with an average of -0.24).

Class V, of the lowest level of socio-economic development, consists of the remaining seven analyzed units, which are solely the rural communities located outside the designated boundaries of Metropolitan Area of Lodz – 2 municipalities of the bełchatowski and łowicki districts and single communes of the following districts: tomaszowski (Żelechlinek) piotrkowski (Grabica) and poddębicki (rural municipality of Poddębice). These territorial units are characterized by negative values of synthetic index (from -1.03 to -0.54, with an average of -0.69).

Carrying out the classification of municipalities in terms of their socio-economic situation according to data of 1990, laid the foundation for further analysis of the cohesion of Lodz Metropolitan Area and its changes in the last two decades. In order to determine these changes, the Perkal synthetic index was calculated again for all investigated spatial units according to data of 2009, allowing the linear ordering of the communities under the same criteria that have been previously adopted to study the baseline.

Changes in internal cohesion was determined using the standard deviation (S_i) – a classic measure of variability, which led to the identification of the average deviation of the synthetic indicator, calculated for the particular municipalities, from its average value. In addition, a positional measure of variability – the interval was used, to determine empirically the variation of the index.

In 2009, a synthetic index calculated for individual communities obtained values from -1.14 to 1.09, which means that the size of the interval decreased from 3.09 to 2.23. After 20 years of socio-economic transformation in Poland, the most differentiating feature of the surveyed spatial units was SI4 characteristic – net migration per 1000 inhabitants (differentiation of the standardized variable at the level of 6.43), while the least discriminating – SI2 feature – dependency ratio (0.05).

On the basis of the synthetic index values, analyzed municipalities were ordered linearly, and then divided into a relatively homogeneous classes (Tab. 2), in terms of the level of their socio-economic development:

- I – the highest level of development ($SI \geq 0,80$),
- II – high level of development ($0,40 \leq SI < 0,79$)
- III – medium level of development ($0,00 \leq IS < 0,39$)
- IV – low level of development ($-0,39 \leq IS < -0,01$)
- V – the lowest level of development ($-0,40 \geq IS$)

Table 2

Differentiation of Perkal synthetic index (SI) – classes of municipalities (2009)

Class (level of development)	Commune	Perkal synthetic index (SI)	Range	Mean	Standard deviation
I – the highest	Rzgów (R), Koluszki (U), Łódź	0,80-1,09	0,29	0,89989	0,161068
II – high	Stryków (U), Rzgów (U), Pabianice (R), Nowosolna, Brójce, Aleksandrów Łódzki (R), Zgierz (R), Aleksandrów Łódzki (U), Łęczycza (U), Ksawerów, Poddębice (U), Zgierz (U)	0,40-0,71	0,31	0,565351	0,103824
III – medium	Tuszyn (R), Pabianice (U), Czarnocin, Dobroń, Tuszyn (U), Konstantynów Łódzki, Łask (U), Lutomiersk, Głowno (U), Andrepol, Brzeziny (U), Ujazd, Ozorków (U), Stryków (R), Żelów (U), Ozorków (R), Wodzierady, Łask (R)	0,00-0,38	0,38	0,205768	0,129635
IV – low	Lipce Reymontowskie, Moszczenica, Brzeziny (R), Rokiciny, Grabica, Lutomiersk, Rogów, Dmosin, Budziszewice, Żelów (R), Łęczycza (R), Jeźów, Dłutów, Słupia	-0,37- -0,05	0,32	-0,22356	0,118786
V – the lowest	Domaniewice, Żelechlinek, Głuchów, Drużbice, Dalików, Głowno (R), Łyszkowice, Koluszki (R), Będków, Piątek, Wartkowice, Zadzim, Parzęczew, Góra św. Małgorzaty, Poddębice (R), Bielawy	-1,14- -0,41	0,73	-0,61575	0,185484

R – rural areas; U – urban areas.

Class I, designated accordingly to 2009 data, has only three spatial units (Fig. 3) – including the capital city of the voivodeship again, as well as rural areas of the Rzgów commune and the small town of Koluszki. The other studied municipalities, that in 1990 formed the class of the highest level of socio-economic development, were marked by a diminishing of position to Class II or III. This was undoubtedly the effect of reducing the interval (by half), as well as the average value of the synthetic index calculated for municipalities comprising Class I.

Class II in 2009 was consisted of 12 territorial units (by 5-less than in 1990), including 7 communes that retained their position in the class of a high level of develop-

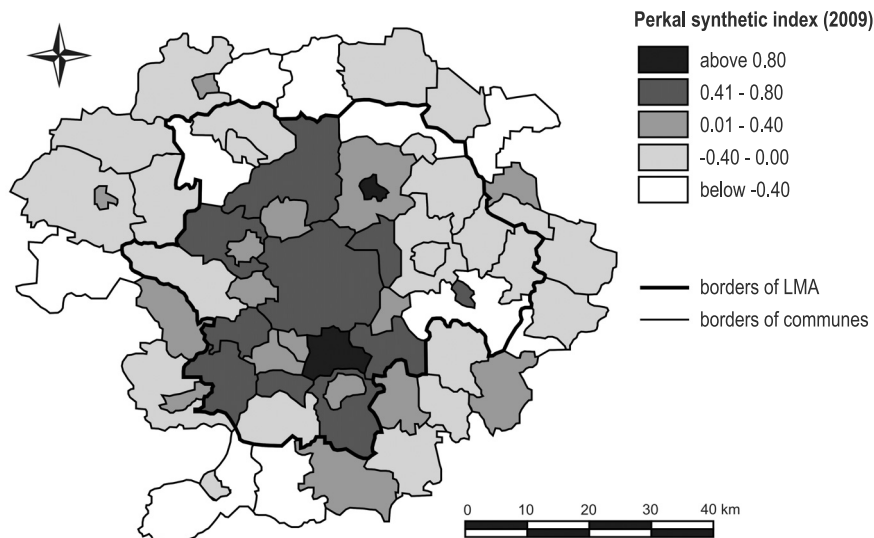


Figure 3. Spatial differentiation of Perkal synthetic index (SI)
– areas comprising and surrounding LMA (2009)

ment (small town of Stryków and the city of Łęczycza – situated outside the metropolitan area, rural communities of Nowosolna, Brójce, Pabianice and Zgierz and rural areas of Aleksandrów Łódzki). In addition, this class also includes municipalities „downgraded” of the top-class (urban areas of Aleksandrów Łódzki, Zgierz and Poddębice, as well as administrative units created after the 1990 – small town of Rzgów (2006) and rural commune of Ksawerów (1997). As a consequence of the discussed class shrinking, the interval of the synthetic index decreased by more than half, similarly to its average value.

Class III, of the medium level of socio-economic development, in 2009 was formed of the largest number (18) of municipalities (about 11 more than in 1990), of which only three have maintained the position in this class, comparing to 1990 (small town of Zelów, rural commune of Ujazd and rural areas of Stryków municipality). The remaining 15 territorial units were characterized primarily by fall in the ranking from Class I (the cities of: Pabianice Konstantynów Łódzki, Głowno and Brzeziny, as well as urban-rural community of Tuszyn) or II (the city of Ozorków, rural communities of Dobroń, Lutomiernik and Andrespol, and the town of Łask, located in the vicinity of LMA) and, to a lesser extent, the „promotion” to the upper class (rural communities of Czarnocin and Wodzierady and rural areas of Łask municipality). Despite a significant increase in size of the discussed class in the 1990-2009, a slight decrease in the value of the SI interval (about 0.07) and a significant decrease in its average value (almost 2/3) have been noted.

Class IV, of a low level of development, is represented by 14 spatial units (by 2-less than at the beginning of the study period – the most „stable” size, compared to

1990, among all the separated classes), consisting solely of rural areas. In this set of communities, the ones comprising LMA are characterized by falls in ranking of Class II (Lutomiersk and Rogów) or III (Brzeziny, Dłutów, Jeźów, Dmosin), while units representing the surroundings of the metropolitan area primarily maintained their position (Lipce Reymontowskie, Moszczenica, Rokiciny, Łęczyca and Słupia), only two municipalities were promoted of class V (Grabica and Zelów). In addition, class IV contains also the commune of Budziszewice, created in 1992. Interval of the synthetic index, calculated for Class IV, decreased slightly (about 0.04) within the period of research, while in the case of its average value a slight increase (about 0.02) has been recorded.

Class V, of the lowest level of socio-economic development, covered in 2009 as many as 16 municipalities (about 9 more than 20 years earlier) represented, as in the case of Class IV, only by the rural areas. Among them, three territorial units were consistent parts of LMA (Głowno, Koluszki and Parzęczew) and distinguished by a significant drop in ranking – up of Class II (high level of development). The remaining municipalities either experienced a fall of Class IV (Głuchów, Dalików, Łyszkowice, Będków, Piątek, Wartkowice, Zadzim, Góra św. Małgorzaty) or maintained their position in relation to 1990 (Domaniewice, Żelechlinek, Druźbice, Poddębice and Bielawa, which at the beginning of the study period also occupied last places of the ranking list). The interval of the synthetic index, calculated for this class, decreased significantly (by about 1/3), while the average value increased slightly (by 0.09).

Conclusions

The classification of municipalities under studies in terms of the level of their socio-economic development, performed according to data from 1990 and 2009, led to the following conclusions:

(1) In the period of 1990-2009 the size of separated classes, measured by the number of municipalities, have changed (significant losses in Class I and II, mainly in favor of Class III and V, have been noted).

(2) Changes in the municipalities belonging to particular classes were frequent in the period of analyses – 37 spatial units (61.7%) changed the class (32 cases were related to loss of position in the ranking, „promotion” was characteristic only for rural areas of Czarnocin, Wodzierady and Łask – from class IV to III, as well as Grabica and Zelów – from class V to IV).

(3) Linear ordering of the municipalities in each class was a subject of significant modifications between 1990 and 2009. Analysis of changes in the position of particular units allowed the identification of areas of “growth”, “stagnation” and “recession”. The first include those, that have improved their position in the ranking (mentioned above), the second are those, that maintained their position and the areas of „recession” are represented by the vast majority of municipalities, whose position

clearly deteriorated over the considered period, resulting in degradation to the lower classes of the level of socio-economic development.

(4) Analysis of changes in the level of development in 1990-2009 at the local level, led to the conclusion of a decline in the average value of the synthetic index calculated for spatial units of Class I, II and III (the highest, high and medium level of development) and a slight increase in the average value of SI for communes of class IV and V (low and the lowest level of development). As a result, it was possible to note a clear decline in a variability of the index in classes I-IV, expressed by a fall in the interval, and the standard deviation of SI, (mainly due to decreasing importance of developed municipalities and strengthening of the less developed ones).

Administratively designated LMA covered areas of a different land-use and various historical determinants of economic development. Its settlement system is characterized by a large predominance of the largest city and its agglomeration, not only in terms of population, but also the level of development and diversification of urban functions and the concentration of economic activity.

Diagnosis of the territorial cohesion of LMA by identifying changes in the internal diversity of the socio-economic situation at the local level in 1990-2009 shows, that in that period Lodz maintained its dominant position as the economic center. At the same, development of other urban areas of the agglomeration, as well as rural communities adjacent to them, has been noted. Moreover, a further marginalization of the least developed municipalities could be also observable. In the years 1990-2009 the overall economic and social cohesion of communities Lodz Metropolitan Area increased slightly. Closer examination shows, however, that during the relevant period, some polarization of the development level occurred, beneficial to the group of municipalities concentrated in the vicinity of the Lodz Agglomeration and unfavorable for development of the peripheral communities.

References

- Bartosiewicz B., Pielesiak I., 2011, *How to Measure Territorial Cohesion of a Metropolitan Area – Proposal of a Research Concept*, [in:] *Urban Regions as Engines of Development*, T. Marszał (Ed.). Studia Regionalia KPZK PAN, Vol. 31, Warsaw.
- Bartosiewicz B., Marszał T., Pielesiak I., 2012, *Spójność terytorialna Łódzkiego Obszaru Metropolitalnego*. Studia KPZK PAN, Vol. CXLVII, Warsaw.
- Baucz A., Potocka M., Żuber P., 2009, *Spójność terytorialna wyzwaniem polityki rozwoju Unii Europejskiej. Polski wkład w debatę*. MRR, Warsaw.
- Churski P., 2008, *Czynniki rozwoju regionalnego i polityka regionalna w Polsce w okresie integracji z Unią Europejską*. Wyd. Naukowe UAM, Poznań.
- Dolata M., 2009, *Zróżnicowanie poziomu rozwoju gospodarczego w układzie wewnętrznym regionu wielkopolskiego – diagnoza spójności gospodarczej*, [in:] *Spójność i konkurencyjność regionu wielkopolskiego*, P. Churski (red.). Projekt badawczy współfinansowany ze

- środków Unii Europejskiej z Europejskiego Funduszu Rozwoju Regionalnego oraz budżetu państwa w ramach *Programu Operacyjnego Pomoc Techniczna*, wersja CD, Poznań.
- Dolata M., Konecka-Szydłowska B., Perdał R., 2009, *Ocena poziomu spójności społecznej Regionu Wielkopolskiego według modelu społeczno-kulturowego na podstawie stanu świadomości regionalnej młodego pokolenia Wielkopolan*, [w:] *Spójność i konkurencyjność regionu...*, *op. cit.*
- Hübner D., 2008, *Regiony są ważne*, [in:] *Polityka spójności UE 1988-2008: Inwestowanie w przyszłość Europy*. Inforegio Panorama, No. 26, Komisja Europejska, DG ds. Polityki Regionalnej.
- Ogrodowczyk A., 2012, *Struktura społeczno-gospodarcza w Łódzkim Obszarze Metropolitalnym oraz jej zmiany w ostatnim dwudziestoleciu*, [in:] *Spójność terytorialna...* *op. cit.*
- Plan zagospodarowania przestrzennego województwa łódzkiego*, Uchwała nr LX/1648/10 Sejmiku Województwa Łódzkiego z 21 września 2010 r. w sprawie: zmiany Uchwały nr XLV/524/2002 Sejmiku Województwa Łódzkiego z 9 lipca 2002 r. w sprawie uchwalenia *Planu zagospodarowania przestrzennego województwa łódzkiego*.
- Rosset E., 1959, *Proces starzenia się ludności. Studium Demograficzne*. Warsaw.