

A spatial comparison of semi-urban and rural gminas in Poland in terms of their level of socio-economic development using Hellwig's method

Iwona Pomianek^{1, CDFMR}, Mariola Chrzanowska^{2, DMR}

Warsaw University of Life Sciences – SGGW, ¹Faculty of Economic Sciences, Department of European Policy, Public Finance and Marketing, Nowoursynowska 166, 02–972 Warsaw, Poland, e-mail: iwona_pomianek@sggw.pl (corresponding author); ²Faculty of Applied Informatics and Mathematics, Department of Econometrics and Statistics, Nowoursynowska 166, 02-972 Warsaw, Poland, e-mail: mariola_chrzanowska@sggw.pl

How to cite:

Pomianek, I. and Chrzanowska, M., 2016: A spatial comparison of semi-urban and rural gminas in Poland in terms of their level of socio-economic development using Hellwig's method. In: Środa-Murawska, S. and Dymitrow, M. editors, *Bulletin of Geography. Socio-economic Series*, No. 33, Toruń: Nicolaus Copernicus University, pp. 103–117. DOI: <http://dx.doi.org/10.1515/bog-2016-0028>

Abstract. The concept of local development remains a crucial one, especially in the context of European Union membership and its support funds. The multidimensional character of local development makes it a subject of interest not only to economists, but also geographers, sociologists and statisticians. The aim of the paper is to present differences in the level of socio-economic development of semi-urban and rural gminas in Poland and to find clusters of gminas with a similar level of development. Hellwig's method was used to compare 2,174 gminas, which showed large development disparities. There is a clear boundary between Eastern Poland with Mazowieckie Voivodship, where the country's capital, Warsaw, is located, and Western Poland. gminas with a high level of development were observed usually on Poland's Baltic coast and suburban areas of Warsaw, Szczecin, Poznań, Wrocław and Kraków. Low level gminas were mostly situated in the peripheries of the eastern voivodships.

Article details:

Received: 18 March 2014
Revised: 10 February 2015
Accepted: 02 April 2016

Key words:

local development,
infrastructure,
society,
economy,
Poland.

© 2016 Nicolaus Copernicus University. All rights reserved.

Contents:

1. Introduction	104
2. Objectives and methods	104
3. Research results	106
3.1. Infrastructural development	106
3.2. Economic development	108
3.3. Social development	110
3.4. Socio-economic development of rural and semi-urban gminas in Poland	112

4. Conclusions	115
Note.....	116
References	116

1. Introduction

The concept of local development remains a crucial one, especially in the context of the European Union membership and use of its support funds. Economists, statisticians, geographers and representatives of other fields of science all have a great deal of interest in this area (Sztan-do, 1998; Strahl, 2006; Szajnowska-Wysocka, 2009; Makkonen, 2011; Rosner, 2012; Bański, 2013; Stan-ny, 2013; Mikhaylova et al., 2015). Local develop-ment is a multidimensional concept, which closely combines the social and economic spheres. It can be broadly defined as the process of joint and com-plementary activity of the community, enterprises and institutions for the best use of local resources and the creation of new values (e.g. Uphoff, 1992; Parysek, 1995: 37; Broł, 1998: 11; Kożuch, 2006: 177–181; OECD, 2013). Numerous researchers (e.g. Sobala-Gwosdz, 2005; Czapiewski, 2010; Flaga, 2010; Brodziński, 2011; Mohiuddin, Hashia, 2012; Pomianek, 2012; Biegańska, 2013) have shown that local development is determined (or affected) by various exogenous factors, including: (a) geographi-cal (e.g. peripheries or suburbs, distance to main transport routes); (b) natural environment (its val-ues as well as legal status); (c) historical conditions (e.g. tradition).

According to endogenous development factors, local development is best measured at the LAU-2 level, which in Poland is at the communal level (re-ferred to in the literature variously as gminas, com-munes, communities, municipalities). The measures are calculated more accurately and reflect the local reality much better. Unfortunately, data availabili-ty is a big problem, because the Central Statistical Office does not collect some potentially significant data on the local level. These are available only at the LAU-1 level (in the literature: at the level of po-viats, districts or counties) or the NUTS-3 level (in

the literature: voivodships, provinces, regions), so it would be difficult or impossible to adopt them to differentiate the level of a particular phenomenon in gminas.

Both social and economic indicators should be used in measuring the level of local development. The most important economic indicators should be based on local budget revenues from differ-ent sources and expenditures for various purpos-es, the structure of enterprises, technical and social infrastructure. On the other hand, social indica-tors consist of the population age structure, births and deaths, migration, unemployment, education, among others. Moreover, social features charac-terising the local authorities should also be con-sidered. They include the university degrees or professional qualifications of the councillors (Hef-fner, Rosner, 2002: 133–152), since their role is to determine strategic objectives and initiate or coor-dinate the activities of local society, entrepreneurs and self-government allowing them to best use the gmina's strengths.

2. Objectives and methods

The aims of the research are to recognise the differ-ences in socio-economic development of semi-ur-ban and rural gminas in Poland, and to find clusters of gminas with similar levels of development. The study includes all rural (1,566) and semi-ur-ban (608) gminas in Poland, according to their ad-ministrative state on 31.12.2014 (there was a total of 2,174 gminas). Data used to construct socio-eco-nomic development indexes come from the Local Data Bank of the Central Statistical Office in Po-land (CSO LDB). 2014 is the analytical year adopt-ed in the research. Considering the data availability at the LAU-2 level, a set of 15 variables was pre-pared (see Table 1).

Table 1. Diagnostic variables applied in the research

Symbol	Diagnostic variable
Infrastructure	
X_1	Proportion of population with a water supply connection
X_2	Proportion of population with a waste water disposal connection
X_3	Proportion of population with a gas connection
X_4	Gmina's property investment expenditures per capita
X_5	Proportion of children aged 3–5 participating in preschool education
Economy	
X_6	National economy entities registered in REGON per 10,000 population
X_7	Proportion of public entities in all entities registered in REGON
X_8	Gmina's own-sources revenues per capita
X_9	Proportion of registered unemployed in the working-age population
X_{10}	Demographic dependency ratio (population of post-working age per 100 population of working age)
Society	
X_{11}	Population density (population per 1 square kilometre)
X_{12}	Change of inhabitants number per 1,000 population
X_{13}	Proportion of councillors with university degrees
X_{14}	Proportion of councillors with high professional qualifications
X_{15}	Foundations, associations and social organisations per 10,000 population

Source: The authors' calculations

The multidimensionality of rural development justifies the use of multivariate analysis methods, including taxonomic ones. Hellwig's synthetic measure of development (SM_i) groups information from a set of diagnostic features and assigns a single (aggregate) measure to an analysed objects using values from 0 to 1 under the assumption that in doing so, a lower value SM_i determines a higher level of the occurrence under analysis (see: Hellwig, 1968).

The formula for determining this measure is as follows:

1. Normalisation of diagnostic variables (x_{ij}),
2. Making all variables homogenous by turning them into stimulants.
3. Constructing the object with the best (highest) values of the diagnostic variables (pattern)

$$z_{0j} = \max_i \{z_j\} \quad (1)$$

where: z_{ij} is the normalised values which have been observed in the (whole) data set;

4. Calculating the Euclidean distance (d_i) of each object from the constructed pattern.

$$d_i = \sqrt{\frac{1}{m} \sum_{j=1}^m (z_j - z_{0j})^2} \quad (2)$$

where $i = 1, \dots, n$ is the number of objects $j = 1, \dots, m$ is the number of variables, z_{ij} is the normalised value of the variable j for the object i , and z_{0j} is the normalized value of the pattern's variable j .

5. The Hellwig measure is normalised by the following formula:

$$z_i = 1 - \frac{d_i}{d_0} \quad (3)$$

where: d_0 is the value determined by the formula

$$d_0 = \max_i \{d_i\} \quad (4)$$

Hellwig's method was used to provide four rankings of semi-urban and rural gminas in Poland. Two parameters: arithmetic mean and standard deviation, were used in the classification of gminas by their level of development. Following classes were defined:

- Class 1 (high level of development) $d_i > \bar{d}_i + s_{d_i}$ (gminas at a distance from the pattern exceeding $\bar{d}_i + s_{d_i}$),
- Class 2 (medium level of development) $\bar{d}_i - s_{d_i} < d_i \leq \bar{d}_i + s_{d_i}$ (gminas at a distance from the pattern ranging $(\bar{d}_i - s_{d_i}, \bar{d}_i + s_{d_i}]$),

— Class 3 (low level of development) $d_i \leq \bar{d}_i - s_{d_i}$
(gminas at a distance from the pattern not exceeding $\bar{d}_i - s_{d_i}$),

where:

d_i is the value of synthetic measure calculated by Hellwig's method,

\bar{d}_i is the arithmetic mean of d_i ,

s_{d_i} is the standard deviation of d_i .

The gminas were divided into two types: rural and semi-urban (urban-rural), and grouped into two areas. The First is Western voivodships, included the gminas in 10 voivodships: Zachodniopomorskie, Pomorskie, Lubuskie, Kujawsko-Pomorskie, Wielkopolskie, Łódzkie, Dolnośląskie, Opolskie, Śląskie and Małopolskie. The second area is Eastern voivodships, with the gminas grouped in 6 voivodships: Warmińsko-Mazurskie, Podlaskie, Mazowieckie, Lubelskie, Świętokrzyskie and Podkarpackie. In the western group there were 1,256 gminas (843 rural and 413 semi-urban). Another 918 gminas were included in the eastern group (723 rural and 195 semi-urban).

The following hypothesis was formulated: there would be more eastern rural gminas in the low-level development class than there would be from the other gminas.

3. Research results

The study enables the characteristics of spatial differentiation of gminas to be discussed in terms of their level of development. The generalised comparison of the level of development of the gminas is preceded by a description of the situation of two analysed groups in terms of 3 components: infrastructural, economic and social.

3.1. Infrastructural development

The infrastructural component included 5 variables:

- the proportion of the population with a water supply connection,
- the proportion of the population with a wastewater disposal connection,
- the proportion of the population with a gas connection,
- the gmina's property investment expenditures per capita,
- the proportion of children aged 3–5 participating in preschool education.

Table 2. Structure of development classes of the infrastructural component as determined by Hellwig's method (2014)

Groups of gminas	Infrastructure						Total
	1 st Class		2 nd Class		3 rd Class		
	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	
Western voivodships							
Rural	87	10.3%	708	84.0%	48	5.7%	843
Semi-urban	43	10.4%	367	88.9%	3	0.7%	413
Total	130	10.4%	1,075	85.6%	51	4.1%	1,256
Eastern voivodships							
Rural	71	9.8%	550	76.1%	102	14.1%	723
Semi-urban	18	9.2%	171	87.7%	6	3.1%	195
Total	89	9.7%	721	78.5%	108	11.8%	918
Total							
Rural	158	10.1%	1,258	80.3%	150	9.6%	1,566
Semi-urban	61	10.0%	538	88.5%	9	1.5%	608
Total	219	10.1%	1,796	82.6%	159	7.3%	2,174

Source: The authors' calculations

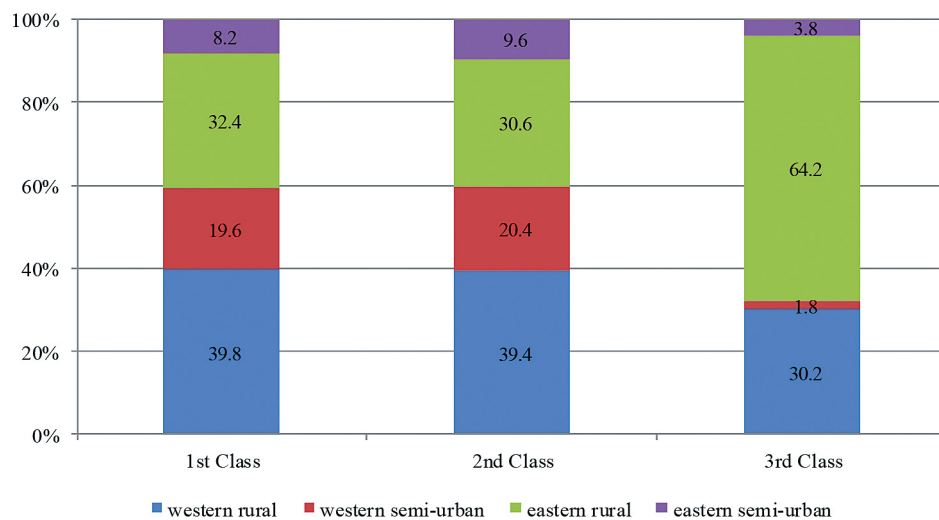


Fig. 1. Participation of gminas by type and group in development classes – infrastructural component, 2014

Source: The authors' calculations

As shown in Table 2, compared to the second group, eastern gminas were characterized by a lower proportion of units from the classes of the high and medium levels of development – and, consequently, an almost three times higher share of gminas in the low development level class. This pattern was observed in both the rural and semi-urban gminas.

Fig. 1 presents the structure of the development classes. The respective shares in classes 1st and 2nd are similar, while in the 3rd Class rural gminas from the eastern region predominate.

Technical infrastructure in the local perspective is primarily associated with the road network and water supply systems, wastewater disposal and gas connections. Unfortunately, the Central Statistical Office does not collect data on roads in gminas, hence this variable could not be included in the study. The average proportion of the population with a water supply connection in western gminas was similar in the analysed classes, though it was a few percentage points higher than in the eastern gminas (Table 3). In general, higher percentages characterised semi-urban gminas, except for the eastern rural communities, where the average share of users of the water supply network in the low development class amounted to 82.4% and was higher by 4 percentage points than in the semi-urban gminas. Differences in the average proportion of the population with a wastewater disposal connection in eastern and west-

ern gminas usually ran to several percentage points. The lowest difference occurred in semi-urban gminas in the 1st Class (4.3 percentage points). The biggest gap was observed in the 3rd Class, where in the western semi-urban gminas, a waste disposal network was used by an average of 22 percentage points more than in rural gminas. In all the classes the indicators for semi-urban gminas were higher than in the rural ones. The gas network in rural areas in Poland is underdeveloped, though the highest average share of people using it occurred in semi-urban gminas in the 1st Class (41.5% in western and 34.5% in eastern ones). Slightly higher shares were noted in eastern rural gminas versus the western ones (2nd and 3rd Classes).

Average gmina's property investment expenditures per capita, an indication of how active a gmina is in investing, were higher in rural gminas than in semi-urban ones. The differences ranged from 32 PLN (3rd Class) to 358 PLN (1st Class). In western gminas they ranged from 85 PLN in the 2nd Class to 126 PLN in the 3rd Class.

The last variable analysed in the infrastructural component, which describes the technical preparation and readiness of a community to provide pre-school education, is the share of children aged 3–5 years attending kindergartens. In 2014, children aged five had to participate in the annual preparation for school. In gminas with a low development

level, the average share of pre-schoolers among 3- to 5-year-olds was approx. 30 percentage points lower than in the other classes. The details are presented in Table 3.

Table 3. Gminas by administrative type and level of infrastructural development (average values, 2014)

Groups of gminas	1 st Class		2 nd Class		3 rd Class	
	rural	semi-urban	rural	semi-urban	rural	semi-urban
Proportion of population with water supply connection						
Western	90.3	93.0	87.7	91.3	86.3	91.7
Eastern	81.7	87.4	80.4	85.8	82.4	78.2
Proportion of population with wastewater disposal connection						
Western	59.4	64.8	39.6	57.3	27.0	53.0
Eastern	40.2	60.5	30.0	49.0	17.0	31.0
Proportion of population with gas connection						
Western	27.4	41.5	15.6	31.6	3.1	5.1
Eastern	24.3	34.5	16.6	28.6	3.4	0.0
Gmina's property investment expenditures per capita						
Western	1,776.6	1,659.7	557.7	472.7	279.7	153.4
Eastern	1,649.1	1,291.0	609.1	525.0	259.2	227.4
Proportion of children aged 3–5 participating in preschool education						
Western	75.9	77.2	67.7	73.9	45.1	39.8
Eastern	73.3	76.3	62.6	68.3	44.6	47.3

Source: The authors' calculations

3.2. Economic development

The economic component included 5 variables:

- national economy entities registered in REGON per 10,000 population,
- the proportion of public entities in all entities registered in Poland's REGON (1) database,
- the gmina's own-source revenues per capita,
- the proportion of registered unemployed in the working-age population,
- the demographic dependency ratio (population of post-working age per 100 population of working age).

Table 4. Structure of development classes of the economic component as determined by Hellwig's method (2014)

Groups of gminas	Economy						Total
	1 st Class		2 nd Class		3 rd Class		
	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	
Western voivodships							
Rural	68	8.1%	774	91.8%	1	0.1%	843
Semi-urban	46	11.1%	367	88.9%	0	0.0%	413
Total	114	9.1%	1141	90.8%	1	0.1%	1256
Eastern voivodships							
Rural	30	4.1%	658	91.0%	35	4.8%	723
Semi-urban	13	6.7%	180	92.3%	2	1.0%	195
Total	43	4.7%	838	91.3%	37	4.0%	918
Total							
Rural	98	6.3%	1432	91.4%	36	2.3%	1566
Semi-urban	59	9.7%	547	90.0%	2	0.3%	608
Total	157	7.2%	1979	91.0%	38	1.7%	2174

Source: The authors' calculations

As presented in Table 4, the eastern gminas were characterised by a lower share of entities from the 1st Class than the other group. The 3rd Class was characterised by a low number of gminas (38 only). It should be emphasised that in this class there was only a single western gmina (with rural status).

Fig. 2 presents the structure of the development classes of the economic component. Western rural gminas participated in the high and medium development classes to a similar extent. The 3rd Class was dominated by rural gminas of the eastern region, representing up to 92% of all units with a low level of development.

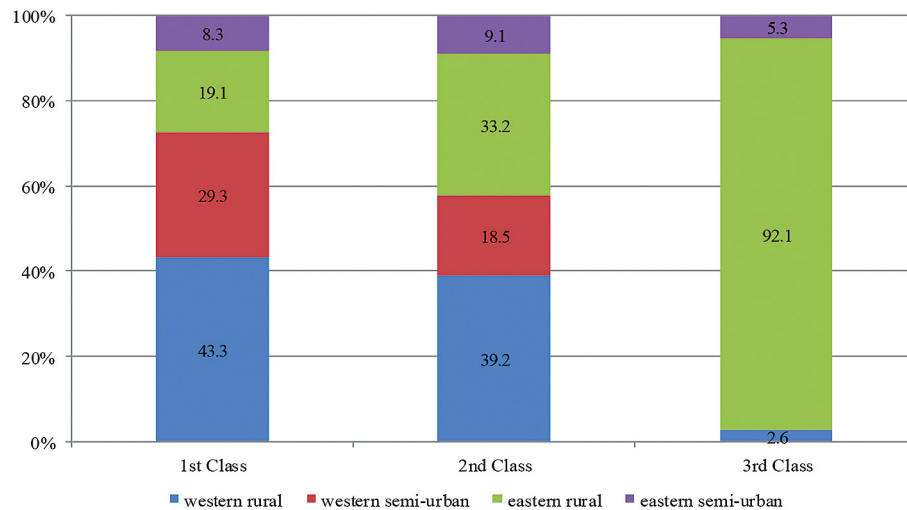


Fig. 2. Participation of gminas by type and group in the development classes – the economic component, 2014 (in%)

Source: The authors' calculations

Regarding the ranking of economic development, there were no western semi-urban gminas in the 3rd Class. In the class of high development, the average number of national economy entities registered in REGON per 10,000 people was higher (by nearly 100) in eastern gminas than in the western ones. The average proportion of public entities in all entities registered in REGON ranged from 2 (eastern semi-urban gminas in the 1st Class) to 5 (eastern rural gminas in the 2nd Class).

Gminas' own revenues provide autonomy in decision-making and create opportunities for more complete coverage of local community needs and raising the standard of services (Sobczyk, 2010). The revenues largely include: local taxes, local fees and participation in income taxes Personal Income Tax (PIT) and Corporate Income Tax (CIT). In addition, the gmina's own revenues include: income earned by the gmina's budgetary units, payments from budgetary establishments and auxiliary

units, interest on the gmina's funds, held in bank accounts, as well as income from the gmina's property. The average gmina's own-source revenues per capita were highest in the 1st Class (rural gminas of both types).

Eastern gminas were characterised by a usually higher average proportion of registered unemployed in the working-age population; the highest, at 12.6%, occurred in the rural gminas of the 3rd Class. Surprisingly, the most unfavourable situation was observed in western rural gminas (19.2%). Another variable, representing the conditions on local labour markets, was the demographic dependency ratio. The highest (and the most critical) percentage was observed in eastern rural gminas (39.3%) in the 3rd Class. In comparison, the average percentage of people of post-working age per 100 population of working age in eastern rural gminas in the 1st Class was similar to the value of western rural gminas in the 3rd Class. The details are presented in Table 5.

Table 5. Gminas by administrative type and level of economic development (average values, 2014)

Groups of gminas	1 st Class		2 nd Class		3 rd Class	
	rural	semi-urban	rural	semi-urban	rural	semi-urban
National economy entities registered in REGON per 10,000 population						
Western	1,186.4	1,160.1	718.0	847.4	587.0	-
Eastern	1,273.9	1,272.2	563.6	704.3	478.2	423.5
Proportion of public entities in all entities registered in REGON						
Western	2.8	4.7	3.7	4.2	3.0	-
Eastern	2.8	2.0	5.0	4.5	4.7	4.7
Gmina's own-source revenues per capita						
Western	3,997.3	2,826.0	1,332.0	1,455.8	776.3	-
Eastern	3,490.2	3,071.3	1,072.0	1,266.2	737.4	560.2
Proportion of registered unemployed in the working-age population						
Western	5.9	6.6	7.9	8.5	19.2	-
Eastern	7.2	6.5	9.9	10.2	12.6	10.0
Demographic dependency ratio (population of post-working age per 100 population of working age)						
Western	24.0	26.9	26.0	27.3	27.7	-
Eastern	27.1	28.6	29.5	29.2	39.3	33.5

Source: The authors' calculations

3.3. Social development

The last of the components, characterising local society, included following 5 variables:

- population density (population per 1 square kilometre),
- the change in the number of inhabitants per 1,000 population,

- the proportion of councillors with university degrees,
- the proportion of councillors with high professional qualifications,
- foundations, associations and social organisations per 10,000 population.

As shown in Table 6, participation of semi-urban gminas of the 1st Class in the two analysed groups was slightly different. More (by 8.4 percentage points) gminas characterised the western group of voivodships.

Table 6. Structure of development classes of social component by Hellwig's method (2014)

Groups of gminas	Society						Total
	1 st Class		2 nd Class		3 rd Class		
	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	
Western voivodships							
Rural	85	10.5%	648	79.7%	80	9.8%	813
Semi-urban	100	24.0%	300	72.1%	16	3.8%	416
Total	185	15.1%	948	77.1%	96	7.8%	1,229
Eastern voivodships							
Rural	83	11.0%	490	65.1%	180	23.9%	753
Semi-urban	30	15.6%	147	76.6%	15	7.8%	192
Total	113	12.0%	637	67.4%	195	20.6%	945
Total							
Rural	168	10.7%	1,138	72.7%	260	16.6%	1,566
Semi-urban	130	21.4%	447	73.5%	31	5.1%	608
Total	298	13.7%	1,585	72.9%	291	13.4%	2,174

Source: The authors' calculations

On the other hand, at 61.9% there was a significant share of eastern rural gminas in the 3rd Class

of development (Fig. 3).

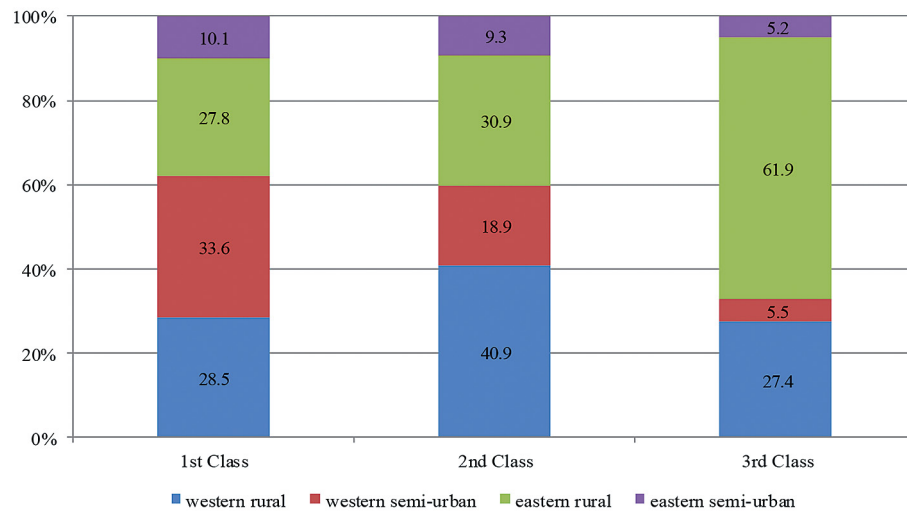


Fig. 3. Participation of gminas by type and group in development classes – social component, 2014 (in %)

Source: The authors' calculations

The first of the analysed variables was population density. The low population density creates very negative development conditions. They affect both investment undertakings connected with the development of technical and social infrastructure in the area, as well as actions aimed directly at developing and improving the quality of human and social capital (Churski, 2013). Eastern semi-urban gminas in the extreme development classes were on average more populated than the western ones (234 people per square km versus 207 in the 1st Class and 44 versus 42 in the 3rd Class). Also, the change in the number of inhabitants per 1,000 people was higher in eastern semi-urban gminas than in the western ones (4.4 versus 3.0). Western rural gminas presented the best average value for the variable (12.5) in the 1st Class and the only positive value in the 2nd Class. In the 3rd Class of development each of the values was negative, but the demographic situation in eastern gminas was much worse than in the western ones.

Another variable was the proportion of councillors with university degrees. Higher average val-

ues were observed in semi-urban gminas. In the 1st Class, a more advantageous situation characterised the eastern gminas, especially semi-urban ones, where on average 58% of councillors had a university diploma. Values in the 3rd Class were almost three times lower than the values in the 1st Class. Again, the average proportion of councillors with high professional qualifications was four or five times lower in the weakest class of development than in the 1st Class. The semi-urban gminas turned in the strongest values (47.5% eastern and 45.6 western ones).

The last variable analysed represented local social activeness and concerned the number of foundations, associations and social organisations per 10,000 people (see: Rakowska, 2011). Average values in the 1st and the 2nd Classes were quite similar, while the number of entities in the last class was lower by about 10 per 10,000 population. Such activeness was slightly higher in eastern gminas, proving that their inhabitants more aware of local problems. Details have been presented in Table 7.

Table 7. Gminas by administrative type and level of social development (average values, 2014)

Groups of gminas	1 st Class		2 nd Class		3 rd Class	
	rural	semi-urban	rural	semi-urban	rural	semi-urban
Population density (population per 1 square kilometre)						
Western	194.7	207.4	66.8	78.0	44.2	41.8
Eastern	158.5	234.0	43.4	74.2	36.4	44.0
Change in number of inhabitants per 1,000 population						
Western	12.5	3.0	1.7	-2.1	-5.9	-7.7
Eastern	9.4	4.4	-1.8	-3.3	-8.3	-9.1
Proportion of councillors with university degrees						
Western	46.8	53.6	28.9	39.7	17.0	20.6
Eastern	48.1	58.0	29.0	36.6	15.8	22.2
Proportion of councillors with high professional qualifications						
Western	38.8	45.6	21.3	32.1	9.4	15.1
Eastern	37.9	47.5	18.4	27.9	6.8	14.7
Foundations, associations and social organisations per 10,000 population						
Western	30.1	31.8	30.3	29.3	22.6	21.2
Eastern	34.2	32.3	32.0	30.5	24.7	23.9

Source: The authors' calculations

3.4. Socio-economic development of rural and semi-urban gminas in Poland

Fifteen variables, presented above and comprising three larger components: infrastructural, economic and social, were used to construct a general ranking of socio-economic development of rural and semi-urban gminas in Poland. A comparison of percentages in the 1st Class shows that they range

from 5.4% (eastern gminas) to 12.7% (western gminas). Twice more semi-urban gminas and almost three times more rural gminas at the high development level were observed in western voivodships. Moreover, only 2% of the gminas in the 3rd Class were western ones (versus 13.1% of eastern gminas). Only 1 semi-urban gmina in the western group had a low level of development. As much as 15.8% of the eastern rural gminas fell in to the 3rd Class. The details are presented in table 8.

Table 8. Structure of development classes in the general ranking by Hellwig's method (2014)

Groups of gminas	1 st Class		2 nd Class		3 rd Class		Total
	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	
Western voivodships							
Rural	94	11.2%	725	86.0%	24	2.8%	843
Semi-urban	66	16.0%	346	83.8%	1	0.2%	413
Total	160	12.7%	1,071	85.3%	25	2.0%	1,256
Eastern voivodships							
Rural	34	4.7%	575	79.5%	114	15.8%	723
Semi-urban	16	8.2%	173	88.7%	6	3.1%	195
Total	50	5.4%	748	81.5%	120	13.1%	918
Total							
Rural	128	8.2%	1,300	83.0%	138	8.8%	1,566
Semi-urban	82	13.5%	519	85.4%	7	1.2%	608
Total	210	9.7%	1,819	83.7%	145	6.7%	2,174

Source: The authors' calculations

As shown in Fig. 4, western gminas dominated in the classes of high (76.2%) and medium development (58.9%). Eastern gminas accounted for as much as 82.7% of all the objects included in the 3rd Class. The eastern rural gminas had the largest

percentage of gminas in the class of low socio-economic development level. This confirms the hypothesis that there would be more eastern rural gminas in the low-level development class than from the other gminas.

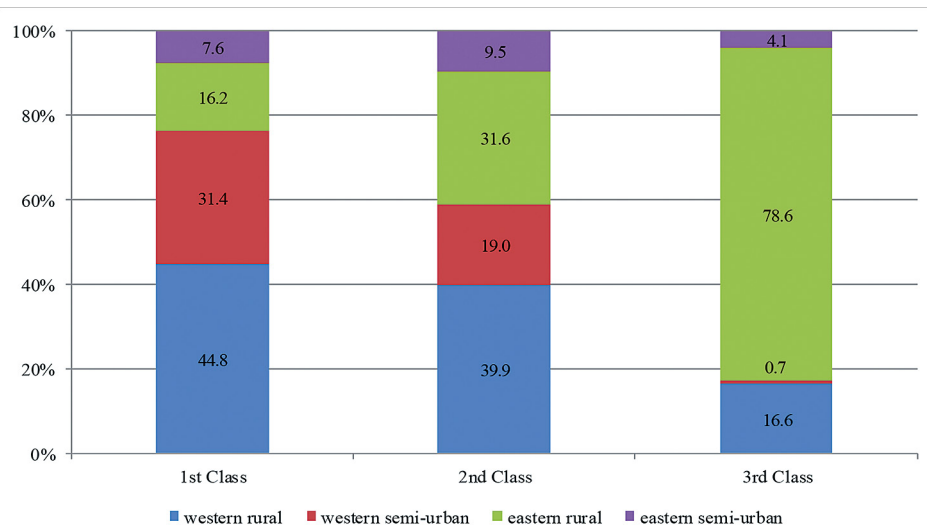


Fig. 4. Participation of gminas by type and group in development classes – general ranking, 2014 (in %)

Source: The authors' calculations

The top ten western gminas in the general classification of socio-economic development level took places 1–3, 5–10 and 13. Three of the gminas were semi-urban. Four gminas were located in Zachodniopomorskie Voivodship, three of which were on the Baltic Sea (Rewal, Dziwnów and Mielno) and the last of which, Nowe Warpno, was a part of the Świnoujście suburban area, on the German-Polish border. Kleszczów (Łódzkie Voivodship) was the richest gmina in Poland by revenue per capita, thanks mostly to the enormous Bełchatów coal mine and power station. The second gmina in Łódzkie, Rząśnia, is situated in close neighbourhood to Kleszczów. Ożarówice gmina lays on the outskirts of Katowice agglomeration and is home to an international airport. It is a part of the most urbanised voivodship in Poland (Śląskie) and the Silesia Metropolis (see: Krzysztofik et. al. 2011). Polkowice is a semi-urban gmina attractive both for tourists and investors. It is the seat of the district Polkowice. Two other gminas – Kobierzyce and Suchy Las – benefit from their close proximity to the capital cities of two voivodships: Dolnośląskie and

Wielkopolskie (table 9). Gminas included in the 3rd Class were situated at a distance from large town or cities, main routes and centres of industry and entrepreneurship. In this group there were no gminas from 3 voivodships: Dolnośląskie, Śląskie and Opolskie. The ten “worst” places filled by western gminas ranged from 2,097 to 2,158, which shows that, compared to the eastern gminas, their socio-economic level was not so weak.

The top ten eastern gminas in the general classification of socio-economic development level took some of the places between 4 and 27. This proves that the highest places in the ranking were taken usually by western gminas. Nine out of ten gminas were located in Mazowieckie Voivodship, in Warsaw's suburban area (see: Drejerska et al., 2014). The other gmina – Stawiguda – was a part of the Olsztyn suburban area (the capital city of Warmińsko-Mazurskie Voivodship). Eastern gminas took the last ten places. And again, there were gminas situated at a distance from economic and social centres of regions as well as major transport routes (Table 10).

Table 9. Extreme western gminas in the general ranking* of the level of socio-economic development (2014)

Position	Gmina	Powiat	Voivodship
1st Class			
1	Kleszczów (r)	Bełchatowski	Łódzkie
2	Rewal (r)	Gryficki	Zachodniopomorskie
3	Dziwnów (s-u)	Kamieński	Zachodniopomorskie
5	Nowe Warpno (s-u)	Policki	Zachodniopomorskie
6	Rząśnia (r)	Pajęczański	Łódzkie
7	Ożarówce (r)	Tarnogórski	Śląskie
8	Polkowice (s-u)	Polkowicki	Dolnośląskie
9	Mielno (r)	Koszaliński	Zachodniopomorskie
10	Kobierzyce (r)	Wrocławski	Dolnośląskie
13	Suchy Las (r)	Poznański	Wielkopolskie
3rd Class			
2097	Dąbie (s-u)	Kolski	Wielkopolskie
2099	Kodrąb (r)	Radomszczański	Łódzkie
2107	Bytoń (r)	Radziejowski	Kujawsko-pomorskie
2117	Bedlno (r)	Kutnowski	Łódzkie
2128	Topólka (r)	Radziejowski	Kujawsko-pomorskie
2129	Aleksandrów (r)	Piotrkowski	Łódzkie
2132	Rzepiennik Strzyżewski (r)	Tarnowski	Małopolskie
2133	Łęczyca (r)	Łęczycki	Łódzkie
2153	Wąpielsk (r)	Rypiński	Kujawsko-pomorskie
2158	Poświętne (r)	Opoczyński	Łódzkie

r – rural gminas, s-u – semi-urban gminas

* the ranking included 2174 gminas and was based on 15 variables

Source: The authors' calculations

Table 10. Extreme eastern gminas in the general ranking* of the level of socio-economic development (2014)

Position	Gmina	Powiat	Voivodship
1st Class			
4	Lesznów (r)	Piaseczyński	Mazowieckie
11	Michałowice (r)	Pruszkowski	Mazowieckie
12	Nadarzyn (r)	Pruszkowski	Mazowieckie
15	Konstancin-Jeziorna (s-u)	Piaseczyński	Mazowieckie
18	Stare Babice (r)	Warszawski	Mazowieckie
20	Piaseczno (s-u)	Piaseczyński	Mazowieckie
23	Ożarów Mazowiecki (s-u)	Warszawski	Mazowieckie
24	Raszyn (r)	Pruszkowski	Mazowieckie
26	Stawiguda (r)	Olsztyński	Warmińsko-mazurskie
27	Nieporęt (r)	Legionowski	Mazowieckie
3rd Class			
2165	Krasnopol (r)	Sejneński	Podlaskie
2166	Ostrów Lubelski (s-u)	Lubartowski	Lubelskie
2167	Nurzec-Stacja (r)	Siemiatycki	Podlaskie
2168	Łopiennik Górny (r)	Krasnostawski	Lubelskie
2169	Dubicze Cerkiewne (r)	Hajnowski	Podlaskie
2170	Dzierzgowo (r)	Mławski	Mazowieckie
2171	Grodzisk (r)	Siemiatycki	Podlaskie
2172	Czyże (r)	Hajnowski	Podlaskie
2173	Braniewo (r)	Braniewski	Warmińsko-mazurskie
2174	Lutocin (r)	Żuromiński	Mazowieckie

r – rural gminas, s-u – semi-urban gminas

* the ranking included 2174 gminas and was based on 15 variables

Source: The authors' calculation

The results of the grouping of gminas by their level of socio-economic development using Hellwig's method are shown in Fig. 5.

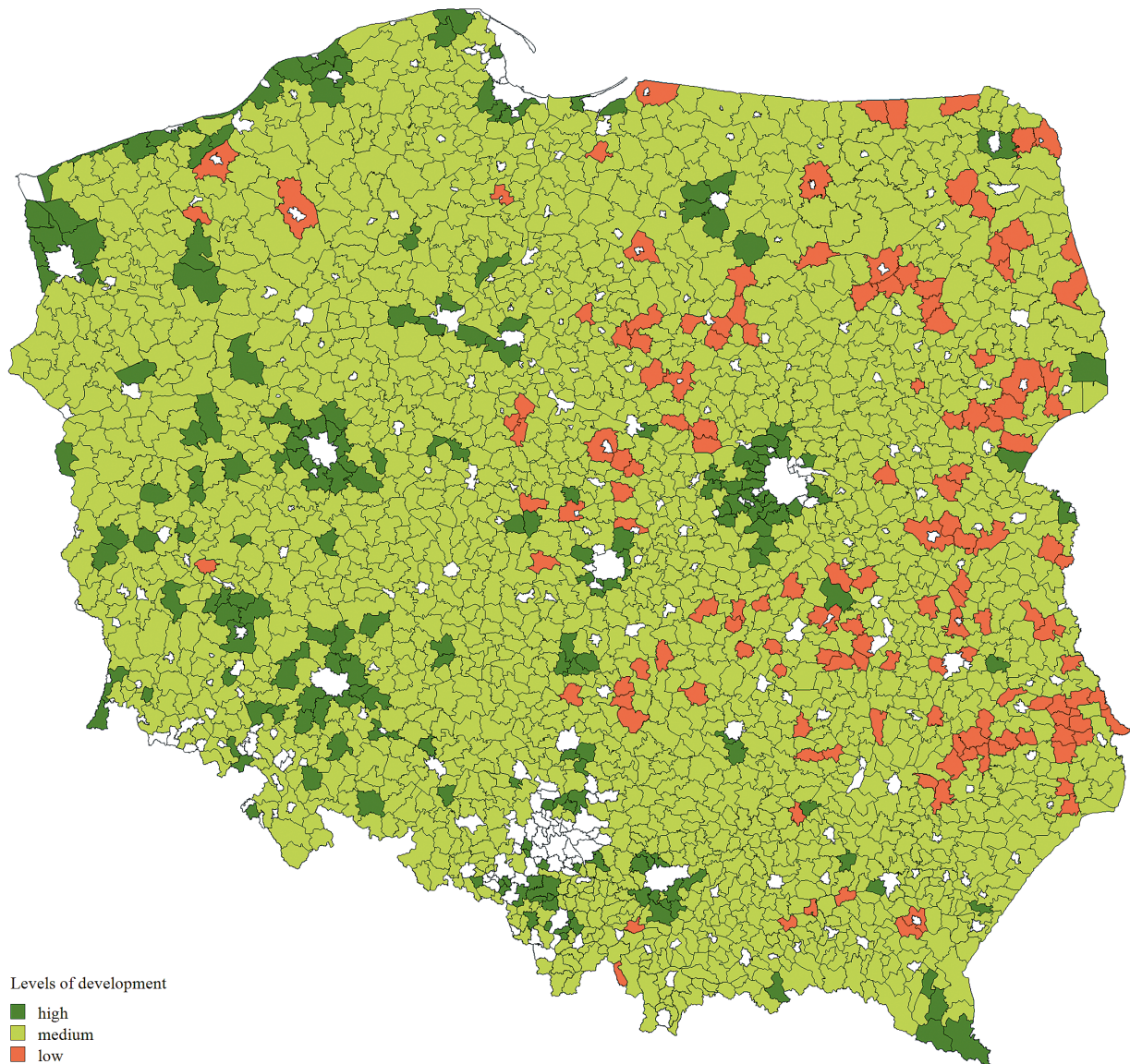


Fig. 5. Spatial structure of development classes of rural and semi-urban gminas* using Hellwig's method, 2014

Explanation: * white spaces = urban gminas not included in the analysis

Source: The authors' calculations

As presented in Fig. 5, high-level suburban areas of Warsaw, Szczecin, Poznań, Wrocław and Kraków can be seen. The Baltic Sea coast as well as main routes connecting Germany and Poland have also been good stimulants for local development. Low-level gminas are mostly situated in the peripheries of the eastern voivodships.

4. Conclusions

The results show that there are pronounced differences in Polish rural and semi-urban gminas regarding their level of socio-economic development. There is a clear boundary between the country's

western and eastern voivodships, including Mazowieckie Voivodship. An exception is the suburban area of Warsaw. The hypothesis was confirmed: there were more eastern rural gminas in the low-level development class than there were from the other gminas. Average gmina's property investment expenditures per capita, which were higher in rural gminas than in semi-urban ones, indicates that the former are more active investors than the latter. This proves that to some extent, local authorities are aware of weak socio-economic situation; and they have been making efforts to improve this unfavourable situation.

The study brings some problem areas to the fore; however, in-depth research and long-term observations are necessary to carry out a precise diagnosis of the reasons for the poor socio-economic situation of gminas and to propose appropriate development measures to address them.

Note

(1) The national registry of businesses in Poland.

References

- Balicki, A.**, 2009: Statystyczna analiza wielowymiarowa i jej zastosowania społeczno-ekonomiczne (Statistical multidimensional analysis and its socio-economic applications – in Polish), Gdańsk: Wydawnictwo Uniwersytetu Gdańskiego.
- Bański, J.**, 2013: Polska wieś w perspektywie 2050 roku (Polish countryside in a 2050 perspective – in Polish). *Studia Obszarów Wiejskich*, Vol. 33, Warszawa: IGiPZ PAN.
- Biegańska, J.**, 2013: Rural areas in Poland from a demographic perspective. In: Szymańska, D. and Chodkowska-Miszczuk, J. editors, *Bulletin of Geography. Socio-economic Series*, No. 20, Toruń: Nicolaus Copernicus University Press, pp. 7–22. DOI: <http://dx.doi.org/10.2478/bog-2013-0008h>
- Brodziński, Z.**, 2011: Stymulowanie rozwoju obszarów wiejskich na poziomie lokalnym na przykładzie gmin województwa warmińsko-mazurskiego (Stimulating of rural development at the local level on the example the Warmińsko-Mazurskie voivodship – in Polish), Warszawa: Wydawnictwo SGGW.
- Brol, R.**, 1998: Rozwój lokalny – nowa logika rozwoju gospodarczego (Local development – a new logic of economic development – in Polish). In: *Gospodarka lokalna w teorii i w praktyce, Prace Naukowe Akademii Ekonomicznej we Wrocławiu*, No. 785, pp. 11–15.
- Churski, P.**, 2013: Szanse i zagrożenia rozwoju obszarów peryferyjnych. Przykład Bieszczad (Chances for and threats to the development of peripheral areas. An example of the Bieszczady Mountains – in Polish). In: Małuszyńska, E. editor, *Dynamika, cele i polityka zintegrowanego rozwoju regionów*, Poznań: Bogucki Wydawnictwo Naukowe, pp. 225–240.
- Czapiewski, K.**, 2010: Koncepcja wiejskich obszarów sukcesu społeczno-gospodarczego i ich rozpoznanie w województwie mazowieckim (Concept of socio-economic successful rural areas and their identification in the Mazovia Region – in Polish). *Studia Obszarów Wiejskich*, Vol. 22.
- Drejerska, N., Chrzanowska, M. and Pomianek, I.**, 2014: Strefa podmiejska Warszawy, Wybrane zagadnienia (Warsaw suburban zone. Selected issues – in Polish), Warszawa: Wydawnictwo SGGW.
- Flaga, M.**, 2010: Demographic consequences of suburbanization in selected towns in the eastern borderlands of Poland. In: Szymańska, D. and Biegańska, J. editors, *Bulletin of Geography. Socio-economic Series*, Toruń: Nicolaus Copernicus University, No. 14, pp. 5–22. DOI: <http://dx.doi.org/10.2478/v10089-010-0011-4>
- Heffner, K. and Rosner, A.**, 2002: Czynniki specyficzne wywierające wpływ na potencjał rozwojowy obszarów wiejskich (Specific factors affecting the development potential of rural areas – in Polish). In: Rosner, A. editor, *Wiejskie obszary kumulacji barier rozwojowych*, Warszawa: IRWiR PAN, pp. 133–152.
- Hellwig, Z.**, 1968: Zastosowanie metody taksonomicznej do typologicznego podziału krajów ze względu na poziom rozwoju oraz zasoby i strukturę wykwalifikowanych kadr (The application of the taxonomic method to the typological division of a countries due to their level of development, resources and structure of qualified personnel – in Polish). In: *Przegląd Statystyczny*, No. 4, pp. 307–326.
- Koźuch, A.**, 2006: Instrumenty zarządzania rozwojem lokalnym (Instruments of local development man-

- agement – in Polish). In: *Zeszyty Naukowe Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*, Vol. 8, Issue 4, pp. 177–181.
- Krzysztofik, R., Runge, J. and Spórna, T.**, 2011: Delimitacja regionu Górnośląsko-Zagłębiowskiej Metropolii „Silesia” (Delimitation of the „Silesia” Metropolis – in Polish), Uniwersytet Śląski, Wydział Nauk o Ziemi, Katedra Geografii Ekonomicznej, Sosnowiec.
- Local Data Bank, Central Statistical Office, Poland, available at: http://www.stat.gov.pl/bdl/app/strona.html?p_name=indeks
- Makkonen, T.**, 2011: Innovation and regional socio-economic development – evidence from the Finnish local administrative units. In: Szymańska, D. and Biegańska, J. editors, *Bulletin of Geography Socio-economic Series*, No. 15, Toruń: Nicolaus Copernicus University Press, pp. 27–42. DOI: <http://dx.doi.org/10.2478/v10089-011-0002-0>
- Mikhaylova, S., Budazhanayeva, M., Sarycheva, T. and Bakumenko, L.**, 2015: Typology of Rural Territories of the Russian Federation Subjects. In: *Mediterranean Journal of Social Sciences*, Vol. 6, No. 3, S7, pp. 205–212. DOI: <http://dx.doi.org/10.5901/mjss.2015.v6n3s7p205>
- Mohiuddin, S. and Hashia, H.**, 2012: Regional socio-economic disparities in the Kashmir Valley (India) – a geographical approach. In: Szymańska, D. and Biegańska, J. editors, *Bulletin of Geography. Socio-economic Series*, No. 18, Toruń: Nicolaus Copernicus University Press, pp. 85–98. DOI: <http://dx.doi.org/10.2478/v10089-012-0021-5>
- Parysek, J.**, 1995: Rola samorządu terytorialnego w rozwoju lokalnym (The role of territorial self-government in local development – in Polish). In: Parysek, J. editor, *Rozwój lokalny: zagospodarowanie przestrzenne i nisze atrakcyjności gospodarczej*, Warszawa: PWN, pp. 37–61.
- Parysek, J. and Wojtasiewicz, L.**, 1979: Metody analizy regionalnej i metody planowania regionalnego (Methods of regional analysis and methods of regional planning – in Polish), Warszawa: PWN.
- Pomianek, I.**, 2012: Demographic determinants of development of Warsaw suburban zone communes. In: *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*, Vol. 14, Issue 6, pp. 231–235.
- Rakowska, J.**, 2011: Zróżnicowanie poziomu rozwoju gmin Polski Wschodniej (Differentiation of development level of communes in Eastern Poland – in Polish). In: *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*, Vol. XIII, No. 2, pp. 329–397.
- Rosner, A.**, 2012: Zmiany rozkładu przestrzennego zaludnienia obszarów wiejskich. Wiejskie obszary zmniejszające zaludnienie i koncentrujące ludność wiejską (Variations in spatial distribution of population in rural areas. Rural areas experiencing depopulation and concentration of rural population – in Polish), Warszawa: IRWiR PAN.
- Sobala-Gwosdz, A.**, 2005: Ośrodki wzrostu i obszary stagnacji w województwie podkarpackim (Growth centres and areas of depression in Podkarpackie Region – in Polish), Kraków: Instytut Geografii i Gospodarki Przestrzennej Uniwersytetu Jagiellońskiego.
- Sobczyk, A.**, 2010: Rozwój lokalny – wybrane problemy finansowania (Local development – specific problems in financing – in Polish). In: *Zeszyty Naukowe SGGW – Ekonomika i Organizacja Gospodarki Żywnościowej*, 81, pp. 125–136.
- Stanny, M.**, 2013: Przestrzenne zróżnicowanie rozwoju obszarów wiejskich w Polsce (Spatial diversification in rural development in Poland – in Polish), Warszawa: IRWiR PAN.
- Strahl, D.**, 2006 editor: Metody oceny rozwoju regionalnego (Methods of assessment of regional development – in Polish), Wrocław: Wydawnictwo Akademii Ekonomicznej we Wrocławiu.
- Szajnowska-Wysocka, A.**, 2009: Theories of regional and local development – abridged review. In: Szymańska, D. and Biegańska, J. editors, *Bulletin of Geography Socio-economic Series*, 12, Toruń: Nicolaus Copernicus University Press, pp. 75–90. DOI: <http://dx.doi.org/10.2478/v10089-009-0005-2>
- Sztando, A.**, 1998: Oddziaływanie samorządu lokalnego na rozwój lokalny w świetle ewolucji modeli ustrojowych gmin (The impact of local government on local development in the light of evolution of constitutional gminas’ models – in Polish). In: *Samorząd Terytorialny*, No. 11, pp. 12–29.
- OECD Urban Policy Reviews, OECD Urban Policy Reviews, Chile 2013.
- Uphoff, N.**, 1992: Local Institutions and Participation for Sustainable Development. *Gatekeeper Series*, No. 31, London: IIED.

