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CHANGES IN THE LEVEL OF DEVELOPMENT OF URBAN AND RURAL COMMUNES IN THE ŚWIĘTOKRZYSKIE PROVINCE

ZMIANY POZIOMU ROZWOJU GMIN MIEJSKO-WIEJSKICH W WOJEWÓDZTWIE ŚWIĘTOKRZYSKIM

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Summary: Local development is a process of interrelated economic, social, political or cultural changes taking place in the local socio-territorial system. The aim of the article is to assess the level of development of urban-rural communes and determine its spatial diversity using a synthetic measure. Data from the Local Data Bank of the Central Statistical Office for 2012, 2014 and 2017 were used as the source material. The development of the commune is consists of many events and processes belonging to various areas of life of the local community. The problem of development is important in the context of small areas and communities such as the urban-rural commune. The best urban-rural communes in Świętokrzyskie Province, regardless of the method of determining the synthetic measure, are: Połaniec, Daleszyce, Morawica, Busko-Zdrój, and Końskie. Their position was shaped by: the number of employees, of business entities, of natural persons conducting economic activity and financial situation.

Keywords: development, urban-rural commune, synthetic measure.

Streszczenie: Rozwój lokalny to proces powiązanych ze sobą zmian gospodarczych, społecznych, politycznych lub kulturowych zachodzących w lokalnym systemie społeczno-terytorialnym. Cele artykułu stanowią ocena poziomu rozwoju gmin miejsko-wiejskich i określenie jego zróżnicowania przestrzennego za pomocą miary syntetycznej. Jako materiał źródłowy wykorzystano dane z Banku Danych Lokalnych GUS za lata 2012, 2014 i 2017. Rozwój gminy składa się z wielu wydarzeń i procesów należących do różnych dziedzin życia społeczności lokalnej. Problem rozwoju jest ważny w kontekście małych obszarów i społeczności, takich jak gminy miejsko-wiejskie. W województwie świętokrzyskim najlepsze rezultaty, bez względu na metodę wyznaczania miary syntetycznej, uzyskały gminy miejsko-wiejskie: Połaniec, Daleszyce, Morawica, Busko-Zdrój i Końskie. Ich pozycję kształtowały: liczba pracowników, podmiotów gospodarczych, osób fizycznych prowadzących działalność gospodarczą i sytuacja finansowa.

Słowa kluczowe: rozwój, gmina miejsko-wiejska, miara syntetyczna.

1. Introduction

Commune self-government in Poland is an independent economic entity, having a range of freedom in deciding on endogenous resources, common property and the implementation of public tasks. The foundation of their implementation are local government authorities and administration as well as own property and finances [Ustawa z dnia 8 marca 1990 r.]. The functioning and development of communes depends on many factors that determine the development perspectives of territorial communities. Basically, local development factors can be divided into economic, social, technical and technological as well as ecological. Geographic space factors play a key role in shaping the character, scale and dynamics of development.

Local development is a process of interrelated changes (economic, social, political or cultural) taking place in the local socio-territorial system. These changes can be substitutive or complementary; they can also be mutually exclusive [Szewczuk 2011, pp. 21-29]. The development of the commune is multifaceted. It consists of many events, phenomena and processes belonging to various areas of life of the local community, which means that they should be analysed and evaluated together [Dziekański 2018]. It can be characterized on the basis of variables depicting five areas: demographic situation and the labour market, social potential, economic structure, technical infrastructure as well as the condition and protection of the natural environment. The problem of development is particularly important in the context of small areas and communities such as a commune.

Development processes take place in a specific space. Its spatial diversity is associated with historical conditions, geographical location, different economic structure and socio-cultural issues.

2. Purpose and research method

The aim of the article is to assess the level of development of urban-rural communes and determine its spatial diversity using a synthetic measure. Data from the Local Data Bank of the Central Statistical Office for 2012, 2014 and 2017 were used as the source material. This is due to relatively limited access to detailed and homogeneous data.

The assessment of spatial diversity of urban and rural communes development in the Świętokrzyskie Province was carried out in the following stages:

- 1) determination of destimulant and stimulant in a selected set of variables, assessment of the degree of variability and analysis of an inverse correlation matrix [Młodak 2006; Zeliaś 2000],
- 2) normalization of feature values (zeroed unitarisation method) [Wysocki, Lira 2005],
- 3) calculating the value of a synthetic measure of the development situation [Bury, Dziekański 2013, pp. 220-248],
- 4) linear ordering of objects and analysis of results [Dziekański 2016, pp. 79-91; Dziekański 2017].

Selected variables were determined on the basis of substantive, statistical or data availability criteria and they have the character of stimulant and destimulant [Grabiński, Wydymus, Zeliaś 1989; Wysocki 1996]. Variables due to variation index (> 0.10) and over-correlated (according to the inverse correlation matrix method) were eliminated from the study [Młodak, Józefowski, Wawrowski 2016; Śmiłowska 1997].

In the next stage, they were subjected to the normalization procedure by the method of zeroed unitarisation. Stimulants were unified according to the formula:

$$z_{ij} = \frac{x_{ij} - \min_i x_i}{\max_i x_i - \min_i x_i}, \quad (1)$$

while the destimulant:

$$z_{ij} = \frac{\max_i x_i - x_{ij}}{\max_i x_i - \min_i x_i}, \quad (2)$$

where: $i = 1, 2, \dots, N$, $j = 1, 2, \dots, p$ (N is the number of objects (communes), p – the number of features); Z_{ij} – denotes the unitary value of the characteristic for the examined unit, x_{ij} – denotes the value of the j -th characteristic for the examined unit, \max – the maximum value of the j -th characteristic.

Then a synthetic measure based on distance in real space was calculated with Euclidean metric according to the formula:

$$OE_{it} = \sqrt{\frac{\sum_{j=1}^p (1 - z_{ijt})^2}{p}} \quad (3)$$

If the value of measure (3) were equal to 0, then the given commune would have the maximum value of each of the stimulants tested. The higher the value of the measure, the worse the assessment of the commune's development [Tokarski 2005; Walesiak 2005; Wysocki, Lira 2005, pp. 106-118].

The synthetic measure was determined according to the non-model method. It allows ordering the set of analysed objects according to the level of the phenomenon studied. It was determined using the formula:

$$s_i = \frac{1}{p} \sum_{j=1}^p z_{ij} \quad (i = 1, 2, \dots, p), \quad (4)$$

where: s_i – synthetic measure in the examined period, z_{ij} – features of the structure of the synthetic indicator, p – number of features. The indicator takes the value from the range [0,1]. A value closer to unity means that the object is characterized by a high level of the analysed phenomenon, while when the values are closer to 0 – the object is less developed in the examined respect.

Finally, the examined objects were divided into four quartile groups [Dziekański 2015; Zeliaś, Malina 1997, pp. 261-279]. The size of the indicator in the first quartile group means a better unit and accordingly the lower group, the units are weaker. Finally, the results were analysed and conclusions were formulated [Dziekański 2017]. The mutual compliance of the obtained results was also verified and a synthetic measure scatter chart was presented [Wysocki 1996; Zeliaś, Malina 1997].

3. Determinants of the commune development process

Regions are complex systems which evolve over time showing a certain productive specialization, as well as an occupation of space which is translated into densities, land uses and disparate growths. These phenomena, although generally consolidated over time, can be affected by natural events, which cause disruptions and changes in the referred spatial or economic evolution [Prada-Trigo, Solis 2018].

The commune as a local government unit can actively influence the quality of life of the local community through the use of planning, financial, economic, social and information instruments [Piontek 2006]. The rational use of internal and external development factors is the basis for local development for which the local

government is responsible, implementing its tasks to meet the collective needs of the community [Ustawa z dnia 5 czerwca 1998 r.].

Socio-economic development is spatially diverse, which is associated with historical conditions, geographical location, different economic structure and socio-cultural issues [Milek 2018, pp. 39-56]. According to M. Adamowicz, local development includes complex processes which consist in various goals and interests of many business entities, and the essence of development is therefore to achieve compliance between individual goals and the overall goal of developing a territorial unit [Adamowicz 2003, p. 13]. Socio-economic development is one of the key tasks facing local authorities. Shaping development can be defined as the way in which development factors influence changes in individual development areas, as well as creating observable social, economic, ecological and spatial effects [Markowski 1996].

Endogenous factors (local economic base) directed at servicing the internal needs of the region are recognized as a system of interacting elements. The internal conditions of the unit are the basis for its development, are inherent in the local system and result from the location rent (from localized resources, economic and social potential or favorable environmental and spatial conditions as well as infrastructural possibilities) [Korenik 1999, p. 38; Zakrzewska-Półtorak 2010, pp. 11-20].

Sources of communal development inequalities result from the spatial diversity of, among others: natural conditions, transport accessibility, concentration of plants of various industries and services, infrastructure equipment, access to resources and knowledge. The factors of local development are not changeable in time, therefore they should be subject to continuous and ongoing analysis [Prusek, Kudełko 2009, p. 6]. Development is perceived on many levels, and at the same time, it is a focused process, which refers to specific activities of the community and local authorities, as well as other entities operating in the commune. It occurs as a result of the accumulation, creation and enlargement of the real dimensions of the social product with simultaneous changes in institutions and economic relations [Brol 2006].

4. The level of development of urban-rural communes in the Świętokrzyskie Province

The municipalities comprise a multidimensional process implemented in a set of various elements making up the demographic, economic, financial and environmental aspects, as well as the links between these elements of the multidimensional space of an object. The socio-economic development of communes was characterized on the basis of variables illustrating five areas: financial situation, economic potential, demographic situation and the labour market, social potential, technical infrastructure as well as the condition and protection of the natural environment [Dziekański 2017; 2018; Rosner 2010; Stanny, Strzelczyk 2015].

Table 1 summarizes the values of the synthetic measure for the development of urban and rural communes in the Świętokrzyskie Voivodeship in 2010 and 2017 in subsequent quartile groups. The first group includes municipalities with the highest entrepreneurship potential; the last group includes the weakest.

In 2010 the measure of development of S_i ranged from 0.37 (Skalbmierz, the weakest unit) to 0.51 (Połaniec, the best unit); in 2017 from 0.39 (Zawichost, Skalbmierz, Koprzywnica, Działoszyce) to 0.51 (Daleszyce, Morawica) respectively. The values of the OE development measure ranged from 0.57 (Połaniec, the best unit) to 0.7 (Skalbmierz, the weakest unit) in 2010 and from 0.56 (Daleszyce) to 0.70 (Działoszyce) in 2017 (Table 1).

The best units in the studied area, regardless of the method of determining the synthetic measure, are Połaniec, Daleszyce, Morawica, Busko-Zdrój, and Końskie. At the other end were Działoszyce, Zawichost, Skalbmierz, Koprzywnica, Ćmielów, and Kazimierza Wielka. Units with the best development potential were characterized by high values, among others the number of employed, business entities, natural persons conducting economic activity, or synthetic measure in terms of financial situation, infrastructure and entrepreneurship. It is worth emphasizing that the analyses conducted by Stanny [2013] and Dziekański [2016; 2017] show that the most important factor in the development of small areas are local finances.

In order to assess the differences in the level of development of urban-rural communes in the Świętokrzyskie Province in the analysed period and to determine whether these differences have changed, among others, arithmetic mean, standard deviation, range and minimum and maximum value of the synthetic measure.

Measures of spatial diversity point to the constant dispersion of urban-rural communes in the Świętokrzyskie Province. The average value of the synthetic measure in 2010 was 0.43 and in 2017 0.44 (for S_i) and 0.63 in 2010 and 0.63 in 2017 (for OE). In 2017, compared to 2010, one can indicate the stability of the studied area according to the standard deviation (0.04-0.04 for S_i ; 0.04-0.04 for OE). The variation stability is indicated by the range (0.14-0.13, 2010-2017; S_i 0.13-0.14 OE), also the classic coefficient of variation, which in the studied period was 0.09-0.08 (S_i ; 2010-2017) and 0.06-0.06 (OE ; Table 2).

Figure 1 presents correlograms describing the relationship between the synthetic measure and its change. The correlation value was 0.124 (for S_i) and 0.177 (for OE). This may indicate that the spatial diversity of urban and rural commune's development was stable. The group of prominent units includes: Połaniec, Morawica, Daleszyce, and Skalbmierz (Figure 1).

Correlation coefficients in the case of the methods used indicate a high similarity of the results achieved in relation to 2010 and 2017. The correlation coefficient was 0.864 (for S_i), 0.883 (for OE), which may indicate convergence in the studied area (Figure 2). It also confirms that each of the analysed development indicators

Table 1. Quartile groups measure the synthetic development of urban-rural communes in the Świętokrzyskie Province in 2010 and 2017*

	S_i development		OE development	
	2010	2017	2010	2017
A	Połaniec 0.51 Morawica 0.5 Daleszyce 0.49 Busko-Zdrój 0.47 Jędrzejów 0.47 Końskie 0.47 Staszów 0.47 Suchedniów 0.46	Daleszyce 0.51 Morawica 0.51 Busko-Zdrój 0.5 Połaniec 0.5 Włoszczowa 0.48 Jędrzejów 0.47 Końskie 0.47 Suchedniów 0.47	Połaniec 0.57 Busko-Zdrój 0.58 Morawica 0.58 Jędrzejów 0.58 Końskie 0.58 Staszów 0.59 Ożarów 0.59 Daleszyce 0.6 Włoszczowa 0.6	Daleszyce 0.56 Busko-Zdrój 0.58 Morawica 0.58 Połaniec 0.58 Jędrzejów 0.59 Końskie 0.59 Włoszczowa 0.59 Staszów 0.6 Suchedniów 0.6
B	Opatów 0.46 Ożarów 0.46 Włoszczowa 0.45 Stąporków 0.45 Małogoszcz 0.44 Chęciny 0.43 Stopnica 0.43	Bodzentyn 0.46 Chęciny 0.45 Małogoszcz 0.45 Opatów 0.45 Staszów 0.45 Stąporków 0.45 Stopnica 0.45	Suchedniów 0.61 Opatów 0.61 Stąporków 0.61 Małogoszcz 0.62 Pińczów 0.62 Sędziszów 0.62	Małogoszcz 0.61 Bodzentyn 0.62 Chęciny 0.62 Opatów 0.62 Ożarów 0.62 Stąporków 0.62 Stopnica 0.62
C	Pińczów 0.43 Sędziszów 0.43 Chmielnik 0.41 Osiek 0.41 Kunów 0.4 Wąchock 0.4	Chmielnik 0.44 Ożarów 0.44 Pińczów 0.44 Kunów 0.43 Sędziszów 0.43 Wąchock 0.42	Chęciny 0.63 Stopnica 0.64 Chmielnik 0.65 Kazimierza Wielka 0.65 Wąchock 0.65 Kunów 0.66 Osiek 0.66 Zawichost 0.66	Pińczów 0.63 Sędziszów 0.63 Chmielnik 0.64 Kunów 0.64 Ćmielów 0.66 Kazimierza Wielka 0.66 Osiek 0.66 Wąchock 0.66
D	Kazimierza Wielka 0.4 Zawichost 0.4 Ćmielów 0.39 Bodzentyn 0.38 Działoszyce 0.38 Koprzywnica 0.38 Skalbmierz 0.37	Osiek 0.41 Ćmielów 0.4 Kazimierza Wielka 0.4 Działoszyce 0.39 Koprzywnica 0.39 Skalbmierz 0.39 Zawichost 0.39	Ćmielów 0.67 Bodzentyn 0.68 Koprzywnica 0.68 Działoszyce 0.69 Skalbmierz 0.7	Koprzywnica 0.68 Zawichost 0.68 Skalbmierz 0.69 Działoszyce 0.7

*Sorted by quartile value for 2017.

Source: the authors' own calculations based on data from the Local Data Bank of Statistics Poland and the Central Statistical Office.

Table 2. Differentiation of the synthetic measure of development of urban and rural communes in the Świętokrzyskie Province in 2010 and 2017

	S_i development		OE development	
	2010	2017	2010	2017
1	2	3	4	5
Average	0.43	0.44	0.63	0.63
Median	0.43	0.45	0.62	0.62
Standard deviation	0.04	0.04	0.04	0.04

1	2	3	4	5
Quartile (quartile) deviation	0.43	0.44	0.63	0.63
Classic coefficient of variation	0.09	0.08	0.06	0.06
Positional coefficient of variation	1.00	0.99	1.01	1.01
Min	0.37	0.39	0.57	0.56
Max	0.51	0.52	0.70	0.70
The range	0.14	0.13	0.13	0.14
Quartile range	0.06	0.05	0.06	0.06
Skewness	0.13	0.19	0.24	0.30
Measure of concentration-kurtosis	-0.98	-0.60	-1.15	-0.70

Source: the authors' own calculations based on data from the Local Data Bank of Statistics Poland and the Central Statistical Office.

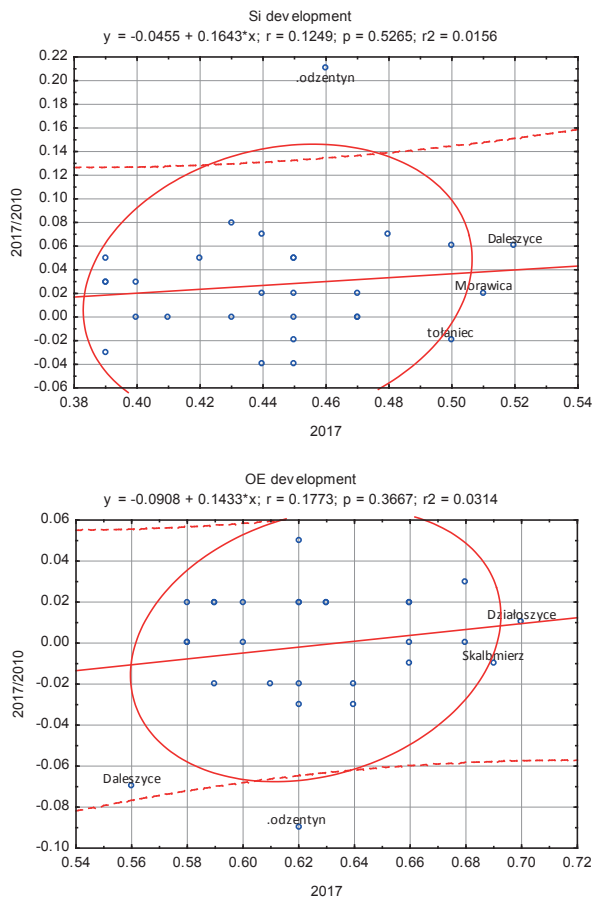


Figure 1. The relation of the change of synthetic measure of urban-rural communes of the Świętokrzyskie Province in 2010 and 2017

Source: the authors' own calculations based on data from the Local Data Bank of Statistics Poland and the Central Statistical Office.

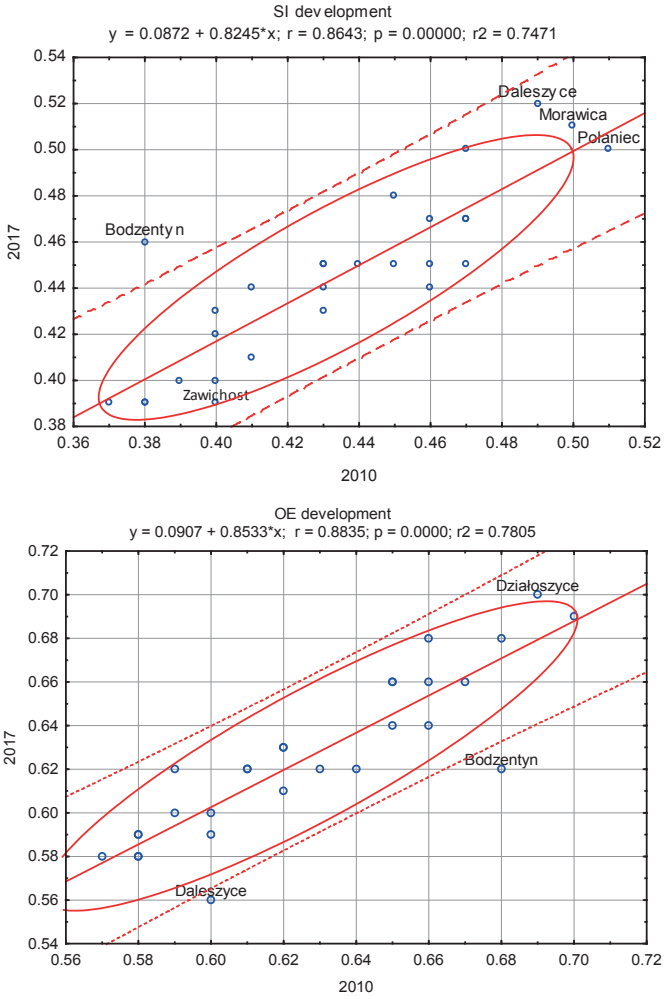


Figure 2. The relation of the synthetic measure of development (2010 to 2017) of urban-rural communes of the Świętokrzyskie Province

Source: the authors' own calculations based on data from the Local Data Bank of Statistics Poland and the Central Statistical Office.

indicates a similar classification of the units surveyed, and the units may have reacted similarly to market changes. The weakest units are: Daleszyce, Morawica, Polanice, Bodzentyn, Działoszyce, and Zawichost.

Figure 3 shows the relationship of the synthetic measure S_t and OE . Correlation coefficients were: for 2010 -0.962 ; for 2017 -0.965 . These values indicate that the convergence process took place during the study period, and the surveyed units

probably reacted similarly to changes in the local economy. The obtained results confirm that the applied measures described development diversity to a similar degree, and the spatial diversity of the studied phenomenon was stable.

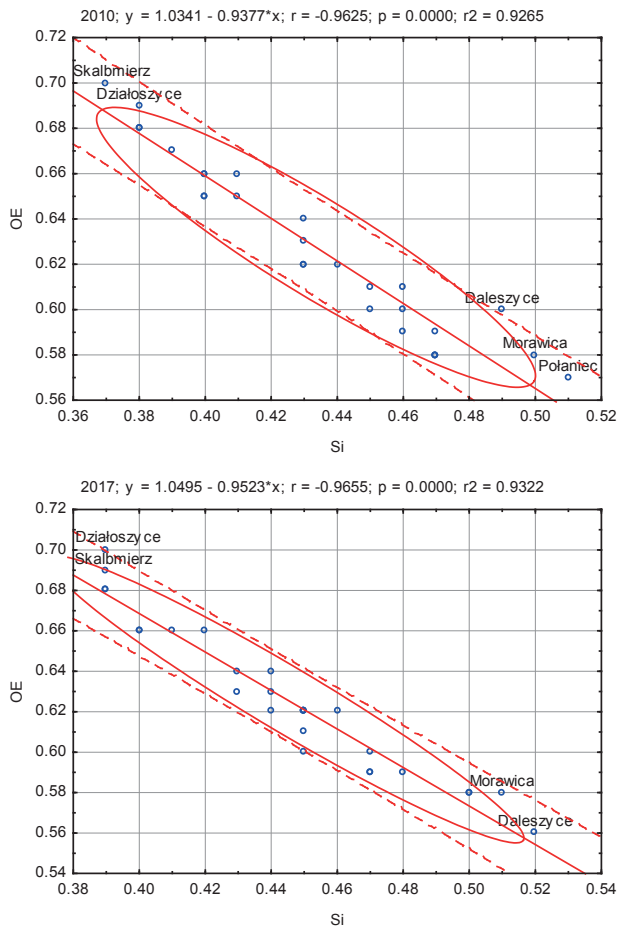


Figure 3. Ratio of synthetic development measure (S_i to OE) of urban-rural communes of the Świętokrzyskie Province in 2010 and 2017

Source: the authors' own calculations based on data from the Local Data Bank of Statistics Poland and the Central Statistical Office.

The calculated synthetic measures confirm that the level of development of urban-rural communes was most influenced by: the number of employees, the number of business entities, the number of natural persons conducting economic activity and own income (Table 3).

Table 3. Correlation of synthetic measure and its structure elements for communes of the Świętokrzyskie province*

	S_i development		OE development
S_i entrepreneurship	0.794	OE entrepreneurship	0.852
Unemployment	0.372	Unemployment	-0.497
Employed persons	0.545	Employed persons	-0.644
Business Unit(s)	0.770	Business Unit(s)	-0.817
Self-employed persons	0.792	Self-employed persons	-0.824
Housing stock	-0.064	Housing stock	0.023
Migration balance	0.153	Migration balance	-0.104
S_i financial situation	0.497	OE financial situation	0.522
S_i infrastructure	0.810	OE infrastructure	0.804
Own income	0.421	Own income	-0.374
Property expenditure (investment)	0.284	Property expenditure (investment)	-0.265

*Linear correlation coefficients for observations from sample 1-224. Critical value (at a double-sided 5% critical area) = 0.1311 for $n = 224$.

Source: the authors’ own calculations based on data from the Local Data Bank of Statistics Poland and the Central Statistical Office.

5. Conclusions

As shown, the urban-rural communes of the Świętokrzyskie Voivodeship are internally statistically similar to each other, and their potential was assessed in the context of the following variables: financial, economic, social, infrastructural and ecological. One should look for endogenous determinants that can accelerate development processes. The proper use of resources can be a lever for local development, ensuring the well-being of residents and gaining a competitive advantage over other units.

The assessment of the development of local government units should take into account the social and economic features shaping the region’s potential. Internal diversity in the context of municipal development is a natural phenomenon. However, it should be remembered that these disparities must reach a level that will be acceptable in a given economic and social situation.

In 2010, the measure of development of S_i ranged from 0.37 to 0.51, in 2017 from 0.39 to 0.51, respectively. The values of the OE development measure ranged from 0.57 to 0.7 in 2010 and from 0.56 to 0.70 in 2017. The correlation coefficients of the synthetic measure S_i and OE were: for 2010 -0.962 ; for 2017 -0.965 . This confirms that the measures described development diversity to a similar degree, and the spatial diversity of the surveyed urban-rural communes was stable while

the convergence process occurred. The best urban-rural communes in the studied area, regardless of the method of determining the synthetic measure, are: Połaniec, Daleszyce, Morawica, Busko-Zdrój, and Końskie. Their position was shaped by the number of employees, the number of business entities, the number of natural persons conducting economic activity and the communes own income.

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