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ASSESSMENT OF THE ECONOMIC COHESION OF THE RURAL AREAS IN POLAND. A DYNAMIC AND SPATIAL APPROACH

Abstract: The objective of this paper is to assess the economic cohesion of Polish rural areas. Particular attention was paid in this paper to the difference in the economic growth rate of rural areas between Eastern and Western Poland. It has been adopted that economic cohesion should be considered from the point of view of financial standing, changes in respect to entrepreneurial activity, and the state of infrastructure in particular communes (plural of *gmina*—the principal unit of administrative and territorial division in Poland). According to the definition by the EU, all the rural areas in Poland comprise those where population density is lower than 150 people/ km²; they have been included in the research. Values of the synthetic indicator and the conducted analysis state that a significant reduction of economic disparity between rural areas of Eastern and Western Poland does not take place, despite the cohesion policy pursued in Poland. The rate of change in financial standing and the level of entrepreneurial activity contribute mostly to that. The rate of infrastructural change is the only factor which reduces the disparity.

Key words: Cohesion policy, economic cohesion, rural areas, regional disparities, Eastern and Western Poland.

Introduction

The cohesion policy pursued by the European Union aims at reducing disparities in the level of development of particular regions. It is executed by performing operations in favour of economic growth, raising employment and competitiveness of regions. The cohesion policy is based on three pillars: economic, social, and territorial cohesion. This paper concentrates on economic cohesion, which is understood as the harmonious economic development of particular regions of Poland aimed at reducing regional disparities. The biggest development gaps in Poland occur between cities and villages and between Eastern and Western Poland. A question arises as to whether the

economic cohesion policy introduced in Poland in 2004 has resulted in a reduction of the development gap between rural areas of Eastern and Western Poland?

In light of the above remarks, the objective of this paper is to assess the economic cohesion of Polish rural areas. Particular attention has been paid in this paper to the difference in the economic growth rate of rural areas of Eastern and Western Poland. It has been adopted that economic cohesion should be considered the point of view of financial standing, changes in respect of entrepreneurial activity, and the state of infrastructure in particular communes (plural of *gmina* – the principal unit of administrative and territorial division in Poland). Thus, answers to the following questions were sought:

- Is the gap in the rate of financial development between rural areas of Eastern and Western Poland being reduced?
- Is the gap in the rate of entrepreneurial activity development between rural areas of Eastern and Western Poland being reduced?
- Is the gap in the rate of infrastructural development between rural areas of Eastern and Western Poland being reduced?

According to the definition by the EU, all the rural areas in Poland comprise those where population density is lower than 150 people/km²; they have been included in the research. Thus, all rural and urban-rural communes have undergone analysis. Areas of Western Poland comprise communes from the following voivodeships: Dolnośląskie, Lubuskie, Wielkopolskie and Podlaskie; whereas Eastern Poland includes the Lubelskie, Podlaskie, Podlaskie, Warmińsko-Mazurskie, and Świętokrzyskie Voivodeships.

The time of the research was limited to the period 2004–2011. Adopting such a time frame was related to Poland's accession to the EU in 2004. At the same time, it was considered the beginning of a new phase of regional policy creation, therein an introduction of cohesion policy instruments. It should be emphasised that Poland was a beneficiary of European Union funds in this period as part of the Regional Operational Programme, Operational Programme Human Capital, Operational Programme Development of Eastern Poland, Operational Programme Rural Development. The incoming funds were invested and used in the analysed period. Due to this, it has been decided that the eight-year-long research period is sufficient for establishing changes tendencies in the economic development of rural areas.

1. Research methods

It has been adopted in the paper that the economic cohesion of rural areas can be assessed on the basis of their synthetic rate of change, which is the sum of three elements: changes in financial revenue, changes in the rate of entrepreneurial activity, and changes in infrastructure at the level of communes.

The increase of individuals' revenue and the increase of commune's budgetary revenue per inhabitant were adopted as measures of change in financial revenue. They are the most commonly used indicators of an administrative unit's wealth development. However, Swianiewicz [2007] noticed that they were not perfect. The author listed their fundamental flaws. Firstly, a commune's budgetary revenue is a poor measurement of wealth development in rural areas due to the fact that farmers do not pay personal income tax. Secondly, this indicator corresponds to the taxable income only to a certain degree. Actual revenue depends on individual policy conducted by a given commune, *e.g.*, in respect of tax concessions and exemptions. Furthermore, the budgetary revenue does not reflect a commune's wealth as part of it comes from the central budget subsidy. Nevertheless, because of a lack of any alternative data, these indicators are usually applied for assessing changes in the financial standing of administrative units.

The number of business entities registered in the REGON (The Register of National Economy) and the unemployment rate (calculated as the unemployed working-age individuals of a given population) were applied as measures of change in the level of entrepreneurial activity. Despite common use of these indicators, attention should be paid to their disadvantages. The number of entities in the REGON system may be inflated due to a lack of obligation to deregister a company whose operation has been suspended or which has been terminated. Nevertheless, this error concerns all the analysed areas to an equal extent. In turn, the unemployment rate in rural areas may be understated due to hidden unemployment, which is related to the small size and small scale production of particular farms.

The percentage of people using the water supply system and gas distribution network, an increase in the area usage of flats, and the number of inhabitants connected to the waste-water treatment plant have been used as measures of infrastructural change. Changes to the area usage of flats were taken into account in order to draw attention to the increase in investments made not only by local authorities but also by private individuals. The authors are aware of the fact that an increase in the length of hard surface roads is one of the best indicators of infrastructural change. Yet, lack of data concerning the analysed period made it impossible to use this indicator.

All the adopted characteristics have a dynamic character. The data from 2004 and 2011 was taken into account, whereas in the change to the area usage of flats, data from 2004 and 2010 were used. All the characteristics underwent standardisation in the first stage of construction of the synthetic rate, according to the formula:

$$\frac{\text{characteristic 2001} - \text{characteristic 2004}}{\text{average of the characteristic 2004}}$$

Swianiewicz [2007] applied a similar procedure while analysing the level of economic and social cohesion of Eastern Poland. As the author indicated, this method

avoids the situation in which the final result is affected by even small progress with a very low initial state.

Partial rates of change in finances in the level of entrepreneurial activity and infrastructure were calculated in the next stage. They account for a sum of the standardised characteristics adopted for analysis.

The synthetic rate of economic change of the communes was calculated as a sum of the formerly mentioned partial elements.

Next, the spatial units were classified into four groups, using the synthetic rate of change as a criterion. The mean value and standard deviation accounted for the base of this division. Four classes of communes characterised by various rates of change were distinguished:

1. high, with a rate of change $W_e > \bar{X} + 1/2S$,
2. medium, with a rate of change: $\bar{X} \leq W_e \leq \bar{X} + 1/2S$,
3. low, with a rate of change: $\bar{X} - 1/2S \leq W_e \leq \bar{X}$
4. very low, with a rate of change: $W_e < \bar{X} - 1/2S$

where:

W_e – rate of change

\bar{X} – mean value

S – standard deviation

2. Research into the economic cohesion of rural areas in Poland – literature review

The term „cohesion” has had a firm position in geography for years and has been used in various kinds of research. Cohesion was related to delimiting natural [e.g.: Dylkowa 1973; Kondracki 1998], social [e.g.: PEd.1984; Thrift 1983], economic [e.g.: Dziewoński 1967; Gilbert 1988; Urry 1985], cultural [e.g.: Buttimer 1971; Tuan 1979] and administrative regions [e.g.: Koter 1996; Liszewski 1991; Stasiak, Miros 1997; Suliborski 1994]. Also, a functional [e.g.: Suliborski 2001, 2010; Szczepański 1972] and systemic [e.g.: Chojnicki 1999; R. Domański 1982; Maik 1992] analysis was based on the cohesion. Particular states and regions were analysed in respect to cohesion (or diversity) in social [e.g. Eberhardt 2005], economic [e.g. Woźniak 2005], and cultural [e.g. Jeannotte 2000] terms; whereas in some studies of cohesion (unity) issues, even geography itself was brought up [e.g.: Jędrzejczyk 2011; Wilczyński 2003]. In a broader sense, it can be stated that geographic research concentrates, to a major extent, on the level of spatial diversity or cohesion of particular natural and socio-economic phenomena leading to balanced or polarised regional development [e.g.: Bański 2007; Gąska *et al.* 2009; Gorzelak 2001; Szlachta 2007].

Since 2004 the term cohesion in Poland has been considered mostly in the context of EU policy. Economic, social, and recently also territorial cohesion [e.g.: Markowski, Turała 2012] has been discussed.

The term economic cohesion is usually used in two contexts [Gąska *et al.* 2009]: traditional – identifying cohesion with a process of unconditioned convergence process, thus reducing the economic development gap between regions or parts of regions; and modern – referring cohesion to the functional and harmonious development of regions and particular parts of regions based on the endogenic potential.

Studies identifying cohesion as a traditional approach, which involve research into disproportions mainly between highly urbanised areas and rural areas, and between Eastern and Western Poland, dominate in Poland. They may be divided into two groups. The first one includes studies showing interregional disparities and gaps between regions. The other group comprises studies concerning the evaluation of the cohesion policy.

Studies from the first group were conducted long before Poland's accession to the EU. They concerned regional diversity of the state at the level of the new voivodeships [e.g.: Czyż 2001; Gawlikowska-Hueckel 2000], economic backwardness of the areas of Eastern Poland in relation to the remaining parts of the state [e.g.: Galar 1997; Gorzelak 1995, 2000; Horodeński, Rościszewski 1999; Stryjakiewicz 1999], and the competitive advantage of large cities over the remaining areas of Poland [e.g.: R. Domański 2000; Dutkowski 2000; Kukliński *et al.* 1997; Markowski, Marszał 2002; Swianiewicz, Dziemianowicz 1998]. The research touched on various aspects of economic development: attractiveness in terms of location [e.g.: Swianiewicz, Dziemianowicz 1998], inward capital flows [e.g. B. Domański 2001], private entrepreneurial activity development [e.g.: Kamińska 1996, 1997, 1999], housing and infrastructural issues [e.g. Gałązka, Mync 1999] as well as innovation economy [e.g. Stryjakiewicz 1999].

Employees from the Institute of Geography and Spatial Organization, Polish Academy of Sciences in Warsaw started some interesting research on the diversity of developmental opportunities in Polish regions. Many publications discussing development of the eastern and western border areas of Poland were the aftermath of these studies [e.g.: Horodeński, Rościszewski 1999; Stasiak, Komornicki 1994; Stasiak, Miros 1993].

After Poland's accession to the EU, scientific research started to pay special attention to the economic situation of Eastern Poland. It was related to the introduction of the Operational Programme Eastern Poland, which included the poorest regions of the EU. A series of interesting papers emerged concerning, among other things, the labour market [e.g., Broniatowska *et al.* 2007], the significance of urban nodes for local and regional development [e.g., Czapiewski *et al.* 2007], agriculture competitiveness [e.g., Herbst, Wójcik 2007], and the level of European funds absorption [Rudnicki 2010].

Generally speaking, the authors emphasise unfavourable level of development of Eastern Poland in relation to other regions of the state [e.g., Gorzelak 1989, 2000; Gruchman 2000; Szlachta 2000] and the difficult economic situation of Polish rural areas in relation to cities [e.g., Kukliński et al. 1997; Stasiak 2000]. The causes of these situations are analysed in respect to natural factors [e.g., natural resources]; [e.g., Bański 2008], historical factors (partitions of Poland); [e.g., Horodeński, Rościszewski 1999], cultural and political factors [e.g., Rosner 2007]. Importance of the soft factors of development such as human and social capital was raised in recent years [Boni 2007; Kamińska, Heffner 2010; Kamińska 2013].

Studies related to the evaluation of the cohesion policy do not provide unequivocal results and depend to a great extent on the level of research (research at the NUTS 5, NUTS 2 level, etc.) and the adopted measures.

For instance, Gorzelak [2007] found that development disparity between Eastern Poland and the rest of the country measured by GDP *per capita* increased in recent years, with this regularity concerning mostly the Subcarpathian and Lublin Voivodeships (especially their rural parts), the Podlaskie Voivodeship to a lesser extent, and the Świętokrzyskie Voivodeship to the least extent.

In turn, Swianinewicz [2007] observed that a majority of indicators describing economic cohesion of Eastern Poland at the level of *powiaty* (plural of *powiat* – the secondary unit of territorial and administrative division in Poland) and *gminy* do not reach the average for the state. Meanwhile, the authors of the paper titled *Wpływ wspólnej polityki rolnej i polityki spójności na rozwój obszarów wiejskich* [2011] (“The effect of the common agricultural policy and cohesion policy on the development of rural areas”) found that the high intensity of development activities taken up in Polish regions has an effect on reducing the development gap in relation to other states of the EU. The authors draw attention to the positive tendencies both in respect of endogenic potential strengthening and development gap reduction occurring in rural areas. The growth rate of the basic indexes reflecting the level of economic development in many fields of the development policy between 2004 and 2010 is higher in rural areas than in urban areas. Thus, the authors prove that EU funds may have an important affect on reducing development disparities in rural areas, but only in some fields, e.g., in respect to the provision of water supply infrastructure. Whereas in other domains, e.g., in regard to business activity, EU funds may even widen the development gap.

The positive effect of the EU cohesion policy on economic development was confirmed also by the research conducted by Zaleski, Kudełko [*et al.* 2010] in the area of Dolnośląskie. The authors emphasise that a relevant contribution of the cohesion policy to the acceleration of economic development in the Dolnośląskie Voivodeship is reflected in the sphere of analysis of the convergence process between the economy of this voivodeship and the European average. The cohesion policy plays an important

role in the processes of employment support, creation of new jobs and, what follows, a reduction of the unemployment rate.

Meanwhile, the economic cohesion issue in the modern approach, relating cohesion to the functional and harmonious development of regions based on endogenous potential, has been brought up in papers concerning links between metropolitan areas and regional base [e.g., Gaska *et al.* 2009, Smętkowski 2005], agglomerations' effect on the suburban zone [e.g., Jakóbczyk-Gryszkiewicz 1998; Kopacz-Wyrwał, Mularczyk 2013], the effect of small towns on the development of rural areas [e.g., Heffner, 2003], or the level of competitiveness in small regions [e.g., Heffner 2007].

3. Diversity of the rate of change in the financial standing of rural areas

The synthetic rate of change in the financial standing of urban-rural and rural communes in Poland oscillated between -8.541 and 18.829, with the average amounting to 1.776. It was characterised by a high spatial diversity, which is proven by the value of coefficient of variation at a level of 77%. The high rate of change in financial standing (rate exceeding 2.461) was noted in 15.5% of the communes inhabited by 30.4% of the population (Tab. 1). Research showed that the high rate of change in financial standing definitely occurred more often in urban-rural communes (32.1% of their total number) than in the rural ones (9.2%) (Tab. 1). It confirms the thesis about the important role of small towns in the development of the rural areas surrounding them [Heffner 2003]. Distribution of the communes with a high rate of change in financial standing showed regularities (Fig. 1): firstly, they were located in the suburban areas of the biggest Polish agglomerations; secondly, in areas with strongly developed non-agricultural functions [Bański, Stoła 2002]; thirdly, in areas where intensive and large-scale production farming dominates [Bański 2007].

Table 1
Rate of change in the financial standing of urban-rural and rural communes in Poland

Rate of change (value of the indicator)	Number of communes	Percentage of		Number of urban-rural communes	Percentage of urban-rural communes	Number of rural communes	Percentage of rural communes
		communes	population				
High (2.461 or more)	337	15.5	30.4	193	32.1	144	9.2
Medium (1.777-2.460)	354	16.3	18.7	129	21.4	225	14.3
Low (1.093-1.776)	958	44.1	36.3	223	37.0	735	46.8
Very low (1.092 or less)	524	24.1	14.6	57	9.5	467	29.7
Total	2173	100	100	602	100	1571	100

Source: Own calculation on the basis of the Local Data Bank, www.stat.gov.pl (Tabs. 1-12).

Slightly more than 50% of the communes (Tab. 1) were characterised by a medium and low rate of change in financial standing. They were inhabited by 55% of the population of the analysed area. A medium and low rate of change was noted in over 58% of the urban-rural communes, and in over 60% of rural communes.

A very low rate of change in financial standing (rate amounting to 1.092 or less) occurred in approximately 24% of the analysed communes inhabited by 14.6% of the population of the analysed area. A very low rate of change was significantly noted more often in rural communes (29.7%), compared to a much less frequent rate in urban-rural communes (9.5%). Communes with a very low indicator were located mainly in peripheral areas of voivodeships, located far from large agglomerations, main routes, in areas characterised by small-size and small-scale production farming with weakly developed non-agricultural functions (Fig. 1) [Bański *et. al.* 2012].

A comparison of the rural areas of Eastern and Western Poland indicates that a more favourable situation occurred in the western part of the state as every fifth commune from this region was characterised by a high rate of change in financial standing, while in the eastern part it was only in every tenth communes (Tabs. 2,3).

Table 2

Rate of change in the financial standing of urban-rural and rural communes
in Eastern Poland

Rate of change (value of the indicator)	Number of communes	Percentage of		Number of urban-rural communes	Percentage of urban-rural communes	Number of rural communes	Percentage of rural communes
		communes	population				
High (2.461 or more)	67	10.5	18.3	33	25.2	34	6,7
Medium (1.777-2.460)	83	13.0	16.2	22	16.8	61	12,0
Low (1.093-1.776)	308	48.2	45.8	64	48.9	244	48.0
Very low (1.092 or less)	181	28.3	19.6	12	9.2	169	33.3
Total	639	100	100	131	100	508	100

A more favourable situation was observed also in respect of inhabitants' concentration. In Western Poland 40% of the inhabitants were concentrated in areas with an above-average rate of change in financial standing, whereas in Eastern Poland it is less than 20% of the population. Mostly urban-rural communes were characterised by a high rate of change in financial standing in both analysed regions. In the western part they accounted for 32.5% and in the eastern part for 25.2%. A higher percentage of communes with a very low rate of change in financial standing in relation to communes in Western Poland occurs in Eastern Poland. In eastern voivodeships they accounted for 28.3% and were inhabited by 19.6% of the population of these voivodeships, whereas in the western ones, they comprised 21.1% of the analysed communes and 13% of the population (Tabs. 2, 3). Very low rates of change in financial standing

characterised mostly rural communes in both analysed cases. In eastern voivodeships they accounted for 33%, while in the western ones for 27.7%. The group of the urban-rural communes with a very low rate of change in financial standing included a much lower number of communes. In Eastern Poland they comprised 9.2%, whereas in Western Poland it was 12.7% of the analysed administrative units (Tabs. 2, 3).

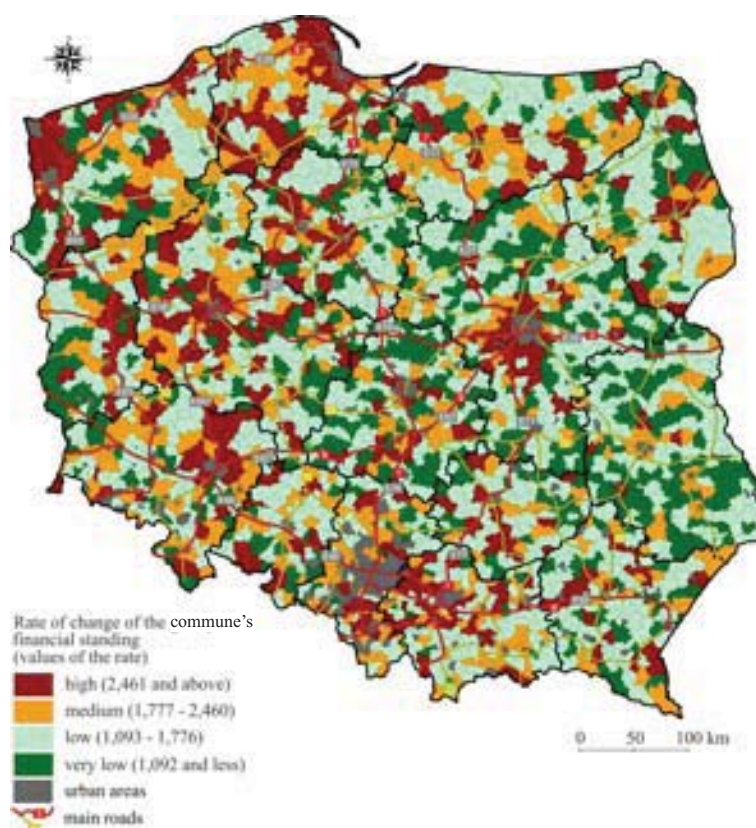


Figure 1. Diversity of the rate of change in the financial standing of communes
Source: Own elaboration on the basis of the Local Data Bank, www.stat.gov.pl (Figs. 1-4).

A significant spatial diversity in the analysed rate was also observed in the researched areas. Western Poland was more diverse in this respect. The coefficient of variation, which amounted to 89% in western voivodeships and 49% in eastern voivodeships, proves that.

Taking the rate of change in the financial standing of rural areas into account, its mean value was higher in the case of Western Poland (1.99) compared to the average for the state (1.77) and Eastern Poland (1.51). On this basis and on the basis of the conducted analysis it can be presumed that a reduction of the gap in this regard between

Eastern and Western Poland does not take place, on the contrary, the gap is widening. The growth rate of individuals' revenue and budgetary revenues of communes *per capita* was higher in the rural areas of western voivodeships than in eastern voivodeships. A higher percentage of communes characterised by above-average growth in comparison to the remaining areas, especially in Eastern Poland, was observed.

Table 3

Rate of change in the financial standing of urban-rural and rural communes
in Western Poland

Rate of change (value of the indicator)	Number of communes	Percentage of		Number of urban-rural communes	percentage of urban-rural communes	Number of rural communes	Percentage of rural communes
		communes	population				
High (2.461 or more)	108	20,9	37,9	74	32,5	34	11,8
Medium (1.777-2.460)	94	18,2	19,6	51	22,4	43	14,9
Low (1.093-1.776)	206	39,8	29,5	74	32,5	132	45,7
Very low (1.092 or less)	109	21,1	13,0	29	12,7	80	27,7
Total	517	100	100	228	100	289	100

Moreover, it was observed that the rate of change in financial standing was higher in the case of urban-rural than in rural communes, both in Western and Eastern Poland.

4. Diversity in the rate of change of the level of entrepreneurial activity in rural areas

The synthetic rate of change of the level of entrepreneurial activity in urban-rural and rural communes in Poland oscillated from -0.66 to 2.88 with the average amounting to 0.3. It was very spatially diverse. The coefficient of variation, which amounted to 84%, indicates this. A high rate of economic change (rate over 0.422) was observed in 495 communes, which accounts for 22.8% of their total number. These areas were inhabited by 28.9% of rural area populations (Tab. 4).

A higher rate of change in the level of entrepreneurial activity characterised urban-rural communes more than rural communes. Almost 30% of urban-rural communes and a little more than 20% of rural communes showed the highest rate among the analysed rural areas (Tab. 4). As far as distribution of the communes reaching the highest rate of change in the level of entrepreneurial activity in Poland is concerned, it can be observed that they are concentrated in the northern, north-western and south-western parts of the state. It is worth noting that communes with the highest rate of economic change in the areas mentioned above occurred not only around the biggest agglomerations, *e.g.*: Tricity, Szczecin, Poznań or Wrocław but they occupied almost

the whole area of the Zachodniopomorskie Voivodeship, Pomorskie, and Dolnośląskie Voivodeship (Fig. 2). These regions are characterised by a high participation of non-agricultural functions in rural areas, especially tourist, service, and housing functions [Bański, Stola 2002]. What is more, they have high entrepreneurial activity rates, mostly in respect to individual non-agricultural business activity [Kamińska 2006, 2011].

Table 4

Diversity of the rate of change in the level of entrepreneurial activity
in urban-rural and rural communes in Poland

Rate of change (value of the indicator)	Number of communes	Percentage of		Number of urban-rural communes	percentage of urban-rural communes	Number of rural communes	Percentage of rural communes
		communes	population				
High (0.422 or more)	495	22.8	28.9	174	28,9	321	20.4
Medium (0.297-0.421)	436	20.1	20.4	145	24,1	291	18.5
Low (0.172-0.296)	563	25.9	23.1	126	20,9	437	27.8
Very low (0.171 or less)	679	31.2	27.6	157	26,1	522	33.2
Total	2173	100	100	602	100	1571	100

The rate of change in the level of entrepreneurial activity in 46% of the analysed communes could be defined as medium and low. These areas are inhabited by 43.5% of the population. A medium and low rate of change was noted in 45% of the urban-rural communes and in 46.3% of rural communes (Tab. 4).

A very low rate of change in the level of entrepreneurial activity (rate under 0.171) was observed in 31.2% of the communes inhabited by 27.6% of the population of the analysed area. Very low rates of change of the analysed changes were noted more often in rural communes (33.2%) than in urban-rural communes (26.1%) (Tab. 4). Communes with the lowest rates of change in levels of entrepreneurial activity were located in the eastern and south-eastern part of Poland. They included almost the whole Podlaskie Voivodeship, a significant part of the Lubelskie, Podkarpackie and Łódzkie Voivodeships as well as northern parts of Małopolskie and Śląskie Voivodeship. Agricultural functions, small-size and small-scale production farming dominate in these areas. Moreover, as research conducted by Kamińska [2006] shows, these are areas with low entrepreneurial activity rates, especially in regard to individual business activity.

A comparison of the rural areas of Eastern and Western Poland shows that a definitely more favourable situation in terms of the rate of change in the level of entrepreneurial activity occurs in the western part of the country. A high rate of the analysed changes was noted in 12.4% of the communes in Eastern Poland, including 15.2% of the population, whereas in Western Poland it occurred in 39.8% of the communes

where 39.4% of the population lives. Very low rates of change in the level of entrepreneurial activity characterised as many as 43% of communes in the eastern part of the state, which included 38.1% of the population living there; while in the western part, the lowest rates occurred in 12.4% of communes inhabited by 14.5% of the people (Tabs. 5, 6).

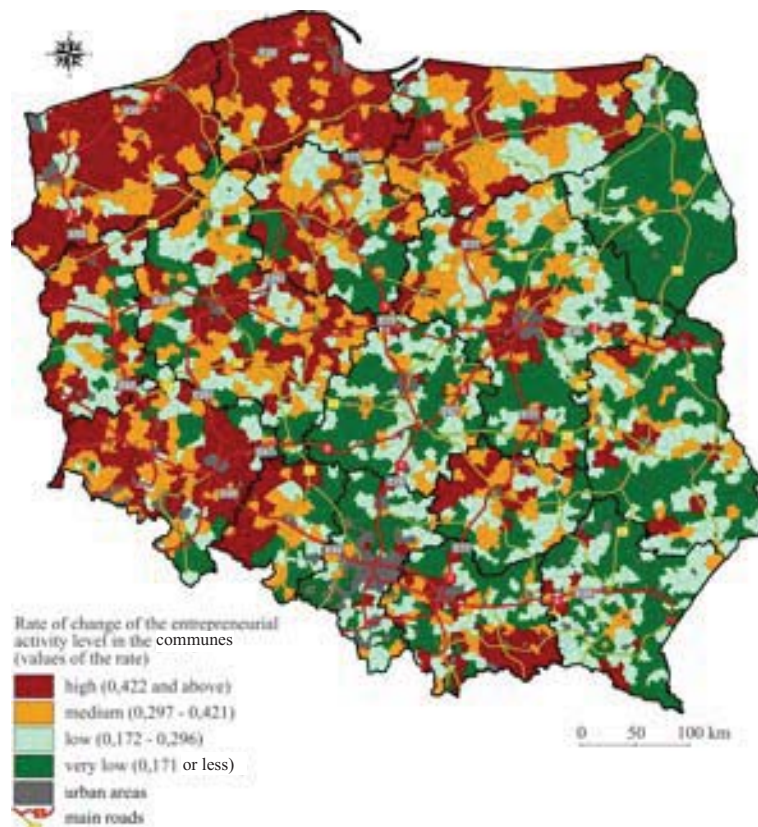


Figure 2. Diversity of the rate of change in the level of entrepreneurial activity in communes

In Eastern voivodeships a higher rate of change in the level of entrepreneurial activity in relation to rural communes (12.0%) was observed in urban-rural communes (13.7%). A very low rate of change was noted in 35.1% of urban-rural communes and 45.1% of rural communes. In Western voivodeships the situation was reversed. A high rate of change in the level of entrepreneurial activity occurred in a higher percentage of rural communes (41.9%) than in urban-rural communes (37.3%) with the very low rates in a higher percentage of urban-rural communes (15.8%) than in rural communes (9.7%) (Tabs. 5, 6).

Table 5

Diversity of the rate of change in the level of entrepreneurial activity
in urban-rural and rural communes in Eastern Poland

Rate of change (value of the indicator)	Number of communes	Percentage of		Number of urban-rural communes	percentage of urban-rural communes	Number of rural communes	Percentage of rural communes
		communes	population				
High (0.422 or more)	79	12.4	15.2	18	13.7	61	12.0
Medium (0.297-0.421)	98	15.3	16.9	33	25.2	65	12.8
Low	187	29.3	29.9	34	26,0	153	30.1
Very low (0.171 or less)	275	43.0	38.1	46	35.1	229	45.1
Total	639	100	100	131	100	508	100

Table 6

Diversity of the rate of change in the level of entrepreneurial activity
of urban-rural and rural communes in Western Poland

Rate of change (value of the indicator)	Number of communes	Percentage of		Number of urban-rural communes	percentage of urban-rural communes	Number of rural communes	Percentage of rural communes
		communes	population				
High (0.422 or more)	206	39.8	39.4	85	37.3	121	41.9
Medium (0.297-0.421)	142	27.5	27.2	65	28.5	77	26.6
Low	105	20.3	18.9	42	18.4	63	21.8
Very low (0.171 or less)	64	12.4	14.5	36	15.8	28	9.7
Total	517	100	100	228	100	289	100

A significant diversity in the value of the rate describing changes in the level of entrepreneurial activity was observed in both analysed areas. Rural areas of Eastern Poland were more diverse in this regard during the analysed period. The coefficient of variation proves that. Its value amounted to 80.2% for eastern voivodeships, and 65.6% for western regions.

The rate of change in the level of entrepreneurial activity reached a peak value in rural areas of Western Poland (0.41), while rural areas of Eastern Poland reached minimum values (0.22) (average for Poland – 0.3). Alike the previous case, it can be observed that a reduction of disparities in terms of the level of entrepreneurial activity between rural areas of Eastern and Western Poland does not take place, on the contrary, those differences are growing. There is a much higher percentage of communes with an above-average growth of entrepreneurial activity expressed by the number of business entities registered in the REGON system, and a lower unemployment rate in western than in the eastern voivodeships.

5. Diversity in the rate of infrastructural change in rural areas in Poland

The synthetic rate of infrastructural change in urban-rural and rural communes in Poland oscillated between -1.67 and 10.33. Mean values amounted to 0.96. The coefficient of variation whose value reached 112% proves a very high spatial diversity of infrastructural change in rural areas. A high rate of these changes was noted in 22.1% of the analysed communes inhabited by 21.3% of the population (Tab. 7). Research results indicate that the rate of infrastructural change in Poland is similar in urban-rural and rural communes (Tab. 7). The location of communes with the highest rate of infrastructural change does not show significant spatial regularities (Fig. 3).

Table 7

Diversity in the rate of infrastructural change in urban-rural and rural communes in Poland

Rate of change (value of the indicator)	Number of communes	Percentage of		Number of urban-rural communes	percentage of urban-rural communes	Number of rural communes	Percentage of rural communes
		communes	population				
High (1.498 or more)	480	22.1	21.3	134	22.3	346	22.0
Medium (0.959-1.497)	345	1.9	16.1	98	16.3	247	15.7
Low (0.421-0.958)	515	23.7	25.3	145	24.1	370	23.6
Very low (0.420 or less)	833	38.3	37.2	225	37.4	608	38.7
Total	2173	100	100	602	100	1571	100

A medium and low rate of infrastructural change was observed in 39.6% of the analysed communes inhabited by 41.4% of the population. It was noted by a similar percentage between urban-rural and rural communes, accounting for 40.4% and 39.3%, respectively (Tab. 7).

Those communes which reached a very low rate of infrastructural change accounted for the most numerous group of the communes. This group included 38.3% of the analysed administrative units inhabited by 37.2% of the population. Like in the case of communes with the highest rates of infrastructural change, it is difficult to unequivocally specify regularities of their spatial distribution. The high number of communes with a very low rate of infrastructural change between 2004 and 2011 may be explained by the fact that the most dynamic development of technical infrastructure, especially water supply system, in rural areas in Poland took place in the 1990s. [Bański, Czapiewski 2008; Kołodziejczyk 2013].

A comparison of the rural areas of Eastern and Western Poland in terms of the rate of infrastructural change shows that a more favourable situation occurred in the eastern part of Poland where 24.4% of communes inhabited by 23.8% of the population were characterised by a high rate of change while in western voivodeships it

was 19.9% of the communes inhabited by 19.2% of the population. Very low rates of infrastructural change were noted in 37.6% of communes in the eastern part of the state, which included 36% of the inhabitants of the analysed area. In the western part, in turn, the lowest rates occurred in 40.2% of communes inhabited by 40.7% of the population (Tabs. 8, 9).

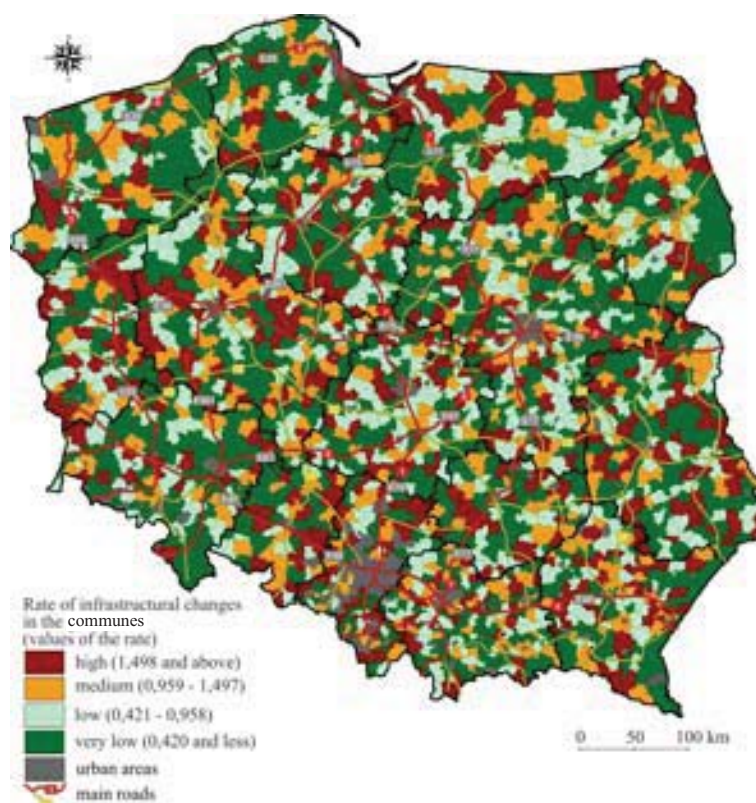


Figure 3. Diversity in the rate of infrastructural change in communes

A high rate of infrastructural change in Eastern Poland was observed more often in rural communes than in urban-rural communes. It was observed in 22.1% of urban-rural communes and 25% of rural communes. Similar, although a lower diversity was observed in communes located in the western part of the state. A high rate of infrastructural change characterised 19.3% of urban-rural communes and 20.4% of rural communes. A very low rate of infrastructural change was noted in the highest percentage of communes in the eastern part of the country. It described 32.1% of urban-rural communes and 39% of rural communes. In Western Poland it was also the highest percentage among the analysed administrative units. A higher amount of 42.1% was observed in urban-rural communes, and a lower amount of 38.8% in rural communes (Tabs. 8, 9).

Table 8

Diversity in infrastructural changes in urban-rural and rural communes in Eastern Poland

Rate of change (value of the indicator)	Number of communes	Percentage of		Number of urban-rural communes	percentage of urban-rural communes	Number of rural communes	Percentage of rural communes
		communes	population				
High (1.498 or more)	156	24.4	23.8	29	22.1	127	25.0
Medium (0.959-1.497)	97	15.2	16.4	27	20.6	70	13.8
Low (0.421-0.958)	146	22.8	23.9	33	25.2	113	22.2
Very low (0.420 or less)	240	37.6	36.0	42	32.1	198	39.0
Total	639	100.0	100.0	131	100.0	508	100.0

Table 9

Diversity in infrastructural changes in urban-rural and rural communes in Western Poland

Rate of change (value of the indicator)	Number of communes	Percentage of		Number of urban-rural communes	percentage of urban-rural communes	Number of rural communes	Percentage of rural communes
		communes	population				
High (1.498 or more)	103	19,9	19,2	44	19,3	59	20,4
Medium (0.959-1.497)	92	17,8	15,5	36	15,8	56	19,4
Low (0.421-0.958)	114	22,1	24,6	52	22,8	62	21,5
Very low (0.420 or less)	208	40,2	40,7	96	42,1	112	38,8
Total	517	100,0	100,0	228	100,0	289	100,0

Values of the rate reflecting the pace of infrastructural changes were diverse both in the communes of Eastern Poland and Western Poland. Slightly higher values occurred in the western part of the state. In this case the coefficient of variation reached 115%, and the rate for eastern areas reached 111%.

The rate of infrastructural change reached the highest medium value in communes located in eastern voivodeships (1.02) and the lowest in communes located in western voivodeships (0.92) (average in the state – 0.96).

A gradual reduction of disparities between Eastern and Western Poland was observed in the analysed period in case of infrastructural change. A lower rate of change in communes in western voivodeships resulted from a better provision of technical infrastructure in these areas, which was already developed before Poland's accession to the EU [comp. Węclawicz et al. 2006]. A higher rate of infrastructural change in rural areas of eastern voivodeships, in turn, was undoubtedly a result of good absorption of the EU aid funds directed to areas of Eastern Poland as a part of the cohesion policy [Rudnicki 2010].

6. Diversity in the rate of economic change of rural areas in Poland

Analysis of the three synthetic indicators illustrating the rate of change in financial standing, changes in the level of entrepreneurial activity, and infrastructural changes made it possible to assess economic changes taking place in rural areas of Poland between 2004 and 2011.

The synthetic indicator of economic change in urban-rural and rural communes in Poland oscillated between -7.35 to 17.54 with the average amounting to 3.01. It was characterised by an average spatial diversity. The coefficient of variation amounting to 56.9% indicates that. A high rate of economic change was noted in 469 communes which accounted for 21.6% of their total number, 32.7% of the rural population inhabited them (Tab. 10).

Table 10

Diversity in the rate of economic change in urban-rural and rural communes in Poland

Rate of change (value of the indicator)	Number of communes	Percentage of		Number of urban-rural communes	percentage of urban-rural communes	Number of rural communes	Percentage of rural communes
		communes	population				
High (3.865 or more)	469	21.6	32.7	206	34.2	263	16.7
Medium (3.009-3.864)	364	16.8	18.1	121	20.1	243	15.5
Low (2.154-3.008)	588	27.1	24.8	158	26.2	430	27.4
Very low (2.153 or less)	752	34.6	24.4	117	19.4	635	40.4
Total	2173	100.0	100.0	602	100.0	1571	100.0

Research results show that a high rate of economic change characterised urban-rural communes much more often than rural communes; 43.2% of urban-rural communes and 16.7% of rural communes were found among the analysed administrative units with the highest rates. This shows how important small towns are for the development of rural areas, which has already been mentioned in case of the analysis of the rate of change of a commune's financial standing. Spatial distribution of communes with the highest rate of economic change did not show that apparent tendencies as in case of the rate of change in financial condition or changes in the level of entrepreneurial activity. It can be observed, though, that they were concentrated mostly around the biggest agglomerations and in rural areas with developed non-agricultural functions. A high rate of infrastructural change in many communes in Eastern Poland contributed to a high value of the synthetic rate of economic change achieved by these units. Thus, the location of communes with the highest rates was not only related to areas of intensive, large-scale farming production. Their presence was also noticed in

areas with a small-size, small-scale of farming production, *e.g.*, in the Małopolskie and Podkarpackie Voivodeships (Fig. 4).

Almost 44% of communes were characterised by a medium and low rate of economic change. They were inhabited by 42.9% of the rural area population. A medium and low rate of economic change were noted in 46.3% of urban-rural communes and in 42.9% of rural communes (Tab. 10).

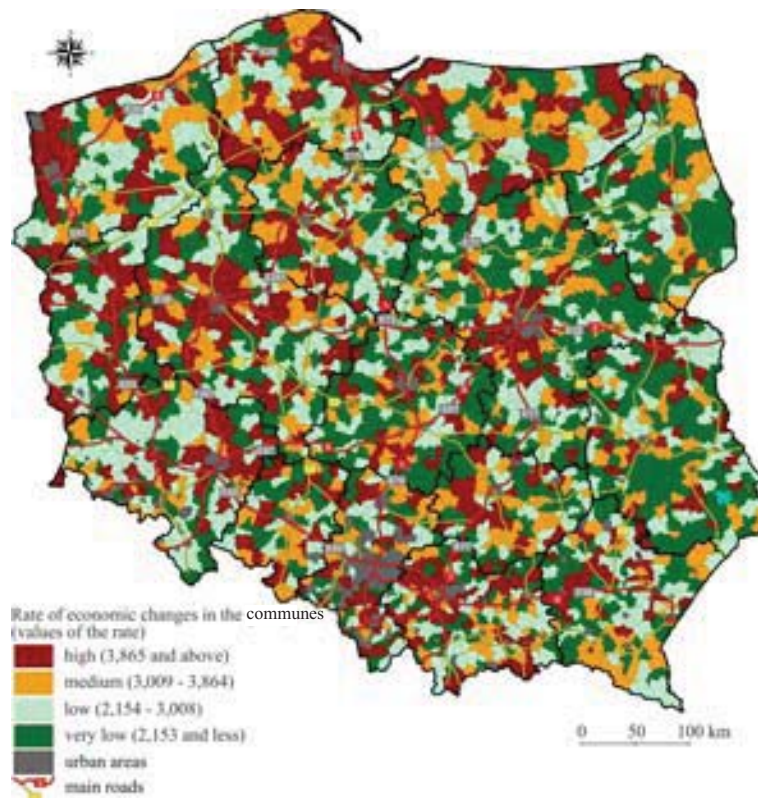


Figure 4. Synthetic rate of economic change of communes in Poland

A very low rate of economic change was observed in the most numerous group of the analysed administrative units. It occurred in 34.6% of communes inhabited by 24.4% of the rural area population. A very low rate of change was observed definitely more often in rural communes than in urban-rural communes. Among the rural units they comprised 40.4%, whereas among the urban-rural ones they comprised 19.4% (Tab. 10). Communes with a very low rate of economic change were located mostly in peripheral areas of voivodeships, in areas where small-size, small-scale farming production dominated with weakly developed non-agricultural functions (Fig. 4).

A more favourable situation, in terms of the rate of economic change, was noted in rural areas of Western Poland. A high rate of economic change was observed there in 27.7% of communes, which were inhabited by almost 40% of the population in the analysed area. In case of Western Poland the highest rates were received in 17.4% of communes populated by 22.2% of the inhabitants (Tabs. 11, 12).

Table 11

Diversity in the rate of economic change in urban-rural and rural communes
in Eastern Poland

Rate of change (value of the indicator)	Number of communes	Percentage of		Number of urban-rural communes	percentage of urban-rural communes	Number of rural communes	Percentage of rural communes
		communes	population				
High (3.865 or more)	111	17.4	22.2	31	23.7	80	15.7
Medium (3.009-3.864)	110	17.2	21.0	40	30.5	70	13.8
Low (2.154-3.008)	164	25.7	25.4	30	22.9	134	26.4
Very low (2.153 or less)	254	39.7	31.3	30	22.9	224	44.1
Total	639	100.0	100.0	131	100.0	508	100.0

Urban-rural communes were mostly characterised by a high rate of economic change in the compared rural areas. They accounted for 34.6% of their total number in Western Poland and for 23.7% in Eastern Poland, whereas such rural communes comprised 22.1% and 15.7%, respectively (Tabs. 11, 12).

Rural areas in the eastern part of the state in relation to the western part were characterised by a higher percentage of communes with a very low rate of economic change. They included almost 40% of communes, inhabited by 31.3% of the population of the analysed area in eastern voivodeships, while 26.3% of the communes with 18.1% of the population in western voivodeships. Rural communes were primarily characterised by a very low rate of economic change in both analysed cases. In Eastern Poland they comprised 44.1% of their total number while in Western Poland they accounted for 31.1% of their total number (Tabs. 11, 12).

A higher spatial diversity of the rate of economic change occurred in western voivodeships than in eastern regions. The coefficient of variation proves this, whose value for communes in Western Poland amounted to 62.8% and 49.5% for communes in Eastern Poland.

The mean value of the rate of economic change of rural areas located in western voivodeships amounted to 3.31 while in eastern voivodeships it was 2.75 (average for the state is 3.01). Mean values of the synthetic indicator and the conducted analysis show that despite the cohesion policy of rural areas pursued in Poland, a reduction of the economic gap between Eastern and Western Poland does not take place in full.

Table 12

Diversity in the rate of economic change in urban-rural and rural communes
in Western Poland

Rate of change (value of the indicator)	Number of communes	Percentage of		Number of urban-rural communes	percentage of urban-rural communes	Number of rural communes	Percentage of rural communes
		communes	population				
High (3.865 or more)	143	27.7	39.6	79	34.6	64	22.1
Medium (3.009-3.864)	78	15.1	15.8	38	16.7	40	13.8
Low (2.154-3.008)	160	30.9	26.5	65	28.5	95	32.9
Very low (2.153 and less)	136	26.3	18.1	46	20.2	90	31.1
Total	517	100.0	100.0	228	100.0	289	100.0

7. Summary and conclusion

On the basis of the conducted analysis of the rate of change in financial standing, it can be stated that disparities in this regard between rural areas of Eastern and Western Poland are not being reduced, on the contrary they are getting worse. The growth rate of individuals' revenues and budgetary revenues of communes *per capita* is higher in rural areas of western voivodeships than in eastern voivodeships. In the western part of the state, participation of communes characterised by an above-average growth was higher than in the eastern part of the state. In many communes, it was dominated by non-agricultural functions and a dynamic development of private non-agricultural entrepreneurial activity, among other things. Above-average growth of tax revenues was the effect of this. The rate of change in financial standing was higher in urban-rural communes than in rural units, both in Eastern and Western Poland. The presence of cities in a settlement system contributes to a diversification of business activity, which in turn stimulates an increase to a commune's budgetary revenues.

A reduction of the gap between rural areas of Eastern and Western Poland takes place in respect to the entrepreneurial activity. The disparities are getting worse. Participation of communes characterised by an above-average growth of entrepreneurial activity and a lowered unemployment rate is much higher in western voivodeships than in eastern voivodeships. It is related to well-developed non-agricultural functions, and a location near the western border of the state, which facilitates transborder co-operation. Historical conditions (being a part of the Prussian sector during the partitions of Poland) also play a role. In addition, a location near the western border of the state is a factor favouring concentration of people with secondary and higher education, which in turn, stimulates private entrepreneurial activity. Meanwhile, a location near the eastern border is a discouraging factor for the best educated part of soci-

ety, which results in a decrease to the pace of creating new private business entities [Kamińska 2013].

In case of infrastructural change, it can be observed that a reduction of disparities between Eastern and Western Poland is taking place gradually. The low rate of change in communes of western voivodeships results from a better provision of technical infrastructure, which was already developed before Poland's accession to the EU. In turn, the high rate of infrastructural change in rural areas of eastern voivodeships is undoubtedly a result of the good use of EU aid funds. The differences to the extent in which these funds were used between urban-rural and rural communes were not observed.

Values of the synthetic indicator and the conducted analysis state that a significant reduction of economic disparities between rural areas of Eastern and Western Poland is not taking place, despite the cohesion policy pursued in Poland. The rate of change in financial standing and the level of entrepreneurial activity mostly contribute to that. Only the rate of infrastructural change results in reducing the disparities. The rate of economic change is still influenced more by historical conditions, human capital stock, ways of managing agriculture, development of non-agricultural functions, density of the urban settlement system than by the cohesion policy pursued as a part of EU actions.

This research has confirmed the worse economic situation of rural areas of Eastern Poland in comparison to the remaining regions of the state. The disparities are diminishing only in the fields where development depends on acquiring and using EU funds and risk is borne by the local authorities (infrastructure). It should be emphasised, though, that infrastructure raises attractiveness of a given area in terms of location and settlement and, thus, it can be a factor stimulating economic growth, but is insufficient as the only development factor. A high level of human and social capital is still needed, as it is people that create new enterprises and new jobs. Unfortunately, also the educational attainment level of inhabitants of rural areas is lower in Eastern Poland than in other regions of the country [Kamińska 2013]. As a consequence, in the fields in which development depends on human capital, that is entrepreneurial activity and commune's financial standing, the development gap does not decrease, on the contrary it grows. The lack of a young population and people with high qualifications caused by migration in rural areas of Eastern Poland and deformed demographic structures resulting from it, constitute the major barrier to reducing economic disparities. Villages of Eastern Poland provided with infrastructure but depopulated may become a pessimistic prospect. Not preventing young, especially well-educated, people from emigration makes this prospect more possible.

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