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Spatial diversity of absorption of EU assistance funds and the level of socio-economic development in Poland

Abstract: The article presents the level and spatial structure of the absorption of EU funds within Cohesion Policy and Common Agricultural Policy during the 2007–2013 EU financial framework in Poland. The data analysed include all of the payments from European programmes, divided into two groups: the support dedicated for the development of agriculture and rural areas, and the cohesion policy. It has been demonstrated that the level and structure of delivery of these funds is spatially diversified. The index of the absorption of EU funds per capita is negatively correlated with the level of socio-economic development, which results from the allocation of payments dedicated for development of agriculture and rural areas. The distribution of cohesion funds is not correlated with the level of socio-economic development in *poviats*.

Key words: EU funding programmes, Cohesion Policy, Common Agricultural Policy, Common Fisheries Policy, Poland

Introduction

Currently, funds within EU programmes constitute the most important factor of socio-economic development of Poland. It has been corroborated in the studies by several authors, for example: Churski (2008a, 2014), Kozera (2011), Kosowski and Klimczuk (2012), Churski et al. (2014), Gorzelak (2014), Hryniowicz (2016), to mention just a few. The issue of spatial diversification of European funds absorption and the impact these funds have on regional development are significant research problems within the field of interests of socio-economic geography and spatial management. Thanks to pre-accession funds, e.g. SAPARD (Rudnicki 2008) the process of EU funds absorption commenced even before the official accession of Poland to the EU. It continued in the years 2004–2006 and gained in momentum during the first full EU financial framework of 2007–2013.

A comprehensive analysis of the delivery of the funds available within the present EU framework of 2014–2020 will be feasible only after 2022, since the funds granted in this period must be spent within two years following its closure ($n+2$ principle).

In the literature, there are numerous studies on the spatial distribution of EU funds and its relation to the socio-economic development of the countries and regions of the Community. They usually concern the absorption of funds distributed within the Cohesion Policy and its effects on the socio-economic convergence of regions and countries. Many studies confirm positive effects of the cohesion funds on convergence between countries, but not anymore at a lower scale of regions within countries (Geppert, Stephan 2008, Alcidi et al. 2018). According to these research, a large proportion of such funds is spend in metropolitan regions, which has even negative convergence effect and aggravates the socio-economic development disparities between regions (Cappelen et al. 2003, Churski 2008b, Geppert, Stephan 2008, Plaziak, Trzepacz 2008). Novosák et al. (2017), identified factors influencing the absorption efficiency in regions as innovative and entrepreneurial economy and agglomeration factors. Small regions with weak economies require additional aid in effective application for subsidies and securing their own contribution to the co-financed projects (Bachtler, McMaster 2008). Some researchers claim there is a maximum desired level of transfers of structural funds in the amount of 1.6% of GDP, above which funds increase regional differences (Kyriacou, Roca-Sagalés 2012, Merler 2016), which conceptually resample the Williamson curve describing the inversed U-shaped relation between the level of economic development and regional economic disparities (Szörfi 2007). Because of the sources available at the European and country level, relatively few studies use spatial resolution lower than region (NUTS 2) level thus lacking the spatial regularities that could appear on lower territorial distribution level.

The second EU policy which, along with the Cohesion Policy occupies most of the common budget is the Common Agricultural Policy. It is less frequent to investigate its spatial patterns and effects on sub-national territorial level, and, similarly to the research on Cohesion Policy, studies on the NUTS 2 level are most popular (Shucksmith et al. 2005, Esposti 2007, Biczkowski 2013). Some research concern the spatial allocation of funds in rural areas in one selected region (Dubownik et al. 2017). There are also studies of individual aspect of sectorial interventions, e.g. EU support for rural non-agricultural businesses (Rudnicki et al. 2016).

It is very rare to jointly look at the absorption of cohesion policy and agricultural policy funds at territorial sub-national level. In one of such studies, Crescenzi et al. (2015) claimed that a part of the funds allocated to agriculture should be allocated to the cohesion of rural areas instead. They also postulated that both policies should be coordinated regionally, and similar studies are needed in a more refined scale than NUTS 2 regions.

Unlike most of the authors cited above, the authors of this paper have conducted the spatial analysis at low administrative level of *poviats* (NUTS-4), and took into consideration all funds for both EU common policies: Common Agri-

cultural Policy and Cohesion Policy. The first aim of the paper is to present the level and spatial structure of the absorption of these funds across voivodeships (provinces) and *poviats* (districts). The second aim is to find the relation between the amount of EU support funds and the socio-economic development in regions of Poland.

Materials and research methods

The analysis relies on a matrix of spatial data including the amounts of payments delivered from EU programmes within 2007–2013 financial perspective in 379 *poviats*¹. The matrix was based on the data from the Management Information System of the Agency for Restructuring and Modernisation of Agriculture (ARMA), SIMIK – the national reporting system of the Ministry of Investment and Economic Development (formerly the Ministry of Economic Development), and the Local Data Bank of the Central Statistical Office. Integration of these databases constitutes a new approach in the studies of funds from European programmes in Poland. The data were compiled as of 31 March 2017, which means that the information is complete (definite) for the period of 2007–2013 (taking into consideration the $n+2$ principle).

The total amount of funds from EU programmes was presented in two groups: payments for implementation of the Common Agricultural Policy (including two sub-groups: direct payments² and operational programmes for development of rural areas³); and payments for implementation of the Cohesion Policy (including two sub-groups: 16 Regional Operational Programmes, and five national operational programmes⁴; Table 1). The two groups together form a large majority of EU funds spent regionally. Even though they have different purpose and allocation mechanisms, they provide capital, infrastructure or skills to local households, firms, and governments, thus they may contribute to local socio-economic development.

The presentation of the level and spatial structure of absorption of the payments from EU programmes is followed by the analysis of their correlation with the level of socio-economic development of Polish regions (correlation significant at 0.05). This indicator was determined on the basis of five diagnostic characteristics, selected in such a way to include various spheres of socio-economic

¹ The town of Wałbrzych was incorporated into the *powiat* of Wałbrzych according to the data from 2007–2012.

² Single area payment scheme, complementary national direct payments, complementary payment to the area of the basic crop groups.

³ Rural Development Program 2007–2013, Rural Development Plan 2004–2006 – only payments made in the 2007–2013 period and being the result of previous RDP 2004–2006 commitments (regarding structural rents, afforestation of land and agri-environmental program as of 2010), Financial support of the most recognized fruit and vegetable producers, Sustainable development of the fisheries sector and coastal fishing areas.

⁴ Infrastructure and Environment Operational Program, Operational Program Innovative Economy, Human Capital Operational Programme, Operational Programme “Development of Eastern Poland”. Cross-border programmes are excluded from the analysis.

development. The data was collected for the year 2010, a midpoint of the period in analysis, and derived from the Central Statistical Office Local Data Bank:

- 1) the socio-economic situation defined by the proportion of the unemployed in the total number of economically active population (destimulant);
- 2) the level of economic growth defined by the number of economic entities entered into the Polish National Business Registry (REGON) per 1.000 working-age population;
- 3) the level of agricultural development defined by the size of global agricultural production in PLN per 1 ha of agricultural acreage (the level of land productivity, Rudnicki 2016, pp. 438–441);
- 4) the condition of infrastructural development defined by the percentage of population with access to water supply and sewage systems;
- 5) the financial situation of local self-governments defined by the share of own revenues in the total revenues of the communes.

The values were standardized (Racine, Raymond 1977). The arithmetic mean of the results was accepted as the index of socio-economic development. Its values serve as the basis of the division of *poviats* into three groups of development levels: low, i.e. below -0.50 (185 *poviats*); average, i.e. from -0.50 to 0.50 (151 *poviats*); and high, i.e. over 0.5 (43 *poviats*). Subsequently, the level of development was juxtaposed with the standardized index of the absorption of funds from EU programmes per inhabitant. In order to do so, Pearson's correlation coefficient between the standardized absorption index and the level of socio-economic development was calculated. Furthermore, differences between the standardized indices were calculated for the purpose of the comparison of the levels of development and funds absorption in particular *poviats* and voivodeships.

Structure and spatial diversification of payments

Within the EU financial framework of 2007–2013 Poland received payments in the amount of 478.9 bln PLN from EU programmes (Table 1), which corresponds to 118.3 bln euro according to mean exchange rate from the period (in the analysis, following the sources of our data, we use PLN rather than euro). The amount was highly diversified across regions, and largely correlated with the population of regions – from 12.6 bln PLN in the least populated Opolskie voivodeship to 71.2 bln PLN in the largest Mazowieckie voivodeship (Table 1).

One third of all the payments (162.0 bln PLN, i.e. 33.8% of the total) consisted of the payments dedicated for the development of agriculture and rural areas, related to the implementation of the Common Agricultural Policy and the Common Fisheries Policy. The percentage of these payments was the largest in the voivodeships with the dominant role of agriculture: Kujawsko-Pomorskie, Podlaskie, and Wielkopolskie (45–50%). In this group slightly more than a half of the funds came from direct payments – 83.8 bln PLN, i.e. 17.5% of total payments. These include single area payments (55.5 bln PLN), complementary national direct payments (23.1 bln PLN), special support (958 bln PLN) and other

Table 1. Structure of funds from EU funding programmes in Poland (by voivodship)

Specification	Total financial support (bln PLN)	Including in %					
		Common Agricultural Policy and Common Fisheries Policy – payments dedicated for development of rural areas			Cohesion Policy – payments for regional and national operational programmes		
		Including			Including		
		Total	direct payments	programmes for rural development	Total	regional operational programmes	national operational programmes
Poland	478.9	33.8	17.5	16.3	66.2	16.1	50.1
By voivodships							
Dolnośląskie	32.3	28.0	16.2	11.8	72.0	16.7	55.3
Kujawsko-Pomorskie	26.4	46.0	24.8	21.2	54.0	16.8	37.2
Lubelskie	34.2	45.2	26.0	19.2	54.8	15.4	39.4
Lubuskie	14.3	32.4	15.0	17.4	67.6	17.4	50.2
Łódzkie	33.5	31.1	16.2	14.9	68.9	14.0	54.9
Małopolskie	30.2	21.4	9.8	11.6	78.6	20.6	58.0
Mazowieckie	71.2	32.9	15.2	17.8	67.1	11.6	55.4
Opolskie	12.6	38.8	24.5	14.4	61.2	17.2	44.0
Podkarpackie	29.1	21.7	10.4	11.2	78.3	18.4	59.9
Podlaskie	22.2	49.8	27.5	22.2	50.2	14.4	35.8
Pomorskie	29.2	30.2	13.9	16.3	69.8	14.0	55.7
Śląskie	34.0	13.0	5.7	7.3	87.0	22.5	64.5
Świętokrzyskie	17.7	34.6	16.9	17.7	65.4	18.5	46.9
Warmińsko-Mazurskie	26.4	36.9	20.8	16.1	63.1	17.7	45.4
Wielkopolskie	41.3	47.8	25.3	22.5	52.2	14.0	38.2
Zachodniopomorskie	24.1	38.6	19.6	19.0	61.4	16.0	45.4

Source: own work based on ARMA (Management Information System), Ministry of Economic Development (national reporting system of the Ministry of Investment and Economic Development 07–13) and Central Statistical Office (Local Data Bank) – as of 31 March 2017.

direct payments (4.3 bln PLN). The largest share of direct payments was noted in the Podkarpackie voivodeship (27.5%). The remaining part of payments from the first group included operational programmes dedicated for development of agriculture, fisheries and rural areas – 78.2 bln PLN, i.e. 16.3% of total payments. This sub-group included: Rural Development Programme for 2007–2013 (61.0

bln PLN in four programme axes); Rural Development Plan for 2004–2006 (5.9 bln PLN of payments made in the period of 2007–2013 as a result of previous agreements); financial aid paid within the programme supporting the fruit and vegetable market (7.9 bln PLN); Operational Programme for the Sustainable Development of Fisheries Sector and Coastal Fishing Areas (OP Fisheries – 3.4 bln PLN in four programme axes).

The majority of the EU funds spent in Polish regions were those within regional and national operational programmes for the implementation of the Cohesion Policy. They accounted for 316.9 bln PLN, i.e. 66.2% of all the payments. The percentage of this funds was the highest in Śląskie voivodeship – 87%, due to its high level of urbanization and relatively small share of agriculture in the economy. This group of funds was divided into two sub-groups. One of them included 16 regional operational programmes, which in total gave 76.9 bln

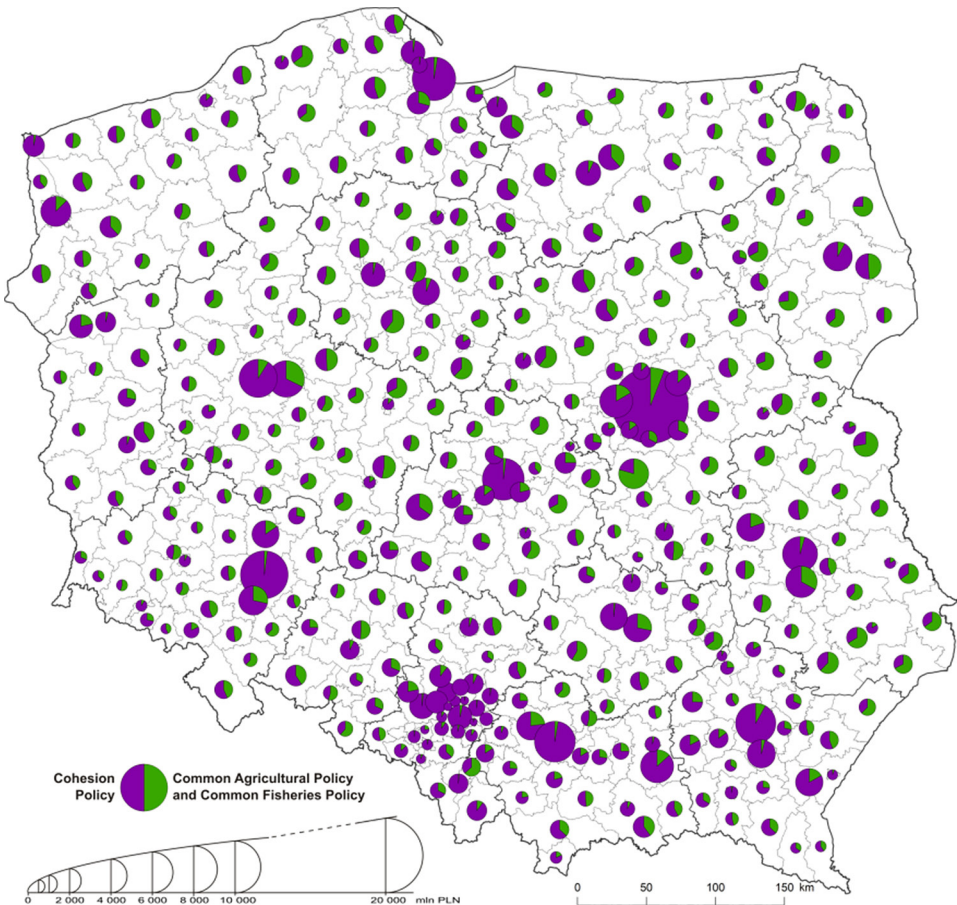


Fig. 1. Amount and structure of absorption of funds from EU programmes in Poland (by *poviats*)

Source: as in Table 1.

PLN, i.e. 16.1% of all the payments. These funds were targeted to voivodeships proportionally to their population. The other included national operational programmes, which in total gave 240.0 bln PLN, i.e. 50.1% of all the payments. The structure of these funds was more uneven in relation to population, as they were assigned reflecting the character of specific programmes: e.g. Operational Programme “Development of Eastern Poland” was only targeted to five voivodeships in eastern part of the country, and the largest operational programme: “Infrastructure and Development” mostly financed large investments in transport infrastructure, so regions along major transit routes and with the largest cities acquired highest financing from it.

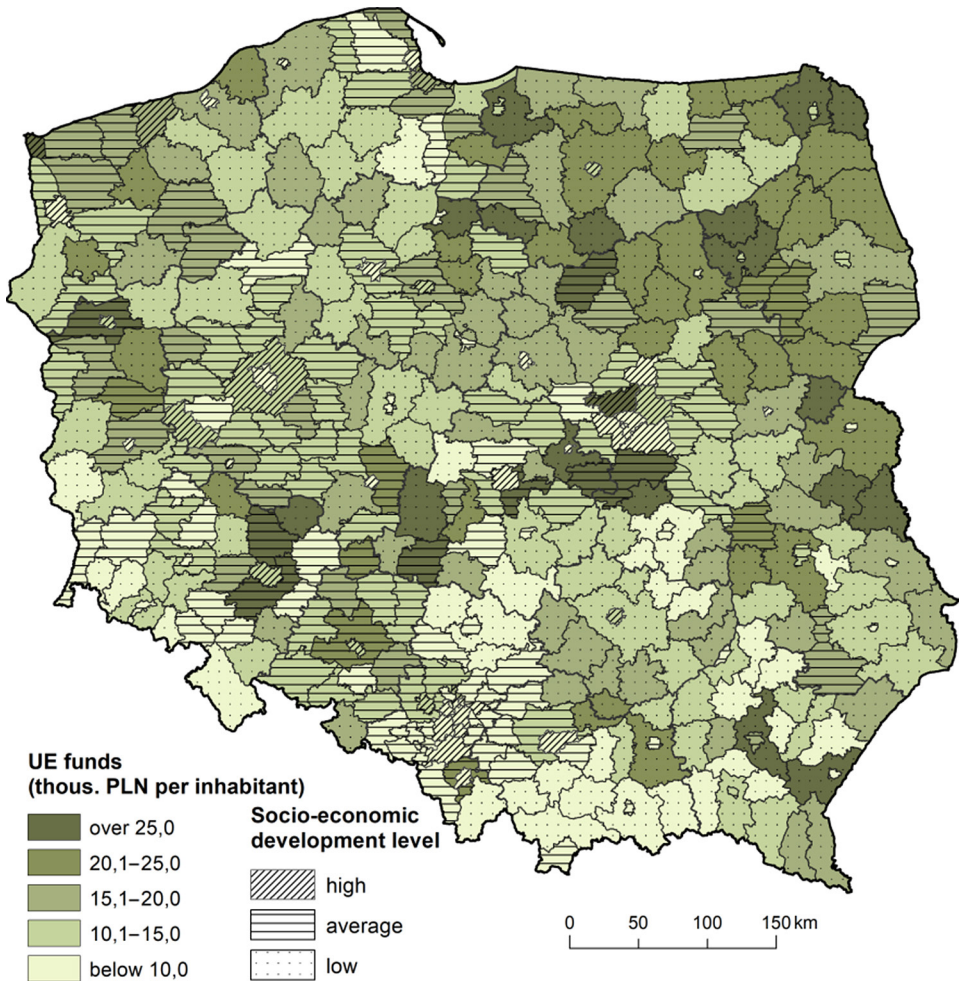


Fig. 2. Index of absorption of funds from EU programmes in Poland by *poviats* and level of socio-economic development of *poviats*

Source: as in Table 1.

The average level of the absorption of EU funds in Poland was 12.5 thousand PLN per inhabitant. This value was spatially diversified as well (Fig. 2). It was below 10.0 thousand PLN per capita in the Śląskie and Małopolskie voivodeship, while it exceeded 15.0 thousand PLN per capita in the Lubelskie, Podlaskie and Warmińsko-Mazurskie voivodeships (Table 2). Low absorption (below 10 thousand PLN/capita) was noted in 115 *poviats*, 64% of which were situated in the southern belt of voivodeships: from Dolnośląskie to Podkarpackie (minimal values in Mysłowice and Ruda Śląska – 2.8 thousand PLN per capita). The highest absorption (over 20 thousand PLN per capita) was recorded in 68 *poviats*, mostly situated in the Mazowieckie, Podlaskie and Warmińsko-Mazurskie voivodeships (there was not a single *powiat* in Opolskie and Śląskie voivodeships in this group).

The highest levels of absorption – exceeding 40 thousand PLN/capita – were recorded in the *poviats* of Suwałki and Świnoujście; however, they featured a strikingly different structure of absorption. Due to the substantial expenditures on the construction of Augustów ring road (78.4 mln PLN within the Operational Programme “Infrastructure and Environment”), the *powiat* of Suwałki presents a dominant share of payments dedicated for the development of rural areas, including direct payments. In Świnoujście, in turn, over 90% of the delivered funds came from national programmes. The biggest investment – modernisation of the waterway and reconstruction of the breakwater in the port of Świnoujście – was completed here with the support from the Operational Programme “Infrastructure and Environment” (349.1 mln PLN).

Correlation between development indicators and funds absorption

Further analysis focuses on the correlation between the levels of absorption of funds from EU programmes and the levels of the socio-economic development. The values of the synthetic index of socio-economic development for voivodeships oscillated between -0.87 in the Podkarpackie voivodeship to 0.56 in the Mazowieckie voivodeship (Table 2, Fig. 2). At the level of *poviats*, the variations were within the range of -1.94 in the *powiat* of Brzozów (Podkarpackie voivodeship) and -1.87 in the *powiat* of Szydłowiec (Mazowieckie voivodeship) to 1.75 in Warsaw and 2.08 in Sopot.

In order to show the dependencies between the development and absorption levels, the correlation coefficient was calculated. The correlation proved to be weak and negative (-0.328). Thus, a nationwide trend was discovered, i.e. a relatively higher level of absorption of funds from European programmes in less developed *poviats*. This result may be accepted as beneficial for the convergence of socio-economic development levels in regions.

To demonstrate how diversified the dependencies between socio-economic development and funds absorption are, differences between the standardized levels of absorption and socio-economic development were calculated for voivode-

Table 2. Selected elements of analysis of the correlation between socio-economic development and absorption of funds from EU programmes in Poland (by voivodships)

Specification	Index of socio-economic development	Absorption level (total payments in thousand PLN/ inhabitant)		Correlation coefficient for absorption and development (difference between standardized values)
		real index value	standardized index value	
Poland – total	0.00	12.4	0.00	0.00
By voivodships				
Dolnośląskie	0.17	11.1	-0.19	-0.37
Kujawsko-Pomorskie	-0.18	12.6	0.02	0.20
Lubelskie	-0.65	15.7	0.47	1.12
Lubuskie	-0.28	14.0	0.22	0.50
Łódzkie	0.03	13.2	0.11	0.08
Małopolskie	-0.23	9.1	-0.49	-0.26
Mazowieckie	0.56	13.5	0.16	-0.40
Opolskie	-0.09	12.4	0.00	0.09
Podkarpackie	-0.87	13.7	0.18	1.05
Podlaskie	-0.46	18.5	0.87	1.33
Pomorskie	0.21	12.8	0.06	-0.15
Śląskie	0.24	7.3	-0.74	-0.97
Świętokrzyskie	-0.57	13.8	0.20	0.77
Warmińsko-Mazurskie	-0.63	18.1	0.83	1.46
Wielkopolskie	0.40	12.0	-0.07	-0.46
Zachodniopomorskie	0.06	14.0	0.23	0.16

Source: as in Table 1.

ships (Table 2) and *poviats* (Fig. 3). It turned out that in the studied financial framework the EU programme payments were the lowest in relation to the development level in the Śląskie voivodeship (-0.97), while the values of differences were above the threshold of 1.00 in the four voivodeships of Eastern Poland: Lubelskie, Podkarpackie, Podlaskie and Warmińsko-Mazurskie. In the case of *poviats*, the absorption was much lower than the development level (difference below -1.50) in 26 *poviats*, including 21 cities with *poviat* status and 5 highly-urbanised land *poviats* of: Lubin (Dolnośląskie voivodeship), Piaseczno and Pruszków (Mazowieckie voivodeship), Mikołów and Rybnik (Śląskie voivodeship) (Fig. 3). On the other hand, the absorption remarkably higher than the development level (difference over 1.50) was found in as many as 92 *poviats*. These units were most numerous in the four voivodeships of Eastern and Central Poland: Lubelskie, Mazowieckie, Podlaskie and Warmińsko-Mazurskie.

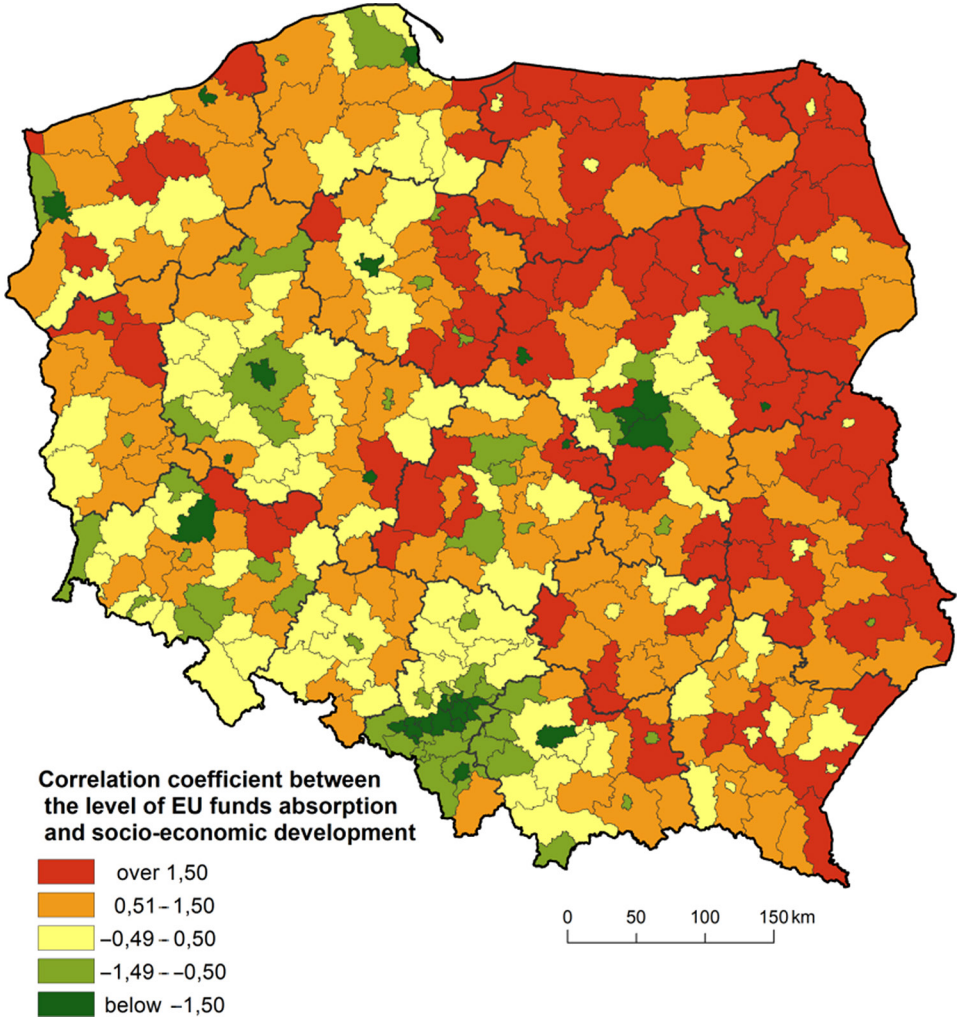


Fig. 3. Correlation coefficient for levels of absorption of funds from EU programmes and socio-economic development of *poviats*

Source: as in Table 1.

The analysis of the relation between absorption of the EU funds and socio-economic development is more complex, which is exemplified by the *poviat* of Suwałki and Świnoujście. In both cases the level of financial support is very high; the structure of its sources (Cohesion Policy and Common Agricultural Policy), however, is manifestly different. It points to a multi-directional impact of EU programme payments on socio-economic development and to the need for further analysis of this process, including the structure and spatial distribution of delivered payments. It is confirmed by large differences between the values of the correlation coefficients calculated for the development level and the indicators

of absorption of funds from the Common Agricultural Policy and the Common Fisheries Policy together (-0.521) and the Cohesion Policy (0.009). Therefore, in the analysed period (2007–2013) it was mostly the payments dedicated for rural areas, not to the cohesion policy, that were targeted to the less developed regions. It puts into question the possible efficiency of EU funds as an instrument of reducing development disproportions between regions.

Summary and discussion

The attempt to sum up the funds from EU funding programmes delivered during the financial framework of 2007–2013 in Poland has resulted in presenting the spatial distribution of nearly 480 bln PLN spent within Cohesion Policy and Common Agricultural Policy in Polish regions. It has been shown that the spatial distribution of these funds featured large territorial differences, in terms of both the amount and the sources of payments. It has emerged that the value of the absorption index for these funds per capita is negatively correlated with the level of socio-economic development. Such correlation results from the allocation of payments dedicated for development of agriculture and rural areas, as the distribution of cohesion funds is not correlated with the level of socio-economic development in regions.

Among the paradigms of the present-day regional policy of the EU there is a prevailing opinion that the existing potential of regions should be utilised by strengthening regional competition (Medeiros 2016). In order to achieve the aim it is inevitable to combine different kinds of territorial capital (OECD 2009) understood as the totality of tangible and intangible assets of regions (OECD 2001, Szlachta, Zaucha 2010, Szlachta 2017) and determined by the sustainable development of the three related factors: economy, society and environment (Markowski 2015). In order to avoid the ‘middle income trap’, the existing territorial capital available in particular regions should be utilised in a more effective manner Szlachta (2017). To this end, instruments integrating urban policy with development policy of rural areas must be designed. Sustainable and resilient growth may be applied through properly selected and financed smart regional specialisations (Camagni, Capello 2013, Dziemianowicz 2014).

The study has proved that EU programme payments are a complex system which has an important impact on the quality the territorial capital of Polish regions. Yet further cooperation and targeting of funds is necessary to use them as a tool for developing regional specialisations. The authors argue that it is necessary to plan Cohesion Policy and Common Agricultural Policy for the forthcoming EU financial frameworks so that they provide the tools and instruments integrating cohesion policy with rural policies for the most efficient use of regional specialisations.

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Zróżnicowanie przestrzenne absorpcji funduszy programów pomocowych UE w Polsce

Zarys treści: Artykuł prezentuje analizę wielkości i struktury przestrzennej wydatkowania funduszy programów pomocowych UE w Polsce na poziomie powiatów w ramach pierwszej pełnej perspektywy finansowej UE. W badaniach uwzględniono ogół płatności programów unijnych, z wydzieleniem wsparcia ukierunkowanego na rozwój rolnictwa i obszarów wiejskich oraz polityki spójności (16 regionalnych i 4 krajowych programów operacyjnych). Wykazano, że poziom i struktura wydatkowania tych środków jest przestrzennie zróżnicowana. Wskaźnik absorpcji funduszy UE na mieszkańca jest ujemnie skorelowany z poziomem rozwoju społeczno-gospodarczego, co wynika z alokacji płatności przeznaczonych na rozwój rolnictwa i obszarów wiejskich. Dystrybucja funduszy spójności nie jest skorelowana z poziomem rozwoju społeczno-gospodarczego w powiatach.

Słowa kluczowe: programy pomocowe UE, polityka spójności, wspólna polityka rolna, wspólna polityka rybołówstwa, Polska