

# Inequalities of the Development of Polish-Ukrainian Transborder Regions

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## Abstract

*The purpose of the article is the estimation of the level of development of Polish-Ukrainian transborder regions, provision of an outline of problems and perspectives of their development, and of possible ways of solving such problems. The hypothesis states that the border line, on both the Ukrainian and Polish sides, is a powerful negative factor in the development of border regions. It is particularly visible on the Ukrainian side of the border. In order to delimitate the research area, the criterion of its location on counties (administration areas are named: in Poland — “powiat,” in Ukraine — “raion”) frame was applied. Therefore, for the transborder region, we consider administrative units located directly near the border: 9 counties of the Lubelskie and Podkarpackie voivodships for the Polish side, and 10 counties of 3 transborder regions in Ukraine (Lviv, Volyn, and Zakarpattia). For complex analysis of its development, we selected 9 diagnostic variables of sociodemographic, environmental, and economic development. In order to evaluate the level of development of transborder region, the synthetic index of its development was elaborated (Perkal index). The analysis of the spatial distribution of selected variables showed similarities in the development of Polish-Ukrainian transborder regions by environmental aspect, but significant differences in economic and sociodemographic depictions. In the context of the Perkal index, 4 classes of development of administrative units were elaborated. The worst situation regarding development was observed in the Volodymyr Volynskyi County with a level of development of -0,58. The best situation was observed in the case of the Bieszczadzki County with a level of development of 0,50. According to the authors, greater integration of Ukraine with the European Union, and active policy for activation of transborder regions could contribute to a reduction of differences in development of Polish-Ukrainian border regions.*

**Keywords:** sustainable development, transborder region, Polish-Ukrainian transborder regions, Perkal index

**JEL:** Q01, R11

## Introduction

The investigation of the current state, conditions, and perspectives of development of the Polish-Ukrainian transborder region is a valid research problem (*Pogranicze polsko-ukraińskie...* 1999; *Euroregion Bug...* 2000; Dolishnii 2000; Eberhardt 1989, 2003, 2004, 2011; Gorzelak 2000; Górz 2000; Jakubowski 2015; Kawałko and Mischczuk 2005; Kostiv and Prytsiuk 2008; Mischczuk 2017; Polski 1997; Poruchynska 2014; Prytsiuk and Fliaga 2007; Rudenko, Khomra, and Starostenko 1996).<sup>1</sup> The Polish-Ukrainian transborder region is a very interesting study area. The border can cause regression or stagnation in terms of economic development, leading to a situation in which the region becomes peripheral. According to Mischczuk (2013, 11), “one of the most spectacular

1. See also: Проблеми співробітництва прикордонних територій України і Польщі. Наукові доповіді учасників українсько-польського семінару у м. Ужгороді (травень 1994) і польсько-українського семінару в Любліні (вересень 1994) [Problemy spivrobotnytstva prykordonnykh terytorii Ukrainy i Polshi]. Варшава-Київ, 1995.

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dimensions of peripherality is geographic transport location.” Such a situation is characteristic of many transborder regions around the globe, although it does not have to always be like that. According to Meksuła and Grzechnik (2015), today’s Polish-Ukrainian transborder zone had more transport connections in the period of existence of the Soviet Union than it currently does.

The objective of the article is the determination of the level of development of the Polish-Ukrainian transborder zone, presentation of an overview of modern problems and perspectives of development of the aforementioned regions, and their solutions. The paper presents a hypothesis stating that the presence of the border both on the Ukrainian and Polish sides is an important destimulant of development of the Polish-Ukrainian transborder region. It is particularly evident on the Ukrainian side of the transborder region. For the purpose of verification of the research hypothesis the analysis of selected sociodemographic, economic and ecological indices of the development of the Polish-Ukrainian transborder zone was conducted.

## 1 Literature review

In spite of a considerable number of initiatives undertaken for the purpose of improvement of the quality of life and social welfare, a number of socio-economic problems and polarization of society through increasing socio-economic inequalities on the international, national, and local level are still encountered. Modern discussion on development focuses on the concept of sustainable development. Sustainable development is defined as a process leading to changes in perspective and assuming a change of the paradigm from development based on equality and excessive exploitation to that of one requiring new forms of responsibility and solidarity (Kjaergard, Land, and Pedersen 2014; Shiva 2005). According to Pawłowski (2009), environmental, social, and economic pillars of sustainable development should be supplemented with the moral, technical, legal, and political pillars. According to Bartniczak and Raszowski (2017, 133), “the implementation of the concept of sustainable development on the national or regional level should on the one hand facilitate the use of the appearing development opportunities, and on the other hand help counteract the occurring problems.” Therefore, the identification of the appearing problems and use of new development opportunities is one of the most important research problems. High importance of ecological and economic components of sustainable development are the subject of research and analyses by scientists from both Poland and Ukraine. The issues of sustainable development are extended by the issue of health and demographic potential of the population which is the key element of the quality of life, resulting from sustainable development (Bański et al. 2014; Makarewicz-Marcinkiewicz 2015).

In the context of the extensive literature on the subject, the Polish-Ukrainian transborder region is described as a peripheral region. Peripherality, both on the national and regional level, beginning from the early 1980s, is broadly discussed in studies by representatives of different scientific disciplines (Cullen and Pretes 1998; Grosse 2007; Rokkan and Urwin 1983; Schmidt 1998; Verdery 2002; Zarycki 2009; Zastavnyi 2006). It should be emphasized that geographers not only from different countries, but also in particular scientific centers, define the phenomenon of peripherality and marginality in different ways (Cullen and Pretes 1998). Schmidt (1998) attempted the comparison of different criteria of defining peripherality in scientific literature. According to the author, peripherality (of marginality) covers the following dimensions: geometric, ecological, economic, social, cultural, and political. According to Grosse (2007), criteria of a peripheral region can be divided into three types: a factor of distance—i.e., distance from economic centers, a demographic factor, resulting from low population density, and an economic factor the main aspect of which is a low level of average income. Rokkan and Urwin (1983) proposed a three-dimensional system of central-peripheral patterns: military-administrative, economic (including the division into urban and rural areas), and cultural.

A term frequently used in this paper is development of transborder regions. It is often associated with socio-economic development. According to Kowerski (see: Miszczuk 2017, 11–32), socio-economic development is a multi-aspect phenomenon, described as a process of positive quantitative-qualitative changes in different spheres of social life: economic, cultural, social, etc. (Chojnicki 1999, 269) also associates the term development with the concept of change, and defines

it as a sequence of changes “directed and irreversibly occurring in the structure of complex objects (i.e., systems).” Modern literature on the subject includes many papers discussing the complex assessment of socio-economic development of different administrative units. Such works include the paper by Angelovic and Istok (2016) concerning theoretical and methodological aspects of research on the quality of life of residents of transborder regions, and the paper by Kowerski (see: Miszczuk 2017, 11–32) regarding the application of taxonomic and econometric methods in the analysis of the level of socio-economic development of transborder regions. The papers inspired the authors of this article to undertake the assessment of the modern level of socio-economic development of the Polish-Ukrainian borderland.

## 2 Source data and study methods

Due to the multi-aspect character of the development process, it cannot be described by means of only one measure. Therefore, taxonomic and econometric methods have also been already applied for a long time (Miszczuk 2017, 12). In Polish literature on the subject, many taxonomic measures of development are applied, aimed at ordering administrative units by their level of socio-economic development. Such measures include the Wrocław taxonomy (dendrite method) and its modifications in papers by Hellwig (1968), Pluta (1977), Zeliaś (2000), and Panek (2009). An interesting methodological solution is the application of the social development index by Kowerski and Matkowski (see: Kawałko and Miszczuk 2005, 127–130). The aforementioned authors attempted to apply HDI in the assessment of the level of socio-economic development of the Polish-Ukrainian transborder zone composed of the Lubelskie and Podkarpackie voivodships, as well as the Lviv, Volyn, and Zakarpattia Oblasts.<sup>2</sup> According to their calculations, Polish administrative units could be described as developed, and the Ukrainian ones—as weakly developed. Research on five regions (Podkarpackie and Lubelskie voivodships, and the Lviv, Volyn, and Zakarpattia Oblasts) in comparison to the remaining regions of the NUTS 2 level of the European Union by means of k-means, conducted by Jakubowski in 2013 showed that the entire Polish-Ukrainian transborder region belongs to the group of the weakest economically developed regions in the analyzed NUTS 2 EU area. Other research by Jakubowski (2017) for 2013 showed that in the system of administrative units of the Polish-Ukrainian transborder region, the Lubelskie Voivodship and Lviv Oblast can be included among highly developed regions (positively distinguished in comparison to other administrative units of Poland and Ukraine), and the Podkarpackie Voivodship and Volyn Oblast—to regions developed on a medium level (with indices lower than the national average).

This paper presents an attempt to analyze the modern development of the state of the Polish-Ukrainian transborder area. The delimitation of the study area employed the criterion of location on the county level.<sup>3</sup> Transborder areas were recognized as administrative units located directly at the national border—9 counties from two voivodships (Lubelskie and Podkarpackie) on the Polish side, and 10 counties from 3 Oblasts (Volyn, Lviv, and Zakarpattia) on the Ukrainian side. The area also covers 2 Polish cities on county rights, namely Chełm and Przemyśl, and 3 Ukrainian cities subordinate to oblasts: Volodymyr Volynskyy, Novovolynsk, and Chervonohrad. The study area covers approximately 22 thousand km<sup>2</sup>, including 11,9 thousand km<sup>2</sup> on the Ukrainian side (2,0% of the area of the country), and 10,9 thousand km<sup>2</sup> on the Polish side (3,5% of the area of the country).<sup>4</sup> It is a weakly urbanized area (particularly its Polish part), with low population density (with the exception of certain administrative units of the Lviv Oblast characterized by higher population density in comparison to the national average).

The complex assessment of the level of development of administrative units of the Polish-Ukrainian transborder area, considering the basic assumptions of the concept of sustainable development, covered diagnostic variables of socio-demographic, economic, and ecological character (tab. 1).

2. Oblast (область)—Ukrainian administration unit, equivalent of Polish voivodship.

3. Administration units are actually named: in Poland—powiat (Polish: powiat), in Ukraine—raion (район). From here “county” will be used for both, Polish and Ukrainian, above mentioned units.

4. [In the journal European practice of number notation is followed—for example, 36 333,33 (European style) = 36 333.33 (Canadian style) = 36,333.33 (US and British style).—Ed.]

**Tab. 1.** Areas of development of the Polish-Ukrainian transborder area

Areas of development	Diagnostic variables and their character
Socio-demographic	<ul style="list-style-type: none"> <li>• level of urbanisation (in %) (nominant)</li> <li>• demographic load per 1 000 persons at productive age (destimulant)</li> <li>• coefficient of live births per 1 000 persons (stimulant)</li> <li>• coefficient of deaths per 1 000 live births (destimulant)</li> </ul>
Ecological	<ul style="list-style-type: none"> <li>• forest area (in %) in total area (stimulant)</li> <li>• arable land (in %) in total area (stimulant)</li> <li>• industrial air pollution (in tons per km<sup>2</sup>) (destimulant)</li> </ul>
Economic	<ul style="list-style-type: none"> <li>• average monthly gross salary (in USD) (stimulant)</li> <li>• unemployment rate (in %) (destimulant)</li> </ul>

A considerable barrier in the choice of diagnostic variables was methodological, terminological, and temporal comparability of data (Miszczuk 2005, 65). The basis for calculations was the period 2015/2016. Statistical data were obtained from the Central Statistical Office of Poland (in the case of administrative units of the Polish side of the transborder area) and the Lviv Statistical Office, Statistical Office in Lutsk, and Zakarpattia Statistical Office (in the case of administrative units on the Ukrainian side).

Three formal criteria were met in the selection of measures for the assessment of development of the Polish-Ukrainian transborder area:

- spatial completeness for the analyzed administrative units,
- reduction of excessively correlated measures, and
- relatively high spatial variability.

The complex measure of development of the Polish-Ukrainian transborder area, composed of the 3 aforementioned areas (socio-demographic, ecological, and economic) was calculated by means of the Perkal measure in the following form:

$$(1) \quad W_s = \frac{1}{p} \sum_{j=1}^p y_{ij},$$

where:

$W_s$  — synthetic index,

$j = 1, 2, 3, \dots, p$  (whereas  $p$  is the number of considered parameters),

$y_{ij}$  — standardized value of  $j$ -th parameter for  $i$ -th object (Runge 2006, 214).

The selection of the Perkal measure for the assessment of the development of the Polish-Ukrainian transborder area is determined by the simplicity of calculations and interpretation of the obtained results. It is worth emphasizing that the simplicity of calculations is a commonly accepted argument for adopting this type of synthetic measure towards interpretative measures with a high degree of complexity. This was discussed by researchers such as Grabiński, Wydymus, and Zeliaś (1982), Rees et al. (1999), and Bański et al. (2014).

The application of the synthetic index first required the standardization of values of indices describing the intensity of particular parameters in the analyzed administrative units of the Polish-Ukrainian transborder region. Standardization for parameters with a character of stimulants was performed based on the following formula:

$$(2) \quad y_{ij} = \frac{x_{ij} - \bar{x}}{s_j},$$

where:

$y_{ij}$  — standardized value of  $j$ -th parameter for  $i$ -th object,

$x_{ij}$  — value of  $j$ -th parameter for  $i$ -th object,

$\bar{x}$  — arithmetic mean value of  $j$ -th value,

$s_j$  — standard deviation of the value of  $j$ -th value.

For destimulants, index values were standardized by means of the following formula:

$$(3) \quad y_{ij} = \frac{\bar{x} - x_{ij}}{s_j}.$$

In the case of the variable nominant (level of urbanization), separate values for urban counties and cities subordinate to oblasts on the Ukrainian side of the border, and rural counties and counties of the Ukrainian side of the transborder region were adopted as the nominal value. The values correspond to mean national values for those categories of units.

Based on the distribution of values of Perkal's synthetic index of development ( $W_s$ ), administrative units of the Polish-Ukrainian transborder area were ordered and classified with the designation of 4 classes of spatial units with an approximate level of values of a given index in the scope of analyzed output parameters (insufficient, sufficient, average, and high level of development).

### 3 Results and discussion

The Polish-Ukrainian transborder area is a very specific study region, developing according to the description by Miszczuk, "on the one hand on the conditions of considerable economic disproportions and institutional distance between the Polish and Ukrainian part, and on the other hand—it has certain common features, and problems typical of near-border and transborder areas" (2017, 5).

The development of the Polish-Ukrainian transborder region according to Flaga, Pantyley and Łoboda (see: Miszczuk 2017, 93) is determined by the following factors:

- Historical peculiarities of development—involving strengthening of its position as an agricultural region.
- Considerable distance from centers of both countries—particularly in the case of the Ukrainian part of the transborder area, providing the basis for treating it as a peripheral region.
- Implications of the effect of the Communist system—which inhibited socio-economic development, particularly in the Polish-Soviet transborder area. The border existing here had a character of a so-called "hard border," and completely prevented the development of broader contacts between residents of neighboring municipalities. This evidently contrasted with the Polish-Czech or even Polish-German border along which a number of border crossings existed enabling the development of local commerce and exchange of people (Maruszczak and Michalczyk 2004).
- Intensification of spatial polarization—as a result of intensive socio-economic transformations. This caused the occurrence of two types of areas (Czyż 2001; Herbst and Wójcik 2013; Pięta-Kanurska 2010): economically strong regions with a character of islands, and problem areas, particularly including east Poland and west Ukraine.
- Poland's accession to the European Union and introduction of visas for neighboring countries from outside the European Union—initially inhibited economic cooperation, particularly for the Ukrainian side. In recent years, however, the situation in the scope of economic cooperation and migration of the population at productive age has considerably improved.

The aforementioned factors led to the occurrence of many differences in the socio-economic, ecological, and demographic scope, between the transborder region and other regions of Ukraine and Poland (tab. 2).

In environmental terms, the Polish-Ukrainian transborder zone is uniform. It is evident in the similar land use structure. The highest contribution of forests is characteristic of administrative units of the southern part of the analyzed area: Bieszczadzki and Leski counties on the Polish side and the Velykyi Bereznyi and Staryi Sambir counties in Ukraine. Almost half of the area is occupied by forests in counties of the northern part of the area in the Włodawski County and in Shatsk and Liuboml counties. High forest cover also occurs in the Lubaczowski County, and in Yavoriv and Mostyska counties. The aforementioned administrative units largely occupy areas with high environmental values, covered with transborder protection as biosphere reserves "East Carpathians," "West Polesie," and "Roztocze"—existing on the Ukrainian side, planned to be expanded onto the Polish side. The high contribution of arable land in the land use structure, determined by high quality of soils, occurs in the territory of Poland in the Hrubieszowski, Tomaszowski,

**Tab. 2.** Selected indices of the development of Polish-Ukrainian transborder regions in 2002–2015

Index	Ukrainian transborder regions						Polish transborder regions					
	Ukraine		Lviv Oblast		Volyn Oblast		Poland		Lubelskie Voivod.		Podkarpackie Voiv.	
	2002	2015	2002	2015	2002	2015	2002	2015	2002	2015	2002	2015
	<b>General information</b>											
Territory (in thousands of km <sup>2</sup> ) . . . . .	603,7	603,7	21,8	21,8	20,2	20,2	312,7	312,7	25,1	25,1	17,9	17,8
Population (in thousands) . . . . .	48 457,1	42 760,5	2 626,5	2 534,2	1 060,7	1 042,7	38 232,3	38 437,2	2 199,1	2 139,7	2 104,3	2 127,7
Level of urbanization (in %) . . . . .	67,2	69,2	59,3	61,0	50,3	52,3	61,7	60,3	46,6	46,2	40,5	41,3
Population density (in number of people / km <sup>2</sup> ) . . . . .	80,3	70,8	120,5	116,2	52,5	51,0	122,3	123,0	87,6	85,0	117,6	119,0
Number of counties . . . . .	490	490	20	20	16	16	308	314	20	20	20	21
	<b>Demographic situation</b>											
Birth rate (in ‰) . . . . .	8,1	10,7	9,2	11,0	11,1	12,8	9,3	9,6	9,4	9,2	10,0	9,2
Death rate (in ‰) . . . . .	15,7	14,9	13,0	13,0	14,1	13,2	9,4	10,3	10,3	10,6	8,5	9,1
Net migration (in thousands) . . . . .	-33,8	9,25	-1,2	0,29	-1,1	0,14	-17,9	-15,8	-3,9	-5,5	-3,0	-2,7
Life expectancy at birth (in years) . . . . .	68,8	71,4	70,9	73,3	68,9	71,5	74,6	77,6	74,5	77,9	75,8	78,7
The share of population over 60 in the total number of population (in %) . . . . .	21,3	22,1	19,1	19,9	19,4	17,9	17,0	22,7	18,1	23,1	16,4	21,1
	<b>Socioeconomic situation</b>											
The average monthly income in households (in USD per capita), according to the PPP . . . . .	181,6 <sup>a</sup>	284,6	167,7 <sup>a</sup>	265,1	162,0 <sup>a</sup>	239,5	329,8 <sup>a</sup>	776,9	276,8 <sup>a</sup>	687,6	265,9 <sup>a</sup>	602,2
The average gross salary per month (in USD), according to PPP . . . . .	308,2 <sup>a</sup>	538,9	269,4 <sup>a</sup>	468,5	99,1 <sup>a</sup>	422,8	1 087,0 <sup>a</sup>	2 190,2	955,2 <sup>a</sup>	1 960,6	932,9 <sup>a</sup>	1 889,8
Unemployment rate (in %) . . . . .	11,6 <sup>b</sup>	9,1	13,3 <sup>b</sup>	8,2	10,0 <sup>b</sup>	9,8	15,1 <sup>b</sup>	9,7	14,0 <sup>b</sup>	11,7	16,2 <sup>b</sup>	13,2
The share of expenses on food among all expenses of households (in %) . . . . .	59,1	57,2	58,8	59,9	66,0	60,2	29,5	24,0	30,4	25,4	32,8	26,5
	<b>Ecological situation</b>											
Forest area (in ha / 100 people) . . . . .	22,5	24,9	25,5	27,4	66,1	66,9	23,8	24,5	25,8	27,7	31,5	32,4
Emission density of air pollutants (in tons / km <sup>2</sup> ) . . . . .	10,1	4,7	8,6	4,7	1,8	0,2	6,9	5,3	1,8	0,9	1,6	1,2
Industrial and municipal waste requiring treatment, discharged into water or soil (in m <sup>3</sup> / person) . . . . .	61,0	20,5	15,0	16,6	6,0	0	59,6	55,2	34,0	32,9	37,1	32,5

Source: Own elaboration based on the data of main statistical offices of Poland and of Ukraine, and statistical offices in Lublin, Rzeszów, Lviv, Lutsk, and Zakarpattia  
<sup>a</sup>Data for the year 2001; <sup>b</sup>Data for the year 2000

and Jarosławski counties, and in Ukraine—in the neighboring Zhovkva, Ivanichi, and Volodymyr Volynskiy counties. Administrative units neighboring along the border are usually characterized by approximate values of the air pollution index per 1 km<sup>2</sup>. The lowest level of pollution is characteristic of counties and regions in Bieszczady and Carpathian Foothills, and Lubaczowski County. The highest pollution index, with no counterpart on the Polish side, concerns the territories of Sokal, Ivanichi and Volodymyr Volynskiy counties. It is determined by both the developing industry and less restrictive legislature in the scope of environmental protection. Whereas in the case of ecological development both analyzed countries and transborder areas are similar to each other, in the case of the socio-economic situation, drastic differences are visible, not only between the two neighboring countries, but also in the borders of both countries in the scope of variables such as the level of income of the population, average gross monthly salary, or food expenses. Regarding the demographic situation of the Polish-Ukrainian transborder area, in the case of the Ukrainian part it is more favorable than throughout Ukraine. The Polish side of the transborder region looks less favorable in comparison to the rest of the country. The spatial variability of separate measures of the level of development of the Polish-Ukrainian transborder region, as well as the Perkal synthetic index are presented in figure 1 (see following pages).

As seen in figure 1, the transborder region on the Polish side is of evident rural character. The urbanization index is much lower not only in comparison to the entire country (60,3%), but also both near-border voivodships (Lubelskie—46,2%, Podkarpackie—41,3%). The urban population is concentrated in only 17 cities, 3 of which belong to medium-sized categories, namely Chełm, Przemyśl, and Jarosław. The three remaining ones were small, including very small cities, where the population did not exceed 5 thousand. In reference to the Polish part of the transborder region, its Ukrainian part is characterized by a higher level of urbanization, but the values are lower both in comparison to the entire Ukraine (69,2%), and two near-border oblasts (the average value for the oblasts amounts to 57,0%). The Ukrainian part of the transborder region includes two cities with a population of more than 50 thousand, namely Chervonohrad and Novovolynsk, although their role in shaping the modern settlement network in the region has considerably decreased.

Apart from regional demographic factors, natural growth in the transborder region is determined by current national social trends referring to forms of marital life and family model. The process is observed on both sides of the border, although it is more intensive on the Ukrainian side. The prevalence of deaths over births resulted in a natural decrease in population over the majority of the Polish transborder area. Apart from the Podkarpackie's counties—Przemyski, Jarosławski, and Leski, where natural growth amounted to 1‰—natural losses of population occurred in all the remaining units. They were particularly high in the case of the Hrubieszowski and Chełmski counties and the cities of Przemyśl and Chełm.

The Ukrainian part of the transborder region is positively distinguished in comparison to the entire Ukraine in terms of natural growth of the population and its components—coefficient of births and deaths. The analyzed units of the Ukrainian transborder area are characterized by relatively high, in comparison to the remaining part of the country, birth rate, low coefficients of deaths, relatively high average estimated life expectancy at birth and relatively young age structure of the population. In terms of 2-year natural growth of population, however, only five administrative units with positive growth stand out in the Ukrainian part of the transborder area, namely the Yavoriv (approximately 4‰), Turka, and Zhovkva counties (approximately 2‰) in the Lviv Oblast, and the Liuboml County and the city of Volodymyr Volynskiy in the Volyn Oblast. In the Velykyi Bereznyi County of the Zakarpattia Oblast, natural growth slightly exceeded 0. The greatest demographic regress is characteristic of northern administrative units of the Ukrainian transborder area: the Ivanichi and Volodymyr Volynskiy counties and the city of Novovolynsk in the Volyn Oblast, as well as the demographically old Staryi Sambir and Sokal counties, together with the city of Chervonohrad in the Lviv Oblast, characterized by considerable migration outflow of the population.

Residents of the Polish part of the transborder area currently constitute one of the older communities in the country. In 2015, the contribution of persons at post-productive age in the total population averaged approximately 20,2% in the counties of the Lubelskie Voivodship, and 18,4%—in



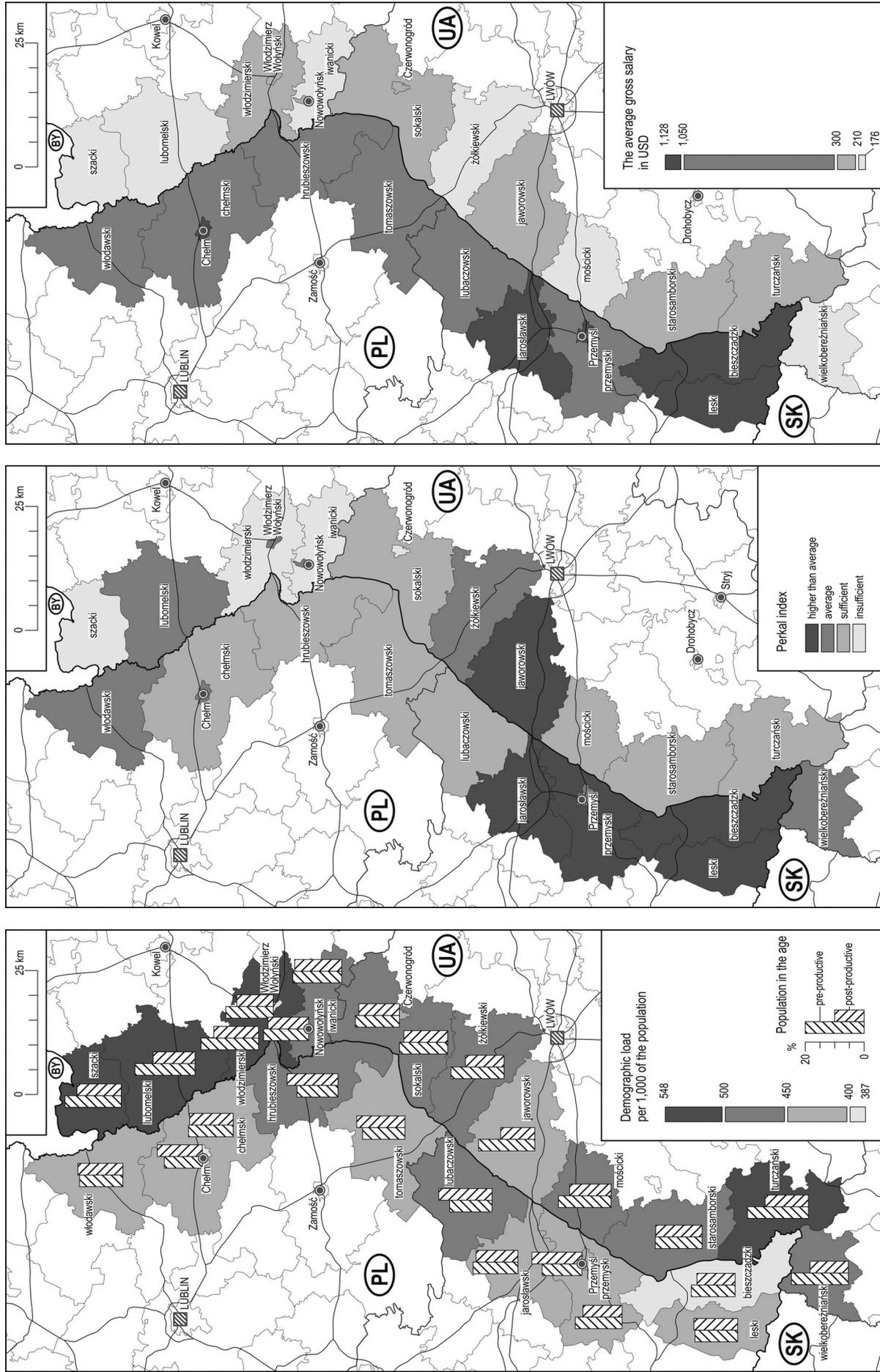


Fig. 1. Indices of the development of Polish-Ukrainian transborder regions

the Podkarpackie Voivodship. On the background of the entire region, high contributions of this age group were characteristic of the county cities of Chełm (21,0%) and Przemyśl (22,0%). Aging of urban populations is currently observed as a result of outflow of young persons from the productive group and a decrease in the level of births. Rural population is subject to certain rejuvenation, directly through the inflow of young families with children, and indirectly as a result of an increase in the level of births owing to the young population.

The Ukrainian transborder area still maintains a relatively young age structure of the population. The contribution of people of pre-productive age on the Ukrainian side of the transborder area in 2015 amounted to 17,8%, whereas the average value for Ukraine amounted to 15,2% at the time. In the microspatial approach, the most favorable situation in those terms is characteristic of the Turka and Liuboml counties (somewhat more than 20,0%), as well as the Velykyi Bereznyi County. The population of the Ukrainian side of the transborder area is also characterized by relatively lower contributions of the elderly in comparison to the national average.

The state of the modern demographic structure of the population in the transborder area is reflected in the variability of the value of the coefficient of demographic load of population at non-productive age (age ranges: 0–14 or 65 and more). The total value of the coefficient of demographic load on the Polish side of the transborder area amounted to 428 persons per 1000 persons at productive age. The most unfavorable situation concerns the southern counties in the Lubelskie Voivodship: Lubaczowski (481), Tomaszowski, and Hrubieszowski, and the most favorable—the Bieszczadzki County (387) in the Podkarpackie Voivodship. Moreover, in the Lubelskie Voivodship, a higher load of population at post-productive than pre-productive age was observed, whereas in the Podkarpackie Voivodship, both of the components showed similar contributions. In the spatial approach, areas with the highest load coefficients overlapped with areas with a high percentage of persons at post-productive age (among others in the Hrubieszowski County or city of Przemyśl), and the lowest coefficients were typical of areas with comparatively higher contributions of persons at production age (the Bieszczadzki and Przemyski counties). The Ukrainian part of the transborder area is characterized by considerably higher values of the coefficient in comparison to the Polish side. In the microspatial approach, a considerably worse situation concerns the rural Turka County (548 persons per 1000 persons at productive age), as well as administrative units of the Volyn Oblast such as the Shatsk, Liuboml, and Volodymyr Volynskyi counties (with the average coefficient value of 526).

The most reliable measure of the socio-economic situation of the region are on the one hand macroeconomic measures (such as gross national product per 1 capita), and on the other hand—measures of the economic condition of households (such as average monthly income of households per 1 household member, or measures of expenditures of households for food in the structure of total expenditures of households). Due to the lack of relevant statistical data for administrative units of the 2nd degree on both sides of the border, however, the measure of average gross salary per 1 employee was applied. For retaining the comparability of the index, gross salary, expressed in currencies of respective countries—PLN and UAH, was converted into one universal currency, namely USD. In the context of the aforementioned measure, the best situation occurs in some counties in the Podkarpackie Voivodship: Jarosławski, Bieszczadzki, Przemyski, together with the city of Przemyśl, and the worst—in the northern weakly urbanized areas of the Volyn Oblast—Shatsk, Ivanichi, and Liuboml. The difference between the richest and poorest regions in the scope amounts to even 6,4 times.

In the context of the Perkal measure, 4 classes of development of administrative units were designated in the analyzed area of the Polish-Ukrainian transborder area (tab. 3), varying from the insufficient level (the outsider Volodymyr Volynskyi County with a level of development of  $-0,58$ ) to a higher than average level (the leading Bieszczadzki County with a value of development level of  $0,50$ ).

In the context of the Perkal index, the worst situation concerns the Shatsk County, north-eastern areas of the Volyn Oblast: Volodymyr Volynskyi and Ivanichi counties (they are poor, weakly urbanized areas with unfavorable age structure), as well as the city of Chervonohrad (as a result of the worst ecological situation throughout the study area). A sufficient level of development

**Tab. 3.** Classes of development of administrative units of the Polish-Ukrainian transborder area

Value of the Perkal measure	Level of development
From $-0,600$ to $-0,300$ )	insufficient
From $-0,300$ to $0,000$ )	sufficient
From $0,001$ to $0,300$ )	average
From $0,300$ to $0,600$ )	higher than average

is characteristic of the majority of the analyzed units of the Polish-Ukrainian transborder area, particularly located in the southern part of the Lviv Oblast (poor mountain regions with an unfavorable age structure and considerable migration outflow of the population), as well as the northern Sokal County (due to the unfavorable ecological situation in the region). On the Polish side of the transborder area, this class includes all counties of the Lubelskie Voivodship except for the Włodawski County and the city of Chełm. The best situation in the context of the Perkal measure concerns the southern counties of the Polish part of the transborder area (Bieszczadzki, Przemyski, Jarosławski, Leski) due to the favorable combination of ecological, demographic, and economic indices, as well as the only administrative unit on the Ukrainian side of the transborder area—Yavoriv County, characterized by the best demographic situation among all analyzed units of Ukraine, and favorable ecological situation.

## Final conclusions

The study permitted obtaining a more detailed image of the development of the Polish-Ukrainian transborder zone. A considerable disproportion is evident in the level of development in the southern part of the zone. Counties with a development index above the average, namely Bieszczadzki, Przemyski, and Jarosławski neighbour on the Mostyska, Staryi Sambir, and Turka counties, where the level of development was determined two classes lower (sufficient level). A similar situation occurs in the northern part of the area. The Włodawski County, characterized by average level of development, neighbors on the Shatsk region with insufficient level of development. A somewhat smaller contrast occurs between the Chemski and Hrubieszowski counties (sufficient level), and the Shatsk and Novovolynsk counties. The level of development according to the Perkal index is coherent between the Tomaszowski, Hrubieszów, and Sokal counties (sufficient level of development), Włodawski County, and Lubomelsk County (average level of development), as well as the Jarosławski County and Yavoriv County. Development indices more favorable than on the Polish side occurred in the transborder zone of Yavoriv County (development higher than average) and Zhovkva County (average development), neighboring on the Lubaczowski and Tomaszowski counties (sufficient level of development).

Such evident disproportions of development are determined historically. From the 1940s, the area developed in a different political-economic situation. Chances for more coherent development of the zone are offered by closer cooperation between Poland and Ukraine. Nowadays transborder cooperation between Poland and Ukraine, on one hand, has become an important instrument for sustainable development of the regions due to additional funds (international technical aid and investments) and, on the other hand, has become an important factor of the creation of positive investment image in the region. In this context one should admit the necessity of more complex consideration of the situation within the Polish-Ukrainian transborder zone in European Union regional policy or even establishing special programs, supporting the development of these regions. In the light of analyzed developmental indices of the Polish-Ukrainian transborder zone one should conclude that even fast accession of Ukraine to the European Union does not solve the developmental problems of aforementioned region. The alignment of the level of development can encounter a number of difficulties related to a division lasting for more than 70 years, resulting in the area gaining features of peripherality both on the Polish and Ukrainian sides.

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