

## **DEPOPULATION OF TRADITIONAL MINING REGIONS IN CENTRAL AND EAST EUROPE: CASE STUDY OF THE UPPER- SILESIAN BASIN (POLAND) AND THE DONETSK BASIN (UKRAINE)**

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### **Abstract:**

The article compares demographic processes taking place in traditional industrial European regions: Upper-Silesian and the Donetsk Basins, which are in their declining stage of development. During communism, a high population concentration was characteristic, currently, migration and population decline are leading to depopulation. Depopulation in the Upper-Silesian Basin is determined mainly by labour migration to the European Union (EU) and by sub-urbanization, whereas, in the Donetsk Basin, it is due to severe population decline intensified by migration. The main reasons are poor economies of the regions, connected with the collapse of numerous industrial facilities and the lack of alternative employment.

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**Key Words:** Coal basin, restructuring of economy, depopulation, migration, population decline

### **Introduction**

Political and economic transformations in Central and Eastern Europe have had a crucial influence on the demographic situation in this part of the European continent. According to the report entitled "The impact of European demographic trends on regional and urban development", issued within the framework of the Hungarian Presidency of the Council of the European Union (EU) (2011), population decline is mostly typical for the new EU member states and the eastern part of Germany. A similar situation is characteristic in the countries of the former Soviet Union. According to the authors, the main cause of population decline lies in political and economic transformations taking place in this part of Europe. The economy restructuring connected with the process of its adjustment to the needs of the local as well as the global markets, forced the liquidation of obsolete facilities, which lead to the reduction of employment and to unemployment, which had been unknown in this part of Europe before 1989. The adaptation to new market conditions was exceptionally difficult in old industrial regions of mono-functional structure of production based on traditional branches of heavy industry. The process of restructuring in such regions, as proved by the experience of Western European countries, is extremely difficult and long-lasting (Hamilton, 1984; Riley, Tkocz, 1998). It is most frequently connected with a total or partial liquidation of the worked-out open cuts, technologically obsolete steelworks and processing plants connected with them. In their place, new industries are introduced and services are developed (Rachwal, 2011; Tkocz, 2006). These, however, are not able to compensate for the loss of jobs in traditional industries, hence, the vast unemployment and emigration of population. The Silesian Voivodeship constitutes an example of such a region in Poland, with the Upper-Silesian Basin in its central part, while in Ukraine, these are the Donetsk Oblast and the Luhansk Oblast, within which the Donetsk Basin is located. Both regions in the times of the communist economy were characterized by intense growth of industry, mining in particular, and mass inflow of workforce (Alforov, 2010, Runge, 2008, Sarzan, 2000, Tkocz, 2001). During the period of economy transformation in Poland, after 1989, and after gaining independence by Ukraine in 1991, in both regions the process of industry restructuring was initiated. It resulted in the liquidation of factories, which did not meet the new market requirements and which applied obsolete and environmentally unfriendly technologies and employed an excessive number of workers (Matykowski, Strykiewicz, 1992; Rechlowicz, Tkocz, 2011). These regions found themselves in the

final stage of their life (Steiner, 1985) and their further development relied on the introduction of new industries and innovative activities. Both regions rapidly faced the crisis phenomena of unemployment, an income decrease in households and a dramatic reduction in the standard of living (Deacom, 2000). The consequence of these phenomena is the migration of population, leading to a steady population decline and an alarming phenomenon of urban shrinking reflected in depopulation of centres, outflow of specialized staff and young people (Krzysztofik, et al., 2011; Mykhnenko, et al., 2010). Even though the two regions were in the past characterized by similar development determinants, in new economic conditions their situations are diverse. This is connected with the fact that Poland has been a member of the European Union since 2004 and its economy had to be adjusted to EU requirements, especially in the limitation of coal mining. The Ukrainian economy is not subject to these restrictions, but Ukraine endeavours to access the EU.

The article aims at a comparison of demographic transformations which took place in the last twenty years in the area of the Silesian Voivodeship and the Donetsk and Luhansk Oblasts in Ukraine, that is in areas intensely developed with vast population inflow, which constituted industrial cores in both countries. An attempt to explain the causes of the observed phenomena was made, including local specifics, in particular. Moreover, contemporary demographic processes were analysed thoroughly and they, to a large extent, reflect the period of the second demographic transition previously observed in Western Europe, which is characterized by a change in the family model, postponed decisions to marry and a decline in reproduction. In order to compare the demographic transformations in various regions, traditional cartographic methods were applied as well as the Webb's typology (1963).

### **Demographic Changes In The Researched Regions**

Ever since the beginning of socio-economic changes in Central and Eastern Europe, i.e. from 1988/89 to 2010/11<sup>1</sup> it may be stated that in most countries of this part of Europe, population was characterized by a downward trend (The impact 2011, fig.3, p.22). High intensity of the depopulation phenomenon is also typical for majority of former Soviet republics, including Belarus (-6,4%) and Ukraine (-10,7%) (fig.1) and is perceived as a consequence of transformations which took place following the collapse of communism (Fassmann, 1994). Poland was one of the few countries where population showed a minimal increase (0,8%). At the same time, the population of the Silesian Voivodeship declined by nearly 300 thousand people (from 4.9 million to 4.6 million - that is by 6.1%), in the Donetsk Oblast by 900 thousand (from 5.3 million to 4.4 million - that is by 17.0%), in the Luhansk Oblast by almost 600 thousand (from 2.9 million to 2.3 million - that is by 20.7%). The Silesian Voivodeship is the second area in Poland, following the Lodz Voivodeship, as far as the intensity of the depopulation phenomenon is concerned. In Ukraine, apart from the above mentioned oblasts, a high index of population decline is also present in the oblasts of Chernihiv (-21.5%) Sumy (-17.9%), Kirovohrad (-17.1%), and Zhytomyr (-17.1%). Depopulation in the analysed regions is much more severe than in other regions of Poland and Ukraine.

An intensive population inflow to the Upper-Silesian and the Donetsk Basins during communist times was accompanied by the development of urbanization processes, therefore, the researched basins in Poland and Ukraine are characterized by a high index of urbanization.

The percentage of urban population in the Donetsk Oblast amounted to 90.5%, in Luhansk 86,7%, and in the Silesian Voivodeship 78,0% (fig.2). Such high indexes result from the development of cities and urban agglomerations where industry constituted the economic basis. Apart from high urbanization and industrialization, these regions are distinguished by a high degree of population concentration. It is mostly visible in the case of the Donetsk and the Luhansk Oblasts, where over 75% of population live on 10% of the regions' areas, whereas in the case of the Silesian Voivodeship it is only half of its population. The high concentration of population in the area of the Donetsk Basin was influenced by various factors, the most important being:

- prevailing significance of heavy industry, especially coal mining, in the economic structure of the Donetsk Basin, and thereby constant attractiveness of large industrial cities as places of residence,

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<sup>1</sup> Polish statistical offices publish data as of the last day of the year (31 December) whereas Ukrainian offices - as of the first day of the year (1 January). Therefore, the article adopted double dates, for example, data for the year 2010/11 refers to population in Poland on 31 December 2010 and 1 January 2011 in Ukraine.

- a much stronger influence of political and economic transformations on the collectivized farming in the times of the Soviet Union and in effect, depopulation of villages and towns of the Donetsk Basin as areas with no perspectives from an economic development point of view, and also deterioration of living conditions for inhabitants of villages and towns (hampered access to trade and services, including medical services),
- poverty preventing mobility, which is the reason why a large group of inhabitants are doomed to live in houses and apartments they received during the times of the Soviet Union, even in situation when there are no perspectives to find jobs in their home towns,
- weaker suburbanization, in comparison to the Silesian Voivodeship, which is an effect of the lack of attractive locations for residence outside urban agglomerations.

The high concentration of population in the Silesian Voivodeship was influenced by strong industrialization of its central part, which lasted continuously since 1740, when the first coal mine was opened. A consequence of it was the development of large and medium-sized cities comprising the Katowice conurbation, the largest metropolitan type area in Poland.

Several factors had influence on the changes in population during the times of the economic transformation of both countries, that is from the beginning of the 1990s. Firstly, social and economic transformations, connected with the transition from the centralized model of the country and the command-and-quota economy to capitalism and, above all, de-industrialization. Participation of industry in the formation of Ukraine's national income in the period of 1991-2009 decreased from 45.7% to 30.0% (Mykhnenko, 2010), in the Silesian Voivodeship from 37% to 29%. The impact of this factor was especially strong in urban centres dominated by large industrial plants. The largest population decline (by over one quarter) was observed in those cities where traditional branches of industry serving as the source of income for its inhabitants, were liquidated or significantly limited their employment. This refers to such centres as: Stakhanov, Kirovsk, Krasnyi Luch and Pervomaisk in the Luhansk Oblast and Shakhtarsk, Yenakieve, Krasnyi Lyman, Torez, Kostiantynivka and Snizhne in the Donetsk Oblast, where the decline amounted to 25-33%. These cities are located along the border between the two oblasts and create one of the largest depopulation areas in Ukraine (Gentil, Marcinczak, 2012). Apart from the above mentioned centres, it is co-formed by five land units in the Luhansk Oblast, i.e. the raions of Popasna, Perevalsk, Kreminna, Antratsyt, and Sverdlovsk with equally high population decline (Mykhnenko, et al., 2010).

The outlook is slightly different in the case of the Silesian Voivodeship, where the change of residency and urban centres depopulation were equally influenced by the restructuring of traditional branches of industry as well as migration connected with the return of population to their home towns and the economic migration, initially mainly to Great Britain and Ireland, but after access to the EU, also to other countries which progressively opened their job markets. Nevertheless, the top of the list are the cities where at least several large industrial plants were liquidated, mainly coal mines and old steelworks, i.e. Katowice, Chorzow, Ruda Slaska, Piekary Slaskie and Bytom. Population decline is approximately half, in comparison to Ukraine and amounts to about 15-17%.

On the other hand, there are centres where industry restructuring happened only on a small scale and until present, a majority of industrial plants operating in the socialist times are still open; they are not public property any longer though, they have been privatized. A flagship example of such cities are large centres of metallurgy and steel working, such as Alchevsk (-10.0 %) in the Luhansk Oblast, Mariupol (-9.7 %) in the Donetsk Oblast and Dabrowa Gornicza (-6.7 %) in the Silesian Voivodeship, where the largest steelworks in Poland, constructed in the 1970s, was sold to a world leader in steel production - Lakshmi Mittal (presently Arcelor Mittal).

A relatively low population decline characterizes regional and sub-regional centres, such as Bielsko-Biala (-1.9 %) or Luhansk (-12.5 %).

Another type of cities consists of centres where the liquidation of traditional branches of industry was accompanied by the establishment of modern technology plants, which was conducive for the reduction of population outflow. Gliwice (-8.5 %), in the Silesian Voivodeship, constitutes the best example of such a centre, where the liquidation of a mine and an ironworks coincided with the opening of a General Motors factory located within the Katowice Special Economic Zone. Unfortunately, there is a lack of such examples in the Donetsk Basin, due to numerous barriers and continued vast risk for foreign investors who would want to locate new factories in Ukraine, but also with delay in implementing economy boost solutions, such as economic zones or preferential

treatment for investors. The economic situation connected with the high indebtedness of the country is also an unfavourable factor, mainly for the International Monetary Fund (IMF) and Russian Gazprom, which delivers gas to Ukraine.

### Characteristics Of Demographic Transformations In 2010

The information presented above lead to a conclusion that considerable depopulation, resulting from various reasons, is present in all researched regions. To find out the reasons, the classic method of J.W. Webb (1963) was applied. Tab.1 presents demographic changes in 2010, with the division not only on downstream administrative units, but also the types of these units. Municipal units have been identified - in the case of Poland, these are township districts, and in the case of Ukraine - mis'krady, and land units - respectively - country districts and raions. The feature that diversifies the researched areas the most is undoubtedly natural migration of population. In respect to it, the the most advantageous is the situation in the Silesian Voivodeship, where natural population increase was observed in a large part of the administrative units, whereas in the Donetsk and the Luhansk Oblasts, all the researched administrative units experienced natural population decline. The dominance of depopulation types E and F clearly points this out. According to Mykhnenko (2010), the birth rate in 2002 decreased to one of the lowest in the world, amounting to 0.9 live births per 1000 women. In both oblasts, natural decline is additionally deepened by migration losses (F). The situation in the Silesian Voivodeship is different; here, the largest group of units is characterized by the predominance of migration outflow over the natural decline (G). The presence of areas with migration inflow and population growth is favourable (B,C). In contrast to the Ukrainian oblasts, all types distinguished by Webb (tab.1) are represented in the Silesian Voivodeship, which indicates that demographic processes are more diversified in this region, in comparison to Ukraine.

**Table 1** Demographic transformations in the analysed area in 2010, according to Webb's types

Type of transformation	The Silesian Voivodeship		The Donetsk Oblast*		The Luhansk Oblast	
	No of units	Population [thousands]	No of units	Population [thousands]	No of units	Population [thousands]
A	1	141,4	0	-	0	-
B	4	395,3	0	-	0	-
C	8	989,3	0	-	0	-
D	2	244,9	0	-	0	-
E	2	222,4	18	1 337,6	12	605,6
F	2	330,3	24	3 013,4	19	1 637,4
G	11	1 591,7	2	35,6	1	48,3
H	6	720,6	0	-	0	-
<b>Total</b>	<b>36</b>	<b>4 635,9</b>	<b>44</b>	<b>4 386,6</b>	<b>32</b>	<b>2 291,3</b>

\* - excluding Krasnyi Lyman and the Krasnozymanskyi raion

Source: own study based on Central Statistical Office 2012, Central Statistical Office of Donetsk Oblast 2012, Central Statistical Office of Luhansk Oblast 2012

Spatial differentiation of the birth rate index in 2010 was presented in figure 3. The first point to mention is that the general value of the birth rate for the Silesian Voivodeship equalled 10.3 of live births per one thousand inhabitants, while in the case of the Donetsk and the Luhansk Oblasts, it was 9,3‰ and 9,1‰ respectively.

Similarly to the change in population in the period of 1988/89 – 2010/11, the differentiation of the birth rate also shows spatial regularity, especially in the Silesian Voivodeship. The lowest, disadvantageous values were observed in districts located in the northern part of the region, whereas the highest values of birth rate were in the southern part. In the Donetsk and the Luhansk Oblasts, a high concentration of low values of the birth rate may be observed in the southern part of the border areas in both oblasts.

A big problem for traditional mining regions in Central and Eastern Europe is a high number of deaths and shorter average lifespan, in comparison to other regions. It is especially apparent in the Donetsk Basin, where factors such as high pollution of natural environment by obsolete industrial plants, insufficient medical services or social problems, mainly alcoholism, are superimposed (Flaga, 2006).

Table 2 presents the number of administrative units in specific value groups for death index, calculated as the number of deaths per one thousand inhabitants. A big discrepancy between the

situation in the Silesian Voivodeship and the Donetsk and the Luhansk Oblasts is noticeable, making it basically impossible to compare the phenomenon applying one scale of values in the arrangement of all analysed regions.

**Table 2** The value of the death indicator in the analysed regions in 2010

Region	The value of the death indicator [number of deaths / 1000 inhabitants] in the lower level units [number of units]							
	<10	10-11	11-12	12-13	13-14	14-15	15-20	>20
The Silesian Voivodeship	19	5	7	5	0	0	0	0
The Donetsk Oblast	0	0	1	1	0	2	34	6
The Luhansk Oblast	0	0	0	0	1	1	25	5
<b>Total</b>	<b>19</b>	<b>5</b>	<b>8</b>	<b>6</b>	<b>1</b>	<b>3</b>	<b>59</b>	<b>11</b>

*Source:* own study based on Central Statistical Office 2012, Central Statistical Office of Donetsk Oblast 2012, Central Statistical Office of Luhansk Oblast 2012.

In eleven units, the number of deaths exceeds 20‰, which is rare in Europe. This refers only to the Donetsk Basin, and mainly to areas with a low level of urbanization.

A difficult position of the Ukrainian society, resulting from a profound and long-lasting economic crisis, is reflected in certain behaviour, which might lead to an increase in death rate. Lack of employment and, as a consequence, lack of means of support lead to suicide attempts. In the beginning of 1990, the suicide rate was 20.6 per 100 thousand inhabitants, reaching its highest level in 1996 with the value of 29.9. In the following period of 5 years (until 2000), the value of this index remained high. In 2010, it was 19.9, in the Donetsk Oblast - 22.8, and in the Luhansk Oblast - 25.8. Such high suicide rates are unheard of in Poland (16,9 in 2009) or other countries of the EU. Another alarming phenomenon, which comes as a consequence of not being able to cope with difficulties, is alcohol abuse. The dimension of it is reflected in the number of road accidents caused by drunkenness. In the beginning of 1990, this index was 10.4 per 100 thousand inhabitants, reaching its peak in the periods of 1995-1997 and 2002-2005, when it oscillated at the level of 19-22 deaths per 100 thousand. In 2010, it amounted to 9.8 in Ukraine, 12.9 in the Donetsk Oblast and 13.7 in the Luhansk Oblast (Rettinger, 2011, p.57).

The Webb's typology (tab.1) shows that migrations have a lesser influence on the shaping of demographic changes in the researched regions. Only in the case of the Silesian Voivodeship the dependence between the type of administrative unit and the migration balance is clearly visible. In 2010, all township districts observed negative migration balance values (from -0,6 in Chorzow to -8,7 in Jastrzebie Zdroj), while in country districts, it was only in Zawiercie (-0,1). All other country districts had positive migration balances (up to +6,3 in the Bielsko-Biala district). The Donetsk and the Luhansk Oblasts do not reveal such a dependence.

Nevertheless, the analysis of spacial differentiation of the migration balance index in 2010 allows an attempt to create an outline of potential migration trends, which, to a large extent, occur concurrently with sub-urbanization. It is mostly visible in large cities (or conurbations) neighbouring rural areas (fig.4)

This phenomenon is less apparent in the Donetsk Basin, but even here, areas where large cities with negative migration balance neighbour rural areas of positive balance were observed in 2010 (fig.4).

In this respect, the reverse phenomenon is noteworthy. In several cases in the Donetsk Oblast, cities with positive migration balance are adjacent to rural areas with negative balance. It is hard to draw simple conclusions with relation to it due to the fact that migrations happened at larger distances, including inter-regional and international ones.

## Conclusions

Traditional industrial regions in Poland and Ukraine, whose genesis is connected with coal mining and the related intense development of other industry branches, especially of low level processing industries, are presently in their decadent stage of development. In the past, they were characterized by an excessive concentration of population, particularly in cities, which is still sustained, hence the contemporary population decline may be treated as positive for the regions. The main reason for depopulation is emigration and natural outflow. The first factor determines the process of population decline in the Upper-Silesian Basin, whereas the second one in the Donetsk

Basin. Heavy population outflow in the Upper-Silesian Basin is linked to employment perspectives beyond Polish borders, due to its membership in the EU since 2004 and the intensifying suburbanization process, reflected by migration and population growth in the southern part of the Silesian Voivodeship. Population decline in the Donetsk and the Luhansk Oblasts is considerably higher and more alarming due to the fact that it is determined by a deep natural outflow intensified by migration. The main reason is the poor economic state of regions connected with the collapse of many industrial plants and also the lack of alternative work places. Still, the continuity and stability in the functioning of industrial plants representing traditional branches of industry has a positive impact on the demographic state, keeping the population of some centres at a relatively constant level. In conclusion, it may be added that demographic processes observed in highly industrialized regions, to a large extent reflect the processes observed previously in highly industrialized European countries.

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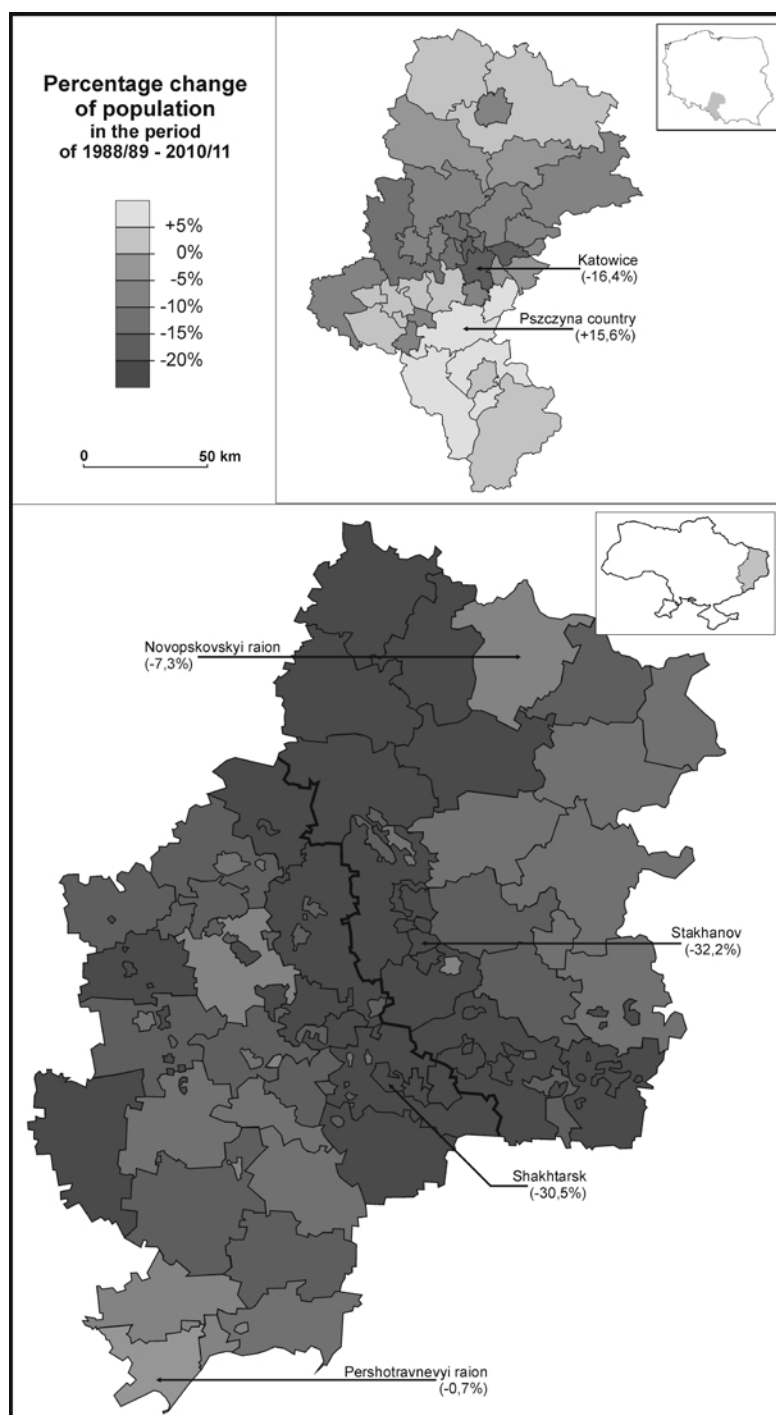
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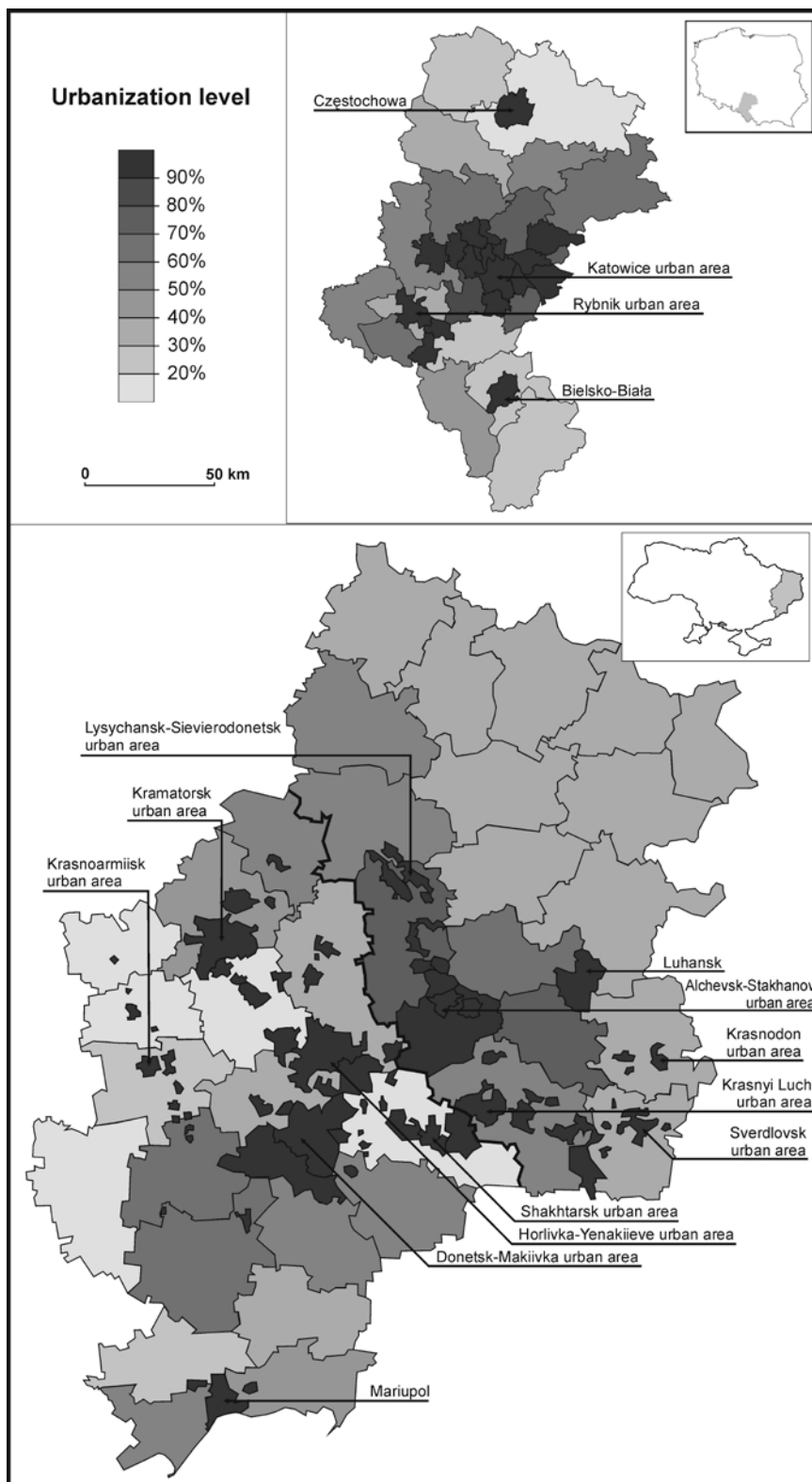
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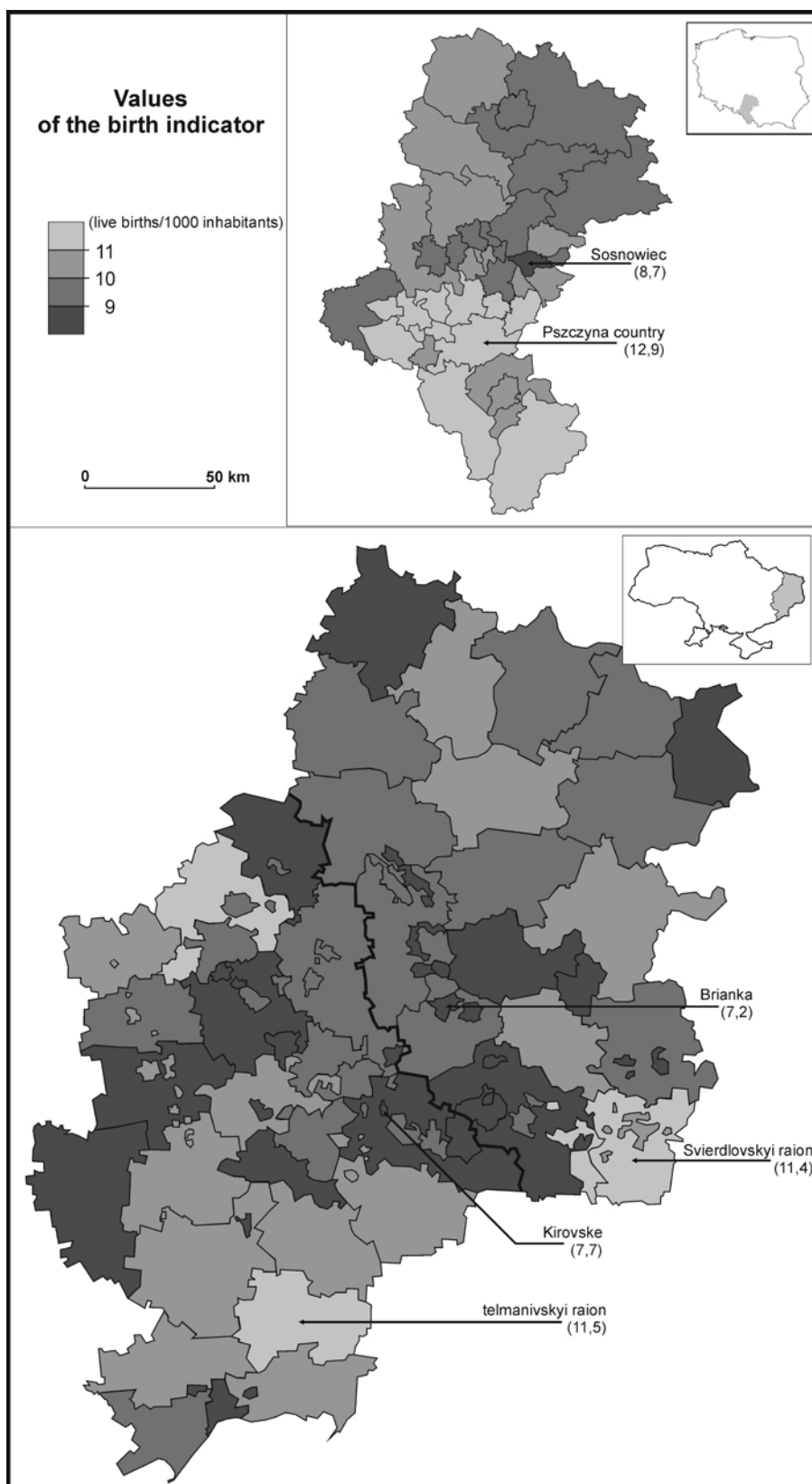


**Fig. 1** Population changes in the examined regions in the period of 1988/89 – 2010/11 (own study).



**Fig. 2** The spatial diversification of the urbanization factor in 2010/11





**Fig. 3** The spatial diversification of the birth indicator in 2010 (own study).



**Fig. 4.** Spatial diversification of the migration balance indicator in 2010 (own study).