THE BALTIC SEA REGION IN THE DEMOGRAPHIC DIMENSION

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Abstract

The Baltic Sea Region (BSR) is a region of strategic partnership of the countries of northern and eastern Europe. European Union programs are being implemented here, with Russia acting as an associate member. BSR is characterized by an aging population, increasing burden on the able-bodied population due to dependents, intensive migration, which creates problems of varying complexity. The dominance of certain characteristics depends on the location of the regions in the West or East of the BSR. In the West, there is an increase in population, including through migration. The opposite processes are typical for the East. The study is designed to investigate the main demographic phenomena up to the level of NUTS 3 regions, establish the dependence of demographic indicators on the place of the region in urban-rural typology, and identify clusters of regions by the totality of demographic indicators. Eurostat and Rosstat databases are used.

Key words: Urban-rural typology, population, region, expectancy at birth, migration

JELCode: J 11, J 19

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Introduction

We consider the Baltic Sea region (BSR) in accordance with a narrow understanding of its composition (option B) , i.e including Denmark, Sweden, Finland, Estonia, Latvia, Lithuania, certain territories of Germany, Poland, and Russia (Klemeshev, Korneevets, Palmowski, Studzieniecki & Fedorov, 2017). The population within the designated area at the beginning of 2018 accounted for 46.8 million people.

The countries of the BSR are closely interconnected geographically, historically and economically. For over 20 years a trans-national strategic partnership has been forming here the EU member coun. Russia acts as an associate member of the programs being implemented. Over these years, the goals, objectives and directions of programs have been repeatedly adjusted. The increased attention to the solution of demographic problems remained unchanged, which is reflected in a number of publications.

In the past quite a lot of attention was paid to the study of population dynamics in the BSR countries. It has been concluded that the countries of the region are strongly differentiated in this respect (Berzins & Zvidrins, 2011; Klemeshev, Kuznetsova & Fedorov, 2016; Manakov, Suvorkov, & Stanaitis, 2017; Thorborg, 2012; Zvidriņš, 2012).

In publications noted that countries with traditional market economies are characterized by a positive migration balance, while those with planned economies in the past have a negative migration balance (Biermann & Stiller, 2013; Kuznetsova, 2010).

In the Baltic states four waves of emigration were identified, which were formed under the influence of the transformation of external and internal institutional and market factors (Hazans, 2016; Juska & Ciciurkaite, 2015; Rausser, Strielkowski, Bilan & Tsevukh, 2018).

The analysis of the published works revealed a number of unresolved issues: the BSR is considered within different boundaries; the studies are limited to the NUTS 2 regions; in the publications of foreign authors there is no completeness of information about Russia.

1 Materials and methods

This article consistently solves two problems:

1) At the level of the NUTS 2 regions, the most common demographic processes are considered: population change and the influence of natural and migratory factors on them are revealed.

2) At the level of NUTS 3 regions, the dependence of demographic indicators on the place of the region in urban-rural typology is established.

At the NUTS 3 level, according to Eurostat monitoring, the BSR includes 23 districts in Germany, 11 in Denmark, 21 in Sweden, 19 in Finland, 12 in Poland, 10 in Lithuania, 6 in Latvia and 5 in Estonia. In Russia we determine 86 municipalities of the second level at NUTS 3 level.

The methods of typology, combination grouping and ordinal scaling are used.

Eurostat and Rosstat databases are used.

2 Results and Discussion

2.1 Demographic processes at the level of the countries in the BSR

2.1.1 Population dynamics

Our calculations showed that from 1990 till 2000 the population of the Russian part of the BSR decreased by 3.5%, in Lithuania by 5.3%, in Latvia by 10.5% and in Estonia by 10.6%. The populations of Denmark, Sweden and Finland increased by 3.7 - 3.9% in this period. The data for Poland within the voivodships whose borders changed in 1999 are available to us only starting from

2000, which made it possible to analyze the population dynamics for all the BSR territories from that very year. The result are given in figure 1.

Fig. 1: Population dynamics in the countries of the Baltic Sea region, 2005 = 100%
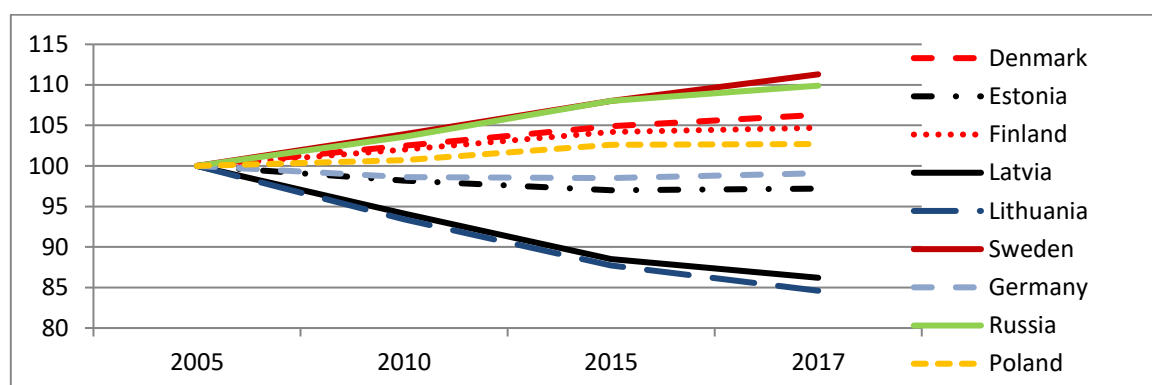
Source: Developed by the author based on data from Eurostat and Rosstat

Figure 1 shows that at the turn of 2005 there was a change in the trends of dynamics and by the end of 2017 three clusters of countries had been clearly distinguished in the BSR area. In Poland, Finland, Denmark, Russia and Sweden, the population increased by 3.2-13.3% (the first cluster). The population of the second cluster (Germany, Estonia) decreased insignificantly – by 1.4% and 5.8% respectively. The population in the third cluster sharply decreased in this period: in Lithuania by 18.5% and in Latvia by 19.2%.

According to the factors determining the dynamics of the population of a country, BSR countries can be divided into four clusters, as shown in table 1.

Tab. 1: Crude rates of population change in the Baltic Sea region, 2015-17
(per 1 000 persons)

	Total change			Natural change			Net migration and statistical adjustment		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
1. Countries with a positive total, natural and migration change									
Denmark	8,4	7,2	5,6	1,0	1,5	1,4	7,4	5,7	4,2
Sweden	10,6	14,5	12,4	2,4	2,7	2,3	8,1	11,9	10,1
2. Countries with a positive total and migration change, but natural change is negative									
Germany	12,0	4,2	4,0	-2,3	-1,4	-1,8	14,3	5,6	5,8
Russia	4,0	7,7	9,5	-0,9	-0,6	-1,5	4,9	8,3	11
Finland	2,8	2,9	1,8	0,5	-0,2	-0,6	2,3	3,1	2,4
3. Countries with unsustainable population change									
Estonia	0,8	-0,2	2,7	-1,0	-1,0	-1,3	1,8	0,8	4,0
Poland	-1,0	0,2	0,1	-0,7	-0,2	0,0	-0,3	0,3	0,1
4. Countries with a negative total, natural and migration changes									

| Latvia | -8,7 | -9,6 | -8,1 | -3,3 | -3,4 | -4,1 | -5,4 | -6,2 | -4,0 |
| Lithuania | -11,3 | -14,2 | -13,8 | -3,5 | -3,7 | -4,0 | -7,7 | -10,5 | -9,7 |

Source: Developed by the author based on data from Eurostat and Rosstat

Recent trends in table 1 suggest that population growth in Denmark and Sweden will continue in the medium term, both through migration and natural growth. In Germany, Finland and Russian, where the positive trend in dynamics is ensured only due to the migration growth, in the long term the general growth of the population may slow down. In Estonia and Poland, the overall population growth is likely to be due to the re-emigration. Depopulation and high rates of emigration in Latvia and Lithuania will cause a further reduction in the total population of these countries.

2.1.2 Migration

We have established that Russia has a positive balance. According to Rosstat, the migration increase in 2006-10 averaged 204, and in 2011-17 it accounted for 272.9 thousand people per year. The migration balance in Poland tends to go from minus to plus. Therefore, the problem of emigration of the population is not as acute for it as for the Baltic countries.

In terms of immigration the largest number of foreigners per 1000 inhabitants were in Sweden – 14.4; Estonia – 13.4; Denmark – 11.9; Germany – 11.1. The minimum number of per 1000 immigrants is noted in Poland (5.5) and Latvia (5.1). This indicator in Russia (2017) was 4.0.

To large extent immigration within the Baltic Sea Region was formed due to the population born in the former Soviet Union and Russia, as shown in table 2.

Tab. 2: The number of immigrants in BSR countries and their structure by place of birth abroad, 1 January 2017

| BSR | Total, 1000 | Structure of the foreign population by place of birth as a percentage of the total | | | | | | | | Other |
		Germany	Estonia	Latvia	Lithuania	Poland	Finland	Sweden	USSR, Russia	
Denmark	668,1	5,3	-	-	-	5,9	-	-	-	88,8
Germany	9220	-	-	-	-	7,9	-	-	-	92,1
Estonia	192,5	-	-	2,6	-	-	2,4	-	63,8	31,2
Latvia	251,5	-	-	1,6	6,1	4,7	-	-	50,5	37,1
Lithuania	127,4	-	-	4,3	-	-	-	-	41,1	54,6
Finland	349,0	-	13,1	-	-	-	-	9,2	20,1	57,6
Sweden	1783	-	-	-	-	5,0	8,6	-	-	86,4

Germany: Main countries of citizenship. Poland: No data
Source: Developed by the author based on data from Eurostat and Rosstat

In the Baltic countries and Finland the share of immigrants from Russia is very noticeable. In the other countries we observe immigration to Finland from Estonia and Sweden, as well as the return

flow of migrants from Sweden to Finland and immigration to Germany from Poland. The remaining migration flows between the BSR countries are insignificant.

The data for Russia provide information on the migration exchange between Russia and the other countries of the Baltic Sea Region in the period of 2008-17. In 2008 the main direction for emigration was Germany – 75.2% of all who left Russia for the BSR countries. In 2017 but its share fell to 55.7% with the net migration of - 0.7 thousand people (4.4 left and 3.7 arrived). Finland in 2008 was in the second place as to the share of emigrants from Russia – 9.5% of the total, but by 2017 this share had fallen to 7.6%. The intensive migration exchange between Russia and the Baltic countries (especially Latvia and Estonia) was observed, which tended to increase. In 2008 the share of immigrants from Russia of the total in the BSR was 3.5% to Latvia and 4.6% to Estonia; and in 2017 – 12.7% to each of these countries. In turn, the share of immigrants from Latvia increased from 14.1% to 19% and from Estonia – from 9.4% to 13.5%. Throughout the entire period of 2008-17 Russia had a positive net migration rate with the Baltic countries, and a negative net migration rate with Germany, Finland and Sweden. There was practically no migration exchange between Russia and Denmark, and with Poland it was minimal.

Thus, the most active migration exchange between the BSR countries was typical of its eastern part, including Russia, the Baltic States and Finland, and also between Russia and Germany. High migration burden in Sweden, Denmark and Germany is largely formed by immigrants from Syria, Iraq, Turkey, Iran, Somalia and other countries with unstable political and economic conditions.

2.2 Dependence of demographic indicators on the location of NUTS 3 regions in urban-rural typology

2.2.1 Total population change

Basing on Eurostat's Urban and Rural typology, three types of NUTS 3 regions are distinguished: Type I (Predominantly urban regions) – rural population is less than 20% of the total population; Type II (Intermediate regions) – rural population is between 20% and 50% of the total population; Type III (Predominantly rural population) – rural population is 50% or more of the total population. According to the results of our typology, the largest number of NUTS of 3 regions in BSR - 88 (47.1%) belongs to type II, the smallest - 25 (13.1%) to type I, and the rest - 74 (39.6%) to type III. Type I areas belong to the coastal zone of the Baltic Sea Region.

These are the territories of the coastal agglomerations of Copenhagen, Stockholm, Helsinki, St. Petersburg, Riga, Tallinn, Kaliningrad, Tricity (Gdansk – Gdynia – Sopot) and others. Type I also includes municipal formations with the capital (Vilnius), centers of regions (Novgorod, Pskov).

The classification of NUTS 3 regions according to the coefficient of change in the total population per 1000 inhabitants is also made on the basis of the Eurostat approach. 5 classes were allocated with the following gradation: Class 1 – (<-6 people per 1000); Class 2 – (-6- <0); Class 3 – (0- <6); Class 4 – (6- <12); Class 5 – (≥12).

The calculations in table 3 showed that the largest number of regions - 73 (39% of the total) belongs to class 1, and 33 (17.7%) - to class 2. Thus, 56.7% of the NUTS 3 regions had negative coefficients, reflecting a decrease of Population. 25 regions (13.4%) where the highest general population growth is observed belong to Class 5.

Tab. 3: Connection of general population change rates with urban and rural typology for NUTS 3 regions of the Baltic Sea Region, 2016

Class / Rate of change in population, per 1000 inhabitants	I. Predominantly urban population		II. Intermediate regions		III. Predominantly rural population		Total	Share in % of total
	number of regions	share from total to type, %	number of regions	share from total to type, %	Number of regions	share from total to type, %		
1. < -6	3	11,1	38	44,2	32	43,2	73	39,0
2. -6 - < 0	3	11,1	15	17,4	15	20,3	33	17,7
3. 0 - < 6	6	22,2	12	14,0	14	18,9	32	17,1
4. 6 - < 12	6	22,2	11	12,8	7	9,5	24	12,8
5. ≥ 12	9	33,4	10	11,6	6	8,1	25	13,4
Total	27	100	86	100,0	74	100,0	187	100,0

Source: Developed by the author based on data from Eurostat and Rosstat

The combination grouping of NUTS 3 regions revealed the presence of certain regularity between the place of the regions in the typology and the coefficients of change in the population in them. In Type I, the largest part of the regions (33.4%) had the highest population growth rates per 1000 inhabitants (≥ 12).

Another 22.2% of regions of type I had these coefficients ranging from 6 to 12, as well as 22.2% - from 0 to 6 people per 1000 inhabitants. Thus, almost 80% of the regions of Type I had a positive population growth. Type III is characterized by the opposite pattern: in 43.2% of the regions the reduction in population was 6 or more, and in 20.3% – up to 6 people per 1000 inhabitants. That is, 63.5% of the regions of this type are characterized by a general reduction in the population. Type II according to these indicators is closer to Type III, where 61.6% of the regions had a general negative population growth.

To establish the strength of relationships between the types of regions and their classes distinguished by the rate of change in population, we used the Pearson coefficient based on the

calculation of chi-square (χ^2). Calculations show that in the Russian part of the BSR the strength relationship between the studied parameters is noticeable, and for foreign territories and the BSR as a whole it is moderate.

2.2.2 The old-age dependency ratio

The level of the old-age dependency ratio is calculated using the coefficients adopted in Eurostat and is determined by the formula:

$$D_{o.a} = \frac{P_{\geq 65}}{P_{15-64}} * 100$$

Eurostat identified five classes of NUTS 3 regions: Class 1 – less than 25 old people per 100 productive population; Class 2 – 25- <30; Class 3 – 30- <35; Class 4 – 35- <40; Class 5 – ≥40. In the Russian statistics these coefficients are calculated based on the age of old people ≥ 60 and that of the productive population 16-59 years. Therefore, we made a recalculation of the Russian data basing on European standards.

The calculation in table 4 showed that the old-age dependence ratio is differentiated according to the BSR territory: in the western part it is higher and in the eastern part it is relatively low. Although in the Baltic countries these indicators are increased. 49 regions (26.2% of all regions of this class) have the minimum old-age dependence ratio, including 55.1% of Type I and the rest of Type II.

Tab. 4: Compliance of the workload indicators of the working population with the elderly urban and rural typologies for the NUTS 3 regions of the Baltic Sea region, 2017

Class	Old-age dependency ratio, %	Type						Total	Share in % of total
		I. Predominantly urban population		II. Intermediate regions		III.Predominantly rural population			
		number of regions	hare from total to type, %	number of regions	hare from total to type, %	number of regions	hare from total to type, %		
1	< 25	27	100,0	22	25,6	-	-	49	26,2
2	25 - < 30	-	-	28	32,6	-	-	28	15,0
3	30 - < 35	-	-	36	41,9	15	20,3	51	27,3
4	35- < 40	-	-	-	-	44	59,4	44	23,5
5	≥ 40	-	-	-	-	15	20,3	15	8,0
Total		27	100,0	86	100,0	74	100,0	187	100,0

Source: Developed by the author based on data from Eurostat and Rosstat

Among the regions of Type III there are no those of them that belong to Classes 1,2. All regions of Type I belong only to Class 1, and of Type II - to Classes 1, 2 and 3. No region of Type II belongs to Classes 4 and 5, while 79.7% of Type III regions belong only to these Classes that are characterized by the maximum old-age dependence ratio.

Thus, a clear pattern can be traced: the smallest burden on the working-age population is typical for regions with predominantly urban, and the greatest - for regions with rural population.

Conclusion

1. On the basis of indicators of population growth rates in 2005-17 we identified three clusters: 1) Sweden, Denmark, Finland and the territories of Russia and Poland (growth); 2) Estonia and the territories of Germany (insignificant decrease); 3) Latvia and Lithuania (sharp decrease).

We identified four clusters of countries according to the components of population change: 1) the countries with a positive total, natural and migration change (Denmark, Sweden); 2) countries with a positive total and migration change, but natural change is negative (Germany, Russia, Finland); 3) countries with unsustainable population change (Estonia, Poland); 4) countries with a negative total, natural and migration changes (Latvia, Lithuania).

The extrapolation of trends of population change shows that its general growth in the medium term in Denmark and Sweden will continue; in Germany, Finland and Russia it will slow down; and in Estonia and Poland it will increase due to re-emigration. In Latvia and Lithuania the population will continue to decline.

2. Migration processes in the BSR intensified after 1990. The population from Russia, the Baltic States and Poland began to immigrate to the countries with a developed market economy: within the borders of the BSR to Germany and Finland, and from Poland to Denmark and Sweden as well. The most active migration exchanges took place in the Baltic countries between themselves and Russia.

In Sweden, Denmark and Germany a high migration load is forming due to immigration of people from the Middle East countries with an unstable political and economic situation.

3. The study of the total change in population depending on the place of the NUTS 3 regions in the typology of a city-village established that the largest part of predominantly urban areas (33.4%) has the highest population growth rates per 1000 inhabitants and 80% of regions is characterized by positive growth. For regions with a predominantly rural population the opposite situation is typical: 63.5% of the regions have a general negative population growth.

4. Compliance of the work load indicators of the working population with the elderly urban and rural typologies for the NUTS 3 regions showed that there is a clear pattern: the lowest old-age

dependence ration is typical of the regions with mostly urban population, and the highest for those with mostly rural population.

Acknowledgment

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