Natural increase in the Baltic South and South-West
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This article analyses the natural population increase (decrease) in the post-communist part of Baltic Europe (the federate state of Mecklenburg-Western Pomerania, West Pomeranian, Pomeranian, and Warmian-Masurian Voivodeships, Lithuania, Latvia, Estonia, the Kaliningrad and Leningrad region, and the federal city of Saint Petersburg) in 2002—2011. The study uses standard methods of demographic analysis, the data provided by national statistical services and Eurostat. All regions analysed are characterised by a low stationary phase of the demographic transition model (DTM). The situation proves to be unfavourable in the Polish regions under consideration and highly unfavourable in the remaining area.

Key words: Baltic Europe, natural increase/decrease

Introduction

Political transformations in Central and Eastern Europe [3; 4; 10; 56], economic transition [5; 8; 12; 42; 46; 49] and social changes [1; 7; 22; 48] had a considerable impact on the demographic [18; 28; 32; 35; 37; 38; 45] and health condition [35; 36; 41; 56] of the residing population. The system transformation process, following the disintegration of the communist system, can be divided into two stages.

- The first period covers the years 1990 to 2003 (from the establishment of the first non-communist government in this part of Europe to the accession of the first eight post-communist countries¹ to the European Union).
- The second period covers the years from 2003 to contemporary times.

The study analyses similarities in the rate of natural increase (RNI) in the second period of transformation. The analysis refers to the southern and south-east

¹ Passing over the fact of Federal Republic of Germany absorbing the German Democratic Republic.
coast of the Baltic Sea, which used to be part of the socialist system. The division of the area into NUTS-2 in the case of European Union countries was considered best suitable for the study and similar size units were adopted for the Russian Federation. In effect 10 regions were identified (fig. 1):

- One region in Germany (Federation of Lands: Mecklenburg-Western Pomerania\(^2\) (earlier — part of the German Democratic Republic).
- Three regions in Poland (Voivodships\(^3\): West Pomerania, Pomerania, Warmian-Masurian — this administrative division has been in force since the beginning of 1999.
- Three independent states, with the entire population embraced by the study (Lithuania, Latvia, Estonia — were in the past part of the Union of Soviet Socialist Republics (USSR).
- Three regions in the Russian Federation (two oblasts: Kaliningrad and Leningrad and one federal city Saint Petersburg\(^4\) — in the past — part of the USSR).

The study covers a period of 10 years: starting from 2002 (i.e. the last year before the accession of Poland, Lithuania, Latvia, Estonia to the European Union) to the year 2011 (the last year for which full statistical data were available).

![Fig. 1. Area under study](image_url)

Source: Own study.

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\(^2\) We can also come across a German liaised name: Mecklenburg-Vorpommern.

\(^3\) This is a direct translation from the Polish language, we can also come across the term: provinces.

\(^4\) The names of cities may also read: Saint Petersburg, Petersburg, up to 1991 the official name was Leningrad.
The statistical data used in the study came from three websites [13—15]. The average population in the Baltic Europe post-communist countries covered by the study reads 21324 thousand. The period 2002—2011 showed minor fluctuation with the greatest oscillation in Latvia (%RSD = 3.51 %), and the smallest in Estonia (%RSD = 0.48 %). Figure 2 presents these changes. We can see that a clear population drop was noted in the period 2002—2007 (from 21523 thousand to 21149 thousand) followed by a slight rising trend reaching its maximum in 2010 (a population of 21348 thousand). These changes can be accurately described by the equation: 

\[ y = 0.011x^2 - 0.137x + 21.667 \quad (R^2 = 0.810). \]

Fig. 2. Changes in population in the studied area in the years 2002—2011

Source: Own study based on dispersed data.

**Changes in the rate of natural increase**

The arithmetic average rate of natural increase in the years 2002—2011 fluctuates from 2.6% in the Pomeranian Voivodship to 10.2% in the Leningrad Oblast. As figure 3 shows, the average positive rate of natural increase is noted only in the Polish regions with a negative rate in the remaining area. This reflects the situation when viewed in terms of countries and not regions. Only in Poland (as a whole) the average rate of natural increase.

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5 This is the arithmetic mean of the years 2002—2011.

6 The relative standard deviation (%RSD) for the period was merely 0.53%.
increase in the years 2002—2011 was positive, whereas Germany and the Russian Federation (and the states of the Baltic Assembly) experienced a natural decrease. In terms of stability the greatest fluctuation in natural increase rate appeared in Estonia and in the Russian regions.

By applying Hellwig’s critical gap method [23] the analysed group of regions was divided into four groups varying in terms of the natural increase rate in the period 2002—2011. The results of the classification are given in fig. 4.

Looking at the map (fig. 4) no clear spatial regularities can be noted. Though in the areas dominated by Poles the natural increase rate was positive and in the areas inhabited by Russians the situation was the worst (three regions in the Russian Federation and Latvia inhabited by a numerous Russian diaspora), the latter should not be interpreted as the major cause of this state.

Additional information derives from the similarity analysis in natural increase changes in particular regions. The Mc Quitty’s method [52] was applied to this aim. The breakdown to types is based on the Pearson product-moment correlation coefficient reading below 0.800. In effect four groups of regions were identified (including two single element groups), representing different types of changes (fig. 5). The results in spatial terms are given in fig. 6.
Fig. 4. Average natural increase [per 1000 persons] in the years 2002—2011 — spatial dimension

Source: Own study based on dispersed data.

Fig. 5. Similarities in natural increase changes in the years 2002—2011.

Source: Own study based on dispersed data.
The next three figures present the population trends expressed by regression analysis, according to three types attributed to the studied regions. The regressions analysis was not calculated when the coefficient of determination fell below 0.800.

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**Fig. 6. Similarities in natural increase changes in the years 2002—2011 — spatial dimension**

Source: Study based on fig. 5.

Regions classified as type A (fig. 7) featured slow gradual growth in natural increase. Looking at the variability of natural increase rates we can note that in the Pomeranian Voivodship and Latvia the increase was poor, sliding down in 2008 to a weak falling trend. In the case of three regions which are part of the Russian Federation, we can see a clear rising trend. The intermediate state between these two subgroups in the regions classified as type A is represented by Estonia showing a rising trend which is slowly dying out (in 2011 compared to 2010 we can even see the signs of a falling tendency).

Quite complicated changes in natural increase appeared in two Polish regions classified as type B (fig. 8). Initially both regions showed a drop in natural increase, which turned into a growing trend to again note a drop in 2008. Fluctuation of natural increase rate in both of these regions resemble the changes in the Pomeranian Voivodship, with the exception of the initial drop in natural increase.
Estonia: $y = -0.0405x^2 + 0.910x - 5.105; \quad R^2 = 0.97$

Kalininigradskaya Oblast:

Leningradskaya Oblast:

Sankt-Petersburg:

Latvia

Fig. 7. Changes in natural increase [per 1000 persons] in regions classified as type A in the years 2002—2011

Source: Own study based on dispersed data.

Fig. 8. Changes in natural increase [per 1000 persons] in regions classified as type B in the years 2002—2011

Source: Own study based on dispersed data.

Fig. 9 presents together the changes in Mecklenburg-Western Pomerania classified as type C and Lithuania classified as type D. The former did not experience serious changes in natural increase but in 2008 started to show a falling trend.
In Lithuania the natural increase change process seems to be the most complicated. The initial period did not note any changes in the natural increase rate but was followed by a drop that that in 2007 showed strong growth, next followed by a decrease in the population rate.

![Graph showing natural increase changes in regions classified as type C and D](image)

**Fig. 9. Changes in natural increase [per 1000 persons] in regions classified as type C and D in the years 2002—2011**

Source: Own study based on dispersed data.

Table 1 presents the results of an earlier study based on average natural increase rate (Hellwig’s method [23]) and changes in natural increase (according to Mc Quitty’s method [52]). Figure 10 shows the spatial aspect of the results.

### Table 1

**Synthetic assessment of natural increase rate in the years 2002—2011**

| Natural increase level | Types of changes in natural increase rate |
|-----------------------|-------------------------------------------|
|                       | A                                         | B                                         | C                        | D                        |
| Positive              | Pomeranian Voivodship                      | West Pomeranian Voivodship, Warmian-Masurian Voivodship |                          |                          |
| Negative              | Estonia                                    |                                           | Mecklenburg-Western Pomerania | Lithuania                |
| Very negative         | Latvia, Saint Petersburg, Kaliningrad Oblast |                                           |                          |                          |
| Extreme negative      | Leningrad Oblast                           |                                           |                          |                          |

Source: Own study based on dispersed data.
Thus, we can see that the natural increase rate in most of the studied areas was not favourable. Though the transformation of the natural increase rate fits to the theory of second demographic transition [53; 55], the changes are much more detrimental in the entire area than the model indicated, with the exception of the Polish regions.

The reason underlying the situation may be related to the negative impact on the population of the system transformation costs [39]. The impact of these costs is twofold. The entire studied area shows a drop in the number of live births. This phenomenon is typical for all European post communist countries and results from changing traditions [11; 17; 45; 51]. Furthermore, the Russian part of the studied area experiences higher death rate resulting from the adopted life style and lower medical care standards [9; 43; 54; 58].

Conclusions arising from the study regarding the period following expansion of the European Union correspond to earlier research on the first period following the fall of the communists [2; 16; 24; 25; 27; 33; 34; 44]. An additional detrimental factor influencing the demographic situation in the majority of the studied areas was the negative migration rate which initially touched Mecklenburg-Western Pomerania (internal emigration in Germany)
and the Baltic Assembly States (emigration of Russian speaking population to Russia) [6; 19; 20; 21; 26; 29; 50]. But following European expansion in 2003 migration covered almost the entire area changing both the direction and cause of migrating. The migration dominating today is economy driven and targets at the countries of the “old” European Union [60]. However, the present economic crisis induces initiatives towards inhibiting the internal free flow of people in the European Union [30]. The direction of migration in the Russian part of the studied area differs from that of the other regions. This is because the south and south east regions of Baltic Europe, which belong to the European Union, are among its poorest parts. Whereas the south and south east parts of Russian Baltic Europe are among the richest in the Russian Federation.

The consequences of the negative demographic transformation, including the falling natural increase rate mean ominous changes in the demographic situation of the population inhabiting the analysed region, expressed by, among others, progressively aging society. Demographic forecasts project further population decrease in the majority of the regions. For example, the demographic forecasts for Estonia assume that in 2050 the population will read approx. 993.5 thousand [31]. An exception to this rule is the Pomera- nian Voivodship with forecasts for the year 2035 of up to 2262.8 thousand compared to 2210.9 thousand in 2007, which means a growth rate of 102.4 % compared to 2007 [47].

These adverse trends may in the near future inhibit economic development of the studied regions due to shortage of labour force on one hand and financial burdens of aging society on the other.

References

1. Ágh, A. 1999, Processes of democratization in the East Central European and Balkan states: sovereignty-related conflicts in the context of Europeanization, Communist and Post-Communist Studies, Vol. 32, p. 263—279.

2. Anisiewicz, R. 2006, Changes in fertility and nuptiality in the post-soviet part of Baltic Europe, In: Michalski, T. (ed.) The Geographical Aspects of the Transformation Process in Central and East-Central Europe, Gdynia; Pelplin, p. 45—57.

3. Antoszewski, A. (ed.), 2006, Systemy polityczne Europy Środkowo- Wschodniej. Perspektywa porównawcza, Wrocław.

4. Antoszewski, A., Herbut, R. (eds.), 1997, Demokracje Europy Środkowo- Wschodniej w perspektywie porównawczej, Wrocław.

5. Bąk, M. 2006, Europa Środkowa i Wschodnia wobec wyzwania transformacyjnego, Gdańsk.

6. Bauls, A. 1998, Changes in the migration of the population in Latvia over 1991—1996. In: Szymańska, D. (ed.), Ruchliwość przestrzenna ludności w okresie przemian ustrojowych, Toruń, p. 165—170.

7. Borowik, I., Babiński, G. (eds.), 1997, New Religions Phenomena in Central and Eastern Europe, Kraków.

7 This is variant 1 which assumes that the present demographic trends will not alter. The most optimistic variant (M) assumes the appearance of positive demographic trends with growing population to 1360.7 thousand in 2020 [31].
8. Cipko, A. 2004, Razmyšleniâ o prirode i pričinah kraha postsovetskogo liberalizma, *Vestnik Analityki*, no. 3(17), p. 4—24.
9. Cockerham, W. C. 2000, Health lifestyles in Russia, *Social Science & Medicine*, no. 51, p. 1313—1324.
10. Complak, K. (ed.), 2002, *Europa Wschodnia — Ameryka Łacińska. Pozycja jednostki i system rządu*, Wrocław.
11. Cubbins, L. A., Szaflarski, M. 2001, Family effects on self-reported health among Russian wives and husbands, *Social Science & Medicine*, no. 53, p. 1653—1666.
12. Dubauskas, G. 2003, Euro Atlantic Integration and Foreign Banks in Transitional Economies, *Tiltai*, no. 4 (25), p. 13—22.
13. European health for all database (HFA-DB) at World Health Organization Regional Office for Europe, available at: http://www. euro. who. int/en/home (accessed: 12.01.2014).
14. Eurostat database, available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home (accessed: 12.01.2014).
15. Federal State Statistics Service Russian Federation database, available at: <http://www.gks.ru/> (accessed: 12.01.2014).
16. Fiedorow, G. M., Kornirjewiec, W. S., Zwieriew, J. M. 2007, Uwarunkowania fizyczno-geograficzne o społeczno-ekonomiczne rozwoju Obwodu Kaliningradzkiego Federacji Rosyjskiej, Uwarunkowania rozwoju rosyjskiej i polskiej części Euroregionu „Bałtyk”. Published series: Regiony Nadmorskie. 13, Gdynia-Pelplin, p. 63—151.
17. Frejka, T. 2008, Overview Chapter 5: Determinants of family formation and childbearing during the societal transition in Central and Eastern Europe // Demographic Research, Vol. 17, p. 139—170.
18. Górecka, S. 2006, Demographic changes in the Central and East Europe on the turn of the 20th and 21th century, *Bulletin of Geography (socio-economic series)*, no 6, p. 67—76.
19. Grzelak-Kostulska, E., Hołowiecki, M., Szymańska, D. 1998, Permanent migrations in the period of constitutional transformations, *Polish Population Review*, no. 13, p. 87—92.
20. Gubrynowicz, A. O. 2005, Estonii i Łotwie niecortodoksyjnych uwag kilka, *Miecznarodowy Przegląd Polityczny*, no. 12, p. 123—138
21. Heiland. F. 2004, Trends in East-West German Migration from 1989 to 2002, *Demographic Research*, Vol. 11, p. 173—194.
22. Helanski, S. (ed.), 2001, *Nacjonalizm. Konflikty narodowościenne w Europie Środkowej i Wschodniej*, Toruń.
23. Hellwig, Z. 1968, Zastosowanie metody taksonomicznej do typologicznego podziału krajów ze względu na poziom ich rozwoju oraz zasoby i strukturę wykwalifikowanych kadr, *Przegląd Statystyczny*, R. 15, z. 4, p. 307—327.
24. Jankevics, J. 1998, Depopulation in Latvia, *Polish Population Review*, no. 13, p. 11—19.
25. Jankevics, J. 1998, Depopulation in Latvia. In: Szymańska, D. (ed.). *Ruchliwość przestrzenna ludności w okresie przemian ustrojowych*, Toruń, p. 9—16.
26. Jankevics, J. 2000, Change in the population of Latvia due to migration. In: Szymańska, D. (ed.). *Procesy i formy ruchliwości przestrzennej ludności w okresie przemian ustrojowych*, Toruń, p. 21—23.
27. Jankevics, J. 2002, Demographical situation in Latria (according to the population census of the year 2000), *Biuletyn Geograficzny*, no. 1, p. 44—48.
28. Katus, K. 2003, Post-transitional fertility development: new perspectives introduced by Central and East European nations. In: Kotowska, I. E., Jóźwiak, J. (eds.). Population in Central and Eastern Europe: Challenges and Opportunities. Statistical Publishing Establishment, Warsaw, 2003, 117—138.

29. Kõre, J. 2000, Political system transformations and changes in population behavior case of migration behavior Estonian population. In: Szymańska, D. (ed.). Procesy i formy ruchliwości przestrzennej ludności w okresie przemian ustrojowych, Torun, p. 9—11.

30. Kuptsch, Ch. 2012, The Economic Crisis and Labour Migration Policy in European Countries, Comparative Population Studies — Zeitschrift für Bevölkerungswissenschaft, Vol. 37, no. 1—2, p. 15—32.

31. Maamägi, A. 2007, Eesti võimaik rahvaarv ja vanuskoosseis aastani 2050, 2005—2006. In: Population prognosis and age distribution in Estonia, Rahvastik, Tallinn, p. 68—96.

32. Macura, M., MacDonald, A. L. 2003, Fertility and fertility regulation in Eastern Europe: from the socialist to the post-socialist era, In: Kotowska, I. E., Jóźwiak, J. (eds.). Population in Central and Eastern Europe: Challenges and Opportunities. Statistical Publishing Establishment, Warsaw, p. 35—90.

33. Michalski, T. 2001, The main demographic and health problems of the former Soviet part of Baltic Europe. In: Wendt, J. (ed.). Baltic Europe on the Eve of Third Millenium. Published series: Coastal Regions 3, Gdańsk, p. 113—119.

34. Michalski, T. 2001, Procesy demograficzne w Europie Bałtyckiej w połowie lat dziewięćdziesiątych. In: Pacuk, M. (ed.). Europa Bałtycka. Rozwój koncepcji. Opracowanie dedykowane Profesorowi Jerzemu Zaleskiemu w pięćdziesiątce pracy naukowej, Gdańsk, p 83—92.

35. Michalski, T. 2005, Changes in the Demographic and Health Situation Among Post-Communist Members of the European Union, Pelplin.

36. Michalski, T. 2010, Sytuacja zdrowotna w europejskich krajach postkomunistycznych w dobie transformacji, Gdańsk.

37. Michalski, T. 2012, Przemiany w liczbie ludności i ruchu rzeczywistym w Europie Środkowej i Środkowo-Wschodniej w okresie transformacji, Pelplin.

38. Mihal’ski, T. 2007, Depopulâcìâ w êwropejskih posktkomunìsiti deržah ãk plata za transformaciini procesi. In: Šablîj, O. (ed.). Teoretîčni ta medo-logicîni problemy suspiľ’noj geogràfijì. Zbirnik naukovih prac po pošanu Zasluženo-go profesora L’wiwskogo naciol’nego universitetu imeni Ivana Franka Olega Šablîâ, L’wiw, p. 255—264.

39. Molodikova, I. N., Nozdrina, N. N. 2000, Migratory flows to Russia and their effect on the territorial distribution of the population. In: Szymańska, D. (ed.). Procesy i formy ruchliwości przestrzennej ludności w okresie przemian ustrojowych, Torun, p. 71—76.

40. Moon, G. 1994, Health Trends in Eastern Europe: a Comparative Analysis. In: Vaishar, A. (ed.). Health, Environment and Development, Brno, p. 61—79.

41. Muzlova, G. D. 2002, Vnišnââ torgovlâ stran central’no-vostočnoj Europy: regional’nye tendencii 1990-h godov, Izvestìâ Rosijskoj akademii nauk. Serìî geografìîskaâ, no. 2, p. 63—70.

42. Nikolai, S. 1998, Geography of modern population processes in Russia: main features, tendencies, problems, Polish Population Review, no. 13, p. 19—32.

43. Palmowski, T., Michalski, T., Wendt, J. 1998, Demographic problems of the Kaliningrad Oblast, Conferinţa Ştiinţifică Internatională «Politici Economic de Integrare Europeană», 23—24 septembrie, 2005, Chişinău, 2005, p. 230—233.
45. Philipov, D., Kohler, H.-P. 2001, Tempo Effects in the Fertility Decline in Eastern Europe: Evidence from Bulgaria, the Czech Republic, Hungary, Poland and Russia, *European Journal of Population*, Vol. 17, p. 37—60.

46. Pojaková, D. 1999, Štrukturálne a prestorové zmieny priemyslu pod vplyvom socioekonomickej transformácie, *Ročník 32, Folia Geographica 3*, FHPH PU, Prešov, p. 116—122.

47. Prognoza ludności na lata 2008—2035, 2009, Departament Badań Demograficznych GUS. Warszawa, available at: <http://www.stat.gov.pl/cps/rde/xbcr/gus/L_prognoza_ludnosci_na_lata2008_2035.pdf> (accessed: 5.01. 2014).

48. Puchnarewicz, E. (ed.). 2003, *Organizacje pozarządowe w krajach rozwijających się i Europie Wschodniej*, Instytut Krajów Rozwijających się Wydział, Warszawa.

49. Radics, Z. 2006, The change of external economic contacts in Central Europe between 1989 and 2003 in the respect of studying the CEFTA. In: Suli-Zakar, I., Horga, I. (eds.),Regional development in the Romanian-Hungarian cross-border space — from national to European perspective, Debrecen, p. 137—142.

50. Rauglaudre. P. De, 1999, Russophones in Latvia: a geopolitical approach, *Multicultural Regions and Cities. Region and Regionalism*, no. 4, p. 56—62.

51. Rudeliūnienė, I. 2003, Moters vaidmens ir šeimos demografinės radios transformacija XX—XXI a., *Tiltai*, no. 4 (25), p. 49—56.

52. Runge, J. 2006, *Metody badań w geografii społeczno-ekonomicznej — elementy metodologii, wybrane narzędzia badawcze*, Katowice.

53. Rychtaříková, J. 1999, In Eastern Europe experiencing a second demographic transition? *Geographica*, no. 34(1), p. 19—44.

54. Shokolnikov, V. M., Corina, G. A., Leon, D. A. et al. 1998, Causes of the Russian Mortality: Evidence and Interpretation, *World Development*, no. 26, p. 1995—2011.

55. Sobotka, T. 2008, Overview Chapter 6: The diverse faces of the Second Demographic Transition in Europe, *Demographic Research*, Vol. 19, p. 171—224.

56. Stačac, M., Michalski, T., Palmowski, T. 2002, Przemiany umieralności w Europie Środkowej, *Biuletyn Geograficzny*, no. 1, p. 23—33.

57. Świaczny, F. 2010, Demographic change in Germany and reversal of spatial ageing patterns, *Baltic Region*, no. 4 (6), p. 37—47.

58. Vallin, J., Andreev, E., Meslé, F. et al. 2005, Geographical diversity of cause-of-death patterns and trends in Russia, *Demographic Research*, Vol. 12, p. 232—380.

59. Wojnicki, J. 2005, Kształtowanie systemów wielopartyjnych Europy Środkowoschodniej 1989—2000, Pułtusk.

60. Yemelyanova, L. L. 2010, International cross-border migration in South-East Baltic: factors, structure, consequences, *Baltic Region*, 4(6), p. 55—64.

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