

THE EFFECT
OF MIGRATION
ON LATVIA'S SEX
AND AGE COMPOSITION

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The theory of Demographic Transition stipulates that the number of countries with the replacement and sub-replacement level of the total fertility rate is growing. In these conditions, population dynamics and the sex and age composition are increasingly affected by migration. The above holds true for Eastern European countries. Population decline has haunted Latvia for two and a half decades. Since 1990, the net migration rate has been negative, which contributes to depopulation. This study aims to reveal the effect of migration on the sex and age composition across Latvia and its largest cities. The authors consider hypothetical transformations in the country's age structure in 2000—2015 in the case of zero net migration. The study uses the cohort component methods and considers the actual age-specific mortality and birth rates. The analysis of the results obtained for the population of Latvia and its individual cities makes it possible to identify temporal and age/space features of migration. A comparison of the official data with net migration rates calculated for different age groups ensures a more accurate estimate of the actual volume and direction of migration flows for certain Latvian cities. The method for calculating net migration for the selected age groups, described in the article, may narrow the gaps in the current migration statistics and reveal the territorial inhomogeneity of demographic processes.

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The number of states experiencing population decline is growing each decade. Depopulation affected eight

countries in the 1990s and over two dozen states — most of them, European — in 2015 [1]. Among the countries with the most rapid population decline are the Baltics. In 1992—2015, resident population decreased by 15.4% in Estonia, by 22.1% in Lithuania, and by 25.5% in Latvia [2]. These rates are much higher in the Baltics than in any other Eastern European country, to say nothing of Western Europe, which was the first to experience the *demographic transition* [3].

A low birth rate and a high mortality rate, which can be attributed to a skewed age and sex structure, are not the only causes of the rapid population decline in the Baltics. A significant contribution to the process is made by a negative net migration rate. In 1992—2015, migration accounted for 63% of the total population decline in Estonia, 77% in Lithuania, and 61% in Latvia [2]. The age of people leaving the country is 18—40. This circumstance distorts the age and sex profile and exacerbates natural decline. In recent decades, Latvia has been an absolute leader — in Europe and the world alike — in losing population. However, the rates of depopulation differ significantly across the country [4, p. 37—39].

Latvia's demography has been addressed by many international scholars, including those from Russia. Naturally, a significant contribution has been made by Latvian demographers, economic geographers, and sociologists, namely, E. Apsite, A. Bauls, M. Berzins, V. V. Volkov, I. Indans, Z. Krišjāne, and P. Eglite [5—12].

The demographic processes in Latvia are often examined in the context of population change and migration across the Baltic States. This is a viable approach, since the three countries have developed within a common geoeconomic and geopolitical space for over two centuries. Many Russian [13—18] and international [19; 20] researchers have stressed the similarities between the natural change and migration patterns in Estonia, Latvia, and Lithuania. A more detailed analysis reveals some distinguishing features of the countries' demographic development. They relate to both changes in natural increase and migration rates and transformations in the age and sex and ethnic profile. Recent works focus on the population change in the coastal cities of the Baltic region [21], regional aspects [22], and the ethnic structures and population ageing in the Baltic States [24]. Studies addressing the Baltics often examine the problems of internal migration and urbanisation [25].

Although many researchers emphasise the effect of migration on population change in the Baltics and their regions, only few works consider the connection between migration and the age and sex structure of migrants [26].

Most demographic studies conducted in Europe examine the effect of migration on the destination society — subsequent population change in the destination country, ethnic tensions, crime rates, and labour markets

[27]. Among the works on the dependence between migrations and changes in the sex and age structure, it is worth mentioning those focusing on interregional migrations in the US after the Baby boom [28].

However, studies into the effect that migration has on the origin countries are not as numerous. The most prominent works consider the impact of emigration on the subsequent economic development of the origin country or 'brain drain' and its effect on the sex and age profile [29; 30].

We aim to fill in this gap and to describe the effect of migration on the sex and age profile of the population of Latvia and its largest cities.

To attain this goal, we will:

- analyse the population change and migration observed in Latvia in recent decades;
- interpret changes in the age and sex profiles that occurred in 1898—2015;
- calculate the demographic damage inflicted on the age and sex structure by negative net migration in 1989—2015;
- consider the effect of migration on the population size and the age and sex structure of Latvia;
- calculate the age structure of net migration in selected Latvian regions.

Natural Change and Net Migration in Latvia the at the Turn of the Century

At the end of the Soviet period, the demographic situation in Latvia was dire. In the early 1990s, the populous generation of 1955—1964 was being replaced as the most fertile cohort by the much less populous generation born in 1965—1970. Combined with the previous decades' changes in the replacement pattern, this caused the fertility rate to decrease dramatically. Over twelve years, from 1986 to 1998, the *total fertility rate* (TFR) halved, having dropped from 2.21 to 1.11 [31], whereas the *crude birth rate* (CBR) fell from 16.1 to 7.6‰ [32]. In 1992, Latvia became a nation with sub-replacement fertility — the mortality rate exceeded the birth rate. The rate of natural decline reached its peak in 1994—1995 (–7.0‰ per year). Although later the rate would not fall below 3—5‰ per year, the number of deaths in Latvia is still 30—50% above the number of births (by 6.5—10.0 thousand people) [32] (fig. 1).

One of the causes of the ongoing demographic crisis is that the fertility rate¹ has not returned to the levels of the 1980s. Today, there are 1.5—1.6 births per one Latvian woman, i. e. the total birth rate is 20—25% below the replacement level [31] (table 1).

¹ The number of births per 1,000 women in their childbearing years.

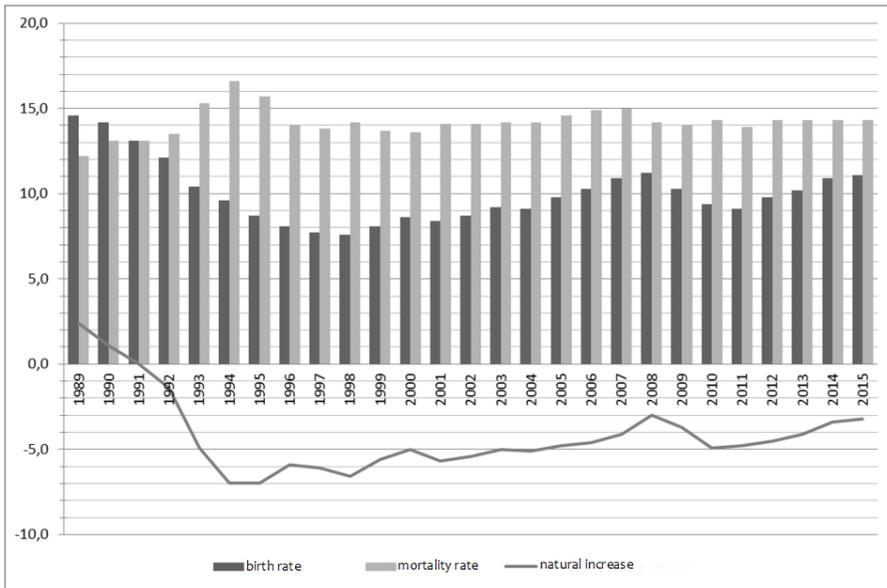


Fig. 1. Natural population change in Latvia, 1989—2015

Compiled by the authors and is based on [32].

Table 1

Average annual natural increase and migration rate in Latvia, 1986—2015

| Period | Total birth rate (TBR) | Crude birth rate (CBR), ‰ | Total mortality rate (TMR), ‰ | Rate of natural increase (RNI), ‰ | Net migration rate (NMR), ‰ | Total population increase, ‰ |
|-----------|------------------------|---------------------------|-------------------------------|-----------------------------------|-----------------------------|------------------------------|
| 1986—1990 | 2.13 | 15.3 | 12.3 | + 3.0 | + 2.2 | + 5.2 |
| 1991—1995 | 1.56 | 10.8 | 14.8 | - 4.0 | - 10.8 | - 14.8 |
| 1996—2000 | 1.17 | 8.0 | 13.9 | - 5.9 | - 3.8 | - 9.7 |
| 2001—2005 | 1.30 | 9.0 | 14.2 | - 5.2 | - 5.8 | - 11.0 |
| 2006—2010 | 1.48 | 10.4 | 14.5 | - 4.1 | - 10.2 | - 14.3 |
| 2011—2015 | 1.54 | 10.2 | 14.2 | - 4.0 | - 6.4 | - 10.4 |

Source: compiled by the authors based on [32].

It would be a mistake to say that the only causes of the post-Soviet rapid population decline in Latvia were the changes in the replacement pattern. As mentioned above, natural decrease accounts for less than 40% of the population decline that has been observed in Latvia in recent

decades. The effect of migration on the changes in the age and sex profile is much stronger than that. In the post-Soviet period, from 1992 to 2016, 421,000 people left Latvia², and it comprises 16% of the country's population as in the early 1990s [33]. There were two emigration peaks over the last quarter of a century. The first peak occurred when the republic's ethnic Russians were leaving for Russia and the other CIS countries. In the first half of the 1990s, Latvia's annual net migration ranged from -20 to -30 thousand people. (In 1992, the country lost 53,000 people due to emigration.) Over a very short period, Latvia turned from a country of immigration to that of emigration [34].

From the mid-1990s, the emigration rate was falling. However, at the end of the century, the number of people leaving Latvia to live abroad permanently started to grow again. Western European countries replaced Russia and Belarus as primary destinations. After Latvia's accession to the EU in 2004, emigration increased even more sharply (fig. 2) [35].

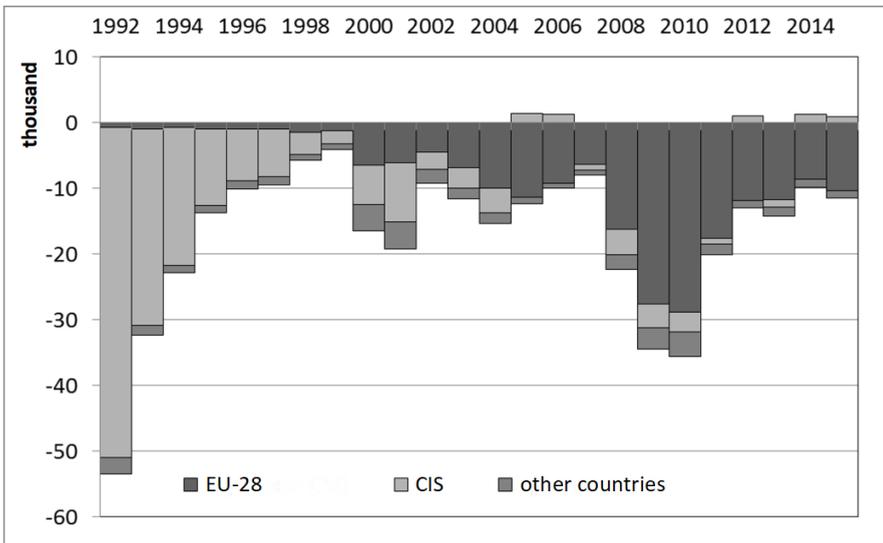


Fig. 2. Latvia's net migration and its primary destinations, 1992—2015, thousand people

Compiled by the authors and is based on [35].

The second and all the subsequent emigration waves after the independence affected not only the ethnic Russians but also the ethnic Latvians [7]. In 2011—2015, the proportion of ethnic Latvians in the total number of the country's emigrants increased from 39 to 51%. However, the emigration rate among Latvia's ethnic Russians is still much higher than among the ethnic Latvians (10.9 people per 1,000 and 8.4% respectively) [36].

² I. e. net international migration.

Changes in the Age and Sex Structure of Latvia in 1989—2016

In recent decades, the population decline observed in Latvia was not homogeneous across different age groups. Mass emigration and a dramatic natural decrease at the turn of the century caused a radical transformation in the age and sex structure of the country's population. According to the 1989 census, persons below legal working age (0—14) accounted for 21.4% of the population. They comprised 18% of the country's population in 2000 and only 15.2% in 2016. The opposite was observed in the case of senior citizens (aged 65 and over). Their proportion increased from 11.8 to 19.6% in 1989—2015 [37; 38] (table 2).

Table 2

Changes in the age structure of Latvia, 1989—2016

| Year ³ | Proportion in the population | | |
|-------------------|------------------------------|------------|------------------|
| | aged 0—14 | aged 15—64 | aged 65 and over |
| 1989 | 21.4 | 66.8 | 11.8 |
| 1996 | 20.5 | 65.7 | 13.8 |
| 2000 | 18.0 | 67.2 | 14.8 |
| 2011 | 14.2 | 67.4 | 18.4 |
| 2016 | 15.2 | 65.2 | 19.6 |

Source: [37; 38].

An examination of Latvia's age and sex pyramids of 1989 and 2016 shows that only selected age groups were significantly affected by the process (fig. 3). In 1989—2015, the total size of the country's population decreased by 26%, whereas the number of people aged 25—29 declined by 47%, aged 15—19 by 52%, and aged 0—4 by 50%. At the same time, the size of groups aged over 70 increased. The number of Latvians aged 70—74 grew by 31% in 1989—2015 (from 70 to 92 thousand people) and of those aged 85 and over by 64% (from 27 to 44 thousand people) [37; 38].

Combined with the growing life expectancy⁴, the rapid ageing of Latvia's population is fraught with an increase in the dependency ratio. The age structure of today's Latvia is strongly affected by the structure of the Soviet migrants. The growing dependency ratio has been alleviated by a reduction in the number of children. However, in the future, the diminishing proportion of taxpayers will pose serious economic and social problems.

³ As at the beginning of the year.

⁴ In 1989—1994, average life expectancy at birth dropped from 71.0 to 66.4 years but increased to 74.7 years by 2016.

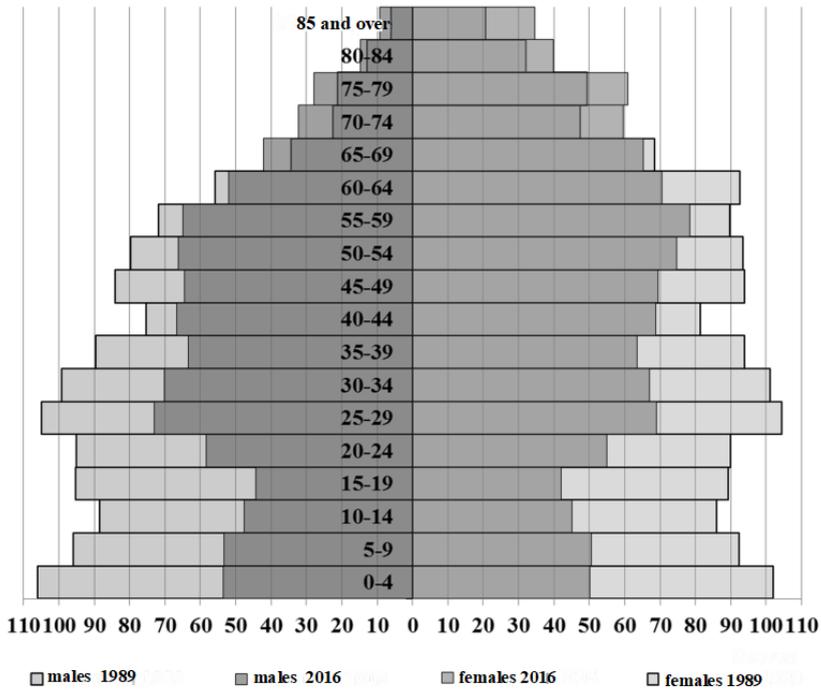


Fig. 3. The age and sex distribution of Latvia’s population in 1989—2016

Compiled by the authors based on [37; 38].

The Effect of Emigration on the Age and Sex structure of Latvia in 2000—2016

A rapid population decline and a significant transformation in the age and sex structure, which took place in Latvia at the turn of the century, could not be caused merely by a change in the rate of natural increase. The demographic situation in the republic was aggravated by emigration. The scale of migration losses was considered above. Below, we will focus on how emigration from Latvia affected the age and sex structure of the republic and its cities.

Unfortunately, open access data on Latvia give a detailed picture of the structure of international migration only from the year 2000. There is no breakdown of migration data by cities and regions. However, an analysis of the available data casts light on the contribution of migrations to the transformation of the age and sex structure of Latvia and its regional centres.

Over the 16 years — from 2000 to 2015 — the negative net migration in Latvia reached 257.4 thousand people. Depending on the socio-economic situation in Latvia and the destination countries (the UK, Germany, the US, Russia, and Ireland), the net migration rate ranged from 7.9 thousand people (2007) to 35.6 thousand people (2010) per year. Over the 25 years, the West replaced the East as the preferred destination. In 1992, 90% of almost 60 thousand people, who had left Latvia, settled in Russia and the other CIS countries. In 2010–2015, only 12–16% of Latvia's emigrants left for the East [35]. In some years (2005–2006; 2012; 2014–2015), more people were coming to Latvia from the CIS countries than leaving for them. At the same time, Western Europe was becoming increasingly popular as a migration destination. In 1993–2004, the proportion of the 15 EU countries increased from 2.5 to 55% in the structure of Latvia's emigration. After the country's accession to the EU, Western Europe (EU-15) accounted for 60–70% of emigrations. The economic crisis of 2008–2009 became another incentive for Latvian citizen to leave for the West. After 2009, 70–76% of Latvian emigrants have been choosing the economically developed European countries as their destinations [35].

Obviously, most Latvia's international migrants are people aged 15–34, i. e. the most mobile cohort. In 2000–2015, this group accounted for 53% of the country's migration losses. This rate changed dramatically over the years — from 31% in 2000 to 72% in 2006. In the recent years, it has remained at 50% [39] (fig. 4).

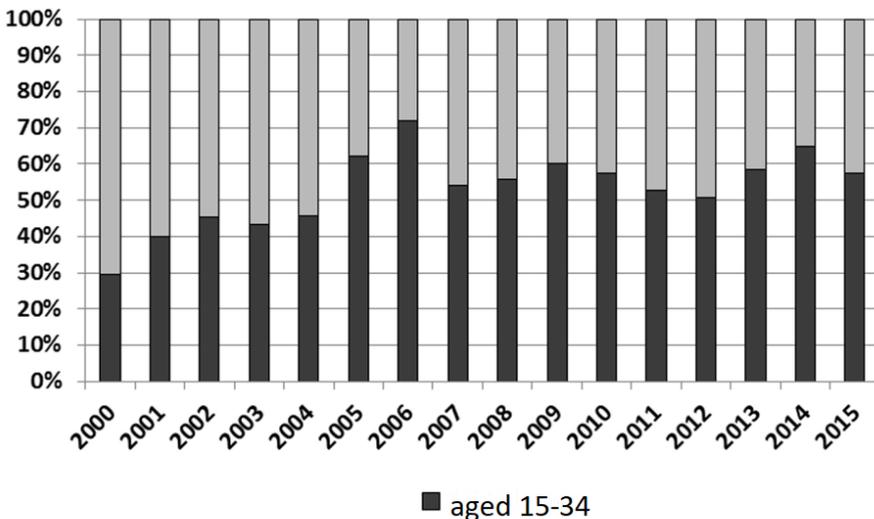


Fig. 4. The proportion of people aged 15–34 in Latvia's population losses, 2000–2015

Compiled by the authors and is based on [39].

Over the study period, people aged 15—34 accounted for 28—34% of Latvia's population. The proportion of young people among the emigrants was twice as high. The age structure of international migration underwent significant changes after 2000. In 2000—2004, before Latvia acceded to the EU, the group aged over 60 had accounted for 10—15% of emigrations. In 2005—2006, more people aged 60 and over came to the country than left it. Later, the net migration rate for senior citizens returned to negative values. Today, Latvians aged 60 and over account for 1.5—3.5% of emigrations [39].

Of interest is the gender structure of migration. Overall, females comprise 52% of Latvia's emigrants. However, this rate has been changing over the years. When the economic situation in the country is favourable and emigration rate is rather low, the females account for 55—60% of emigrations (the peak values of 63—68% were reached in 2006—2007). The proportions of males and females are equal if one considers the country's net migration rate. However, in the groups aged 50 and over, the number of females exceeds that of males dramatically. In the age group of 60 and over, women account for 90% of international net migration, this is well above the proportion of females in Latvia's population [39].

The difference in the number of people coming to live in the country (immigrants)⁵ and leaving to settle abroad permanently (emigrants) is not the only factor that affects Latvia's demographic potential. Indirect damage is caused by most Latvian emigrants being of fertile age. The country is losing not only those who have emigrated but also their children born abroad. Using the cohort projection method and age-adjusted birth and mortality rates, one can calculate the total size of population that Latvia lost in 2000—2015. As mentioned above, over the 16 years, Latvia's direct migration losses amounted to 257.4 people. In view of the age structure of migration and using current birth and mortality rates, we calculated the natural increase for Latvia's emigrant population.⁶ The result is 21.5 thousand people or 8.4% of the net migration rate. Thus, in 2000—2015, the country lost 278.9 thousand people to international migration. Table 3 shows the age and sex distribution of Latvia's demographic losses to migration.

A comparison between the country's actual age and sex pyramid as at the beginning of 2016 [40] and a distribution that could exist if net migration had been zero from 2000 illustrate the demographic damage caused by a negative net migration rate. Overall, Latvia lost 14% of its

⁵ Most immigrants leave Latvia to return to the country after some time.

⁶ The calculations used age-adjusted 2000—2015 birth and mortality rates for Latvia rather than for the destination countries.

population over the study period. However, the difference between the actual and potential size of selected age group is well above that level. The difference reaches 20% for the group aged 0—4 and 29% for that aged 30—34 (fig. 5). The group aged 25—40 is characterised by the greatest difference, which reached 27% over the 16 years. The minimum divergence between the actual and possible population size (2—4%) is observed in the age cohorts aged 65 and over.

Table 3

The size and age and sex distribution of Latvia's demographic losses to international migration in 2000—2015, age-adjusted, as at the beginning of 2016, people

| Age group | Total population decline, people | | | Proportion of the age group, % | | |
|--------------|----------------------------------|----------------|----------------|--------------------------------|--------------|---------------|
| | Males | Females | Total | Males | Females | Total |
| 0—4 | 10,086 | 10,174 | 20,260 | 3.62 | 3.65 | 7.27 |
| 5—9 | 9,237 | 9,324 | 18,561 | 3.31 | 3.34 | 6.66 |
| 10—14 | 6,568 | 6,429 | 12,997 | 2.36 | 2.31 | 4.66 |
| 15—19 | 4,501 | 4,494 | 8,995 | 1.61 | 1.61 | 3.23 |
| 20—24 | 8,806 | 9,732 | 18,538 | 3.16 | 3.49 | 6.65 |
| 25—29 | 18,562 | 19,600 | 38,162 | 6.66 | 7.03 | 13.69 |
| 30—34 | 20,096 | 20,315 | 40,411 | 7.21 | 7.28 | 14.49 |
| 35—39 | 15,719 | 15,507 | 31,226 | 5.64 | 5.56 | 11.20 |
| 40—44 | 11,644 | 10,938 | 22,582 | 4.18 | 3.92 | 8.10 |
| 45—49 | 8,497 | 9,276 | 17,773 | 3.05 | 3.33 | 6.37 |
| 50—54 | 7,304 | 8,547 | 15,851 | 2.62 | 3.06 | 5.68 |
| 55—59 | 5,887 | 7,626 | 13,513 | 2.11 | 2.73 | 4.85 |
| 60—64 | 3,673 | 5,123 | 8,796 | 1.32 | 1.84 | 3.15 |
| 65—69 | 1,845 | 2,713 | 4,558 | 0.66 | 0.97 | 1.63 |
| 70—74 | 660 | 1,104 | 1,764 | 0.24 | 0.40 | 0.63 |
| 75—79 | 702 | 1,466 | 2,168 | 0.25 | 0.53 | 0.78 |
| 80—84 | 396 | 1,012 | 1,408 | 0.14 | 0.36 | 0.50 |
| > 85 | 291 | 1,012 | 1,303 | 0.10 | 0.36 | 0.47 |
| Total | 134 474 | 144 392 | 278 866 | 48.22 | 51.78 | 100.00 |

Source: [39].

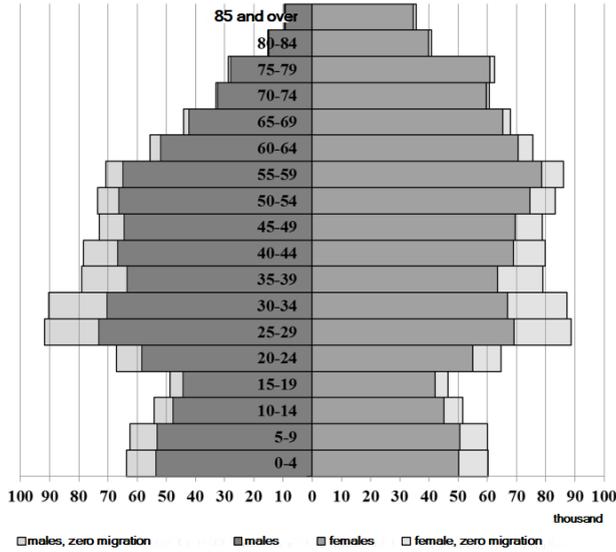


Fig. 5. Actual and potential (zero-net-migration scenario) age and sex structure of Latvia, as at the beginning of 2016

Compiled by the authors using the author’s own calculations is based on [40].

International migration did not only distort the age and sex structure of Latvia but also increased the dependency ratio (table 4).

Table 4

Dependency ratio on Latvia (as at the beginning of 2016)

| Age and sex structure | Dependency ratio (per 1,000 persons of productive age) | | |
|-----------------------|--|--|------------------|
| | People aged 0—14 (dependent part) | People aged 65 and over (dependent part) | Dependency ratio |
| Actual | 234 | 302 | 536 |
| Potential | 235 | 266 | 501 |

Source: compiled by the authors, based on [40] and based on the author’s own calculations.

The Effect of Migration on the Age and Sex structure of Latvia: Regional aspects

Over the 16 years, from 2000 to 2015, the country lost 14% of its population to migration. This rate differed significantly across Latvian regions. Unfortunately, open access data do not contain a breakdown of the age and sex distribution (ASD) of migrants by administrative units.

Thus, when calculating the effect of migration on the ASD of selected territories in 2000—2015, we will use the same age and sex proportion as we did when considering the total population of Latvia.

We will examine Latvia's nine largest regions, which were granted the status of independent administrative units by the 2008 reform. These are Riga, Daugavpils, Jelgava, Jēkabpils, Jūrmala, Liepāja, Rēzekne, Valmiera, and Ventspils. Unlike Latvia's other administrative units established by the reform, these cities reported not only the census data on the ASD (2000, 2011) but also more recent information (2016). This makes it possible to trace changes in the numbers and proportions of selected age cohorts, caused by the natural change and migration over the period under consideration (2000—2015).

As mentioned above, Latvia's population decreased by 412.8 thousand people or 17.3% of the total population size at the turn of the century. Across Latvia's largest cities, this rate ranged from 10.5% (Jelgava) to 27.2% (Rēzekne) [41] (table 5).

Table 5

Changes in the size of population in Latvia's major cities, 2000—2015

| City | Population size as at the beginning of the year, people | | Natural increase (decline) in 2000—2015, people | Population growth rate, 2000—2015 (2000 = 100) | Contribution of migration to the total population increase (decline), % |
|------------|---|---------|---|--|---|
| | 2000 | 2016 | | | |
| Riga | 766,381 | 639,630 | – 126,751 | 83.5 | 68.3 |
| Daugavpils | 115,574 | 85,858 | – 29,716 | 74.3 | 70.9 |
| Liepāja | 89,641 | 70,630 | – 19,011 | 78.8 | 76.2 |
| Jelgava | 63,743 | 57,053 | – 6,690 | 89.5 | 74.0 |
| Jūrmala | 55,673 | 49,182 | – 6,491 | 88.3 | 36.2 |
| Ventspils | 43,999 | 35,903 | – 8,096 | 81.6 | 65.0 |
| Rēzekne | 39,430 | 28,692 | – 10,738 | 72.8 | 67.8 |
| Jēkabpils | 27,911 | 22,750 | – 5,161 | 81.5 | 72.2 |
| Valmiera | 27,799 | 23,248 | – 4,551 | 83.6 | 78.7 |

Source: Compiled by the authors based on [41].

A comparison of the 2000 and 2016 age and sex pyramids of Latvian cities shows that changes in the numbers of certain age cohort were not symmetrical over the 16 years. In all the cities, the absolute numbers of people aged 0—4⁷ and those aged over 75 was increasing. Another com-

⁷ The exceptions are Ventspils and Rēzekne, where the numbers of the group aged 0—4 declined by 5.7 and 2.8% respectively in 2000—2015.

mon development is a significant — 41—57% — decrease in the numbers of the cohort aged 10—19 (fig. 6). These changes in the age structure of the cities are in line with the national trend. However, there are significant differences in selected age groups [42].

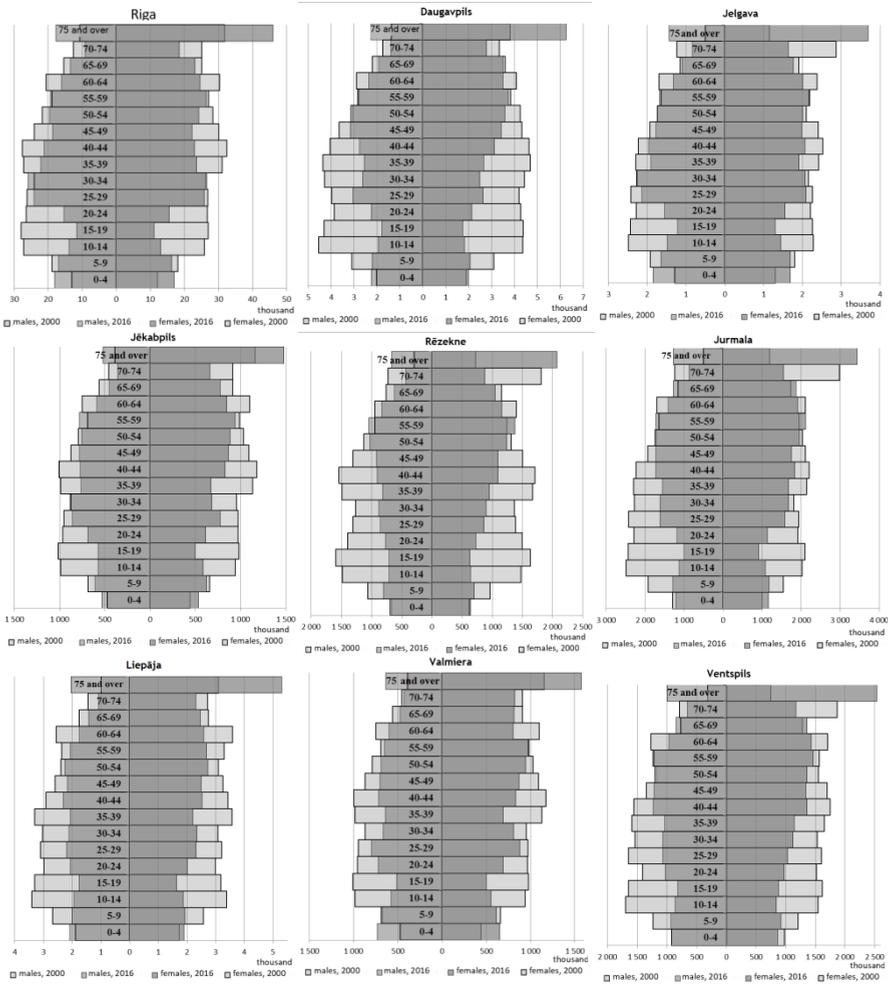


Fig. 6. A comparison of the age and sex structure of Latvian cities in 2000 and 2016

Compiled by the authors based on [42].

In some Latvian cities (Daugavpils, Liepāja, Rēzekne, Valmiera) the proportion of groups aged 35—39 is diminishing. In other cities (Jelgava, Jūrmala, Rēzekne) this process is affecting people aged 70—74. Over this period Jūrmala and Rēzekne witnessed a significant increase in the number of residents aged 55—59 (table 6).

Table 6

**Population growth rates in Latvia and its major regions
for five-year cohorts in 2000—2015, % (2000 = 100 %)**

| Age | Latvia | Rīga | Daugavpils | Liepāja | Jelgava | Jūrmala | Ventspils | Rēzekne | Jekabpils | Valmiera |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 0—4 | 108.0 | 139.8 | 108.3 | 110.0 | 137.2 | 115.2 | 94.3 | 97.2 | 116.8 | 151.0 |
| 5—9 | 71.5 | 89.8 | 69.1 | 74.9 | 89.8 | 80.7 | 75.4 | 74.4 | 91.2 | 95.8 |
| 10—14 | 49.7 | 50.8 | 42.1 | 55.9 | 61.7 | 54.1 | 52.6 | 45.7 | 60.1 | 58.8 |
| 15—19 | 48.4 | 41.3 | 40.6 | 52.5 | 53.6 | 46.4 | 51.9 | 41.4 | 53.8 | 51.1 |
| 20—24 | 70.2 | 58.2 | 53.8 | 68.2 | 69.4 | 61.5 | 68.4 | 51.8 | 67.3 | 73.3 |
| 25—29 | 86.2 | 94.2 | 69.7 | 71.7 | 90.4 | 82.5 | 64.9 | 63.7 | 84.7 | 87.5 |
| 30—34 | 86.2 | 104.4 | 58.6 | 73.0 | 97.8 | 92.4 | 71.5 | 67.6 | 85.6 | 80.8 |
| 35—39 | 71.7 | 78.4 | 57.5 | 62.0 | 81.0 | 80.7 | 67.3 | 56.1 | 67.6 | 63.1 |
| 40—44 | 77.3 | 73.4 | 67.8 | 76.5 | 84.5 | 86.9 | 78.5 | 61.8 | 73.1 | 71.2 |
| 45—49 | 86.2 | 75.7 | 82.5 | 79.7 | 86.6 | 90.5 | 84.0 | 71.6 | 83.6 | 80.3 |
| 50—54 | 100.8 | 87.3 | 89.9 | 91.1 | 97.7 | 100.6 | 92.0 | 93.0 | 89.9 | 89.8 |
| 55—59 | 100.6 | 99.6 | 99.2 | 83.9 | 100.7 | 113.9 | 96.9 | 111.0 | 102.6 | 97.3 |
| 60—64 | 83.6 | 79.7 | 84.0 | 70.4 | 82.2 | 93.9 | 80.6 | 85.2 | 77.3 | 75.9 |
| 65—69 | 88.8 | 90.0 | 93.3 | 86.3 | 93.8 | 113.7 | 108.2 | 86.8 | 82.9 | 87.4 |
| 70—74 | 86.8 | 73.2 | 81.9 | 81.6 | 60.2 | 58.0 | 69.1 | 51.6 | 74.3 | 91.7 |
| 75 and over | 148.0 | 149.8 | 163.8 | 179.6 | 311.9 | 282.0 | 332.5 | 269.6 | 129.1 | 143.3 |
| Total | 82.7 | 83.5 | 74.3 | 78.8 | 89.5 | 88.3 | 81.6 | 72.8 | 81.5 | 83.6 |

Source: compiled by the authors and is based on [42].

Using data on the age and sex structure of Latvian cities in 2000 and at the beginning of 2016 and being familiar with the age-adjusted birth and mortality rates for the total national population, we can calculate net migration rates for selected age cohorts. Under a zero-net-migration scenario, the five-year cohort aged 14—18 turns into the group aged 30—34 with a 1.6% loss due to mortality.

Similarly, when the age group aged 24—28 turns 40—44, 3.4% of the initial numbers are lost. The transition of the cohort aged 39—43 into that aged 55—59 is associated with a 10.8% loss. Naturally, losses increase in older age groups. The transition from the 59—63-year-old cohort to that aged 75—79 produces a 36% loss. The same way, an analyst can calculate the possible numbers of younger age groups — those from 0 to 16 years old. The mortality rate in the younger age groups is very low (hundredths of a percent per year), thus their numbers depend primarily on the age-adjusted birth rate per 1,000 female population of fertile age.

The cohort projection method produces an age distribution of Latvia's population for 2016 under the zero-migration scenario. The difference between the actual and possible numbers of selected age groups can be accounted for only by migration.

We will use the age-adjusted birth and mortality rates to check the calculations performed for Latvia's major cities. In 2000—2015, all the nine cities were losing population, migration being the major cause of that (see table 6). In six cities, the difference between the actual population size as at the beginning of 2016 and the calculated data was very close to the net migration rate observed over the 16 years [43]. In Riga, Daugavpils, Liepāja, Jelgava, Valmiera, and Jēkabpils, the difference between the official and calculated data on net migration was within 10%. Only in Rēzekne, Ventspils, and Jūrmala, the actual migration calculated using the cohort projection method deviated from the official statistics by more than 10%. In Daugavpils, Liepāja, Jelgava, Jūrmala, Ventspils, and Rēzekne the obtained data on population decline were above the official ones. In Riga, Valmiera, and Jēkabpils, the official statistics exaggerated the demographic losses to migration.

A comparative analysis of the age structure of migration in Latvia's cities produces results that are even more surprising (fig. 7). Daugavpils, Liepāja, Ventspils, and Rēzekne have a similar structure of migration, which does not deviate significantly from the national trends observed over the 16 years (see table 3 and fig. 5). Migration losses affected all the age cohorts — but, most significantly, that aged 25—39 and the least so those aged 15—19 (0—4 in Liepāja) and 65 and over.

The age structure of migrants in other Latvian cities differs considerably from that in the nine considered above. In Riga, the greatest migration losses of 2000—2015 affected the group aged 40—59, which accounts for almost 38% of the net migration rate. The least affected group was the cohort age 25—29. In Jūrmala, on the contrary, the numbers of the cohort aged 50—57 increased due to migration, whereas the group aged 25—34 sustained the greatest losses over the 16 years. In Valmiera and Jēkabpils, population growth due to net migration was observed in the group aged 15—24.

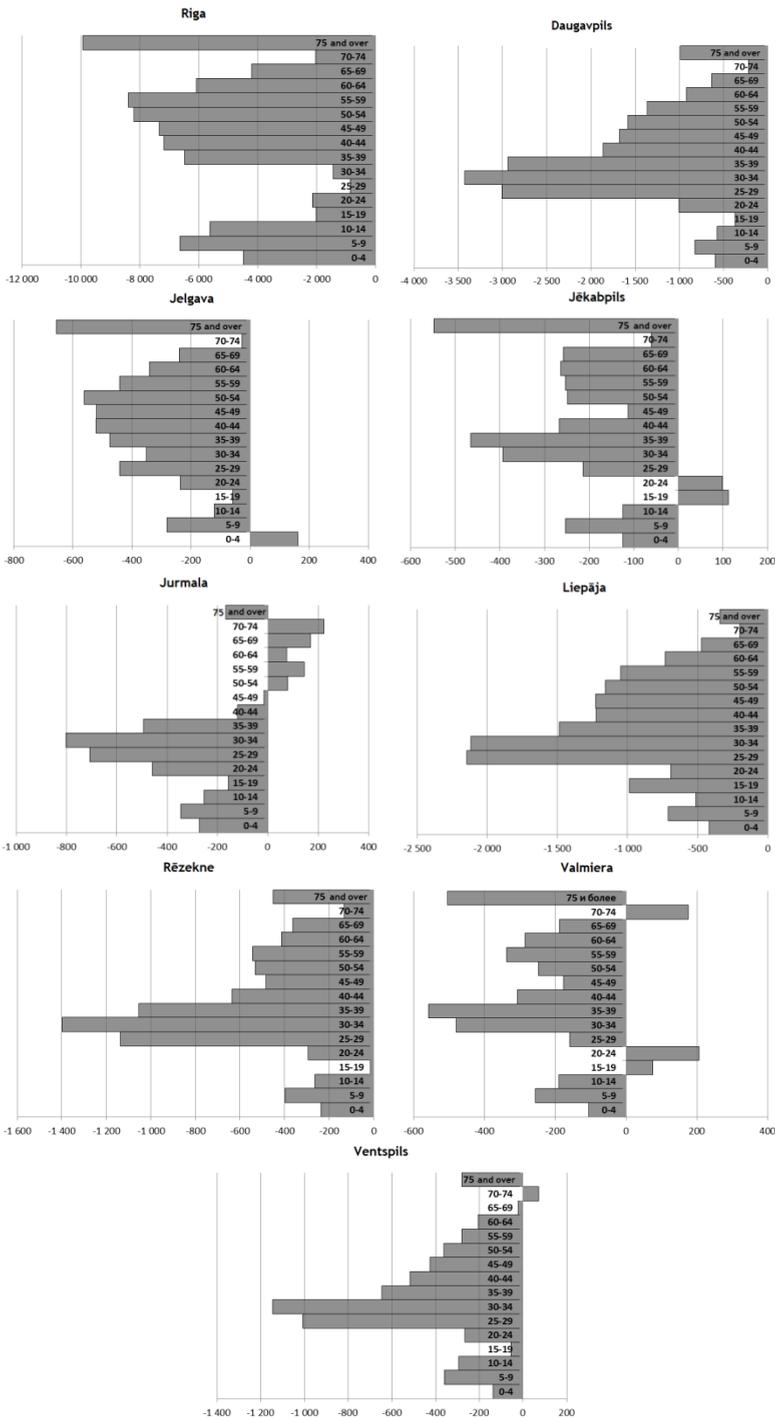


Fig. 7. The age structure of net migration rate for Latvian cities, 2000—2015, people

Compiled by the authors and is based on [43] and the authors' own calculations.

Conclusions

The characteristics of migration processes in Latvia allow us to draw a number of conclusions.

1) Over the past twenty-five years, Latvia has been an absolute leader — in Europe and the world alike — in losing population. Migration accounts for most of the population decline (64.2%). However, from the 1990s, the primary destination of Latvian migration changed. Today, the European Union is the preferred destination. Latvia's ethnic Russians — who live predominantly in the cities — are the most likely emigrants.

2) Latvia's population decline rate differs significantly across age groups — and this distorts the age and sex distribution of the population. From the late 1980s, the proportion of the pre-productive population (aged 0—14) decreased by a third (from 21.4 to 15.2%) and that of the post-productive population (aged 65 and over) increased by more than half (from 11.8 to 19.6%). The increase in dependency ratio caused by a growing proportion of the senior population is offset by the falling numbers of children. However, this situation cannot last forever. In the near future, the increasing lifespan of Latvians will translate into a decline in productive population (aged 15—64) and an increase in the dependency ratio. However, emigration is accelerating this process — over the past fifteen years, people of the most fertile age (20—29) accounted for most emigrations.

3) The effect of international migration on the age and sex structure of Latvia's population is not the mere outflow of population aged 15—29 and 30—49. In 2000—2015, the direct losses to emigration amounted to 257.4 thousand people or 10.8% of Latvia's population.⁸ The potential birth and mortality rates among migrants suggest that, in the sixteen years, the country lost 278.9 thousand people or 14.2% of the population as at the beginning of 2016. In the cohorts aged 25—29 and 30—34, this loss amounted to 26.8% and 29.4% respectively. Overall, the most fertile group aged 25—39 accounted for 40% of Latvia's demographic losses to migration. This led to even greater disproportions in the age and sex structure of Latvia's population and blighted the prospects for overcoming the grave demographic crisis.

4) The age structure of Latvia's demographic losses to migration has pronounced regional differences. Using the age projection method and the age-adjusted mortality and birth rates, we calculated the actual scope and age structure of the 2000—2015 international migration of Latvia's

⁸ As at the beginning of 2000.

nine major cities. A comparison of the calculation results and the actual population size revealed a discrepancy between the official migration statistics and the values obtained. For Riga, Daugavpils, Liepāja, Jelgava, and Valmiera, this difference did not exceed 3—7%, whereas it reached 12% in Ventspils, 13% in Rēzekne, and 24% in Jūrmala, with the official statistics providing much smaller numbers. However, the migration losses of Jēkabpils in 2000—2015 turned out to be 9% below the official data.

The most important finding is that the age structure of migrants differs significantly across Latvia's major cities. In Daugavpils, Liepāja, Ventspils, and Rēzekne (and Latvia in general), the greatest migration losses over the study period were sustained by the group aged 25—39 — the most mobile cohort. In the capital, which attracts ambitious young people, this group is not associated with considerable losses, which affected the cohorts aged 45—59 and over 75. A similar migration loss structure is observed in the adjacent city of Jelgava, where people over 75 years comprise the most populous group of emigrants.

An interesting case is Jūrmala, where the age structure of migration is completely different. People under forty are leaving the resort town, looking for employment. At the same time, affluent Latvians aged 50—74 find Jūrmala an attractive place to live. Moreover, this resort town — a popular real estate choice for Russian citizens — is a convenient way to obtain a residence permit in the European Union.

It is more difficult to explain the migratory increase in the groups aged 15—24 in the smallest of Latvia's major cities — Valmiera and Jēkabpils. Whereas Valmiera's 'youth magnet' is its university (Vidzemes augstskola), it is not quite clear why younger Latvians find Jēkabpils attractive. However, this study does not aim to explain the cause-effect relationships behind the revealed migratory processes.

The methods used to estimate the effect of migration on the changes in the age and sex distribution and to identify regional differences in the migration structure in Latvia contribute to a better understanding of demographic development in selected countries and regions. These methods will not only help to narrow the gaps in migration statistics but also contribute to the design of relevant models and improve the quality of demographic projections.

References

1. The coefficient of annual population growth (per 1000), 1950—2015. In: *Demoscope Weekly*, Institute of Demography of the National Research Institute "Higher School of Economics", available at: <http://www.demoscope.ru/weekly/app/app4002.php> (accessed 02.01.2018) (in Russ.)

2. Zhitin, D. V., Ivanova, A. A. 2017, *Demograficheskoe razvitie stran Baltii* [Demographic development of the Baltic States], Scientific reports of the Russian Association of Baltic Studies, Series 2. Socio-economic development, Moscow, Association of Book Publishers "Russian Book", 112 p. (in Russ.)

3. Klupt, M. 2015, Center-Peripheral Relations in Europe: Demographic Aspect. In: *Mirovaya ekonomika i mezhdunarodnyye otnosheniya* [World Economy and International Relations], no. 2, p. 58—67 (in Russ.)

4. *Demografija*, 2015. Statistisko datu krajums, Riga, 120 p. (in Latvian).

5. Indans, I. 2009, *Migration Policies in the Baltic Sea Region 2008—2009*. Rīga.

6. Krisjane, Z., Berzins, M. 2012, Post-socialist Urban Trends: New Patterns and Motivations for Migration in the Suburban Areas of Riga, *Latvia Urban Studies*. Vol. 49, no. 2, p. 289—306.

7. Göler, D., Krišjāne, Z., Bērziņš, M. 2014, International Migration in the Periods of Transition and Crisis: the Case of Latvia, *Balt. Reg.*, Vol. 6, no. 2, p. 75—85. doi: 10.5922/2079-8555-2014-2-6.

8. Apsite, E., Krišjāne, Z., Berzins, M. 2012, Emigration from Latvia under economic crisis conditions, *International Proceedings of Economics Development and Research*, Vol. 31, p. 134—138.

9. Eglite, P. 2007, Regional Differences of Depopulation in Latvia. In: *Geografiski Raksti. Folia Geographica* [Geographic Articles], Vol. 13. p. 169—174.

10. Krišjāne, Z., Berzins, M., Apsite, E. 2013, Post-accession migration from the Baltic states. The case of Latvia. In: Glorius, B. (ed.) *Mobility in Transition. Migration Patterns after EU Enlargement*, Amsterdam, p. 85—109.

11. Krisjane, Z., Eglite, P., Baul, A. et al. 2008, *Darbaspeka geografiska mobilitate* [Working in the field of geographic mobility], Riga (in Latvian)

12. Volkov, V. V. 2017, Ethnic minorities in the Latvian political discourse, *Etnograficheskoe obozrenie* [Ethnographic Review], no. 2, p. 24—38 (in Russ.)

13. Kuznetsova, T., 2010, Migration trends in the Baltic region states: the spatiotemporal aspect, *Balt. Reg.*, Vol. 2, no. 4, p. 48—54. doi: 10.5922/2079-8555-2010-4-5.

14. Khrushchev, S. 2010, The ethnic aspects of demographic processes in the Baltic region states, *Balt. Reg.*, Vol. 2, no. 4, p. 81—91. doi: 10.5922/2079-8555-2010-4-9.

15. Vinogradova, S. M., Rushchin, D. A. 2016, Gender aspects of the social development of the Baltic region, *Vestnik Sankt-Peterburgskogo universiteta. Seriya 17. Filosofiya. Konfliktologiya. Kul'turologiya. Reli-*

giovedenie [Bulletin of the St. Petersburg University. Series 17. Philosophy. Conflictology. Culturology. Religious studies], no. 1, p. 111—119 (in Russ.)

16. Kuznetsova T. Yu., Fedorov G. M. 2011, Territorial differentiation of the demographic development of the Baltic macroregion, *Vestnik Immanuel Kant Baltic Federal University, Natural and medical sciences*, no. 1, p. 131—137 (in Russ.)

17. Kazemina, O. E. 1991, *Dinamika etnicheskogo sostava naseleniya Litvy, Latvii i Estonii v XX v. (etnodemograficheskoe issledovanie* [Dynamics of the ethnic composition of the population of Lithuania, Latvia and Estonia in the XX century. (ethnodemographic study)], PhD thes., Moscow (in Russ.)

18. Manakov, A. G., Chuchenkova, O. A. 2017, *Dinamika etnicheskogo sostava naseleniya Estonii i Latvii s 1881 po 2016 g.* [Dynamics of the ethnic composition of the population of Estonia and Latvia from 1881 to 2016], Scientific Reports of the Russian Association of Baltic Studies, Series 2. Social and Economic Development, no. 2, Moscow, Association of Book Publishers "Russian Book", 96 p. (in Russ.)

19. Kaszmarczyk, P., Okólski, M. 2008, Economic Impacts of Migration on Poland and Baltic States, *Fafo-paper*, Oslo.

20. Katus, K., Sakkeus, L. 1999, Urbanization, migration and regional development of the Estonian population. In: *Migratsiya i urbanizatsiya v 90-ye gody* [Migration and urbanization in the 90s], Moscow, p. 159—183 (in Russ.)

21. Fedorov, G. M., Razumovsky, V. M., Kuznetsova, T. Yu., Gumenyuk, L. G. 2017, Location and dynamics of the population of coastal cities in the Baltic. In: *Izvestiya Russkogo geograficheskogo obshchestva* [Bulletin of the Russian Geographical Society], Vol. 146, no. 6, p. 14—24 (in Russ.)

22. Raagmaa, G. 2003, Centre-Periphery model explaining the regional development of the informational and transitional society, *43rd Congress of the European regional science association (ERSA) Jyvaskyla*, Finland, August 27—30, available at: <https://www.jyu.fi/ersa/2003/cdrom/papers/503.pdf> (accessed 02.01.2018).

23. Ivanov, K. O. 2011, Ethnic structure of the population of Latvia. In: *Pskovskiy regionologicheskiy zhurnal* [Pskov regionological journal], no. 12, p. 62—69 (in Russ.)

24. Manakov, A., Suvorkov, P., Stanaitis, S. 2017, Population Ageing as a Sociodemographic Problem in the Baltic Region, *Balt. Reg.*, Vol. 9, no. 1, p. 55—67. doi: 10.5922/2079-8555-2017-1-5.

25. Kontuly, T., Tammaru, T. 2006, Population subgroups responsible for new urbanization and suburbanization in Estonia. In: *European Urban and Regional Studies*. Vol. 13, no. 4, p. 319—336.

26. Mkrtychyan, N., Karachurina, L. 2014, The Baltics and Russian North-West: the Core and the Periphery in the 2000s, *Balt. Reg.*, Vol. 6, no. 2, p. 48—62. doi: 10.5922/2079-8555-2014-2-4.

27. Coleman, D. 2008, The demographic effects of international migration in Europe, *Oxford Review of Economic Policy*, Vol. 24, no. 3, p. 453—477.

28. Plane, D. A. 1992, Age-Composition Change and the Geographical Dynamics of Interregional Migration in the U.S, *Annals of the Association of American Geographers*, Vol. 82, no. 1, p. 64—85.

29. Beine, M., Docquier, F., Rapoport, H. 2008, Brain drain and human capital formation in developing countries: Winners and losers, *Economic Journal*, Vol. 118, no. 528, p. 631—652.

30. Vidal, J.-P. 1998, The effect of emigration on human capital formation, *Journal of Population Economics*, Vol. 11, no. 4, p. 589—600.

31. 15 independent states. Coefficient of total fertility, *Demoscope Weekly*, Institute of Demography of the National Research Institute "Higher School of Economics", available at: http://www.demoscope.ru/weekly/ssp/sng_tfr.php (accessed 03.01.2018) (in Russ.)

32. ISVG01. Vital statistics, *Official site of the Central Statistical Bureau of Latvia*, available at: http://data.csb.gov.lv/pxweb/en/Sociala/Sociala__ikgad__iedz__iedzskaits/ISV0010.px/table/tableViewLayout2/?rxid=a79839fe-11ba-4ecd-8cc3-4035692c5fc8 (accessed 03.01.2018).

33. IBG01. Long-term migration, *Official site of the Central Statistical Bureau of Latvia*, available at: http://data.csb.gov.lv/pxweb/en/Sociala/Sociala__ikgad__iedz__migr/IB0010.px/table/tableViewLayout2/?rxid=a79839fe-11ba-4ecd-8cc3-4035692c5fc8 (accessed 03.01.2018).

34. Zhitin, D., Krasnov, A., Shendrik, A. 2016, Migration Flows in Europe: Space and Time Transformation, *Balt. Reg.*, Vol. 8, no. 2, p. 68—86. doi: 10.5922/2079-8555-2016-2-6.

35. IBG02. International long-term migration by country group, *Official site of the Central Statistical Bureau of Latvia*, available at: http://data.csb.gov.lv/pxweb/en/Sociala/Sociala__ikgad__iedz__migr/IB0020.px/table/tableViewLayout2/?rxid=a79839fe-11ba-4ecd-8cc3-4035692c5fc8 (accessed 03.01.2018).

36. IBG041. International long-term migration by ethnicity of migrants, *Official site of the Central Statistical Bureau of Latvia*, available at: http://data.csb.gov.lv/pxweb/en/Sociala/Sociala__ikgad__iedz__migr/IB0041.px/table/tableViewLayout2/?rxid=a79839fe-11ba-4ecd-8cc3-4035692c5fc8 (accessed 03.01.2018).

37. ISG022. Resident population by major age group (by 5-years age groups), *Official site of the Central Statistical Bureau of Latvia*, available at: http://data.csb.gov.lv/pxweb/en/Sociala/Sociala__ikgad__iedz__iedzs

kaits/IS0022.px/table/tableViewLayout2/?rxid=a79839fe-11ba-4ecd-8cc3-4035692c5fc8 (accessed 03.01.2018).

38. All-Union Population Census of 1989. Distribution of population of union republics and their regions by sex and age. Latvian SSR, *Demoscope Weekly*, Institute of Demography of the National Research Institute "Higher School of Economics", available at: http://www.demoscope.ru/weekly/ssp/sng_age_89.php?reg=82 (accessed 03.01.2018) (in Russ.)

39. IBG04. International long-term migrants by age and sex, *Official site of the Central Statistical Bureau of Latvia*, available at: http://data.csb.gov.lv/pxweb/en/Sociala/Sociala_ikgad_iedz_migr/IB0040.px/table/tableViewLayout2/?rxid=a79839fe-11ba-4ecd-8cc3-4035692c5fc8 (accessed 03.01.2018).

40. ISG06. Population by sex and age at the beginning of year, *Official site of the Central Statistical Bureau of Latvia*, available at: http://data.csb.gov.lv/pxweb/en/Sociala/Sociala_ikgad_iedz_iedzskaits/IS0060.px/table/tableViewLayout2/?rxid=a79839fe-11ba-4ecd-8cc3-4035692c5fc8c (accessed 04.01.2018).

41. ISG12. Usually resident population in statistical regions, cities under state jurisdiction and counties by actual and declared place of residence, *Official site of the Central Statistical Bureau of Latvia*, available at: http://data.csb.gov.lv/pxweb/en/Sociala/Sociala_ikgad_iedz_iedzskaits/IS0120.px/table/tableViewLayout2/?rxid=a79839fe-11ba-4ecd-8cc3-4035692c5fc8 (accessed 04.01.2018).

42. ISG171. Men and women by age and cities under state jurisdiction at the beginning of year, *Official site of the Central Statistical Bureau of Latvia*, available at: http://data.csb.gov.lv/pxweb/en/Sociala/Sociala_ikgad_iedz_iedzskaits/IS0171.px/table/tableViewLayout2/?rxid=a79839fe-11ba-4ecd-8cc3-4035692c5fc8 (accessed 04.01.2018).

43. IBG10. Long-term net migration of population in statistical regions, cities under state jurisdiction and counties, *Official site of the Central Statistical Bureau of Latvia*, available at: http://data.csb.gov.lv/pxweb/en/Sociala/Sociala_ikgad_iedz_migr/IB0100.px/table/tableViewLayout2/?rxid=a79839fe-11ba-4ecd-8cc3-4035692c5fc8 (accessed 05.01.2018).

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