

Population development trends in Russia and China in the 21st century

Aleksandra V. Korolenko¹

¹ *Vologda Research Center of the Russian Academy of Sciences,
Vologda, 160014, Russia*

Received 20 April 2019 ♦ Accepted 3 June 2019 ♦ Published 30 June 2019

Citation: Korolenko AV (2019) Population development trends in Russia and China in the 21st century. *Population and Economics* 3(2): 45–64. <https://doi.org/10.3897/popecon.3.e37961>

Abstract

Currently, Russia and China are in an intermediate position between rich developed countries with declining indigenous populations and poor developing countries with a relatively fast-growing population. However, if China is the world leader in population size (1.38 billion people), Russia, with its much larger territory, has almost ten times less population (144.3 million). However, according to the UN forecasts both countries are facing the same challenge in the 21st century: it is a significant reduction in population size, which necessitates the identification of the prerequisites, causes and effects of the upcoming demographic transformations. This fact determined the purpose of this article – analysis of the population development in Russia and China in the first decades of the 21st century, identification of its differences and general trends. The research was based on statistics from the United Nations, the World Bank and the World Health Organization. The author analyzes the dynamics of population size, age structure, gender ratio, natural movement (fertility and mortality), life expectancy and mortality rate structure. Trends of population development both common for two countries and specific for each of them, were identified; according to the author, they should be taken into account in shaping responses to demographic challenges and in elaborating mechanisms for managing demographic processes.

Keywords

21st century; population development; population trends; China; Russia.

JEL codes: J11, O15

Introduction

The current development of the world population is characterized by two distinct poles: on the one hand, rich developed countries with declining indigenous populations, and on the

other, poor developing countries with relatively rapidly growing populations (Iontsev 2014: 99). Between these two poles, the intermediate position, among many other countries, is taken by China and Russia. In their development both countries had a common socialist past, emerged from it, inheriting the features of a planned economy and distribution relations. A market economy has been chosen as the main route both in the People's Republic of China and in the Russian Federation (Danilova et al. 2012: 13). Russia and China are, first of all, neighbouring states, having a long section of common border (about 4 thousand km), which determines their close political and trade-economic relations. The beginning of strategic cooperation between the two countries was laid in the second half of the 1990s in the framework of bilateral and multilateral agreements, and it peaked in the 2000s. Thus, in April 1996 in Shanghai the "Agreement on Confidence-Building in the Military Sphere in Bordering Areas" was signed. A year later in April 1997 in Moscow the "Agreement on Mutual Reduction of Armed Forces in Bordering Areas" was signed, which served as the basis for the creation of the "Shanghai Five", which has evolved into the Shanghai Cooperation Organization¹ in 2001. In July 2001, the Moscow Treaty on Good-Neighbourliness, Friendship and Cooperation between the Russian Federation and the People's Republic of China was signed, which constituted a legal framework for bilateral strategic relations (Rossijsko-kitajskie otnosheniya... 2016: 7). During the 2000s, trade relations intensively developed: trade turnover between Russia and China increased up to \$69.5 billion by 2016 (Chzhe, 2017: 152).

Close economic and political cooperation between the two countries and their territorial proximity also contributed to numerous migration flows. As V. L. Larin noted, international tourism plays a huge role in Russian-Chinese relations: on the one hand, it is a legal way to move people and goods across the border, which is one of the sources of economic development of bordering territories, on the other hand, is a channel for irregular migrants to Russia (Larin 2008: 37). All these issues call for studying the general and specific features of the demographic development of the two countries.

Currently, the population development of China and Russia has both similarities and differences. China has the largest population in the world (1.38 billion people), while Russia ranks only 9th (144.3 million people) (World Population Prospects 2017: 20, 22). At the same time, the territory of the Russian Federation significantly exceeds the territory of China (17,098.2 against 9,597.0 thousand square km). As a result, the population density in China is significantly higher than in Russia (1,296 people per square km versus 120 people per square km) (Population Reference Bureau 2016).

According to the UN forecasts, the population of both countries will decrease in the coming decades: by 2050 in China it will reduce to 1.36 billion people, in Russia – to 132.7 million people, and by 2100 – to 1.02 billion in China and 124.0 million people in Russia. By 2030, India will become the world first country in terms of population size, overtaking China by almost 72 million people; by 2050 this gap will reach 295 million people, and by 2100 – 496 million people (World Population Prospects 2017: 21, 23).

To conduct effective domestic and international policy in China and Russia, maintain their geopolitical and national security, it is extremely important to understand the pre-conditions and nature of the upcoming demographic transformations, which will enable identifying measures to respond to population challenges and to develop mechanisms to

¹ The "Shanghai Five" included China, Russia, Kazakhstan, Tajikistan and Kyrgyzstan. The member states of the Shanghai Cooperation Organization include besides China, Russia, Kazakhstan, Tajikistan, Kyrgyzstan, also Uzbekistan (since 2001), India and Pakistan (since 2017) (Syroezhkin 2007: 50).

manage the demographic processes. The purpose of this article is to analyze the population development of Russia and China in the first decades of the 21st century, to identify its differences and general trends. Selecting this time interval for analysis is not accidental: during this period, a model of cross-border Russian-Chinese relations is being finalized, strategic and trade-economic cooperation developed most actively. In addition, the beginning of the 21st century in both countries was marked by an increase in a number of disturbing demographic issues, the most acute of which is population ageing.

Theoretical background. Many scientific works are dealing with the study of the population development trends in China in the 21st century, including the challenge of rapid population ageing, the exhaustion of the “demographic dividend”, and the reduction of the working-age population (Waldman 2005; Wang 2010; Peng 2011; Di Stefano 2012; Iontsev 2014; Zhoochao 2014; Larionov et al. 2015). Particular attention in a number of studies is paid to the demographic consequences of the “One family – one child” state policy to decrease the birth rate (Li and Zhang 2011; Pochagina 2014; Guleva 2016). At the same time, some scholars contest the role of State actions in shaping contemporary demographic trends, giving crucial importance to the factors of globalization, socio-economic country development and demographic transition (Waldman 2005; Yong 2010). Changes in the population dynamics in Russia in the 2000s were analyzed by a wide range of authors and scientific groups (Vishnevsky 2004; Osipova and Rybakovsky 2009; Rybakovsky 2011; Zhiromskaya 2012; Aganbegyan 2017; Lokosov and Rybakovsky 2017). In these works, the key demographic challenges are most often associated with high mortality rates, low life expectancy, low birth rate, depopulation and demographic ageing. However, there are not many works devoted to the study of common features and specifics of population development trends in Russia and China (Dudchenko 2002; Li 2003; Ryazantsev and Qionglan 2016) and they mainly deal with the inter-country migration flows, which actualizes the need for a more detailed study of this issue.

The **information basis** for the research are official statistics from international organizations, namely the Health Nutrition and Population Statistics databases of the World Bank, Global Health Estimates of the World Health Organization, World Population Prospects of the United Nations.

The review of population development trends in the two countries was carried out on the basis of indicators of population size, its age composition, gender ratio, natural movement (fertility and mortality), life expectancy and mortality patterns. When working with data, general scientific methods were used — analysis, comparison and generalization, tabular and graphic method.

Results of the study

As noted above, the population of China is almost 10 times larger than that of Russia. In addition, there is a difference in the dynamics of this indicator in the period between 2000 and 2016. While the population of the People's Republic of China increased by 9 per cent during the period under review (116 million), the population of the Russian Federation, by contrast, decreased by 2 per cent (2.3 million).

In 2000–2016 there was no significant change in the number of rural and urban residents in Russia (Fig. 2). Throughout the period, the urban population in the country was steadily higher than the rural population (2.8 times on average). In China, the situation is different:

urbanization was faster during this period (an average of 3 per cent per year; Fig. 1). Until 2010, the rural population of China numerically exceeded the urban, but the trend of reduc-

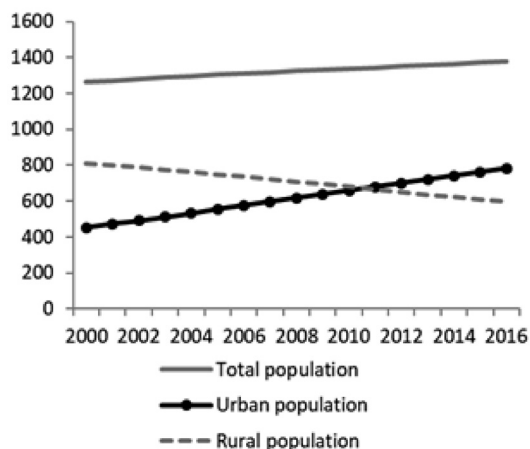


Figure 1. Population of China, 2000-2016 (millions). Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

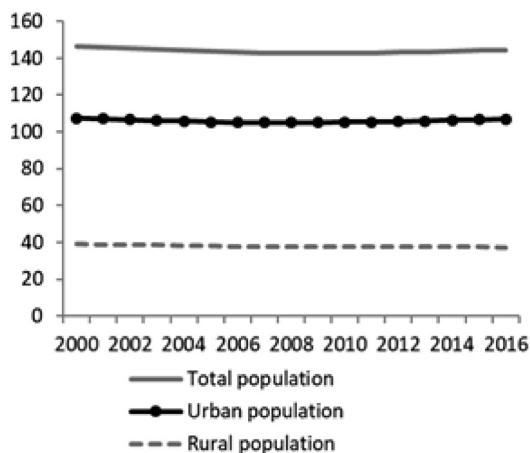


Figure 2. Population of Russia in 2000-2016(millions). Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

ing the number of rural inhabitants resulted in the fact that since 2011 the ratio of rural and urban population changed in favour of the latter.

Whereas in 2000 the share of urban and rural population in the People's Republic of China was 36 and 64% respectively, in 2016 it was 57 and 43% respectively (Fig. 3). In Russia, during the period under review, the proportion of urban and rural population has changed

insignificantly: in 2000 it was 73 and 27% respectively, in 2016 — 74 and 26% respectively (Fig. 4). Thus, in China the process of urbanization in 2000–2016 proceeded more intensively in comparison with the Russian Federation, which is largely explained by the largest in world history flows of internal migrants “from village to city” (Wang 2010: 245). In Russia,

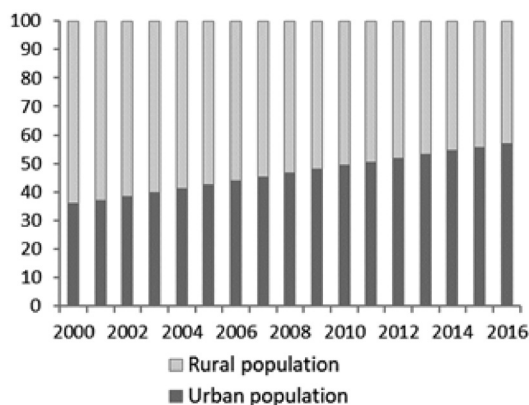


Figure 3. Ratio of urban and rural population in China, 2000 — 2016 (%). Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

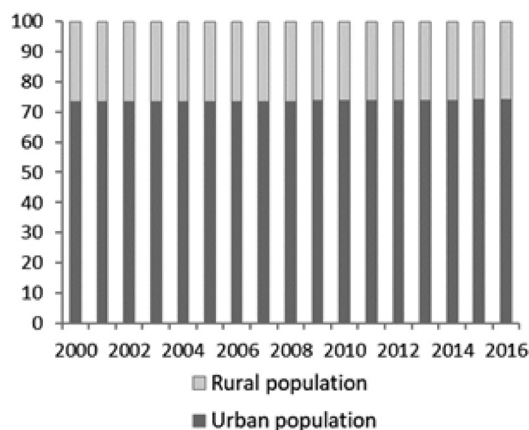


Figure 4. Ratio of urban and rural population in Russia, 2000 — 2016 (%). Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

the most intensive urbanization was in the 1960s–1980s. As a result, by 1990, the rural population reached 73 per cent and remained unchanged for the next 25 years.

Disproportion in sex ratio is currently an important feature of the population development both in China and Russia. However, the essence of this issue is different in two countries. Whereas in China the male population exceeds the female population, in the Russian

Federation, on the contrary, the number of women is higher than that of men. Thus, in 2016, per 1,000 men there were 941 women in China and 1,152 women in Russia (Fig. 5, 6). However, it is important to consider the age profile of the sex ratio. During the period under review, the male population in China exceeded the female population in the age groups of 0–14 and 15–64 years, while in the group 65 years and over there was a reverse proportion. In the Russian Federation, the gender imbalance with the numerical predominance of the male population is in the population of 0–14 years; the ratio changes in favour of women in the age group 15–64 years and reaches the highest value in the group 65 years and older (by over 2 times!). At fertile age (15–49 years), the sex ratio in China is 934 women per 1,000

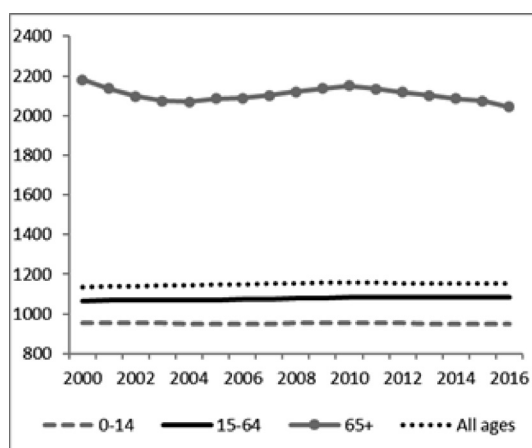


Figure 5. Sex ratio in the population of Russia, 2000 — 2016 (women per 1,000 men in different age groups). Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

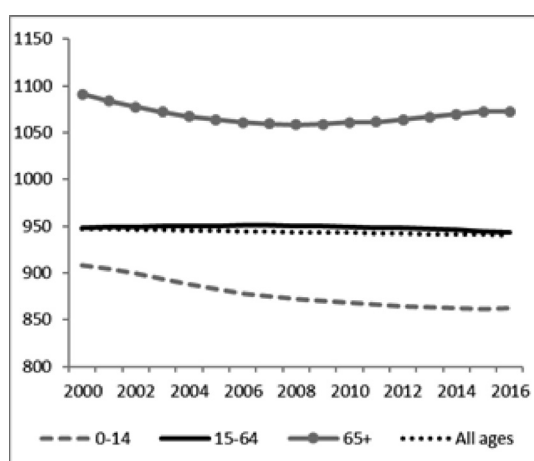


Figure 6. Sex ratio in the population of China, 2000 — 2016 (women per 1,000 men in different age groups). Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

men, in Russia — 1,009. Thus, the problem of gender imbalance is most acute for the Chinese population of childbearing cohorts.

According to experts, the gender imbalance in China is a result of the policy of limiting the birth rate. It resulted to a number of serious consequences: the problem of male solitude and celibacy due to the number of grooms exceeding brides, the spread of same-sex relationships among men because of the inability to form a heterosexual couple, aggravating the criminal situation associated with trafficking girls (Zhoochao 2014: 87). The gender imbalance of the population of Russia in the 21st century is caused, first of all, by the numerical predominance of the female population over the male population in older age groups, which Russian researchers explain by higher mortality rates of men and significant differences in the life expectancy of men and women (Rimashevskaya 2001: 36; Sinelnikov 2017).

Both in China and Russia, during the period under review, the proportion of the child population decreased (from 25 to 18 per cent and from 18 to 17 per cent respectively) and the proportion of older persons increased (from 7 to 10 per cent and from 8 to 10 per cent respectively). It should be noted that in both countries, the proportion of older persons aged 65 years and over has long surpassed the mark of 7%, therefore, according to the scale of population ageing of the United Nations¹, their population is recognized as “ageing”. According to UN forecasts, the share of population 65 years and older in China will reach 26% in 2050 and 32% in 2100, in Russia — 22% and 24% respectively (World Population Prospects 2017: 239, 249).

Demographic ageing is a global trend that is an inevitable consequence of demographic transition. The hallmark of ageing in China is its acceleration in the late twentieth and early twenty-first centuries, mainly due to a decline in fertility (so-called “bottom-up ageing”), which was also facilitated by the implementation of the “One family — one child” policy (Larionov et al. 2015: 185). The average annual growth rate of the proportion of older persons during the period under review in China reached 0.2%, in Russia — 0.1%.

In the Russian Federation, one of the main causes of ageing is also the reduction of fertility to the below replacement level. However, the specificity of the transformation of the age structure of the Russian population is due not only to the evolutionary process of demographic transition. It is also rooted in “spontaneous” factors, namely historical disasters of the first half of the 20th century and their “echo”, which strongly deformed the age pyramid, contributed to the wave-like dynamics of the number of all age groups (Vishnevsky and Shcherbakova 2018: 57).

Currently, the age structures of the population of the two countries have common features, namely similar proportions of the population under 15 years of age (18% in China and 17% in Russia) and population 65 years of age and older (10% in both). A distinctive feature of the population development in the PRC in 2000–2016 is the increase in the share of the working-age population (15–64 years) in the total population (from 69 to 72%), as a result of which most favourable age structure parameters were created, which provided a “demographic dividend” to the country (Lee and Mason 2011). In Russia, the proportion of this age group has not changed significantly during the period under review (69% both in 2000 and 2016).

¹ To assess the stages and level of the population ageing, the UN has developed a three-step scale, according to which with the proportion of persons aged 65 and over is less than 4% of the total population there is a stage of “demographic youth”, at 4–7% – a stage of “pre-ageing”, at 7 or more per cent – stage of “ageing population”.

The construction of age-sex pyramids also helps to characterize changes in the structure of the population. By the beginning of the 21st century, both Russia and China had noticeable “dips” due to the socio-economic turmoil and political events of the 20th century. So, on the pyramid for the Russian Federation there are “dips” in the number of children born in the 1990s, as well as of people whose childhood and youth fell on the years of the Second World War (so-called “children of war”; Fig. 7). Sex disparity is visible only in the older age (60 years and over), due to higher male mortality. Such a pyramid indicates a regressive type of reproduction: when mortality decelerates, fertility decline continues, and the population ages significantly. The age-sex pyramid of the population of China in 2000 also had evident “dips” in the age groups of 0-9 years and 15-24 years (Fig. 8), which can be associated with the consequences of the “One family – one child” family planning policy of the state. The population group of 15-24 years old is children born in its most active period, which was the end of the 1970s and early 1980s. The “dips” in the number of children from 0 to 9 years of age is associated with the decline in the number of the most active childbearing generations due to the first stages of the policy of limiting the birth rate. In the pyramids for 2016 in both countries, the consequences of the previous “demographic waves”, shifted to older age groups. Thus, in Russia, they were expressed in the “fall” of the population of 15-19 years of age, in the increase of sex disparity in older ages (Fig. 9). In the age pyramid of the popu-

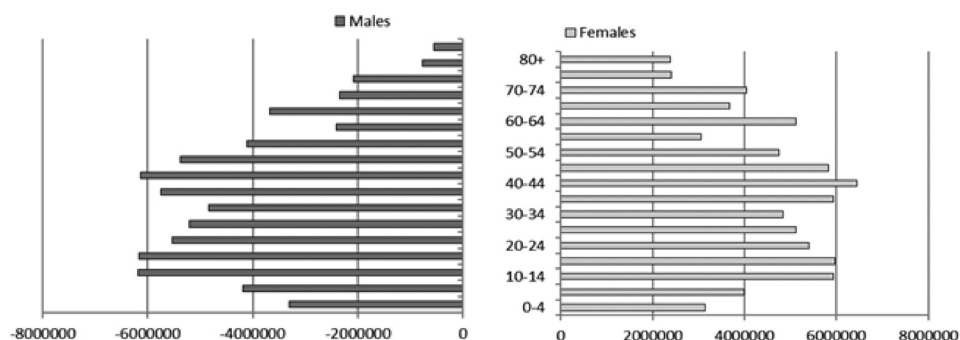


Figure 7. Age-sex pyramid of the population of Russia in 2000. Source: Health Nutrition and Population Statistics // World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

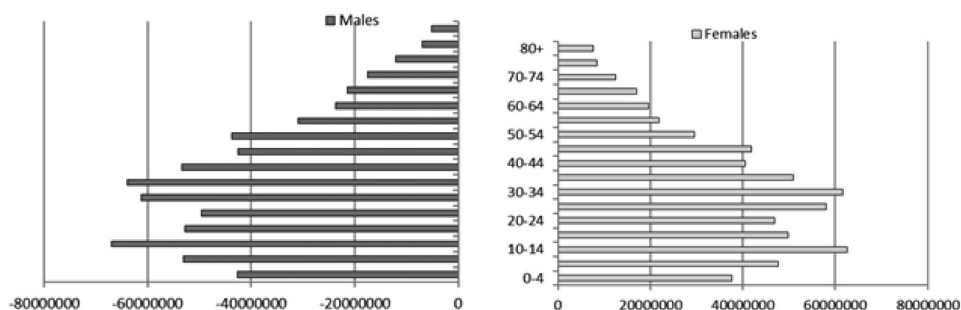


Figure 8. Age-sex pyramid of the population of China in 2000. Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

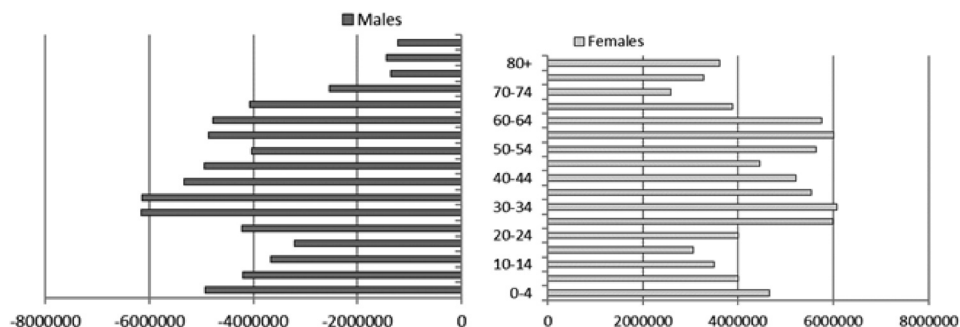


Figure 9. Age-sex pyramid of the population of Russia in 2016. Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

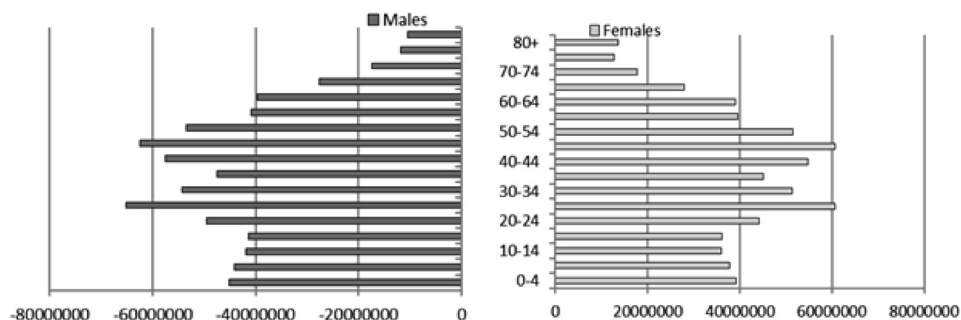


Figure 10. Age-sex pyramid of the population of China in 2016. Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

lation of China for 2016 the “dips” of age groups 10-19 and 35-39 (Fig. 10) are clearly seen. Thus, wave-like processes continue to influence the age-sex structure both of the Russian and Chinese populations.

The analysis of the age structure of the population of China and Russia from a gender perspective allows to reveal additional differences. Between 2000 and 2016 in China the share of children under 15 years of age among men and women decreased significantly (by 6.7%), while the share of the working-age population and the elderly population increased (by 3.7% and 3.1% respectively) (Table 1). In the Russian Federation, the age distribution of men and women has not changed significantly.

It is noteworthy that currently, the age composition of the male population in China and Russia is identical. While among the female population in China the share of working-age groups is higher (72.3% in China compared to 67% in Russia) and in the Russian Federation the share of children under 15 years of age is higher (17.3% in Russia compared to 10.8% in China).

The dynamics of the age structure entails changes in the dependency ratio. The dependency ratio reflects the number of dependants (children under 15 years of age and over 65 years of age) per 100 persons of working age. In China, the ratio declined from 46.1 in 2000 to 38.5 in 2016, with a minimum value recorded in 2010 (35.6%) (Fig. 11). A low depen-

Table 1. Male and female population of China and Russia by age groups in 2000 — 2016 (%)

Age groups (years)		Years									2016 to 2000, +/-
		2000	2005	2010	2011	2012	2013	2014	2015	2016	
Male population											
China	0-14	25.1	20.5	18.6	18.4	18.4	18.4	18.4	18.4	18.4	-6.7
	15-64	68.4	72.2	73.5	73.5	73.3	73.1	72.8	72.5	72.1	+3.7
	65 and older	6.4	7.3	7.9	8.1	8.3	8.5	8.7	9.1	9.5	+3.1
Russia	0-14	19.9	16.7	16.5	16.7	17.1	17.6	18.1	18.6	19.1	-0.8
	15-64	71.7	73.7	74.6	74.3	73.8	73.2	72.6	72.0	71.2	-0.5
	65 and older	8.4	9.6	9.0	9.0	9.1	9.2	9.3	9.4	9.8	+1.4
Female population											
China	0-14	24.1	19.2	17.1	16.9	16.9	16.9	16.9	16.9	16.9	-7.2
	15-64	68.5	72.6	74.0	74.0	73.8	73.5	73.2	72.8	72.3	+3.8
	65 and older	7.4	8.2	8.9	9.1	9.3	9.6	9.9	10.3	10.8	+3.4
Russia	0-14	16.7	13.8	13.5	13.7	14.1	14.5	14.9	15.3	15.7	-1.0
	15-64	67.2	68.7	69.8	69.6	69.2	68.8	68.2	67.7	67.0	-0.2
	65 and older	16.0	17.5	16.7	16.7	16.7	16.7	16.8	17.0	17.3	+1.3

Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

dependency ratio and high proportion of the working-age population in the 2000s contributed to obtaining a benefit in the form of a “demographic dividend”. At the same time, while during the period under review the dependency ratio of children decreased from 36 to 24.5 per cent, older persons, on the contrary, increased from 10.1 to 14 per cent. According to the

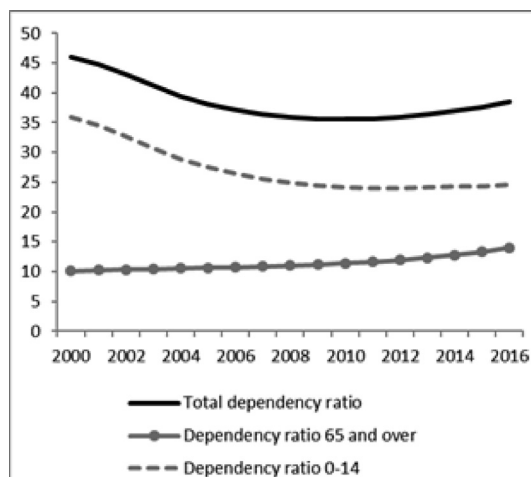


Figure 11. Dependency ratio in China, 2000-2016 (%). Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

calculations of the Spanish demographer David Reher, the rapid demographic ageing with a significant reduction in the proportion of the working population in China, may result in closing of the “window of opportunity” already the next decade (Reher 2011).

In Russia, the total dependency ratio did not changed significantly between 2000 and 2016: from 44.3 per cent to 45.1 per cent, while the burden of people aged 65 and over increased from 18 to 20 per cent (Fig. 12). Currently, the dependency ratio in Russia is 6 p.p. higher than in China (45.1% versus 38.5%), mainly due to the elderly (20% versus 14%).

Population dynamics and age structure strongly depend on natural movement, which in turn is determined by the birth and death rates. Between 2000 and 2016 in China, the birth

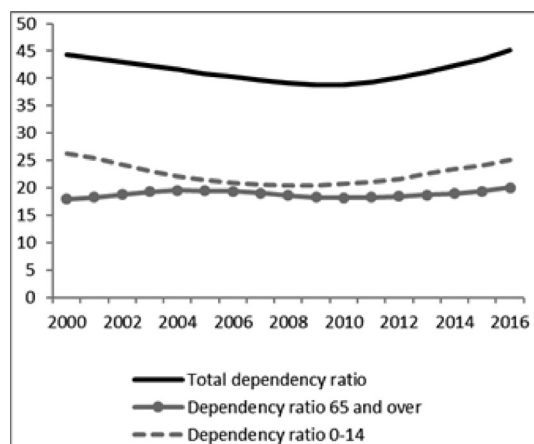


Figure 12. Dependency ratio in Russia, 2000-2016 (%). Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

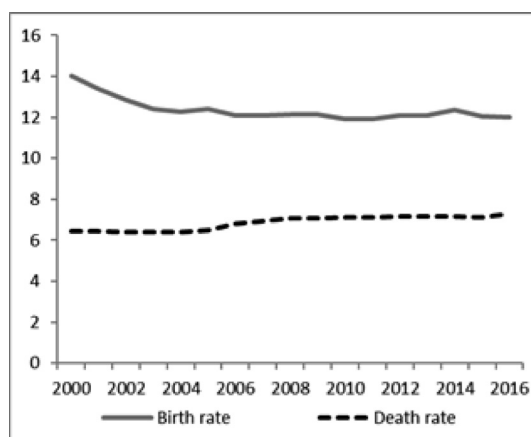


Figure 13. Birth and death rates in China, 2000-2016 (per 1000 population). Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

rate consistently exceeded the death rate (by 1.8 times on average; Fig. 13). However, in 2000 the gap in their value was 2.2 times (14 ‰ versus 6,5 ‰), while in 2016 it was 1.6 times (12 ‰ versus 8.7 ‰).

In Russia during the period under review, the situation was different. Until 2011, the death rate exceeded the birth rate, and there was a natural decline in the population (Fig. 14). However, in 2012 the values of these indicators were equal, and since 2013 the birth rate be-

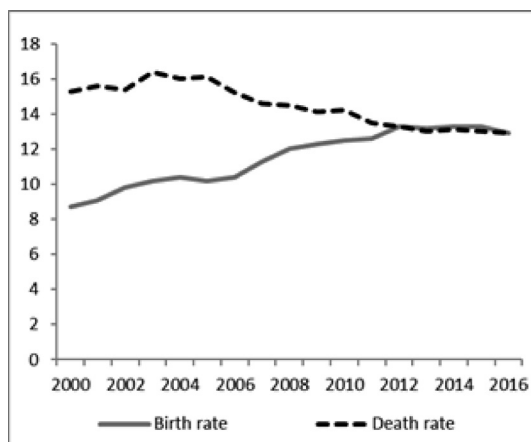


Figure 14. Birth and death rates in China, 2000-2016 (per 1000 population). Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

gan to exceed the death rate. However, the positive trend did not last long: already in 2016, the lines of birth rate and death rate crossed again, which among Russian demographers was called the “second stage of depopulation” (Lokosov and Rybakovsky 2017).

One of the most important indicators of reproduction is the total fertility rate (TFR), which represents the number of children that would have been born on average to a woman over her lifetime, under the condition that current age-specific fertility rates remain unchanged (Rybakovsky 2005: 64). The dynamics of this indicator in China and Russia during the period under review showed an upward trend (Fig. 15). In 2000-2011, the TFR in the People’s Republic of China was consistently higher than in the Russian Federation. However, the gap in its value gradually narrowed and in 2012 there was an overturn in the trend: the Russian figure exceeded the Chinese one. As a result, by 2016 TFR was 1.75 in Russia and 1.62 in China. The most noticeable rise in Russia occurred in 2006-2012, which is explained by both the influence of structural factors (numerous generations born in the 1980s were in the active reproductive age during this period) and the intensification of the state population policy (the introduction of additional measures to stimulate the birth rate, in particular the “maternal capital”).

In both states, however, the TFR level is below the level required for reproduction (2.11). This fact is confirmed by another demographic indicator — net reproduction rate, which reflects the proportion of maternal generations replaced by daughters. According to the latest UN data on average for 2010-2015 in China its value was 0.726, in Russia — 0.807 (World Population Prospects 2017). Thus, in both countries it has not reached 1, and therefore,

maternal generations are not completely replaced by daughter generations, but only 73% in China and 81% in Russia.

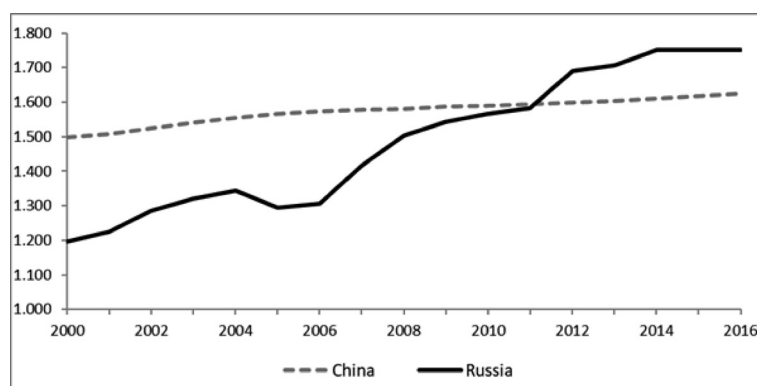


Figure 15. Total fertility rate in China and Russia, 2000–2016 (number of births per woman of reproductive age). Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

The TFR in China has been below the level of reproduction for almost twenty years. The situation is complicated by the fact that such an intensive transformation of the model of population reproduction took place in China in an extremely short time — in just two to three decades, while in European countries it took almost a hundred years (Korolev 2013).

Infant mortality is one of the most important integral indicators, which characterizes not only reproductive health, but also the demographic situation as a whole, reflecting the socio-economic well-being of society (Shabunova 2010: 157). The infant mortality rate between 2000 and 2016 declined markedly in both countries: its ratio decreased by 72% in China and 60% in Russia (Fig. 16). During the period under review, this figure in China was higher than in Russia. However, the gap in its value decreased from 1.8 times in 2000 (30.1

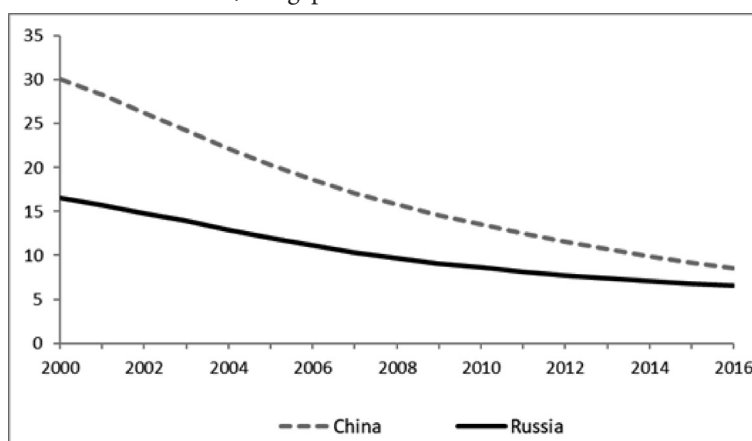


Figure 16. Infant mortality rate in China and Russia, 2000–2016 (deaths per 1,000 live births). Source: Health Nutrition and Population Statistics. World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

versus 16.6 deaths per year per 1,000 live births) to 1.3 times in 2016 (8.5 versus 6.6). The positive trends in infant mortality in both countries are largely attributable to the development of health systems and the improvement of obstetric services.

There are noticeable differences in the mortality patterns of the two countries. In 2016, the standardized death rate in China exceeded Russian for such causes as respiratory system

Table 2. Age-standardized death rates by cause of death in Russia and China in 2000 and 2016 (per 100 thousand population)

Cause of death	China			Russia		
	2000	2016	2016 to 2000,%	2000	2016	2016 to 2000,%
All causes	800.1	615.5	76.9	1184.6	797.8	67.3
I. Infectious, maternal, perinatal diseases, eating disorders	74.8	27.7	37.0	68.8	52.2	75.9
Infectious and parasitic diseases	21.9	8.0	36.5	29.1	31.1	106.9
Respiratory infections	26.2	11.7	44.7	25.7	16.2	63.0
Maternal diseases	0.5	0.3	60.0	0.5	0.3	60.0
Infant diseases	24.1	6.6	27.4	13.0	4.3	33.1
Nutrition disorders	2.0	1.0	50.0	0.5	0.3	60.0
II. Non-communicable diseases	659.5	542.4	82.2	947.0	659.7	69.7
Cardiovascular diseases	271.5	262.4	96.6	608.6	391.4	64.3
Neoplasms	170.9	134.8	78.9	178.0	153.0	86.0
Diseases of the respiratory system	128.3	55.9	43.6	27.8	13.3	47.8
Diseases of the digestive system	21.8	15.9	72.9	36.7	36.3	98.9
Diseases of the nervous system	29.6	38.9	131.4	23.1	21.5	93.1
Mental disorders and disorders caused by the use of psychoactive substances	2.2	2.7	122.7	42.7	25.3	59.3
Diseases of the sexual area	11.8	12.4	105.1	10.0	6.9	69.0
Diabetes	9.3	9.5	102.2	6.0	4.1	68.3
Congenital anomalies	8.9	4.2	47.2	9.6	4.7	49.0
Endocrine and immune diseases, blood diseases	1.8	1.5	83.3	1.1	0.9	81.8
diseases of musculoskeletal system	1.2	1.3	108.3	1.0	0.7	70.0
Skin diseases	0.4	0.5	125.0	0.8	0.7	87.5
Sudden infant death syndrome	0.2	0.1	50.0	1.1	0.7	63.6
III. Injuries	147.5	45.4	30.8	168.8	85.9	50.9
Unintentional injuries	48.7	36.4	74.7	90.5	49.3	54.5
Deliberate injuries	17.1	9.1	53.2	78.3	36.6	46.7

Source: Disease burden and mortality estimates. World Health Organization. Available at: http://www.who.int/healthinfo/global_burden_disease/estimates/en/

diseases (4 times), nutrition disorders (3 times), diabetes, the musculoskeletal system diseases, neurological diseases, diseases of the sexual area, endocrine and immune diseases, blood diseases (2 times), neonatal conditions (1.5 times) (Table 2). At the same time in Russia, the death rates exceeded the ones in China for the following reasons: mental and behavioral disorders (9 times), sudden infant death syndrome (7 times), intentional injuries, infectious and parasitic diseases (4 times), digestive system diseases (2 times), cardiovascular diseases (1.5 times), respiratory infections, skin diseases and unintentional injuries (1.4 times).

Between 2000 and 2016, both in China and Russia mortality from large classes of causes of death decreased — infectious, maternal, perinatal and dietary disorders, non-communicable diseases and external causes of death. Much of this progress was due to the development of national health care systems. In Russia, the National Project on Healthcare was launched in 2006, and the Health Development State Program for 2014–2020 was adopted. The priorities of the new Government policy are: improvement the health of citizens, raise in availability and quality of medical care, development of primary medical care and the preventive medicine, improvement of specialized, including high-tech medical care. In China, in 2009, health reforms aimed at expanding citizens health insurance coverage (especially for low-income citizens and rural residents), improving primary health care and hospital financing systems, increasing the availability of medicines (Süssmuth-Dyckerhoff and Wang 2010).

At the same time, during the observed period in China, growth in mortality from certain cases was noted, namely from nerve system diseases (by 31%), mental diseases and diseases caused by consumption of psychoactive substances (by 23%), skin diseases (by 25%), diseases of the musculoskeletal system (by 8%) and the sex area (by 5%). In Russia, only growth in mortality from infectious and parasite diseases was noted (by 7%).

Reduction of the death rate in both countries resulted in an increase in life expectancy: between 2000 and 2016 it increased by 4 years in China (from 72 to 76 years) and by 6 years in Russia (from 66 to 72 years) (Table 3). Growth in the life expectancy was true both for

Table 3. Life expectancy at birth in China and Russia, 2000–2016 (years)

	Sex	Years									2016 to 2000, +/-
		2000	2005	2010	2011	2012	2013	2014	2015	2016	
China	Both sexes	72.0	74.0	75.2	75.4	75.6	75.8	75.9	76.1	76.3	+4.3
	Men	70.4	72.5	73.8	74.0	74.2	74.3	74.5	74.6	74.8	+4.4
	Women	73.7	75.6	76.8	77.0	77.2	77.3	77.5	77.7	77.8	+4.1
Russia	Both sexes	65.5	65.5	68.8	69.7	70.1	70.6	70.7	71.2	71.6	+6.1
	Men	59.0	58.9	63.1	64.0	64.6	65.1	65.3	65.9	66.5	+7.5
	Women	72.3	72.5	74.9	75.6	75.9	76.3	76.5	76.7	76.9	+4.6

Source: Health Nutrition and Population Statistics // World Bank. Available at: <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>

men and women. Despite positive changes in life expectancy, in 2016 this indicator was by 5 years lesser in Russia than in China. Particularly relevant is the gap in life expectancy in men – by 8 years (75 years in China compared to 67 years in Russia).

Conclusions

Population development in Russia and China in the first decades of the 21st century has some similar trends. Firstly, these are common trends in the dynamics of demographic processes: population ageing primarily due to a decrease in birth rates, and, as a consequence, the dependency ratio growth, decrease in the level of general, infant and maternal death rates, mortality due to infectious diseases and digestive disorders, non-infectious and external causes of death, increase in life expectancy in men and women. Secondly, similar reproductive characteristics, namely, a below-replacement population reproduction pattern due to low birth rates. Thirdly, similar parameters of population structures in terms of approximately equal shares of the under-age and the elderly cohorts and identical age composition of the male population.

At the same time, the population development in China and Russia has significant differences related to the specifics of historical, sociocultural, economic and political conditions of the development of the two countries. The demographic characteristics of the two nations are to a large extent explained by differences in the stages of demographic transition. In Russia the “window of opportunity” for achieving a demographic dividend has already “closed” (after 2008 it faces a sustainable reduction in the share of working-age population and the dependency ratio growth). Meanwhile, China continues to benefit from the “demographic bonus” to this day, though this effect is forecasted to exhaust itself soon. Besides, the nature of the “demographic waves” in two countries is different: in Russian they are rooted in the wars and other political and socio-economic disasters of the 20th century; in China they are the result of the shifts of the State population policies in 1970s and 1980s.

The features of the population development in China in the 21st century are:

- a high rate of urbanization, but a lower share of urban (57% vs. 74%) and a higher share of rural population compared to Russia (43% vs. 26%);
- an increase in the proportion of the working-age population, a decrease in the overall dependency ratio and especially in the dependency ratio of children, which results in demographic dividend benefits;
- the positive natural population growth due to the prevalence of births over deaths;
- increase in death rates from diseases of the nervous system, mental disorders and disorders caused by the use of psychoactive substances, skin diseases, diseases of the musculoskeletal system, diseases of the sexual area.

The features of population development in the contemporary Russia are:

- gender imbalance caused by a significant predominance of the female population over the male population in the older age groups;
- excess of deaths over births during 2000-2011, and, as a consequence, the natural decline of the population (depopulation). In 2016, birth and death rates again equalized, and “the second stage of depopulation” began;
- growth of death rates from infectious and parasitic diseases, which some experts identify as the “reverse epidemiological transition” (Semenova 2005: 256);
- lower life expectancy than in China: by 5 years (72 years in Russia compared to 76 years in China). The most noticeable lag in the life expectancy is among the male population - by 8 years (67 years in Russia compared to 75 years in China);

- higher death rates from mental and behavioural disorders, sudden infant death syndrome, intentional injuries, infectious and parasitic diseases, diseases of the digestive system, cardiovascular system diseases, respiratory infections, skin diseases, unintentional injuries compared to China.

These specific and common features of the population development in Russia and China should be taken into account in the construction of internal and international policies of both states, in shaping responds to demographic challenges and developing mechanisms for managing population processes.

For both China and Russia, the priority political measures should include the adjustment of the economy, the labour market, social systems (pension, health, social protection) and the nation as a whole to the population ageing. In means increasing the employment of older persons, encouraging employers to hire people in this age group, improving pension systems and social protection. Steps in this direction are already being taken. Thus, in Russia the retirement age has been raised, employer liability for dismissal of people of pre-retirement age has been introduced, and the unemployment benefit for persons of pre-retirement age has been increased. Unfortunately, these measures do not fully address the problems of the quality of life of older persons and the growing economic and social burden on the State and the working-age population. As noted by R. Lee and A. Mason, in order to better implement the second demographic dividend, which represents increased accumulation of assets, policies must be adopted to encourage creation of post-retirement savings by the working population (Lee and Mason 2011). The Governments should optimize resources to effectively implement the potential of pension-age people.

Moreover, it is fundamentally important for both countries to implement of a set of measures for the formation of favourable parameters of population reproduction: for Russia — to overcome depopulation and stimulate fertility; for China — to stabilize fertility and the population size. In the 2000s, the principal measures of the population policy of the PRC were aimed at stabilizing the low birth rate with an emphasis on improving the quality of the population (Veremeychik 2015: 263). However, in 2016, the Chinese leadership, faced with the unfavourable consequences of the family planning policy, announced a new “One family — two children” course (Kupriyanova and Yanishevskaya 2017: 53). Since the mid-2000s Russia has also taken active steps towards overcoming the demographic crisis: national projects, concepts and programs of demographic, family and migration policies have been adopted and implemented. In 2018, the Russian Federation approved the National Projects “Health” and “Demography”, aimed at reduction of mortality (first of all, mortality among working-age population, infant mortality, mortality from diseases of the circulatory system, neoplasms), increase in life expectancy, increase in the total fertility rate, increase in the proportion of citizens with a healthy lifestyle. The implementation of an active population policy in both countries improved the situation, but has not removed all the challenges. That is why it seems expedient to carry out constant state monitoring of population development threats, according to which population policy will be improved.

Acknowledgement

The research was carried out within the framework of the state task № 0168-2019-0011 “Demographic development of territories”.

Reference list

- Aganbegyan AG (2017) Demograficheskaja drama na puti perspektivnogo razvitija Rossii [Demographic drama on the path of perspective development of Russia]. *Narodonaselenie* [Population] 3(77): 4–23. doi: 10.26653/1561-7785-2017-3-1 (in Russian)
- Chzhochao U (2014) Demograficheskie faktory social'no-jekonomicheskogo razvitija Kitaja [Demographic factors of China's economic development]. *Jekonomicheskaja teorija* [Economic theory] 11(4): 85–91. (in Russian)
- Chzhe G (2017) Razvitie torgovo-jekonomicheskogo sotrudnichestva mezhdu Rossiej i Kitaem v kontekste prodvizhenija koncepcii "Odin pojas, odin put'" [Development of trade and economic co-operation between Russia and China in the context of the promotion of the concept of "One Belt, One Road"]. *Jekonomika: vchera, segodnja, zavtra* [Economics: Yesterday, Today and Tomorrow] 7(6A): 151–161. (in Russian)
- Danilova EN, Yadov VA, Dawei P (Eds.) (2012) Rossijane i kitajcy v jepohu peremen: sravnitel'noe issledovanie v Sankt-Peterburge i Shanhae nachala XXI veka [Russians and Chinese in the era of change: A comparative study in Saint Petersburg and Shanghai in the early 21st century] Logos, Moscow (in Russian)
- Di Stefano E (2012) Demographic Trends and Sustainability of the Old-Age Security System in China. In: Gomel G, Marconi D, Musu I, Quintieri B (Eds). *The Chinese Economy*. Springer, Heidelberg, Berlin, Pp. 83 – 100.
- Disease burden and mortality estimates. World Health Organization. http://www.who.int/healthinfo/global_burden_disease/estimates/en/.
- Dudchenko GB (2002) Kitaj i Dal'nij Vostok Rossii: k voprosu o demograficheskom disbalanse [China and the Far East of Russia: on the issue of demographic imbalance]. *Vestnik Evrazii* [Acta Eurasica] 3: 142–149. (in Russian)
- Guleva MA (2016) Otmena politiki «Odna sem'ja - odin rebenok» v Kitae [China Abandons one-child policy]. *Azija i Afrika segodnja* [Asia and Africa today] 6: 24–33. (in Russian)
- Health Nutrition and Population Statistics World Bank. <http://databank.worldbank.org/data/reports.aspx?source=health-nutrition-and-population-statistics#>
- Iontsev VA (2014) Kitaj – odin iz glavnih potencialov sovremennogo demograficheskogo razvitija mira [China as one of the main potentials of the modern demographic world] In: Ponkratova LA, Zabiako AA (Eds.) *Proceedings of the 2nd International Scientific Conference "Russia and China: a New Vector of Development of Social and Economic Cooperation"* (October 2013). Vol. 2. Pp. 99–102. (in Russian)
- Korolev A (2013) Demograficheskaja neopredelennost' vneshnej politiki sovremennogo Kitaja [The Demographically uncertain foreign policy of today's China]. *The Russian International Affairs Council*. Available at: <http://russiancouncil.ru/en/analytics-and-comments/analytics/the-demographically-uncertain-foreign-policy-of-today-s-chin/> (in Russian)
- Kupriyanova YA, Yanishevskaya AI (2017) Novaja demograficheskaja politika v Kitae: "Odna sem'ja – dva rebenka" [New population policy in China: "One family - two children"] *Demograficheskoe obozrenie* [Demographic Review] 4(2): 53–64. (in Russian)
- Larin VL (2008) Mezhregional'nye otnoshenija Rossii i Kitaja v nachale XXI v. [Interregional relations of Russia and China at the beginning of the 21st century]. *Tamozhennaja politika Rossii na Dal'nem Vostoke* [Customs policy of Russia in the Far East] 3 (44): 22–39. (in Russian)
- Larionov AV, Chirkova EN, Larionov AV (2015) Demograficheskij vyzov sovremennomu razvitiu Kitaja: problemy i perspektivy [Demographic challenge to the Chinese development: problems and perspectives]. *Vestnik Instituta jekonomiki Rossijskoj akademii nauk* [The Bulletin of the Institute of Economics of the Russian Academy of Sciences] 5: 182–196. (in Russian)

- Lee R, Mason A (2011) Population aging and generational economics: key findings. In: Lee R, Mason A (Eds.) *Population Aging and the Generational Economy*. Edward Elgar Publishing, Cheltenham, UK, pp. 3–31.
- Li H, Yi J, Zhang J (2011) Estimating the Effect of the One-Child Policy on the Sex Ratio Imbalance in China: Identification Based on the Difference-in-Differences. *Demography* 48(4): 1535–1557.
- Li W (2003) Razvitie naselenija i semejno-demograficheskaja politika v Kitae i Rossii [Population development and population policy in China and Russia]. MaxPress, Moscow. (in Russian)
- Lokosov VV, Rybakovsky LL (Eds.) (2017) Demograficheskoe razvitie Rossii v XXI veke: dostignutyje rezultaty i predstojashhie trudnosti: nauchnyj doklad [Demographic development of Russia in the 21st century: achieved results and upcoming difficulties: scientific report]. Ekon-Inform Publishing House, Moscow (in Russian)
- Osipova GV, Rybakovsky LL (Eds.) (2009) Demograficheskoe razvitie Rossii v XXI veke [Demographic development of Russia in the 21st century]. Econ-Inform Publishing House, Moscow (in Russian)
- Peng X (2011) China's Demographic History and Future Challenges. *Science* 333(6042): 581–587.
- Pochagina OV (2014) Izmenenie politiki “Odn sem’ja - odin rebenok” v Kitae: prichiny i ozhidaemye rezultaty [Changes in “One Family – One Child” policy in China: causes and expected results]. *Problemy Dal’nego Vostoka [Far Eastern Affairs]* 3: 94 – 106. (in Russian)
- Population Reference Bureau (2016) World Population Data Sheet. <https://www.prb.org/data/>
- Reher D (2011) Economic and social implications of the demographic transition. In: Lee RD and Reher DS (Eds.) *Demographic Transition and Its Consequences*. A supplement to Vol. 37 of *Population and Development Review*. Pp. 11–33.
- Rimashevskaya NM (2001) Kachestvennyj potencial naselenija Rossii: vzgljad v XXI vek [Qualitative potential of the population of Russia: a look into the 21st century]. *Problemy prognozirovaniya [Problems of forecasting]* 3: 34–48. (in Russian)
- Rossijsko-kitajskie otnoshenija na sovremennom jetape. K 15-letiju podpisaniya Dogovora o dobrososedstve, družbe i sotrudničestve mezhdru RF i KNR [Russian-Chinese Relations at Present Stage: the 15th Anniversary of Signing the Treaty of Good Neighborliness, Friendship and Cooperation between RF and PRC] (2016) *Problemy Dal’nego Vostoka [Far Eastern Affairs]* 4: 5–43. (in Russian)
- Ryazantsev SV, Qionglan U (2016) Jemigracija iz Rossii v Kitaj: trendy, formy, formirovanie russkogoovorjashhij obshhin [Emigration from Russia to China: trends, types, formation of the Russian-speaking communities]. *Nauchnoe obozrenie. Serija 1: Jekonomika i pravo [Scientific Review. Series 1: Economics and Law]* 6: 15–24. (in Russian)
- Rybakovsky LL (2011) Demograficheskoe razvitie Rossii i ego dominanty v pervoj chetverti XXI veka [Demographic development of Russia and its dominants in the first quarter of the 21st century]. *Narodonaselenie [Population]* 3(53): 4–10. (in Russian)
- Rybakovsky LL (Ed.) (2005) *Prakticheskaja demografija [Practical demography]* Center for Social Forecasting, Moscow, 280 pp. (in Russian)
- Semenova VG (2005) Obratnyj jepidemiologicheskij perehod v Rossii [Reverse epidemiological transition in Russia]. Center for Social Forecasting, Moscow, 235 pp. <http://mednet.ru/images/stories/files/publikacii/semenova.pdf> (in Russian)
- Shabunova AA (2010) Zdorov’e naselenija v Rossii: sostojanie i dinamika [Health of the population in Russia: state and dynamics]. Institute for Socio-Economic Development of Territories of the Russian Academy of Sciences, Vologda. (in Russian)

- Sinelnikov AB (2017) Brachnost' i rozhdaemost' bez dvoynyh gendernykh standartov [Marriage and fertility without double gender standards]. Demoscope Weekly. no. 725-726. <http://demoscope.ru/weekly/2017/0725/tema01.php> (in Russian)
- Süssmuth-Dyckerhoff C, Wang J (2010). China's health care reforms. Health International 10: 54-67.
- Syroezhkin K. 2007. Kitaj v Central'noj Azii: ot trgovli k strategicheskomu partnerstvu [China in Central Asia: from trade to strategic partnership]. Central'naja Azija i Kavkaz [Central Asia and the Caucasus] 3: 40-51. (in Russian)
- Veremeychik AS (2015) Demograficheskaja politika v sisteme modernizacii KNR [The population policy in the system of PRC's modernization]. Obshchestvo i gosudarstvo v Kitae [Society and state in China] 2(45): 254-268. (in Russian)
- Vishnevsky AG (2004) Pjat' vyzovov novogo veka [Five challenges of the new century]. Mir Rossii. Sociologija. Jetnologija [World of Russia. Sociology. Ethnology] 2: 3-23. (in Russian)
- Vishnevsky AG, Shcherbakova EM (2018) Demograficheskie tormoza jekonomiki [Demographic brakes of the economy]. Voprosy jekonomiki [Issues of economy] 6: 48-70. (in Russian)
- Waldman C (2005) China's Demographic Destiny and Its Economic Implications. Business Economics 40(4): 32-45. doi:10.2145/20050403
- Wang F (2010) China's population destiny: the looming crisis. Current History 109(728): 244-251.
- World Population Prospects. Interactive data. United Nations Department of Economic and Social Affairs. <https://esa.un.org/unpd/wpp/DataQuery/>
- World Population Prospects: The 2017 Revision. Volume I: Comprehensive Tables. 2017. United Nations Department of Economic and Social Affairs. New York.
- Yong C (2010) China's Below-Replacement Fertility: Government Policy or Socioeconomic Development? Population and Development Review 36(3): 419-440. doi:10.1111/j.1728-4457.2010.00341.x
- Zhiromskaya VB (2012) Osnovnye tendencii demograficheskogo razvitija Rossii v XXI veke [Main trends of the demographic development of Russia in the 21st century] Kuchkovo Pole, Moscow. (in Russian)

Authors information

- Aleksandra Vladimirovna Korolenko, Junior Research Officer in the Department of Level and Style of Life Research of the Vologda Research Center of the Russian Academy of Sciences. E-mail: coretra@yandex.ru