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# THE MAIN RESULTS IN THE POPULATION PROJECTION OF THE CZECH REPUBLIC OF CZECH STATISTICAL OFFICE 2018–2100<sup>1)</sup>

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## **Abstract**

This article summarises the basic descriptive results in the Population Projection of the Czech Republic of Czech Statistical Office between 2018 and 2100 and also analyses the demographic indicators of the age structure with a focus on population ageing and older age groups. It also compares the latest projection with older population projections or population projections of the Czech Republic from different institutions. The central focus is on the medium variant of the 2018 Projection, as it is expected to be the most likely variant of population development.

**Keywords:** population projection, Czech Republic, population structure, population ageing

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## INTRODUCTION

The Czech Statistical Office published a Population Projection of the Czech Republic for the period 2018–2100 in 2018 (hereinafter Projection 2018). The methodology and assumptions relating to future population development are described in detail in other articles in this issue of the journal *Demografie*. The main goal of this article is to describe the basic results and to analyse the demographic indicators of the age structure with a focus on population ageing. A comparison with other relevant population projections is also included. The analysis is mainly

based on the medium variant of Projection 2018, which is considered the most likely variant of population development in the future.

## THE PROJECTED POPULATION

According to the medium variant, and provided the assumptions behind it are fulfilled, the population of the Czech Republic will increase in the first years of Projection 2018 and will reach its highest number on 1 January 2029 (10,784 thousand). On the other hand, the projected lowest number is expected to be reached in 2081 (10,411 thousand). A population

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1) Detailed results and assumptions are available at <https://www.czso.cz/csu/czso/projekce-obyvatelstva-ceske-republiky-2018-2100>. Labels of tables are in English. Text is in Czech only.

2) Czech Statistical Office, [roman.kurkin@czso.cz](mailto:roman.kurkin@czso.cz).

decrease is predicted to occur every year between 2029 and 2080 (except for a modest increases in 2047, 2048, and 2049), and then, from 2081 onwards, the population will, conversely, increase every year and reach 10,527 thousand in 2101.

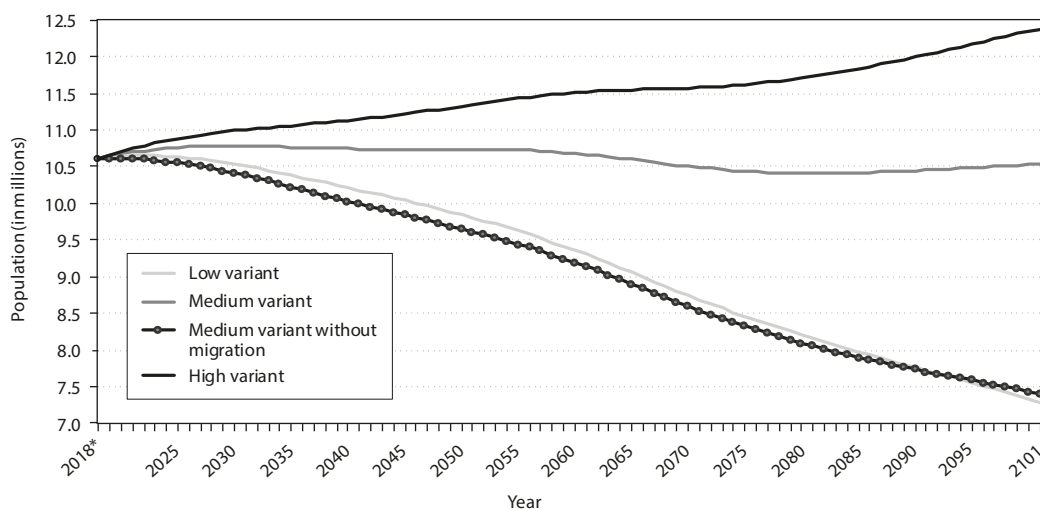
Since net migration is projected to remain at a constant level of 26 thousand in the medium variant (except in 2018 – when it was 38 thousand), the main factor of uneven population development is expected to be natural change. Natural population change is projected to be positive only in the year 2018 (1 thousand). Between 2018 and 2028 it should decrease to -24 thousand, but net migration is expected to compensate for this decrease. However, from 2029 to 2035 the difference between the number of deaths and live births is expected to be even higher – reaching its local maximum in 2034 (-31 thousand). Due to a rise in a number of live births the natural population decrease is projected to be slightly lower between 2035 (-31,000) and 2047 (-26,000) than in previous years. However, the further development of the projected natural decrease is very unfavourable, with it reaching -45 thousand in 2066 (the absolute low in the projected years). This development will probably be driven by both a rise in the number of deaths and a decline in the number of live births. The trend in natural population change is predicted

to reverse once again, while the decrease will diminish to -18 thousand in 2093 in connection with the lower number of deaths. In the rest of the projected period, the natural population decrease will rise again to 21 thousand in 2100. To sum up, future population development according to the medium variant is relatively stable. The different between the population number in 2018 and the maximum and minimum (projected) numbers is 1.6% and 1.9%, respectively

The low and high variants of Projection 2018 represent the extreme limits that probably won't be exceeded. The high variant (high fertility, low mortality, high net migration) shows a population increase every year. The size of the population in 2101 (on 1 January) is projected to be 12,380 thousand. The most population gains should be reached at the beginning and end of the projection period.

Low variant (low fertility, high mortality, low net migration) predicts total population only until 2022. After that the population should shrink yearly to 7,279 thousand in 2101. The medium variant with zero migration shows an even smaller number of inhabitants for most of the projection years compared to the low variant (except 2093–2101), but this scenario is only hypothetical given that the assumptions about net migration are not realistic.

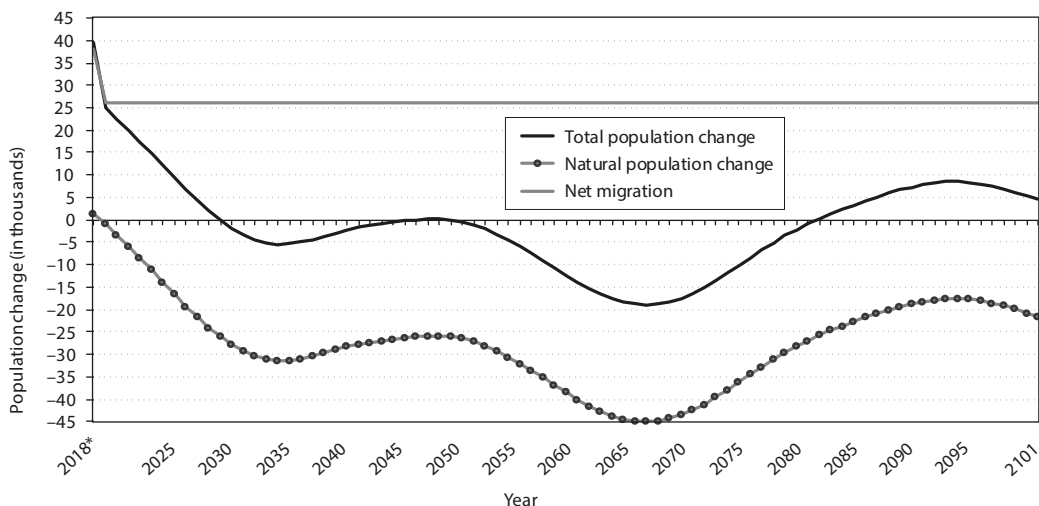
**Figure 1** The projected population of the Czech Republic on 1 January, by variants, 2018–2101



Note: \* Observed data.

Source: Czech Statistical Office, 2018a and 2018b.

**Figure 2** Projected population change in the Czech Republic, medium variant, 2018–2100



Note: \* Observed data.

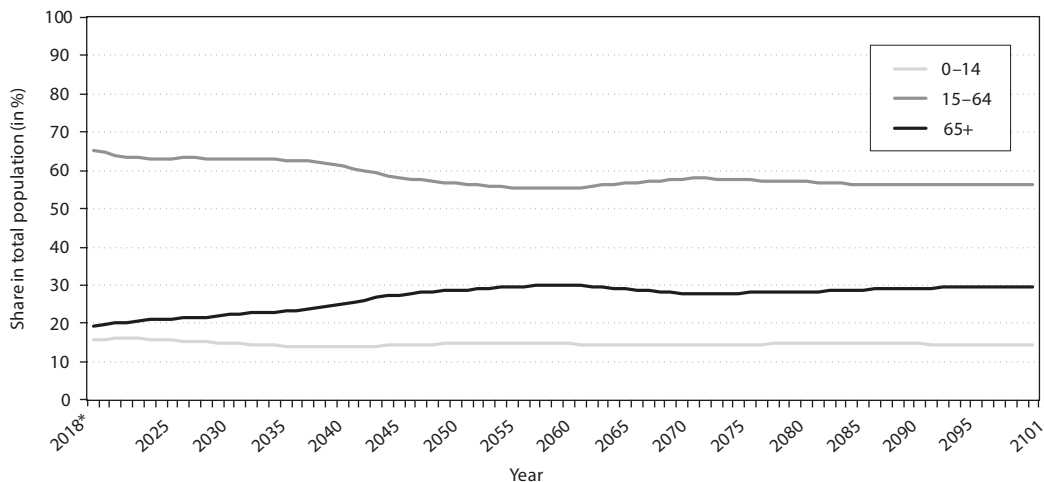
Source: Czech Statistical Office, 2018a and 2018b.

### PROJECTED AGE STRUCTURE OF THE POPULATION

Demographic ageing will take effect mainly from the top of the age structure. The share of people aged 65 and over in the population is predicted to increase from 19.2% in 2018 to 30.0% in 2059 in the medium variant. After a slight decline to 27.8%

in 2072, a further rise to 29.5% in 2101 is expected. For the youngest age group (0–14 years) the maximum proportion of the population is projected to be 16.1% in 2021, while the minimum is predicted to be 13.9% in the years 2037–2040. However, the variability of this indicator is quite low. The productive population (15–64 years) should follow a declining path from

**Figure 3** Projected structure of the population of the Czech Republic by main age groups, medium variant, 2018–2101 (on 1 January)



Note: \* Observed data.

Source: Czech Statistical Office, 2018a and 2018b.

65.0% in 2018 to 55.3 % in the years 2057–2059. Afterwards it should slightly rise, but it should never exceed 58.0%. Because of the assumptions embedded in Projection 2018 and relatively even in the population structure in 2070, the shares of the main population groups are quite stable roughly after 2070.

Projection 2018 assumes that the most profound changes in population numbers will occur among the oldest population groups. In 2101 compared to 2018, the age group 65 years and over is expected to increase by more than 50% in the medium variant; however, among those aged 85 and over the number will be four times higher. An even more intense rise is predicted for the age group 95 and over from 9 thousand in 2018 to 128 thousand in 2101.

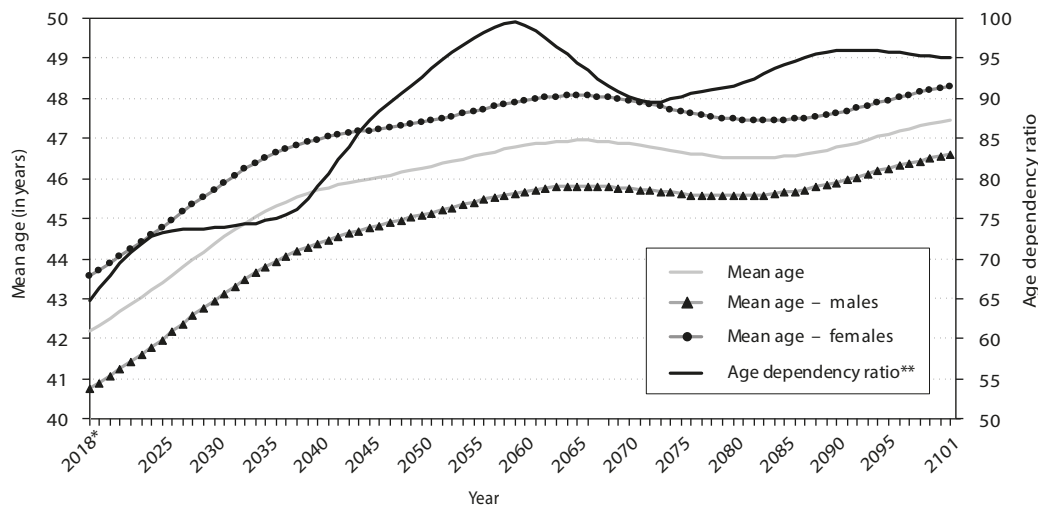
The mean age of the population is assumed to rise from 42.2 years in 2018 to 46.9 years in 2061–2070; then it will probably decrease slightly to 46.5 years in 2079–2085 and after that it will increase to 47.4 years in 2101. The mean age of men is expected to rise from 40.8 years in 2018 to 46.6 in 2101. The figures are 43.6 years and 48.3 years, respectively, for women in the same years. Uneven trends are similar to the trend for the total population. The age dependency ratio (the number of dependents aged 0 to 19 and 65 and over in relation to the total population aged 20 to 64) is predicted to rise significantly from 64.8 in 2018 to 99.4 in 2059 (the maximum value in projected period). A decrease to 89.4 in 2072 is projected, followed by a rise to 95.0-96.0 from 2086 onwards.

**Table 1** Projected population by selected age categories in the Czech Republic (in thousands), medium variant, 2018–2100

Age groups	2018*	2020	2030	2040	2050	2060	2070	2080	2090	2101
65+	2,040	2,134	2,403	2,699	3,076	3,196	2,939	2,931	3,047	3,108
75+	786	851	1,247	1,372	1,592	1,910	1,912	1,694	1,817	1,987
85+	201	208	294	470	505	668	804	788	706	876
95+	9	11	18	32	54	64	102	118	126	128

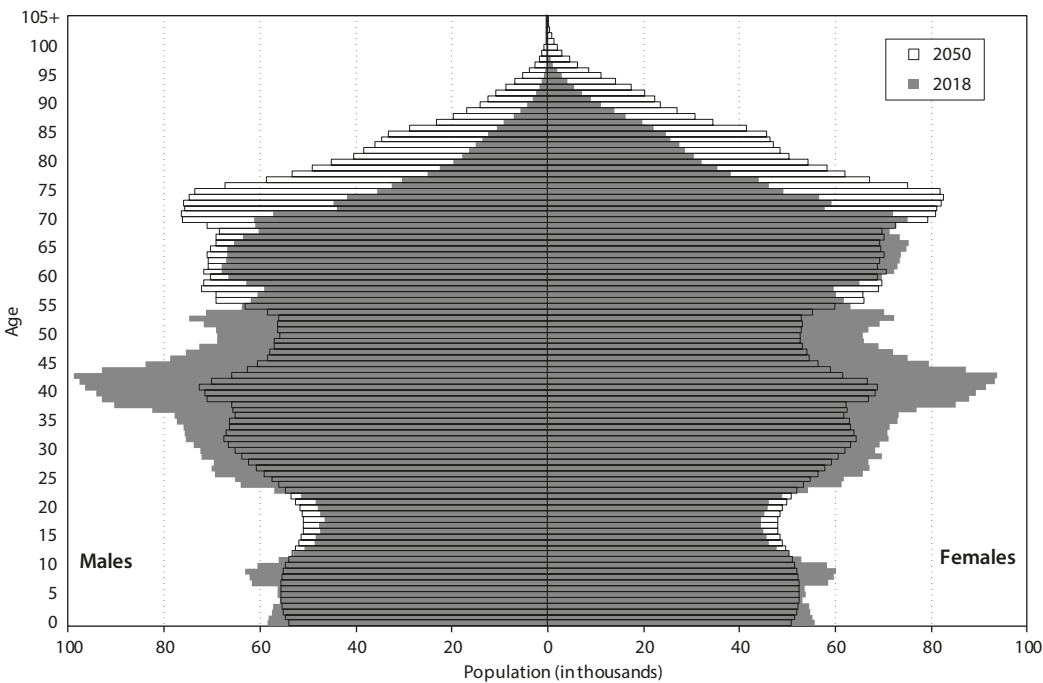
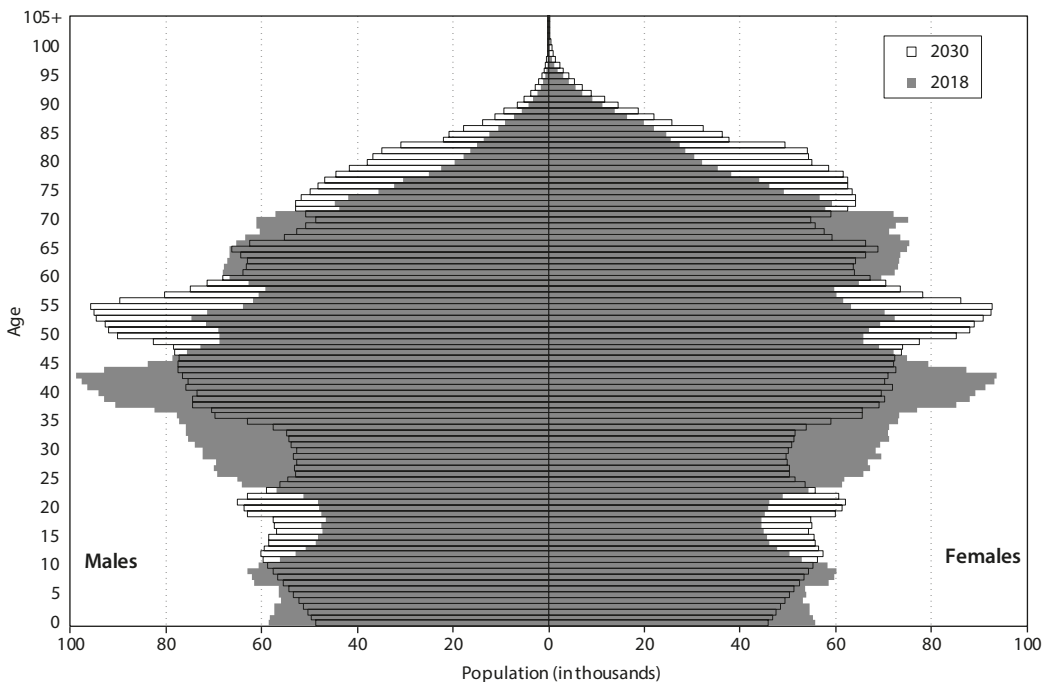
Note: \* Observed data.  
Source: Czech Statistical Office 2018a and 2018b; authors' calculations.

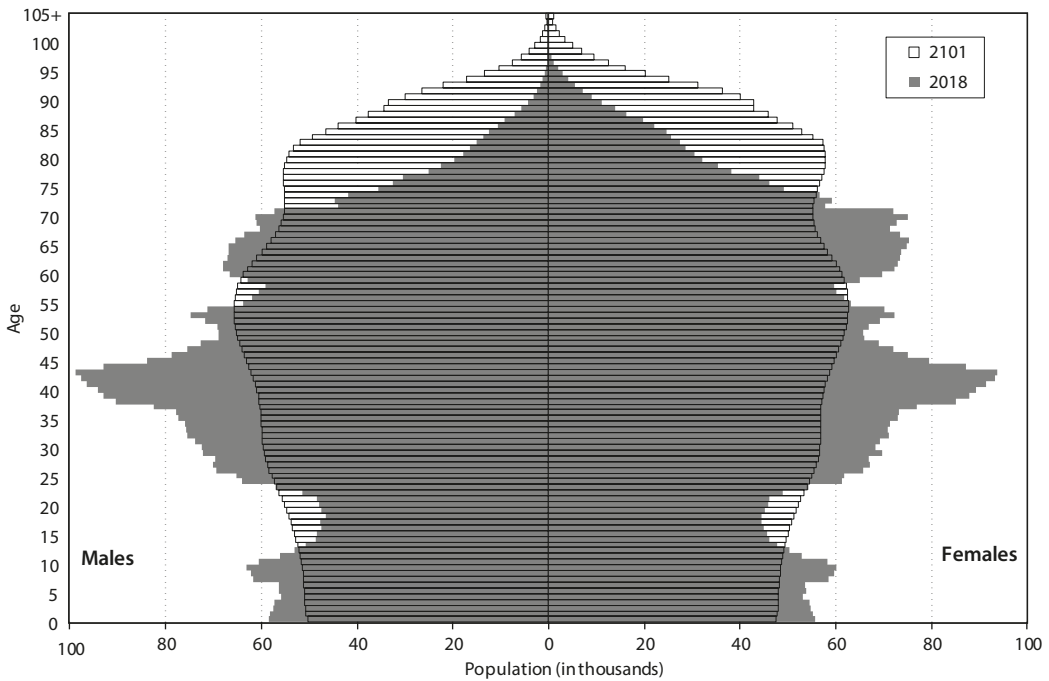
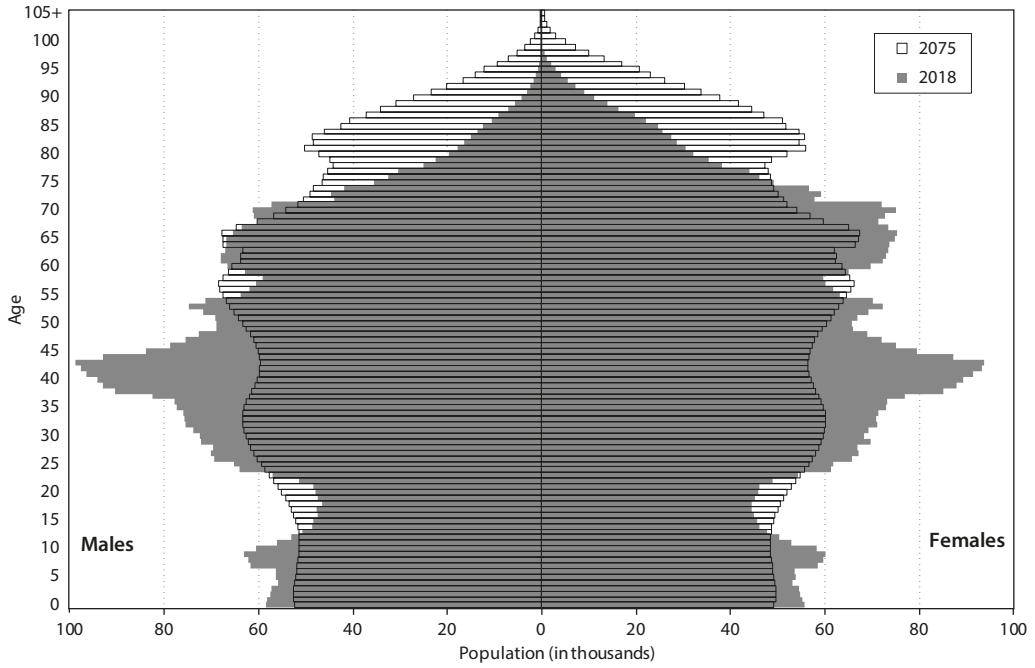
**Figure 4** Projected indicators of the age structure in the Czech Republic, medium variant, 2018–2101 (on 1 January)



Note: \* Observed data. \*\* Population aged 0–19 and 65+ per 100 population aged 20–64.  
Source: Czech Statistical Office, 2018a and 2018b; authors' calculations.

Figure 5, 6, 7, 8 Projected structure of the population of the Czech Republic by age, medium variant, 2018\*, 2030, 2050, 2075, 2101 (on 1 January)





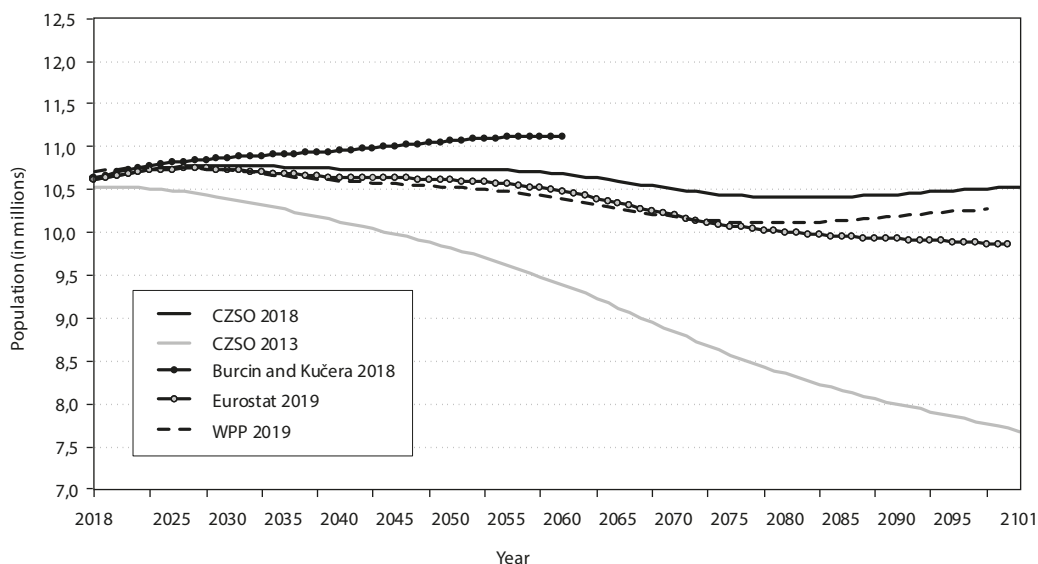
Note: \* Observed data.  
 Source: Czech Statistical Office, 2018a and 2018b.

The population pyramids show the shifting of the population into older age groups and the gradual diminishing of the generation born in the 1970s (currently the most numerous generations). However, this generation is expected to be the largest until 2051. Starting in 2052 the 1980s generation should be the numerically largest generation. In 2057 the 2010s generation will take the position of the largest group and after that only generations that are not yet born will be the most populous ones. The age structure of the population is becoming more even than it was in the first year of Projection 2018 as a result of the smooth development of assumptions. The age at which there will be more females than males in the population is expected to move from 58 years in 2018 to 67 years in 2050 and then to 72 years in the last projected year. The share of males in the population is projected to increase from 49.2% in 2018 to 50.3% by the end of the project period (the 50.0% threshold should be surpassed in 2073). This development is mainly a consequence of the convergence of life expectancy by sex and also a result of there being more males in net migration (even though the share of men in net migration is decreasing).

## A COMPARISON OF POPULATION PROJECTIONS

A comparison of the relevant population projections of the Czech Republic and their medium variants shows that the most pessimistic one was a previous projection by the Czech Statistical Office projection from 2013, which predicted lower total fertility rates and net migration than Projection 2018 does. Conversely, the most optimistic one in terms of population growth is a projection by Czech demographers Boris Burcin and Tomáš Kučera (Charles University in Prague). The projection horizon was set as the year 2060 and the population number was projected to be about 450 thousands higher than the size projected by Projection 2018 in 2060, because of the higher intensity of fertility and net migration. The Eurostat Projection (2019) is quite similar to Projection 2018 in the first years of the projection period; however, the population is expected to decrease in the long term and the difference between the projections for 2100 is almost 670 thousands. The latest Eurostat Projection uses a higher intensity of fertility and higher life expectancy at birth for both men and women, but lower net migration than Projection 2018. Finally, the World Population

**Figure 9** Projected population of the Czech Republic on 1 January according to various projections, medium variant, 2018–2101



Source: Burcin and Kučera, 2018; Czech Statistical Office, 2013, 2018a and 2018b; Eurostat, 2019; United Nations, 2019.

Prospects 2019 by the United Nations assumes a higher population count than Projection 2018 up to 2024. From 2025 on the population number is lower and the difference is expected to grow to roughly 300 thousands around 2080, then it will decrease to almost 250 thousands in 2100. The United Nations Projection predicts a higher intensity of fertility, but lower net migration compared to Projection 2018 (life expectancy at birth is close).

## CONCLUSION

To conclude, population development from 2018 to 2100 is predicted to be quite stable in terms of the absolute number of inhabitants. Net migration is assumed to compensate for the natural decrease.

However, the most distinct phenomenon expected is population ageing 'from the top of the age structure'. The medium variant of Projection 2018 is much more optimistic than the same variant in Projection 2013 (10.53 million inhabitants in 2101 vs 7.68 million, a maximum population decrease of -45 thousand vs. -72 thousand, a smaller share of the population aged 65+) which is more similar to the low variant in the newer projection (7.28 million). The main differences between 2013 and 2018 medium variants are the higher fertility rates and the higher net migration assumptions in the more up-to-date projection. These assumptions are based on recent population development, which is in favour of higher intensity fertility and more positive net migration.

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## Sources of data:

- Burcin, B. – Kučera, T. 2018. In: B. Bleha, B. Burcin, T. Kučera, B. Šprocha and B. Vaňo (2018). The Population Prospects of Czechia and Slovakia until 2060. *Demografie* 3(60): 219–233. Available at: <<https://www.czso.cz/csu/czso/demografie-revue-pro-vyzkum-populacniho-vyvoje-c-32018>>
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earned his PhD degree in demography at the Faculty of Science, Charles University, in 2015. He participated in coordinating and processing the 2011 Population and Housing Census at the Czech Statistical Office between 2009 and 2013 and since 2014 he has been working in the Demographic Statistics Unit at the same institution. He specialises in the analysis of fertility, abortion, and the regional differentiation of demographic processes.



## APPENDIX

**Appendix 1** Projected population on 1 January by variants, 2018–2101

Variant	2018*	2020	2030	2040	2050	2060	2070	2080	2090	2101
Medium variant	10,610,055	10,674,467	10,783,895	10,742,630	10,736,254	10,678,941	10,504,663	10,411,955	10,447,883	10,527,469
Medium variant without migration	10,610,055	10,608,983	10,414,691	10,027,139	9,651,496	9,192,066	8,597,551	8,092,986	7,736,995	7,402,347
Low variant	10,610,055	10,643,331	10,533,441	10,212,544	9,845,569	9,356,904	8,742,756	8,201,144	7,762,148	7,278,956
High variant	10,610,055	10,704,448	10,990,644	11,129,024	11,322,659	11,506,273	11,573,728	11,709,514	11,992,652	12,379,837

Note: \* Observed data.

Source: Czech Statistical Office, 2018a and 2018b.

**Appendix 2** Expected population change, medium variant, 2018–2100

Indicator	2018*	2020	2030	2040	2050	2060	2070	2080	2090	2100
Total population change	39,369	22,589	-1,810	-2,263	-448	-14,000	-16,364	-880	7,865	4,554
Natural population change	1,369	-3,411	-27,810	-28,263	-26,448	-40,000	-42,364	-26,880	-18,135	-21,446
Net migration	38,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000

Note: \* Observed data.

Source: Czech Statistical Office, 2018a and 2018b.

**Appendix 3** Expected population by main age groups, medium variant, 2018–2101 (on 1 January)

Age group	2018*	2020	2030	2040	2050	2060	2070	2080	2090	2101
0–14	1,670,677	1,708,986	1,607,203	1,494,217	1,590,935	1,569,846	1,502,505	1,538,190	1,538,515	1,496,955
15–64	6,899,195	6,831,139	6,773,419	6,549,646	6,069,732	5,913,237	6,063,579	5,942,549	5,862,235	5,922,669
65+	2,040,183	2,134,342	2,403,273	2,698,767	3,075,587	3,195,858	2,938,579	2,931,216	3,047,133	3,107,845
85+	200,834	207,924	293,687	470,469	505,383	667,843	803,529	787,661	705,993	875,843

Note: \* Observed data.

Source: Czech Statistical Office 2018a, and 2018b.

**Appendix 4** Expected indicators of age structure, medium variant, 2018–2101 (on 1 January)

Indicator	2018*	2020	2030	2040	2050	2060	2070	2080	2090	2101
Age dependency ratio**	64.8	68.0	73.9	79.0	92.6	99.1	90.1	91.5	95.8	95.0
Mean age	42.2	42.5	44.4	45.7	46.3	46.8	46.9	46.5	46.8	47.4
Mean age – males	40.8	41.1	43.0	44.4	45.1	45.7	45.8	45.6	45.9	46.6
Mean age – females	43.6	43.9	45.7	47.0	47.4	47.9	47.9	47.5	47.6	48.3

Note: \* Observed data. \*\* Population aged 0–19 and 65+ per 100 population aged 20–64.

Source: Czech Statistical Office, 2018a and 2018b; authors' calculations.