

DEMOGRAPHIC PROCESSES AND BRIEF OVERVIEW OF POPULATION RESEARCH IN CZECHIA AND SLOVAKIA AFTER DISSOLUTION OF THE COMMON STATE

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Demographic processes and brief overview of population research in Czechia and Slovakia after dissolution of the common state

The study makes a brief overview of the demographic processes and research on them in Czechia and Slovakia during the past three decades, the period following the splitting of the common Czechoslovak state. General trends in selected demographic processes are identified and described. Research is summarised and critically evaluated in three basic areas: an analysis of recent trends, forecasting and, finally, applied demographic research. The study focuses more on applied research and forecasting because they have been less frequently appearing in the recent review studies. We intentionally omit the structures and general population dynamics. While recognizing several advancements in developing research topics and methodologies, and their increasing representation in prestigious journals, this study also highlights certain reservations and future challenges inherent to these developments.

Key words: demography, population geography, demographic change, forecasting, Slovakia, Czechia

INTRODUCTION

Demography, geodemography and population geography all have a long tradition in Slovakia and Czechia. Thanks to several leaders in the field from the 19th and first half of the 20th century, a relatively broad basis of personnel managed to be built, which continued to be expanded after the Second World War. It must be stated that the tradition in Czechia was longer and the scientific base that Czechia had entering the era of independence was broader. Demographic research was also more extensive at the statistical office, and as is described in more detail in the section on forecasts, most Czechoslovak forecasts came from there. Thus, Czechia undoubtedly had a more favourable starting position, though a certain institutional catching up occurred due to the founding and building of the Demographic Research Centre first headed by Boris Vaňo from the turn of the millennium. In that period, an independent Department of Demography and Demogeography was also set up, founded and headed by Jozef Mládek at the Faculty of Natural Sciences at Comenius University. In Czechia, a separate workplace – a department – had been established at Charles University by Zdeněk Pavlík as early as 1990.

An institutional foundation is without a doubt important, but the potential of personnel is certainly even more important, and here, again, Slovakia was given the short end of the stick. The study of demography and geodemography had a longer

and stronger tradition in Czechia, although studied mainly within human geography and economy as in the case of Slovakia. However, the situation gradually improved in Slovakia thanks to the research stays of some workers in Czechia. At present, the staffing of the Section of Demography and Population Geography within Department of Economic and Social Geography, Demography and Territorial Development at the Faculty of Natural Sciences at Comenius University is stable, though additional expansion is more than desired. Aside from the mentioned Demographic Research Centre and this section, only individuals at certain other academic workplaces are devoted to demography and population geography. Some researchers worked and work at the Institute of Geography of the Slovak Academy of Sciences. There is a long tradition here, especially in the field of population geography, developed formerly by scholars such as Ján Verešik and several others. Some research on demography and demographic statistics has been conducted at Statistical Office of the Slovak Republic as well (among others Milan Žirko). Some researchers focus more or less sporadically on demographic or demo-geographical research at universities across Slovakia, for example Karol Pastor, Jozef Chajdiak, Jozef Brezák, Miloš Bačík and several others. The range of studies cited in this article must be very broad but can't, on the other hand, be exhaustive. In terms of the quality and availability of data, the differences between countries are smaller given their long-term tradition of cooperation on statistics. The truth remains, however, that Czechia participates in some sample surveys that Slovakia does not take part in, and overall it has a wider basis for its data, for example, in the areas of population climate, health status or assisted reproduction.

The article pursues two basic goals. The first is to provide a short, condensed view of the most important aspects of development in the main demographic processes in the Czechia and Slovakia after the division of the republic. The second focuses on the question of the direction of research in the field of demography in both countries. However, these seemingly different and unrelated goals are closely related. It is necessary to realize that the dynamic and, in many ways, historically unique changes in the population development of both countries contributed to the growth of demographic research, the search for new methods, approaches and the solution of many new research topics. However, the ambition of the article is not and cannot be to present a comprehensive view of population development in its entirety. In the same way, it is not able to cover the entire variability of demographic research after 1992 on both banks of the Morava River, while it concentrates mainly on key scientific institutions dealing continuously with this issue. We focus more on applied research and forecasting, less frequently appearing in recent review studies.

CZECHIA AND SLOVAKIA VIEWED THROUGH DEMOGRAPHIC CHANGES AND RESEARCH ON THEM AFTER 1993

The change in economic, social, cultural and political conditions that took place in Czechia and Slovakia after 1989 had a major impact on effectively all demographic processes. The first half of the 1990s was particularly linked with a sudden drop in the intensity of childbirth, a trend that was maintained in a less dynamic form until the beginning of the new century. Both countries were gradually included, not only among populations with very low fertility (less than 1.5 children), but the level of childbirth in them even fell below the extremely low threshold of 1.3 children, which is referred to as the lowest-low fertility (Kohler et al. 2002). Given

the somewhat more dynamic course of these changes in Czechia and the slightly higher starting level of fertility in Slovakia, the crossing of these boundaries occurred earlier in the Czech population. On the other hand, we also identify an earlier onset and a more intensive revival of reproduction in Czechia, which is why the total fertility rate has already reached higher values in the most recent decade and more, and the recent global economic crisis and the years affected by the COVID-19 pandemic have not changed anything about that. In 2021, the total fertility rate in Czechia reached almost 1.83 children per woman, while it was approximately 1.64 children per woman in Slovakia (Fig. 1). The unfavourable reproductive conditions during the pandemic, however, will likely be reflected in the intensity of childbirth, because the first results for Czechia and Slovakia for 2022 indicate a certain decrease in the total fertility rate.

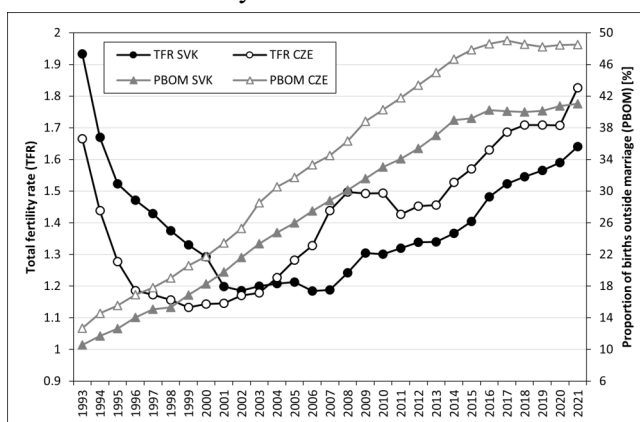


Fig. 1. Basic indicators of fertility in Czechia and Slovakia

Several foreign (Bongaarts and Feeney 1998 and Kohler et al. 2002), as well as Czech and Slovak studies (Sobotka 2003, Marenčáková 2006, Potančoková 2008, Kocourková and Šťastná 2021, Slabá et al. 2021 and Šprocha 2021a) have shown that the above-mentioned changes in childbearing intensity are closely associated with the postponement process, and though it has mainly affected the first-born children in both countries, its effects can also be observed in other parities (Šťastná et al. 2017 and 2019). In this case, too, the postponement process initially occurred somewhat more dynamically in Czechia. Of interest is that at the beginning of the 1990s, thanks to earlier starts to marriages, it was also true that a first child was born a little earlier for women in Czechia. This dynamic postponement, however, contributed to the near reversal of this phenomenon, and up to the mid-1990s it was effectively still true that women in Czechia became mothers for the first time later. What's more, with the continuing process of postponement, a deepening of this difference occurred between the two countries. Not even the visible slowdown in the year-on-year increase of the mean age of the first birth, which we can see in both Czechia and Slovakia in the last decade, has changed anything. At the same time, we record a certain exception to this development trend only in the second year of the pandemic (2021). The value of this indicator, however, again rose faster in Czechia, and thanks to this, women in Czechia become mothers for the first time almost 1.5 years later than in Slovakia (Fig. 2).

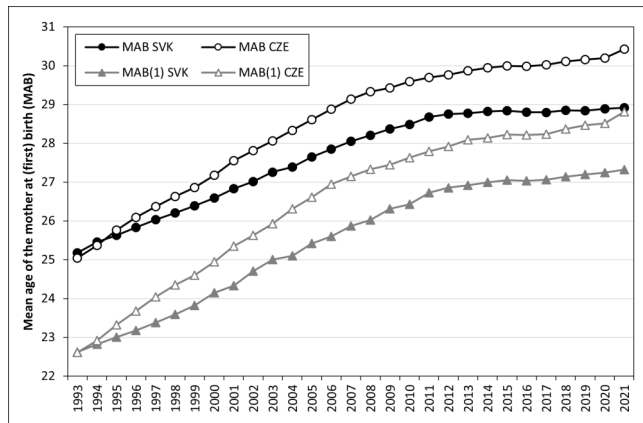


Fig. 2. Timing of fertility in Czechia and Slovakia

Aside from changes in the intensity and timing of fertility, both populations also saw a major transformation in terms of children born within a marriage. For a long time, unmarried women became mothers somewhat more often in Czechia than in Slovakia, but in the late 1980s and early 1990s, the differences between the two populations were minimal, and the share of children born out of wedlock moved steadily below the 10% threshold. Further developments, however, led to a disconnection of the relationship between married life and reproductive intentions. Here, too, we identify a more dynamic growth in the share of children born out of wedlock in Czechia. Though recent years have recorded a certain stabilisation of the situation in both countries with the children of unmarried women in Czechia comprising almost half, while in Slovakia they make up about 41%.

The effect of changes in the timing of fertility and the parity structure of women in the transformation period led to a discussion of the reliability of conventional transverse indicators of fertility intensity. This was also reflected in the Czechoslovak environment (e. g. Sobotka 2003 and Potančoková 2008).

From about the second half of the 1960s to the end of the 1980s, a relatively unfavourable development of mortality was identified in the Czechia and Slovakia (Jurčová et al. 2001, Rychtaříková 2010a and Šprocha 2022a). Only the slow increase in life expectancy at birth for women and even a certain decrease in men and the subsequent stagnation that persisted for more than two decades has contributed significantly to the overall lagging of both countries behind demographically more advanced Europe (Meslé and Vallin 2002 and Meslé 2004). There has also been a concurrent deepening of the male excess mortality. Since the beginning of the 1990s, however, the situation in both countries has changed significantly. The mentioned stagnation was overcome, and the value of life expectancy at birth for men and women in both Czechia and Slovakia effectively grew continuously (Rychtaříková 2004 and 2010b, Mészáros 2008 and Šprocha 2022b). For this demographic process, too, life was extended more dynamically in Czechia, which is also confirmed by the empirical data. Already in the early 1990s, the life expectancy at birth for men in Czechia was approximately one year longer, but by the end of the first decade of the new millennium, the difference was more than three years. Although in the most recent period, part of this gap has been eliminated due to the

faster improvement of mortality rates in Slovakia, in the last pre-pandemic year of 2019, men from Slovakia continued to lag behind those from Czechia by more than two years. Among females, the situation was the opposite in the early 1990s, as the life expectancy at birth was slightly higher in Slovakia. The more dynamic reduction in mortality in Czechia, however, contributed not only to the turnaround, but also to the subsequent deepening of Slovakia's lagging behind. In this case the maximum recorded difference occurred at the end of the first de-cade of the 21st century, when life expectancy at birth was lower by approximately 1.5 – 1.8 years, and the subsequent reduction ended in 2019 at approximately one year. Thus, overall, from 1990 to 2019, the life expectancy at birth for men in Czechia rose by approximately 8.8 years and in Slovakia by 7.6 years to 76.4 (Czechia) and 74.3 years (Slovakia), respectively. As mentioned previously, this trend was not as dynamic for women, with the values of the synthetic indicator of mortality increasing by 6.7 years in Czechia and by 5.5 years in Slovakia. Based on data from the last pre-pandemic year, the life expectancy at birth for women was 82.2 years in Czechia and 81.2 years in Slovakia (Fig. 3).

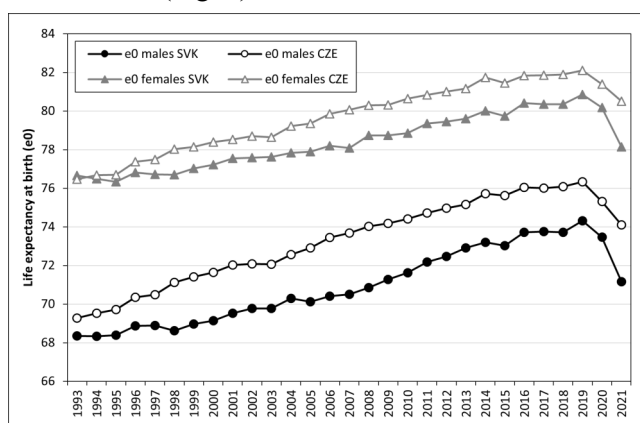


Fig. 3. Life expectancy at birth in Czechia and Slovakia

The last two years for which we have available data were significantly affected by the COVID-19 pandemic, and in both countries and for both sexes, the life expectancy at birth showed a decline (Burcin et al. 2023). At the same time, the pandemic had a more negative impact on the male portion of the population, and in the first year the situation was slightly worse in Czechia, while in the second year Slovakia saw a more significant decrease in life expectancy at birth. Thus, overall, between 2019 and 2021, the life expectancy at birth for men decreased by 2.3 years in Czechia and by 3.1 years in Slovakia. In the case of women, the reduction was 1.7 years (Czechia) and 3.0 years (Slovakia).

More detailed analyses of the development of mortality ratios in both countries (e. g. Burcin 2007, Burcin and Kučera 2008 and 2010, Fiala et al. 2018 and Šprocha 2022a) confirmed the improvement, particularly in productive and younger post-productive ages. For women especially, the future development of mortality will be closely connected mainly to potential changes in mortality at age 80 and over. In Slovakia, and especially in Czechia, we no longer observe any more significant potential for the further extension of life in the age group of up to 65 years,

given the overall low probability of death. The situation is moderately different for men, particularly in Slovakia, where we can also identify a relatively important lagging behind in the older productive age (50 – 64 years) and, of course, in the senior age, too. What's important for further direction is the fact that in both countries the influence of the generations who lived most of their lives under the previous political regime is gradually declining, and thus their health status is conditioned by several negative aspects in place at that time (Kučera 1994). Thus, the further development of mortality ratios will be closely associated with the ability of both countries to finance increasingly expensive and sophisticated medical care focused on an increasingly elderly population (Šprocha et al. 2015).

Among the reasons for the life extension in both countries and in both sexes since the start of the 1990s, the reduction of mortality from cardiovascular diseases and in part from tumours predominates (Burcin and Kučera 2010 and Šprocha 2022a). Dynamics of improvement were more striking in Czechia.

The reproductive conditions created under the previous political regime contributed in Slovakia to a consolidation and in Czechia to the creation of a model of marriage behaviour characterised by early entry into marriage, with a significant age concentration and a low share of persons with no experience of marriage at the end of their reproductive age (Rychtaříková 2010a and Šprocha 2021b). From the end of the 1980s and especially in the 1990s, sharply changing external and gradually also internal factors contributed to the rapid abandonment of this model and the start of postponement or partial rejection of marriage, which were replaced in part by various forms of informal cohabitation. Connected closely with this is a notable drop in the intensity of marriage and an increase in the number and share of unmarried persons of a reproductive age (Fialová and Kalibová 2010, Kresťanová 2020 and Šprocha and Tišliar 2022). While the marriage rate of single men in Czechia still reached 91% at the beginning of the 1990s and was approximately 89% in Slovakia, by the end of that decade its level had fallen below 70% and 68%, respectively. We can also identify a similar process among women. In their case, the share of single women who would marry before the end of their reproductive age declined between 1990 and 2000 in Czechia from 96% to less than 75% and in Slovakia from almost 93% to slightly more than 74%. Thus, it is evident from the above that the marriage rate for single men and women was higher in Czechia for the whole of the 1990s. This changed rapidly, however, in the period that followed, since further development in Slovakia was characterised by alternating between short periods of the temporary revival of marriage rates and a subsequent year-on-year decline. In Czechia we identify a relatively significant drop in the intensity of entering into a first marriage between 2007 and 2013. From that moment on, however, a revival of marriage occurred in both countries and for both sexes. The differences in intensity between them did not change significantly. As a result, the marriage rate of single men in Czechia reached almost 59% in 2019, while in Slovakia it was at 65%, and for women, it was less than 68% in Czechia and more than 72% in Slovakia. The situation changed significantly with the arrival of the COVID-19 pandemic. Above all, the first year of the pandemic saw a sharp year-on-year drop in both countries in the intensity of marriage, below 52% or up to 56% in men and not quite 61% or slightly more than 64% for women, respectively. The second pandemic year showed a slight recovery, though the table marriage rate still lagged behind the pre-pandemic numbers by roughly 4 – 5 percentage points (Fig. 4).

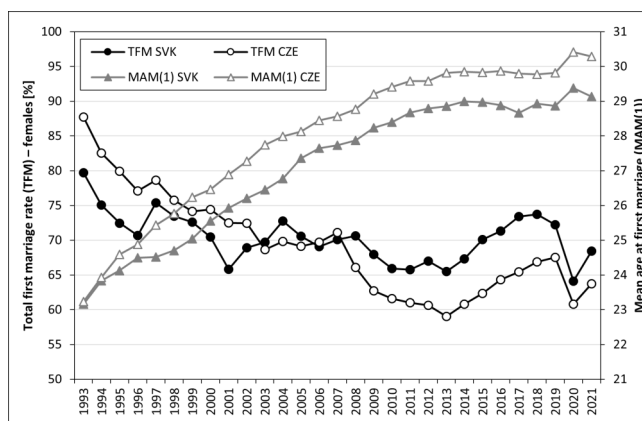


Fig. 4. Marriage indicators in Czechia and Slovakia

The postponement of the start of marriages until a higher age became a significant transformational indicator in the marriage process in both countries. In the early 1990s, the mean age of men and women at first marriage was still relatively low in both Czechia and Slovakia, which was a legacy of the previous model of almost universal and early marriage (Fialová and Kalibová 2010 and Šprocha 2021b). Further development was marked by the already mentioned marked postponement, which in this case also happened more dynamically in the Czech population. In the last years before the pandemic, however, the process of postponement slowed or even stopped in both populations. The mean age of men at first marriage was around 32.1 – 32.3 years in Czechia and 31.4 – 31.5 in Slovakia. For women in Czechia, this stabilised at just below 30 years old, while in Slovakia it was about one year less. The specific conditions of the COVID-19 pandemic significantly disrupted this stagnation.

Not only the formation of marriages, but also their legislative termination underwent some important transformations in both countries after 1989. Research on the divorce process focused mainly on the issue of development trends of intensity and the internal setting of the process in terms of the duration of the marriage union and the age of the divorced spouses (Fialová and Kalibová 2010, Krest'ánová 2020 and Šprocha and Tišliar 2022). In both Czechia and Slovakia, the effect of a decrease in the risk of divorce in the first years after marriage was confirmed, while the divorce rate for longer-lasting marriages increased.

The results of several analyses (Fialová and Kalibová 2010 and Šprocha 2021b) confirm that in both Czechia and Slovakia the trend of continuous growth in the risk of divorce prevailed for a long time. In general, the intensity of divorce was significantly higher in the western part of the former Czechoslovakia at the beginning of the 1990s. Approximately 38 out of 100 marriages would end in divorce (year 1990), while in Slovakia this was less than 23 marriages. Despite the temporary decrease since the founding of independent states, further development was marked by the mentioned increase in the total divorce rate. In Czechia this ceased temporarily, with a significant decline in 1999 which was conditioned by a change in the law. The following years saw another increase. This, however, stopped relatively quickly. The total divorce rate in Czechia in 2003 – 2010 oscillated with re-

lative stability at a level of 47 – 50%. In Slovakia, growth in the total divorce rate peaked in 2008 and 2009, stopping just below 42%. This was also a period when the difference between the two populations in the intensity of divorce reached its lowest level. Development in the years that followed was marked by a gradual decrease in the risk of divorce in both populations. This was then accelerated by the last two years affected by the COVID-19 pandemic, the result of which was the total divorce rate in Czechia falling below 40% and in Slovakia below 30% (Fig. 5).

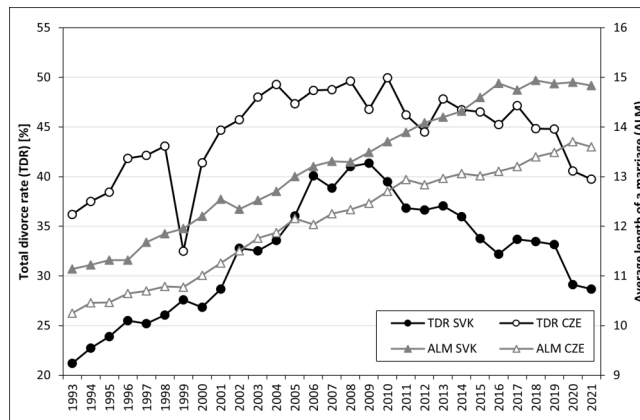


Fig. 5. Divorce indicators in Czechia and Slovakia

The significant and dynamically advancing changes in reproductive behaviour, especially the decline in fertility and the number of live births associated with it, and in essence the almost continuous extension of life combined with the existence of significant differences in the number of individual age cohorts, have led to an acceleration of the demographic aging process in both countries. Given this, it is no surprise that analysis of this behaviour has become a central topic. Both in Czechia and Slovakia have been recorded processes such as an increase in the share of seniors, the growing aging index, the level of economic burden, etc. Along with the conventional indicators, efforts have also been made to apply some alternative approaches (e. g. Šídlo et al. 2020), but the retrospective approach still predominates in the assessment of population aging. As several foreign studies have shown, however (e. g. Sanderson and Scherbov 2007 and Spijker 2015), this can be distorted at a time of dynamic life extension and needs to be supplemented with a prospective concept. Their application in the Czecho-Slovak environment clearly indicates that by taking into account changes in life expectancy and linking the old-age limit to the remaining potential number of years of life, the level of aging, as well as the dynamics of this process, is significantly lower in both populations (Fiala and Langhamrová 2020 and Šídlo et al. 2020).

In the context of overall population development, migration is gaining importance in both countries. This was also reflected in the growing interest of migration. An overview of migration research and its results would certainly deserve a separate study. Therefore, we mention only few works and some basic data. In the field of foreign migration in Slovakia, Divinský systematically published several publications (e. g. Divinský 2007 and 2017). The concise research was also con-

ducted by Jurčová (e. g. 2013). Internal migration was concisely analysed in several studies by Podolák (e. g. 1995), Bezák (e. g. 2005) and also younger generation of geographers such as Přebil and Novotný (2022). In Czechia, from the point of view of fo-reign migration, it is especially necessary to mention works by Burcin et al. (2008), Drbohlav (2009) and Fiala and Langhamrová (2017). As part of internal migration, studies of Ouředníček et al. (2015 and 2019) and a specific work by Krest'ánová et al. (2019) are worth paying attention to. The importance of migration is evident especially in connection with Czechia, which in several years of the analyzed period recorded a natural decrease. Between 1993 and 2022, there was a total decrease of approximately 203 thousand people. It could only be identified in Slovakia at the beginning of the millennium (2001 – 2003) and in the last three years affected by the COVID-19 pandemic. However, in Slovakia, thanks to the preponderance of births over deaths, only less than 103 thousand people were added between 1993 and 2022. Migration began to play a more significant role in both republics only after joining the European Union and admission to the Schengen area. The peak of the migration balance in 2007 in Czechia (almost 84 thousand people) and in Slovakia in 2008 (more than 8 thousand people) relates to this. In general, for a long time it was true that Czechia was more attractive for migration. The development after 2008 was negatively affected by the global economic crisis, which was associated with a decrease in foreign migration. However, the last period brought a certain revival, which, especially in Slovakia, was once again adversely affected by the COVID-19 pandemic. However, even more important in the development of migration was the unprecedented increase in the number of migrants in Czechia in 2022, linked primarily to the war conflict in Ukraine.

Thanks to migration, the population of the Czechia grew after 2002 (apart from 2013). In Slovakia, the overall population growth in the 1990s was mainly saturated by a natural increase. In the first decade of this century, migration came to the fore. Subsequently, their influence levelled off. In recent years, there has been a natural decrease, which, however, cannot be compensated for by the low positive migration balance. Therefore, in the last two years, the total number of inhabitants in Slovakia has been decreasing.

NATIONAL AND REGIONAL DEMOGRAPHIC FORECASTS

Forecasts and projections are perhaps the demographic outputs most requested. Demographic development has a significant effect on various areas of a society's life, some even very significantly. Therefore, information about the expected or potential development of the number, growth, structure and distribution of the population is important information when considering the future functioning of a society. Such information is needed by the state and public administration, the private sector, international institutions and the scientific community, and the general public is interested in it, too. In times of significant social changes, the importance of demographic estimates, forecasts and model simulations increase. It is necessary to know the most probable scenarios of future development and to distinguish them explicitly from all other scenarios, mainly the more unrealistic ones. Such a situation occurred in Slovakia and in Czechia after 1990 and continues to the present day.

The history of creating official forecasts of population development in the time of the former Czechoslovakia had a whole order of specifics. Unlike most similar outputs in other European countries, the population of Czechoslovakia was always

divided for the needs of demographic research into two national populations defined by the borders of the current independent states, due to the significant differences in the intensity of reproductive processes. Thus, more than 80 years have passed since the first projections regarding the population of Slovakia (Vaňo 2015), and during this period, many population forecasts and projections with various territorial details were elaborated and several projections derived focused mainly on the development of census households, the workforce, and the Roma population. Prior to the division of Czechoslovakia, the majority of demographic forecasts for Slovakia were prepared in Czechia. Demographic forecasting only began developing in Slovakia from the end of the 1980s, and since 1993, all official demographic forecasts focused on Slovakia have been compiled in Slovakia.

The period after the 1990 census can be labelled as the period of modern forecasting in Slovakia. All forecasts and projections produced during this time were processed using forecasting methods in line with UN recommendations and in most cases were multi-scenario (thus elements of uncertainty were partially eliminated). Modern computer technology and specialised software were used in forecasting, leading to faster processing, greater detail and variability of outputs, as well as greater user comfort. Unlike forecasts and projections from the previous period, Slovak demographers took part directly in the creation of forecasts and projections after 1980, even if the projections were made in Czechia (Vaňo 2015). The characteristic information about the input assumptions of these forecasts published were their detailed results. All official forecasts were managed by the statistical office. Prior to 1992, this was done under the management of the Federal Statistical Office in Prague, in the period 1993 – 2007 under the management of the Statistical Office of the SR, and since 2008 under the management of Infostat. The Faculty of Natural Science at Comenius University Bratislava also took part in the forecasts made after 2000, and Faculty of Natural Science at Charles University in Prague also cooperated on some projections. After 1980, a total of nine forecasts which are considered official forecasts of the Slovak population were produced under the management of statistical office.

Official population forecasts also include regional forecasts prepared at the regional and district levels of Slovakia. Six such forecasts were made in Slovakia after 1990 in the Department of Statistics. These were forecasts based on the results of population censuses from 1991, 2001 and 2011 (one forecast and one update each time)¹.

Forecasts elaborated for the last three decades in Slovakia can be described as standard both in terms of methodology and content, and thanks to them, demographic forecasting has a relatively good reputation. A fundamental problem of demographic forecasting in Slovakia has been long-term capacities. Abroad, teams of experts deal with demographic forecasts, while here this is merely a handful of individuals at two workplaces. This leads to a lack of capacity for forecasting itself, as well as for research and international collaboration. These capacity problems are manifested mostly in the area of methodology (alternative forecasting methods are not used) and in the frequency and variability of forecasts (forecasts alternative to official ones are not produced, as there is insufficient space for creating model projections and other simulations).

¹ Regional forecast on the results of the 2021 population census are currently being prepared.

The situation is more favourable in Czechia, with which Slovakia also shares a common past in the field of demographic forecasting and maintains relatively close contact. Alternative forecasting activities began to develop in Czechia in the early 1990s in the spirit of the methodological recommendations from the United Nations. In 1994, two forecasts were produced simultaneously, which were independent of the forecasting work of the Czech Statistical Office. These were the forecasts prepared at the Faculty of Science at Charles University (Burcin et al. 1994) and at Masaryk University (Rabušic 1994). The results of these forecasts, together with other demographic developments (especially the unprecedented drop in the birth rate in 1994), set a mirror to official forecasting practice. The unflattering picture subsequently led to a significant shift in implementing international recommendations by official forecasting practice in Czechia. The Czech Statistical Office publicly announced its intention to update population forecasts at regular two-year intervals. However, this was done only once, in 1995. The next forecast appeared with a one-year delay in 1998 and the next one only in 2003, following the 2001 census. In this forecast, the horizon of official forecasts was shifted from 2020 to 2050. However, in terms of the methodology for producing official population projections, there was no significant shift between 1995 and the 2003 projections. This happened only with the entry of a new generation of demographers into positions of authority around 2005 – 2010. The forecast prepared in 2009 (Štyglerová et al. 2010) represents a fundamental qualitative shift in the processing of official population forecasts in Czechia. The forecasters from the Czech Statistical Office jettisoned the long-term conservative view on the future development of fertility and mortality, which had marked the reliability of previous forecasts. The basic population forecast from 2013 (authors Štyglerová and Němečková 2013) represented the return of population forecasting to a professional level comparable to the peak of Czechoslovak forecasting in the mid-1960s, and the forecast horizon was shifted from year 2065 to 2100. The forecast made in 2018 (Kurkin 2019, Němečková 2019, Pechholdová 2019, Štyglerová 2019 and Zeman 2019) is another important signal and promise of the further progressive development of official forecasting practice in Czechia.

Demographic forecasts are considered relatively reliable thanks to the stabilising influence of the population's age structure and a certain persistence of most demographic processes. Demographic forecasts can usually reliably predict the main trends in the development of the number, increase and age structure of population. The only exceptions in the conditions of the two countries being examined were the breakthrough year 1989 and the COVID-19 pandemic, which were obviously not anticipated in the results of previous forecasts, as they were unpredictable changes that had a major impact on the functioning of the reproductive system.

A comparison of official forecasts in Slovakia for the period from 1989 to the present also confirms that the basic forecasting trends tend to be similar over the long term (Vaňo 2015). More visible differences occur in the forecast of population numbers, while the differences in the results of forecasts with regards to the age structure of the population are insignificant. The development of the population number will depend crucially on the development of migration; therefore, it is burdened with a greater degree of uncertainty. In any case, a drop in the population of Slovakia after 2030 remains highly likely. Minimal differences in the results of the projections in relation to the age structure of population indicate the irreversibility of population aging in Slovakia in the coming decades.

Along with the standard elements of uncertainty, which are the input parameters of the forecast and the length of the forecast period, an additional highly important factor affecting the results of forecasts in Czechia and Slovakia is the year of processing. The political and social change that occurred in 1989 fundamentally influenced demographic development, and pre-revolutionary forecasts did not and could not have included such changes in their assumptions. The creation of forecast scenarios during the transformation period, primarily at its beginning, when the strength and course of the transformation processes were not yet known, was also difficult (this relates to the forecasts made during the 1990s). Forecasts produced after year 2000 already have the advantage that the scope and course of the transformation processes were known, and social development began to shift gradually from transformation to stabilisation, which simplified the preparation of the input assumptions of the forecasts.

Forecasts processed prior to 2019, of course, did not and could not have captured the fluctuation in mortality caused by the COVID-19 pandemic and thus not even the significant change in the population number and growth. This is only a short-term fluctuation, however, particularly among the elderly population, and it will not have a significant impact on the results in the longer horizon of the forecasts. This is why it is important to bring new knowledge that can be used in population forecasting and that can significantly increase the reliability of future estimates (e. g. Pechholdová 2019).

DEMOGRAPHY AND POPULATION GEOGRAPHY IN APPLIED RESEARCH AND PRACTICE

The results of demographic and geodemographic research in both countries also found application in the practical sphere. Applied demography is an important element of demography, and its activities can be divided into two basic groups: “commercial” demography and activities for public administration and decision-making (Swanson et al. 1996). In both countries being examined, both these groups of activities are extensive. In this text, we have selected only some of the more significant and interesting research and activities, above all those used in the decision-making sphere and self-government at the local and regional level. In the countries of the EU, as well as in the USA, a great deal of attention has long been paid to methodology and use (Smith et al. 2001). These authors have long ranked among the promoters in the field of applied demography and the use of research at the local level. Swanson and Pol (2004) consider population estimates and projections at the local level to be the “heart and soul” of applied demography. The broader scope of activities of applied demography and population geography also includes sub-disciplines, such as educational demography, demography of health and health services, research and forecasts of human resources in a quantitative and qualitative perspective (human capital), which also fall into the area of population economics. There, the subject of interest, among other areas, is macroeconomic models in association with the change in age composition, changes in the distribution of incomes and expenses based on age in connection with shifts in the life cycle, for example due to the later start of reproductive paths. On the whole, connecting the results of demographic analyses and forecasts to economic research is exceedingly important. Demography, using microsimulation approaches, also contributes at the micro-level, the level of individuals and families (Vaňo 2020, p. 27). As Vaňo states: “microsimulation models have more than 50 years of history and tradition;

they are used relatively little in practice. The main reason for their less common use can be considered the difficulty of preparing the input data (transition probabilities), as well as the need for sampling, which forms the input and individual simulation or forecasting steps and the output database of the model. At the same time, the simulating of any newly introduced or modified measures in public policies using a suitable model apparatus should be a matter of course.”

In Slovakia, demographic analyses and forecasts are frequent for local governments, cities and rural communities. These were a (mandatory) component of several types of strategic and planning documents, for example, territorial forecasts, territorial plans, economic and social development programmes, community plans and others. Some of them are medium-term (4 – 7 years), while others are prepared for a longer time period of two or three decades. Bleha and Farbiaková (2017, p. 44) analysed several dozen demographic parts and forecasts in economic and social development programmes of large rural municipalities from two self-governing regions, though their findings are not very encouraging. As they state: “The greatest shortcoming of the analysed programmes is the missing forecast. This is completely omitted in the vast majority of such works. Planning without knowing the future at least in rough outline is problematic. Another shortcoming in these works is the poor quality of the analysis text itself in terms of content. Most analyses make no effort to evaluate and justify given phenomena and trends in the population, but only briefly describe them”. It can be assumed that the situation in most other municipalities in Slovakia with regard to processed planning documents will generally not be more favourable. Despite this an extensively detailed analytical-forecast document is not expected for each municipality, particularly municipalities of lower population, awareness of the consequences of demographic development is very important. However, it has not always taken into account and put into practice. In the imaginary chain of data – information – policy – action municipalities often reached only the second state in their documents. Furthermore, the data and information were not sufficient. Reality also shows that many measures remained only on paper. In this context, Bleha (2011) surveyed the views of mayors of municipalities on the issue of demographic development in their municipality and in wider contexts, and the findings from the planning and programming documents were confirmed. The leaders of the selected Slovak municipalities (those willing to respond) basically know the demographic development and know how to evaluate it (positively or negatively), but the issues of managing demographic development are less obvious to them. They are not always aware of the difference between adapting to demographic changes and directly influencing them, thus alleviating their effects – “mitigation”, as Lutz (2007) distinguishes between them.

Some of the planning and strategic documents contain a sweeping and detailed demographic analysis and demographic forecast. These were largely processed using the cohort-component method, similarly as forecasts at the national and regional levels. An example is a study focused on an analysis and forecast of the demographic potential of Bratislava (Bleha et al. 2018). It was used in the municipal development programme “Bratislava 2030”. In 2023, a new and updated forecast will also be published for the capital, districts and city boroughs. As part of this task, projections simulating the effect of very high migration and zero migration (the impact of a natural increase on dynamics without the effect of migration) were also prepared for the city as a whole. A very important part of such coordinated studies

is the formulation of connections to other components of the human-geographical sphere and the effects on the future development of the city, including potential measures for mitigation and adaptation. This research task, which will be the basis for city's territorial forecast under the management of the Metropolitan Institute of Bratislava, includes cooperation with human geographers following in their parts (transport, social sphere, housing and others) on the results of the demographic forecast.

Several results of population forecasts were used, for example, with economic development forecasts, the preparation of pension reform, the preparation of socio-economic measures, and the processing of transport models for regions, districts and some towns. Demographic forecasts are regularly used as a basis for economic forecasts and outlooks, for example by the National Bank of Slovakia, the Ministry of Finance, the Council for Budget Responsibility or the Economic Institute of the Slovak Republic.

With the pension issue, demographic forecasts have been applied in recent years at the Ministry of Labour, Social Affairs and Family (MPSVR), in the social insurance company, as well as in pension management companies. The MPSVR, mainly during the period before 2010, used the results of demographic forecasts when preparing socioeconomic measures. Overall, it is possible to conclude that in the last decade, the results of national and regional forecasts in Slovakia have been given more importance than in the first half of the post-November period. No one today casts doubt on the principle changes and aging taking place, which in the past could be seen via statements of leading representatives of the executive branch of government. Even at the local level, self-government representatives are generally aware that it is necessary to "fight" for residents, while also taking care of the aging residents (issues of social care, changing the composition of services).

In Czechia, as in Slovakia, applied demography is focused primarily on forecasting and partially on model outputs for state administration and self-government. Over the past three decades, several key forecasts have been developed, particularly at the national level, which have mainly served as one of the basic documents for the work of the existing pension commissions. For more than a quarter of a century now, their standard results have been part of the input data of dynamic microsimulation models (Schneider 1998 and Deloitte 2011). Since 2003, they have also been an inseparable part of mortality forecasts in a generational perspective, which enables, among other things, a very robust estimate of the time spent in retirement (MPSV ČR 2010). In the work of the second Bezděk Pension Commission, another product of applied demography was used, specifically the estimate of replacement migration for Czechia (Burcin et al. 2005) derived from the results of the forecast compiled in 2003 (Burcin et al. 2003). The results of applying the replacement migration concept have also become the primary inhibitor of political discussions on alleviating or even preventing the expected aging of the Czech population through foreign migration. An additional important project in the field of applied demography with a strong forecasting accent was the Reproduction of Human Capital (RELIK) research project, which was as part of the National Research Programme, secured by the Prague University of Economics and Business (Fiala et al. 2011).

After 1992, hundreds of forecasts or forecast-analytical studies in the field of applied demography were produced in Czechia, whether they were population forecasts and model projections, or forecasts and projections derived from their results.

Their results have served different purposes. They were perhaps most often used as the basis for the elaborating of strategic studies and development plans for cities and municipalities, including the capital city of Prague and other regions of the country. They were also the basis for political decisions on expanding or reducing the capacities of school and pre-school facilities, social care facilities, municipal waste processing, the production and supply of drinking water, or the construction of road and highway networks and the implementation of other infrastructure projects.

Recent years have seen an increase in outputs that respond to the aging of the population and attempt to outline possible problems and pitfalls. Aging is considered a complex process; therefore, a whole spectrum of its effects on the functioning of society can be identified. Among them are not only the previously mentioned issue of the optimal setting of the pension system but also studies that indicate uneven population development in the regions of Czechia and the different effects of this development on the age composition of the population, which may have a major impact on the development of the region as a whole. A classic example is the different demand for certain types of services depending on the age composition of a local population, whether it is in the area of education (see e. g. Hulík et al. 2008, Kušovská 2016 and others), social services (see e. g. Průša 2015, 2018 and 2019 and Šídlo and Křesťanová 2018) or health services.

The last mentioned area in particular, applied demography in the field of health services, has already received considerable attention in Czechia in recent years. This is associated, not only with the implementing of applied research projects addressing the relationship between the age structure and the areas of use, provision and availability of health services, but also to the overall demand for such analyses, which is based on the needs of (not only) the state apparatus. Several outputs focused on estimating the future number and structure of doctors needed in selected medical specialties (e. g. Šídlo 2010 and Burcin and Šídlo 2017 and 2020) were created, as well as regional analyses on the availability of selected health services in relation to geodemographic factors, such as on the side of the providers of these services, and their recipients (e. g. Šídlo et al. 2017a, 2017b and 2021, Maláková et al. 2020 and Maláková 2022). The results of these analyses were then used as foundation materials for the ongoing reforms of primary or psychiatric care or as a basis for subsidy titles of the Ministry of Health of the Czech Republic for the field of general medicine, as well as in the creation of strategic materials (MZ ČR 2020 and MMR ČR 2021) or became the basis for the introducing of a regular definition of areas with poor availability of health services within the internal project of the largest Czech health insurance company.

In the most recent years, the issue of personnel stabilisation of health services and the setting of a system for planning the future capacities of health workers has come to the fore. This has opened up possibilities for the application of demographic approaches not only for analysis, but in particular for the forecast of these workers in the form of model forecasts, which should alert decision-making bodies to possible problems in a timely manner as a primary task. This is why demographers from Charles University have become party to a new European project, whose aim is to resolve these issues and, in cooperation with other domestic institutions, to lay out appropriate solutions at the national level.

From the presented examples, it is evident that applied demography in Slovakia and Czechia has been on the rise in recent years, but its potential is far from being

fully used. In connection with the aging of the population structure in particular, more questions about possible risks will arise, but also new challenges that this process brings, and thus also to a great extent requirements for quality analyses and future estimates. Therefore, the task of the main demography departments is to educate new experts in this field and to further emphasise the importance of the field of (geo)demography and its indisputable importance in terms of its application.

CONCLUSION

The thirty years of the development of demography and population geography in Czechia and Slovakia have been relatively varied. In both countries, it has been possible to maintain the tradition of basic demographic research, personnel and teaching, and in some respects, Slovakia has succeeded in reducing the differences compared to Czechia and caught up with it, for example, in terms of teaching and institutional security. Overall, Slovak and Czech researchers have succeeded in placing their research in more prestigious foreign journals and in deepening foreign cooperation on several projects. Population forecasts, including regional forecasts, are now regularly published and updated, and in Slovakia, two special atlases devoted to demographic issues have also been produced. Therefore, it can be concluded that the demographic development at the national and regional level is analysed in relative detail in both countries. Demographic and population-geographic viewpoints are certainly being successfully promoted in the field of applied demography, both in the areas of commercial demography and public services, in Czechia especially in the field of health care and pension reform, in association with the significant aging of both populations.

Demographers and population geographers, however, also face some research, forecasting or organisational challenges. In the area of analyses of demographic processes, this will mainly be the further effort to apply and expand the use of new analytical approaches, to deepen knowledge in the area of generational or cohort view, and to focus on some more complex and sophisticated statistical methods in the processing of demographic data. No less important will be the question of deepening the spatial aspects of the transformation, focusing on certain specific forms of reproductive behaviour and on the area of certain subpopulations, whose demographic behaviour has differed from that of the majority population for a long time.

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DEMOGRAFICKÉ PROCESY A STRUČNÝ PREHĽAD POPULAČNÉHO VÝSKUMU V ČESKU A NA SLOVENSKU PO ROZDELENÍ SPOLOČNÉHO ŠTÁTU

V roku 1993 vystupoval demografický výskum na Slovensku a v Česku do éry samostatnosti odlišne. V Česku bola výskumná aj akademická tradícia dlhšia, počet demografov bol vyšší a aktivity neboli koncentrované na jedinom pracovisku. Na Slovensku fakticky neexistovalo samostatné pracovisko, ktoré by sa systematicky venovalo demografickému výskumu, s výnimkou štatistického úradu, kde sa však viac-menej rozvíjala iba demografická štatistika, hoci sa podieľali aj na demografických prognózach. Výskum v oblasti populačnej geografie bol v podstate raritný, iba sporadicky sa objavili štúdie od humánnych geografov.

Po roku 1993 sa posilnila inštitucionálna báza, vzniklo jedno akademické a jedno výskumné pracovisko zamerané na demografiu, resp. populačnú geografiu. Zároveň sú to však jediné dve špecializované pracoviská v celej Slovenskej republike. Do istej miery sa podarilo znížiť aj rozdiel v objeme a kvalite výskumných štúdií. V oboch krajinách vznikajú pravidelne kmeňové demografické prognózy a ich aktualizácie. Publikované boli aj viaceré odvodnené, resp. špeciálne prognózy, počnúc projekciami cenových domácností, končiac prognózami pracovných síl či prognózou rómskej populácie (v SR). Slovenskí aj českí demografi pomerne výrazne vstupujú aj do praktickej sféry, napríklad v oblasti zdravotníctva. Demografia a populačná geografia sú pomerne dobre popularizované. Viacero demograficky ladených projektov bolo riešených v rámci agentúr VEGA a APVV.

Možno tiež skonštatovať, že demografický vývoj posledných troch dekád je dostatočne a detailne zmapovaný v oboch krajinách, vrátane využitia moderných demografických metód a prístupov (napríklad retrospektívny pohľad na starnutie populácie). Pomerne veľké množstvo štúdií sa venovalo aj vnútornej a zahraničnej migrácii. Publikovaných bolo aj niekoľko regionálnych prognóz (zväčša na okresnej a krajskej územnej úrovni).

Veľmi stručne a synteticky môžeme konštatovať o demografickom vývoji oboch krajín nasledovné. Na sklonku 80. rokov minulého storočia sa Česko i Slovensko v oblasti demografickej reprodukcie odlišovali v podstate len minimálne. V oboch republikách po roku 1989 pritom identifikujeme viac-menej rovnaké transformačné zmeny. K nim predovšetkým patril zánik modelu skorej a takmer univerzálnej sobášnosti a plodnosti, pokles intenzity rodenia detí, posun týchto rodinných prechodov do vyššieho veku. Nemenej dôležitá je aj intenzifikácia znižovania úmrtnosti a intenzifikácia s tým spojeného procesu demografického starnutia. Ukazuje sa pritom, že v západnej časti bývalého Československa tieto zmeny prebiehajú alebo prebiehali značnú časť transformačného obdobia dynamickejšie. Aj preto sme svedkami vzniku, resp. prehlbovania určitých diferencií v reprodukčnom správa-

ní medzi oboma republikami. Okrem toho tiež dochádza k formovaniu niektorých historicky nových javov, ako je napríklad vyššia prierezová i generačná plodnosť v Česku.

Pred demografmi a populačnými geografmi oboch krajín stoja niektoré výskumné, prognostické či organizačné výzvy. V oblasti analýz demografických procesov pôjde predovšetkým o ďalšiu snahu aplikovať a rozšíriť využitie nových analytických prístupov, prehĺbiť poznanie v oblasti generačného, resp. kohortného pohľadu, ako aj zamerať sa na niektoré komplexnejšie a sofistikovanejšie štatistické metódy pri spracovaní demografických údajov. Nemenej dôležitou je tiež otázka prehlbovania priestorových aspektov transformácie, orientácia na niektoré špecifické formy reprodukčného správania, ako aj na oblasť určitých subpopulácií, ktorých znaky demografického správania sa dlhodobo odlišujú od väčšinovej populácie.



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