HARMONIZED DEMOGRAPHIC PROJECTIONS BETWEEN FRANCE, HUNGARY AND SLOVAKIA[1]

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INTRODUCTION

One of the main questions of contemporary demographic situation in Europe is whether we are heading toward more homogenous or diverse paths. All the European countries are over the (first) demographic transition, however, their demographic characteristics are far from being the same, although this is what we expected according to the classical model of the demographic transition (Notestein 1945). Van de Kaa's response to this situation, the introduction of the term of a second demographic transition, seemed to be a solution for interpreting and explaining the post-transitional development (van de Kaa 1987). However, it has not been demonstrated yet that patterns of population development will converge during the second demographic transition, even in a very long run. With continuously improving mortality and increasing mass migration, fertility levels do not have to be over the simple reproduction threshold. Various assumptions can lead to the same stable population size (Hablicsek and Tóth 2003). Although the demographic convergence is expected on the basis of decreasing social-economic differences, there are many factors and uncertainties preserving the diversity (Coleman 2005). One can mention here the increasing role of values and norms (Lesthaeghe and Moors 2000) or the existence of different types of societies (Mayer 2001). Increasing number of papers vote for a parallel development or a slow convergence in population development of the European countries in the 21st century (Billary and Wilson 2001).

[1] This paper is based on the final report of the Working Group on Population Projections within a trilateral co-operation of the statistical offices of France, Hungary and Slovakia. In the preparation of the final report the following people took part: Robert-Bobée I. (Insee), Sardon J.P. (ODE), Richter Maria H. (HCSO), Jurcova D. (VDC), Hablicsek L. (HCSO DRI), Meszaros J. (VDC), Vano B. (VDC), Kamarás F. (HCSO), Tóth P. P. (HCSO DRI). The complete report has been published by INSEE: under the title: Comparative Population Projections for France, Hungary and Slovakia. *INSEE* Document de travail N° F 0504.

An additional motivation to analyse the demographic challenges in Europe is the recent enlargement of the EU. The accession of Central and East European countries modifies the EU averages and increases the variance around them. It is very clear in the field of mortality and migration, but also remarkable concerning fertility (Frejka and Sardon 2004). Furthermore, regional and social differences within the new member countries are very big, which is a further reason for long term diversity (Melegh et al. 2004; Vano 2005).

For the purpose of measuring the demographic conditions for convergence and looking at the consequences of diversity, alternative population scenarios of Hungary and Slovakia were prepared and compared with the baseline (most probable) scenario for France. In the integrating (optimistic, convergent) scenarios (higher fertility, lower mortality, higher migration) the differences between France and new members will decrease rapidly. As opposed to the above scenarios, in the stagnating (pessimistic, non-convergent) scenarios (lower fertility, higher mortality, lower migration) the differences will decrease much more slowly. The main goal is to analyse the relationship between old and new members of EU and a more rapid or slower demographic integration of new members in the EU.

The paper is divided into three sections. The first part presents comparative analyses of past trends on fertility, mortality and international migration. The second part details the assumptions on fertility, mortality and migrations for Hungary and Slovakia and compares them with the baseline assumptions for France. The third part analyses future demographic evolution for the three countries. At the end some political consequences will be discussed.

PAST TRENDS OF FERTILITY, MORTALITY AND MIGRATION

Fertility

It is obvious that fertility development is the most important component of population reproduction/replacement. During the demographic transitions in the 19–20th centuries levels of fertility decreased very significantly in all the analysed countries.

It is not easy to analyse the fertility trends, because there are strong fluctuations in the numbers and rates of births. Especially, period indicators, based on mixed behaviour of different cohorts being present in a given period of time, show shifts and falls in the time series. These fluctuations are connected to the changing age-specific fertility behaviour: couples may *postpone* (or *bring forward*) the childbirth. If a general postponement, or in other words a pattern change takes place then it causes a fertility fall in the period fertility measures.

Cohorts may counterbalance these effects in their life history therefore cohort fertility measures seem to be much more stable.
Period and cohort fertility level

France experienced a sustained strong post-war baby-boom, which lasted from 1946 through the mid-1960s and Total Period Fertility Rates (TPFRs, average final number of children estimated for periods) were between 2.5 and 3.0 births per woman. This was followed by a marked decline in fertility in the mid-1970s. Nevertheless, during the second half of the 20th century France was among Western countries with relatively high fertility. TPFR fluctuated between 1.7 and 1.9 throughout the last quarter of the century.

Cohort fertility rose to a peak of 2.6 births per women of the birth cohorts born around 1930. Subsequently, the total cohort fertility rate (TCFR, average number of children completed by the cohort members) declined between the 1929 and the 1948 cohort from 2.6 to 2.1. It means that the level of fertility is still over the simple replacement threshold in the cohorts having completed their fertility history or being close to this stage.

Contrary to many other European countries, *Hungary* did not experience a lasting increase in fertility, a baby boom after the Second World War. However, there were strong fertility peaks and falls mainly connected to population policy measures between 1950–1990. The 1990s, with the transition towards the market economy, witnessed a rapid fertility decline. The TPFR declined from 1.9 in 1991 to 1.3 in 1998, a drop of almost 30 percent within seven years. Since then the level is stabilised around 1.3.

In contrast to the fluctuating trend of the TPFR, the trend of the total cohort fertility rate (TCFR) was remarkably smooth and almost horizontal. Cohorts born before 1930 were experiencing a gradual fertility decline and the birth cohorts of the 1930s, 1940s and 1950s were within a narrow range. They all had TCFRs between 1.9 and 2.1 births per woman. Our estimates indicate that completed fertility of the cohorts born after 1960 display a moderately declining trend. The 1967 and 1968 birth cohorts were estimated to have TCFRs around 1.9 births per woman.

Slovak fertility was among the highest in Europe throughout the 20th century. Indeed, demographic transition took place later in Slovakia than in neighbouring countries and ended in the mid-1930s. In the middle of the century its period total fertility rate (TPFR) was around 3.5 births per woman. It then declined quite steadily, although with some irregularities, to reach replacement level fertility as late as around 1990. During the 1990s the fertility decline was even faster than before and by 2000 the TPFR was at 1.29. The irregularities in the fertility trend from the 1950s through the 1980s were in part influenced by the policy measures of the Czechoslovak government.

Slovakia's total cohort fertility rates (TCFRs) of the generations born around 1930 were higher than in practically all other European countries, including the formerly socialist ones, namely almost 2.9 births per woman. Thereafter cohort fertility declined from one generation to the next and our estimates indicate that the generations born in the late-1960s will have TCFRs around 1.9 births per woman.

Concerning the comparative perspective, one can observe, that since the last world war, and especially since mid-1970, differences in fertility levels between the three countries were diminishing rapidly. At the beginning of the 1990s TPFR indices were very close, but during this decade trends developed in opposite directions and the gap between France and the two others, Hungary and Slovak Republic increased rapidly. In the former socialist countries transition towards market economy produced a deep decrease in TPFR, while, at the same time, in France it was increasing.

This is undoubtedly a transitional situation. This is, why it is reasonable to think that in the future Hungary and Slovak Republic could reach a fertility level close to that observed in France. Nevertheless, one of the main difficulties is to foresee when this convergence will occur (See Figure 7, 9 and 10).

Mean age at childbearing and age-specific fertility

Past trends in mean age at childbearing show that the three countries follow a similar development but different paths. The continuous decrease in the mean age since, at least, the nineteen fifties, stopped in the last decades and is now increasing quickly. The turning point was reached in the mid-1970 in France, at the end of the 1970s in Hungary, and at the very beginning of the 1990s in Slovak Republic (Figure 8).

Today, the gap between France and the two other countries is around two years and has increased almost continuously Even in the last years the mean age is increasing very rapidly in the Slovak Republic and in Hungary, while it is on the way of stabilisation in France.

Analysis of the evolution of age-specific fertility rates reveals that the end of the 1970s was a turning point in France. At that time fertility rates at older ages (above 28) stopped to decrease and recovered continuously, sign of a recovering of births postponed when women was at younger ages. As a first step, fertility at younger ages continued to decline until the end of the 1990s. After that trend is not very clear, but it seems that, at all ages, fertility rates are stabilizing.

Developments in the former socialist countries are quite different, especially in the Slovak Republic. In this country fertility at younger ages was quite stable, if we disregard effects of changes in population policy. But, during the

1990s, with the transition to market economy, fertility at younger ages fell down sharply, while at older ages fertility rates continued to decline at the previous speed. Few years after, in the second half of the 1990s, fertility above 28 years of age started to increase.

In Hungary, situation is more an in between scenario. Trends in age specific fertility rates looked like the one observed in France, but the transition to market economy led to a strong decline of fertility at ages where traditionally fertility was at the maximum (21–27 years of age). This temporary deficit is somewhat compensated by the increase of fertility at older ages (29 years of age and more at the extreme end of the 1990s.

Comparison of fertility developments in the three countries shows that there can be a time lag between countries. France can be seen as a precursor and Hungary and Slovak Republic are only at the very beginning of the second step of the post-transitional fertility evolution (the catching up after the age of 30 of the postponed fertility), even if Hungary entered a little bit earlier into this new stage (See Figure 8, 10, 11).

Even if the direction of fertility is the same for the three countries, there is a gap between the fertility patterns in France and in the two former socialist countries, Hungary and Slovak Republic. In France age at childbearing is much higher and more concentrated, in the other countries changes are more marked especially during the transition.

So the challenge for the future is to foresee if the current differences are going to disappear in the future, in particular with the new common partnership in the European Union, or if demographic differences reflects cultural differences and they are not just temporary gaps in the timing of a common evolution. In such case differences between countries might remain, at least for the age at childbearing even if fertility level converge.

Past trends in mortality

Mortality is a component of population development beside fertility, migration and ageing. By deaths the population as a whole and all age groups are decreased. In spite of the fact that everybody dies, the populations show very different death rates. Longer or shorter life expectancies, older or younger age structures influence the number and rate of deaths.

For modern population projections applying the cohort component method (see section 2.1) future estimation of mortality by age and sex is necessary. Therefore the analysis of past trends here focuses on sex and age specific mortality.

Decreasing mortality in young ages

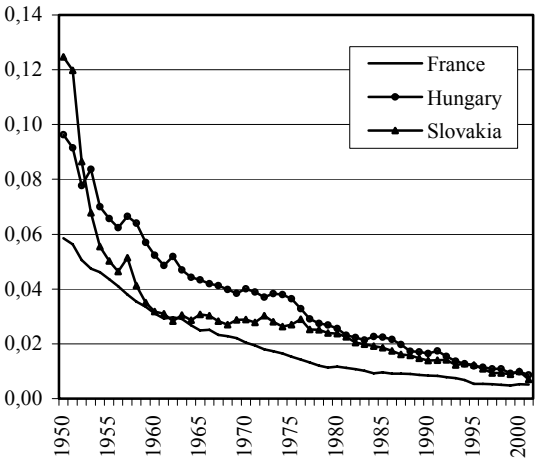
Figure 1 and 2 present the probabilities of dying in the young age groups: for newborns and for the 1–9 old people. The general trend in the last 50 years is the decline, less and less people die in these age groups.

The probability of dying among newborns is relatively high compared to the risks thereafter because of the dangers the newborn is exposed after the birth. However, a fundamental development of maternity health led to avoid or eliminate these risks substantially and led to decrease the death probabilities to a minimum level in all countries. The recent q_0 is only 5–6% of its value in 1950 in Slovakia, 8–9% in France and 9–10% in Hungary. The differences among the countries have decreased in absolute terms, but remain more or less stable in relative terms. The French probabilities were almost the half of the Hungarian and Slovakian values between 1950 and 2001. The evolution of risks is quite parallel in France and Hungary. In Slovakia, there was a period of a fast decrease until the 1960s and stagnation until the 1980s. The current levels are much lower than the probabilities in the age interval 1–9, which is also a sign of a radical improvement (Figure 1).

Deaths of children under age 10 have decreased also very significantly in all countries. The speed of the decline was, however, lower than that in case of the newborns. Hungary is an exception where the relative decrease of the risk of dying between ages 1 and 10 is higher than it is among the newborns. The French probabilities have decreased to about 13% of their values in 1950. The Slovakian risks are at the 9% level among females and 17% among males as compared to the risks observed in 1950. In general, development of child care, implementation of child-friendly institutions, such as the maternity leave and the kindergartens (Figure 2).

Probabilities of dying among teenagers (aged 10–19) show also a declining trend, but there are different stages of development. In the first period until the 1960s one can observe a quick removal of the risks, to almost half of them in Hungary and Slovakia. An exception is Hungary where a big one-year peak occurred in 1956 which was evidently the effect of the Hungarian uprising. In the next two decades there was a slight decrease in the two former socialist countries and a remarkable increase in France. Motorization, growing influence of bad habits as smoking, alcoholism and drug consumption might be behind this stagnation period. Also increasing social differences as compared to the living conditions of children under the age of 10 might play a role. In the last 1–2 decades one can observe a step-by-step improvement and convergence among the countries.

Males



Females

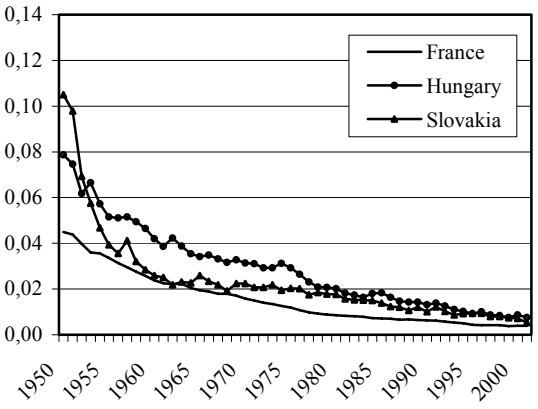


Figure 1
Probability of dying, 0 year old, 1950–2001

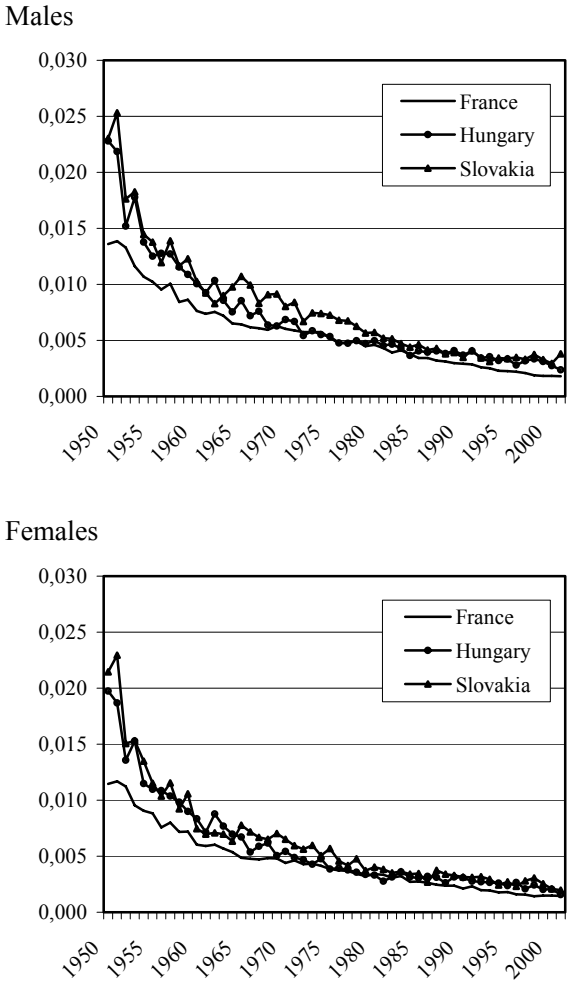


Figure 2
Probability of dying, 1–9 years old, 1950–2001

The same trends and, maybe, the same underlying causes appear in the age-group 20–29 with some exceptions and peculiarities. The stagnation period between 1960 and 1990 is much more stressed and appears to be longer than among the teenagers. The decrease of the risks is remarkable for all countries in the last decade leading to nearly same probabilities as nowadays. However, Slovakia shows a declining trend since the 1970s, while probabilities of dying

in Hungary had a slightly increasing trend between 1970 and 1990, especially among males. This latter observation is already may be connected to the special increasing trend in mortality appearing in Hungary during that time.

Opposing trends in working age groups

In the working age groups, more concretely between the ages of 30 and 70, there are three different periods regarding the three countries. Until the second half of the 1960s mortality developed parallel and the probabilities were close to each other in these age groups. In the second period (1970s and 1980s years) the countries showed separate trends. Probabilities of dying decreased very significantly in France, while growing risks of dying can be observed in Slovakia and especially in Hungary and first of all among males. It can be said that a reverse tendency appeared in mortality in Hungary and, to a certain extent, in Slovakia. The third period is the one starting in the early 1990s. The previous decline continued in France and the death probabilities in Hungary and Slovakia started to decrease, too. However, the number of observations for this latter period is too little to determine whether the differences disappear step-by-step or there will be a parallel development in the countries maintaining the recent gaps for a longer period. Figures 3 shows the time series for the age group 50–59 in the three countries by sex.

What is behind this special development leading to large differences between France and Hungary, Slovakia? We can get an answer by using different approaches. In general, one can attribute the turn in the development of mortality to the unsuccessful development of Hungary and Slovakia in the state-socialist era. Another approach would be to differentiate the causes of the increase of the risks in the latter two countries from the causes leading to the decrease of mortality in France.

In the case of France, we can start with the fact, that in the most developed countries a new stage in health conditions has developed. In human history one can differentiate four epidemiological transitions up till now. During the first transition there was a successful struggle against big pandemics, while during the second transition the infectious diseases could be controlled. The fight against the so-called degenerative diseases characterizes the third transition. Human life is limited and by the ageing of the organism more and more problems occur in its functioning. However, development of the health care may counterbalance the risk factors leading to early deaths and, as a result, bring great proportion of the newborns near to the upper limit of the human life. One can say, that this is the end of history; a further development seems to be impossible.

However, a new transition period started in the 1970s. With the improvement of the health care, prevention of diseases and due to life-style changes a

further increase of the life chances has been realized. Without radical changes in the medical causes of death life became longer and the ageing of human organism was postponed to very old ages. It seems to be really an increase in the age limit of the humans.

Let us summarize the results of this new transition period in the case of France. The probability of dying among males aged 30–39, 40–49, 50–59 and 60–69 decreased by 34, 29, 36, 40%, respectively. The decrease among females is more dramatic: 39, 36, 43, 48% in the relevant age groups.

From this point of view the increase of the differences between France and Hungary, Slovakia can be attributed to the fact that the latter countries remained in the third epidemiological transition period. The structure of medical causes of death is nearly the same; the leading cause of death is the diseases of the circulatory system followed by tumours and accidents. But the evolution and progress of the diseases are different. These occur much later and develop more slowly in France as compared to Hungary and Slovakia.

The effect of the general economic development under state socialism in Hungary and Slovakia further increased the differences. As compared to the values of 1970 the probabilities of dying increased in the Hungarian male population by 64, 73, 59 and 13% in the age groups of 30–39, 40–49, 50–59 and 60–69, respectively. The increase is the main tendency among Slovakian males, too, however the increase is smaller than in Hungary: 36% in the age group 30–39, 42% among 40–49 years old people and 14% in the age group 60–69.

Concerning the females, there is a clear tendency of the increase of the risks in Hungary in the age group between 30–59 and stagnation among women aged 60–69. However, the decrease is much smaller as observed among males. In Slovakia probabilities of dying among women aged 40–59 were practically unchanged between 1970 and 1990, while there was a slight decrease in the surrounding age groups (30–39, 60–69 years old).

As a consequence of the different paths of development the gap between France and Hungary-Slovakia increased significantly till the late 1990s. Extreme values show the relative difference of the probabilities of dying between Hungarian and French males in 1990. The Hungarian values were higher than the French ones by 84, 114, 98 and 72% in the age groups 30–39, 40–49, 50–59 and 60–69, respectively (Figure 3 for the age group 50–59).

It is important to note that the relative differences between France and Hungary, Slovakia with regard to females seem to be even higher than in the case of males. The corresponding percentages are 89, 107, 106, 116, however on a much lower absolute level than among males. The situation is the same in Slovakia.

In the early 1990s a general improvement started in Hungary and Slovakia. The increase of mortality in the respected age groups came to an end and a definite decrease can be observed. Between 1990 and 2001 the death probabilities decreased among the Hungarian males by 61, 93, 89 and 89% in the age

groups of 30–39, 40–49, 50–59 and 60–69, respectively. The decrease is nearly the same in the female population. In Slovakia, the corresponding percentages are 72, 72, 79, 88 among males and somewhat higher among females. The curves in the figures allow us to speak about a parallel development rather than about a convergence. However, the whole period is too short to determine the type of the evolution.

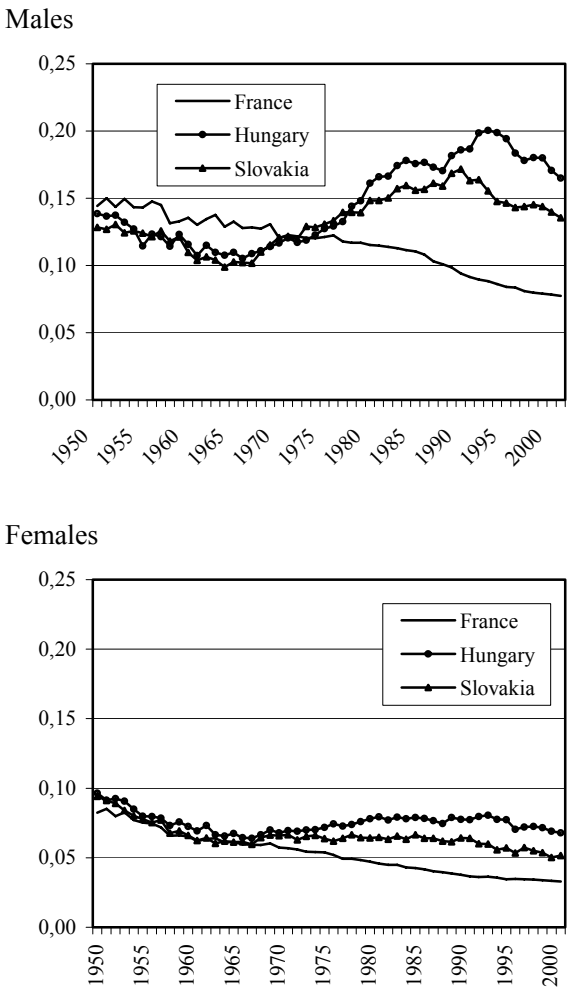


Figure 3
Probability of dying, 50–59 years old, 1950–2001

Increasing gaps in old ages

The old age mortality (mortality in the age groups 70–79 and 80–89) shows the same tendency in the analysed countries. The trends show essentially a decrease, however with a growing gap between France and Hungary, Slovakia. As an exception, a period of increase of the risks should be mentioned in Hungary and a period of stagnation in Slovakia between 1970 and 1990 in the male population aged 70–79 (Figure 4).

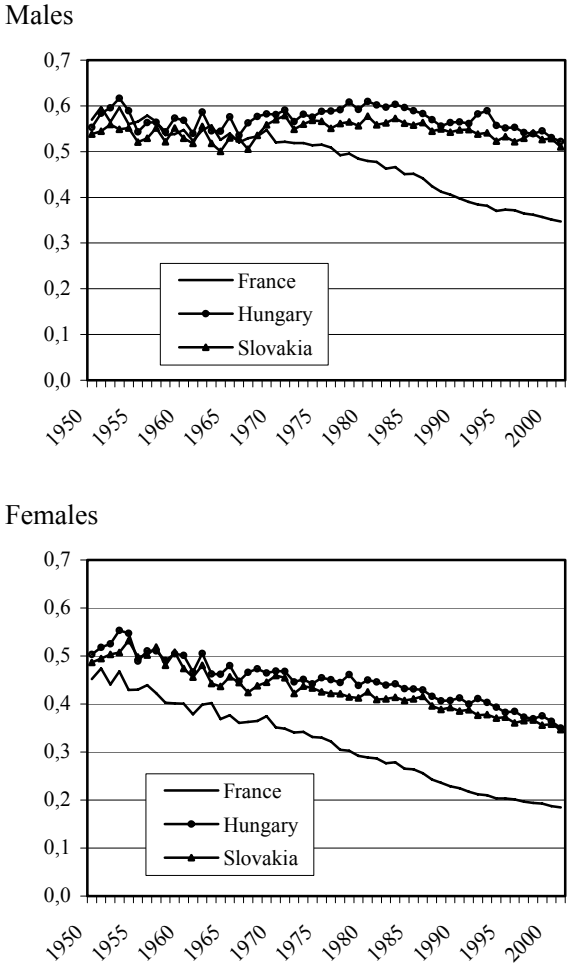


Figure 4
Probability of dying, 70–79 years old, 1950–2001

The increase of the differences between the countries is very significant. In 1970 the relative difference between the probabilities in France and Hungary among males aged 70–79 was 18%, among females 33%. The corresponding values in 2001 are 51 and 98%. In the age group 80–89 the appropriate figures are 6 and 16% in 1970, 16 and 35% in 2001, among males and females, respectively. In Slovakia the tendencies and the scales are nearly the same, because the probabilities of dying are nearly the same, especially in the latest years.

Looking the possible causes of these tendencies one can point out the same problems of development as it was mentioned in the case of the working ages. The problems in health care and general economic development hindered the decrease of mortality as compared to France. One additional element should be mentioned here. The declared full employment and the early retirement ages in Hungary and Slovakia led to a worsening situation among the pensioners, especially after the change of the regime. The number and the share of pensioners became too high. As an additional point the collapse of the economy in the early 1990s pushed millions of people in working ages to find a low but secure income in the frame of the social security system, first of all opting for an early retirement or a disability pension. As a result, a very great proportion of people receive pension type benefits now. This figure in Hungary is almost one third of the population. It is obvious that for such a huge part of the population only a relative low level of benefit can be guaranteed, taking into consideration also the low levels of employment. These all led to a situation that elderly people are less able to cope with the challenges of old ages in Hungary and Slovakia than their colleagues in France. It seems that an exchange of a complete generation of cohorts is needed to change radically the situation. Therefore one can stress that even assuming a favourable development of the new EU members in the future, a longer period is necessary for the evolution of a clear convergence in old age mortality between the countries.

Life expectancies

The development of the life expectancy at birth clearly summarizes the age-specific mortality trends described above. Starting with a significant advantage in France we can observe decreasing distances in average life duration up to the middle of the 1960s. Then, a significant progress happened in France and stagnation occurred in Hungary and Slovakia which changes are shown in Figure 5 up to the 1990s. One can observe even a decrease of average life expectancy among Hungarian males up to 1993. In the last years there was a turn in the tendencies and an increase started in Hungary and Slovakia, while in France the development has been unbroken. The recent differences are 7.3 and 5.7 years

among males, 6.4 and 5.0 among females, comparing Hungary and Slovakia to France, respectively.

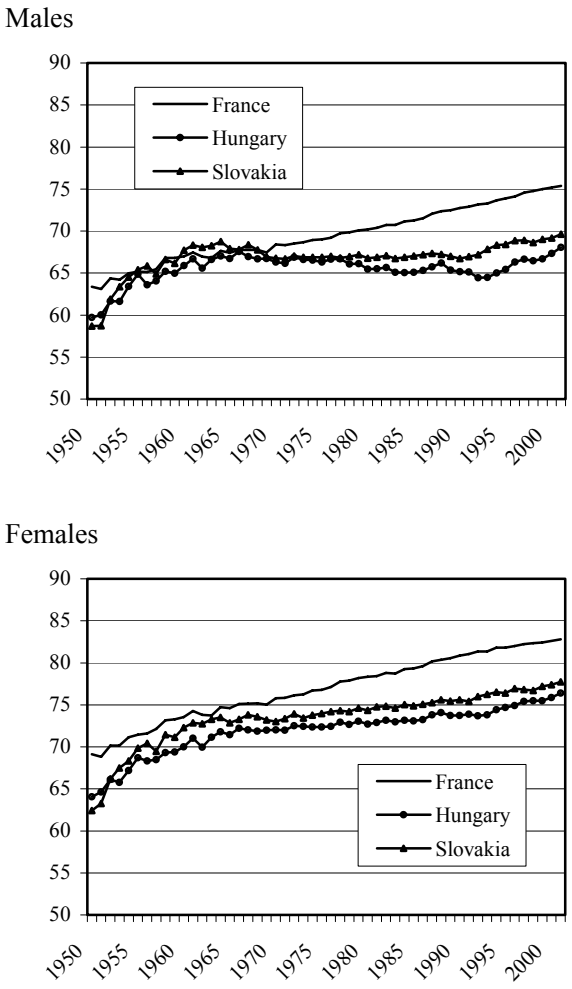


Figure 5
Average life expectancy at birth, 1950–2001

Looking at Figure 5 one can assume a parallel change in the different countries in the future. However, taking into consideration the divergent trends in

the old ages, even a further increase of the differences cannot be excluded, at least on a shorter run.

Figure 6 clearly shows this latter possibility. Since from the 1970s the distances in life expectancies at the age of 60 between France and Hungary, Slovakia have been growing. In 2001 the French people at the age 60 lived longer than their counterparts in the other two countries by almost 5 years.

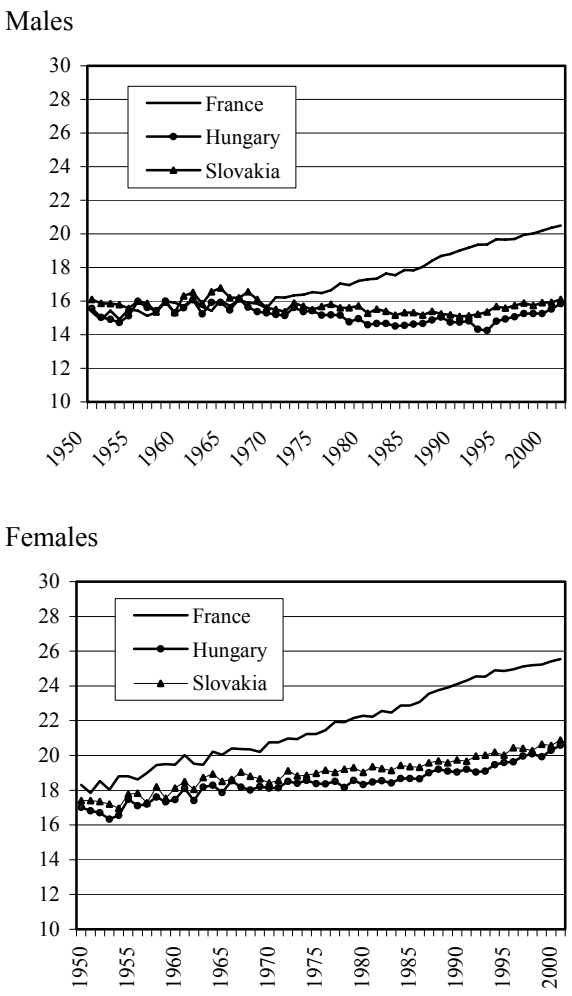


Figure 6
Life expectancy at age 60, 1950–2001

The brief analysis of mortality trends in Hungary, Slovakia and France shows that there are different tendencies looking at the different age groups and sexes. The risks of dying in the young age groups are low and close to each other in the analysed countries showing a developed maternity and child health care and a child-friendly society in the background. The situation in older ages is opposite: during the past decades very significant differences have developed in the life chances. As a result, there is large excess in French life expectancies over the Hungarian and Slovakian values.

The trends seem to be the same at least since the middle of the 1990s. However, we can speak neither about a convergence nor, in the case of the elderly people, about a parallel development. It seems that further examinations and observations are needed to draw clear tendencies for the future.

Past trends in migration

International migration is the third component of the population change. The first impact of migration is a direct increase or decrease of the population size. Usually, it is the most important effect from a demographic point of view. But there is a second, indirect influence, too. Immigrants 'produce' demographic events additionally to that of the native populations. Emigrants reduce somewhat also the natural increase of the population.

The net migration balance is the difference between the number of people who come to live in a certain country and those who leave it in a certain period of time.

The case of France is quite simple. Migration balances are positive, and they are around a yearly 50,000 persons. It is also the main assumption for the future.

The situation in Hungary and Slovakia is much more complex. Both countries belong to a group of sending countries regarding international migration until the late 1980s. During the economic transition period the attractiveness of these countries increased. It resulted in a positive migration balance, more immigrants were received than emigrants sent mainly to Western Europe. It is a real turn in tendencies in this field. One can say that it was the only positive change in population development in the first period of transition.

ASSUMPTIONS FOR THE FUTURE

The starting point for the projections is 2003 using the sex and age estimated distribution of population at the 1st of January 2003. We define then

assumptions for the three components of population changes over time: fertility, mortality and migrations.

Baseline assumptions for France

The assumption for fertility is the maintenance of the level of total fertility rate at the value of 1.8 after 2000. This is the mean value observed between 1977 and 1998. The mean age at childbearing is assumed to increase a little due to the past trends, to reach 30 in 2005 (instead of 29.3 in 2000). Projected age-specific fertility rates remain thus constant after 2005.

According to the baseline mortality assumption, age-specific death rates will continue decreasing at each ages over time, following exponential past trends (estimated for the years of 1967–1997). Life expectancy at birth will then increase, from 75.2 years in 2000 to 84.3 years in 2050 for men, and from 82.9 to 91.0 years for women. In 2003, projected life expectancies are respectively 75.8 and 83.5 for males and females.

The baseline assumption for migrations consists in projecting a constant annual net-migrations balance (immigrants minus emigrants) of 50 000 inhabitants (50% females, 50% males). Age patterns for males and female are the ones observed during the years 1990–1999 (census data).

Assumptions for Hungary and Slovakia

Fertility assumptions for Hungary and Slovakia

Two scenarios for fertility development have been set up: the "*fertility convergence assumption*", where Hungarian and Slovakian fertility patterns will be similar to the French one in 2025, and the "*fertility differential assumption*", where fertility rates and age at motherhood will increase in Hungary and Slovakia, but will remain lower than in France up to the end of the projection period.

From a demographic point of view the above assumptions have two characteristic features. First, in all transition countries in Central and Eastern Europe, i.e. in the former socialist countries, one can observe a dramatic fall in fertility during the 1990s. According to various analyses it is mainly due to a rapid process change in patterns of fertility. Before the transition these countries showed a so called Eastern fertility pattern, which is characterized by early marriage and low age at childbearing. After the change of the regime in the early 1990s fertility pattern in theses countries changed very significantly. Young people started postponing marriage and childbearing because of the problems of economic transformation in the first period and due to an adjust-

ment to the challenges (e.g. extended period of education) later. By that time older generations in fertile ages following a previous fertility pattern had practically finished the childbearing period of their life. This twofold effect made period fertility and the annual number of births to fall in spite of the presence of large generations in fertile ages in several countries.

The process of fertility change described above has the consequence that, after new generations 'fulfill' fertile age groups, a new fertility pattern will develop with definitely higher age at childbearing, but unknown number of children. The length of the adjustment period may be 2–3 decades, the final age-pattern may be similar in the countries, but the final level of fertility will depend on more factors (fertility differentials, socio-economic development, etc.).

The two assumptions on fertility used in our comparative projections have in common the fact that the low level of present fertility in the two countries is more or less temporary. We assume, that levels of fertility, after an adjustment period, will increase in both cases, up to 2025, and then will remain stable. The two assumptions differ in the level of fertility and the mean age at childbearing reached.

Convergent assumption

The estimated total fertility rates in 2003 are 1.27 for Hungary and 1.15 for Slovakia. These values and the estimated annual number of births correspond to the expected 2003 figures in both countries.

Following the past trends the total fertility rate will develop below the current level for some years. In case of Hungary TFR will be around 1.27 in the next 3 years, in Slovakia it will decrease to 1.11. The 'critical level' of 1.3 will be reached again in 2008 in Hungary and 2013 in Slovakia. There is a step-by-step progress toward the target level of 1.8 being the same for all countries in 2025 (Figure 7).

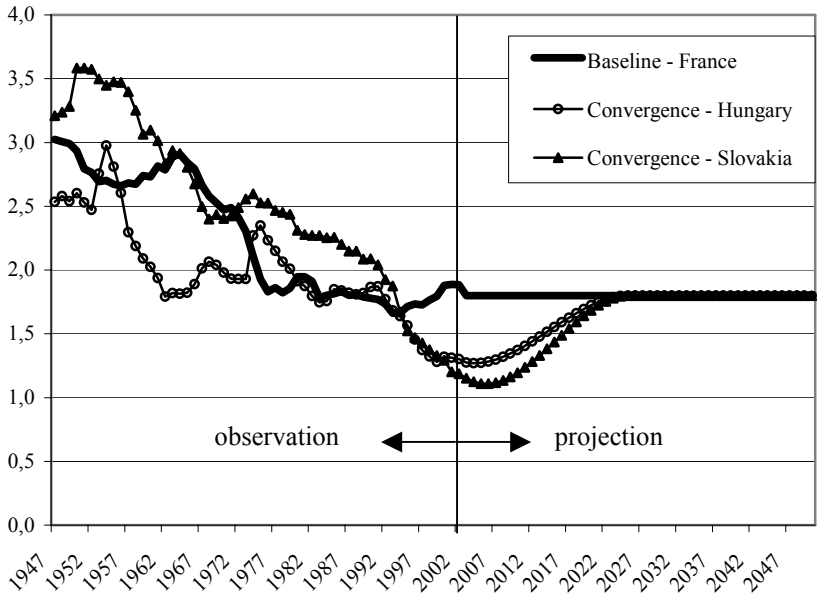


Figure 7
Total fertility rate between 1947 and 2047
Baseline scenario for France, convergence scenario for Hungary and Slovakia between 2003 and 2047

Concerning the mean age at childbearing its starting values in 2003 are 29.8 years in France, 28.0 years in Hungary and 27.2 years in Slovakia. After a gradual convergence in 2025 the values become the same: 30.0 years. There is a convergence not only in the mean age, but also in all ages. Fertility rates at each age will be the same in the analysed countries according to this scenario (Figure 8).

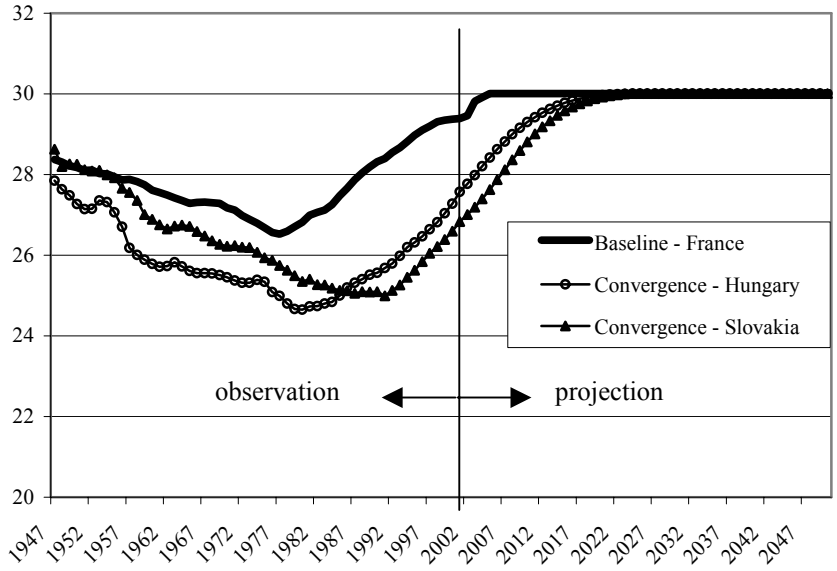


Figure 8
Mean age at childbearing between 1947 and 2047
Baseline scenario for France, convergence scenario for Hungary and Slovakia between 2003 and 2047

For a more complex view of the effects of our assumptions on the fertility development we can estimate the cohort-completed fertility, i.e. the final average number of children in the subsequent birth cohorts of women. It can be said, that this is the most important indicator for interpreting the future perspectives of fertility in the countries.

Starting with the female cohort born in 1932 one can point out the big difference between Hungary and the two other countries. While in France and Slovakia the fertility levels of a number of cohorts (born up to the late 1960s) were over or around the replacement level (which is about 2.1 at present mortality conditions), in Hungary it was clearly below this threshold. This low fertility period seems to be the main cause of the early population decrease starting in Hungary in the early 1980s (Figure 9).

Completed fertility of the cohorts born at the end of the 1960s (these cohorts have practically finished their childbearing period) is about 2.0, very close to each other in all three countries. However, after these years of births the trends diverged in France, Hungary and Slovakia. While in France there will be only a

gradual decrease of the completed fertility, in the latter countries the observed and projected rates show a fertility fall in the cohorts born in the 1970s. One can point out that these cohorts faced the challenges of the first period of socio-economic transformation in their most fertile ages regarding the former fertility pattern. In other words, these are the pioneers also from a demographic point of view.

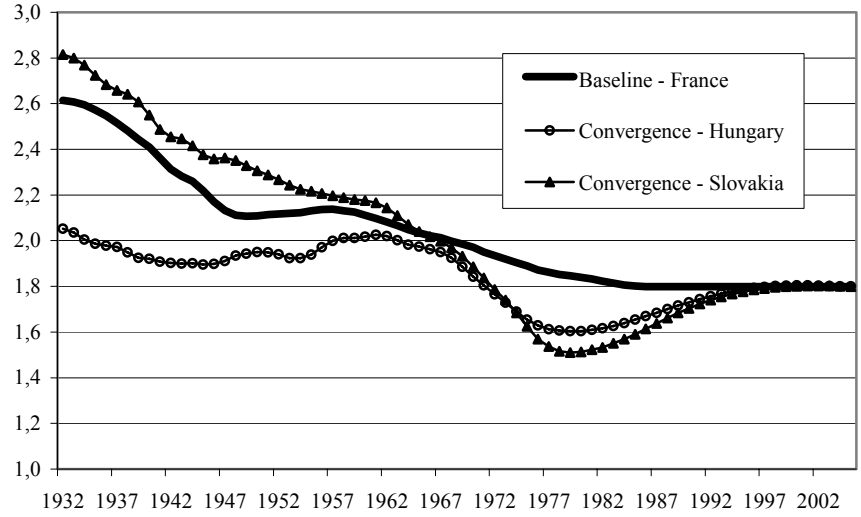


Figure 9
Completed fertility in the female birth cohorts born between 1932 and 2002 Using baseline scenario for France, convergence scenario for Hungary and Slovakia for non-completed cohorts

In both countries the cohort born in 1979 shows the lowest final number of children, 1.6 in Hungary and 1.5 in Slovakia. According to the convergence assumption the completed fertility shows a consolidation in the cohorts born in the 1980s and 1990s reaching 1.8 in the youngest cohorts. However, this is purely comes form the assumption, the real future is not clear.

Non convergent assumption

In this case the past trends show a total fertility rate being below the current level for a longer period than in the convergence scenario. In the case of Hungary TFR will be around 1.27 in the next 5 years, in Slovakia it will decrease below 1.1. The 1.3 level will be reached again in 2010 in Hungary and 2017 in

Slovakia. After this time the 1.5 target level will be reached in both countries till 2025. It means that there will be a difference of 0.3 between France and Hungary, Slovakia. In other words we assume that 30% of women will have one more child in France as compared to the other two countries (Figure 10).

According to the assumption the mean age at childbearing will be different, too. Nowadays French women give birth to their children on average when they are 29.8 years old. This is almost 2 years higher than in Hungary and 2.6 years higher than Slovakia. According to these assumptions the differences should decrease by half until 2025 (Figure 11).

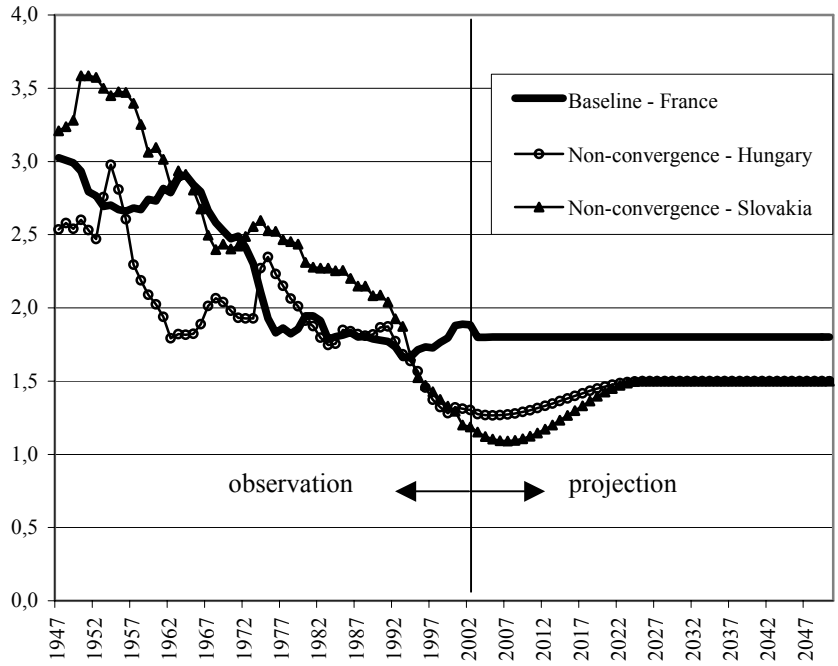


Figure 10
Total fertility rate between 1947 and 2047
Baseline scenario for France, non-convergence scenario for Hungary and Slovakia between 2003 and 2047

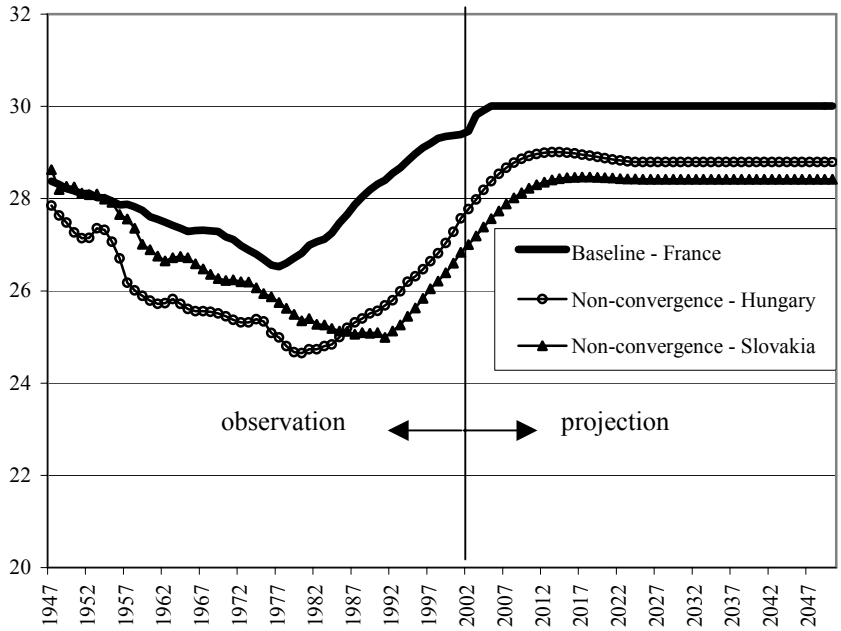


Figure 11
Mean age at childbearing between 1947 and 2047
Baseline scenario for France, non-convergence scenario for Hungary and Slovakia between 2003 and 2047

Concerning the age-specific fertility rates, they will also be different in the non-convergence case. They show a clear further postponement of the births in Hungary and Slovakia between 2000 and 2025. However, neither the height nor the average age projected for France will be reached in Hungary and Slovakia. (Figure 12)

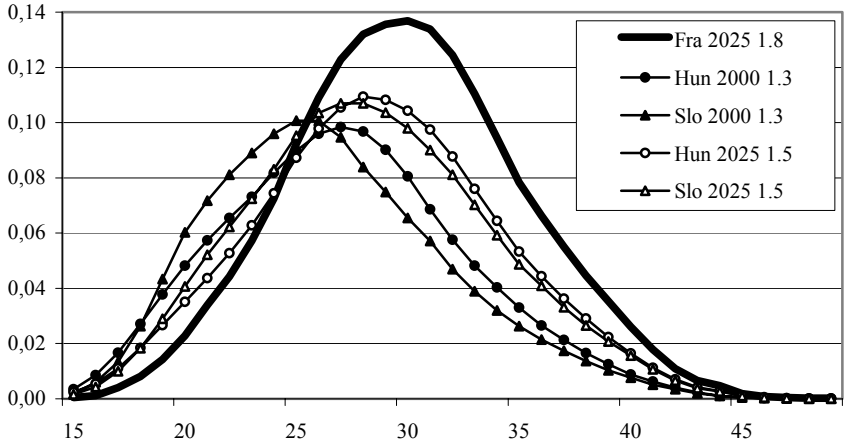


Figure 12
Age-specific fertility rates, 2000, 2025
Baseline scenario for France, non-convergence scenario for Hungary and Slovakia between 2003 and 2047

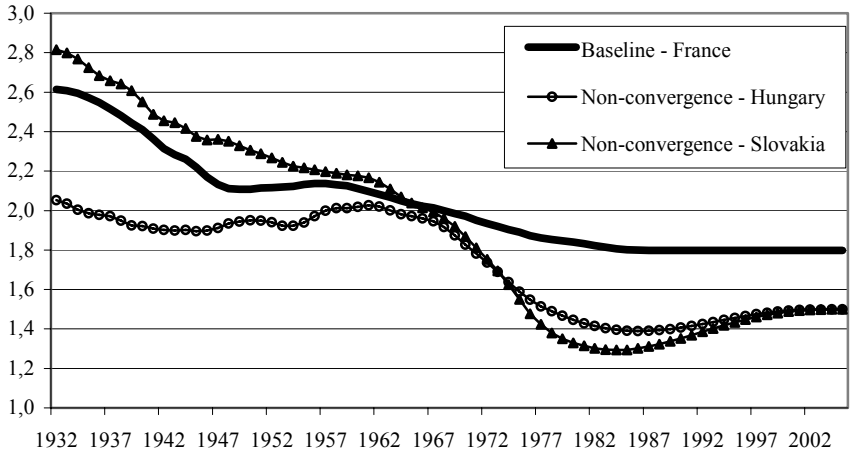


Figure 13
Completed fertility in the female birth cohorts born between 1932 and 2002
Baseline scenario for France, non-convergence scenario for Hungary and Slovakia for non-completed cohorts

Looking at the cohort completed fertility; one can clearly observe the assumed different pattern between France, Hungary and Slovakia (Figure 13).

In the latter countries the observed and projected rates show a fertility fall in the cohorts born in the 1970s and only a little improvement in the cohorts born afterwards. It means that Hungary and Slovakia will have severe adjustment problems in the future according to this scenario.

Mortality assumptions for Hungary and Slovakia

Life expectancy at birth is supposed to increase over time according to both mortality assumptions. The increase is smaller according to the pessimistic mortality scenario: about 4.5 years lower for females in 2050, and 5.5 to 6 years for males.

Table 1
Projected average life expectancy at birth, from 2000 to 2050

	Males			Females		
	France	Slovakia	Hungary	France	Slovakia	Hungary
Optimistic assumption for Hungary and Slovakia						
2000	75.2	68.7	66.9	82.9	76.9	75.4
2020	79.2	74.4	73.5	86.7	81.9	81.1
2050	84.3	83.0	83.1	91.0	89.5	89.4
Pessimistic assumption for Hungary and Slovakia						
2000	75.2	68.7	66.9	82.9	76.9	75.4
2020	79.2	72.3	71.2	86.7	80.3	79.4
2050	84.3	77.5	77.0	91.0	85.1	85.0

Migration assumptions for Hungary and Slovakia

The most important event in the development of international migration in Slovakia and Hungary has been the accession of these countries into the European Union. Currently it is very hard to estimate the impact of this fact.

When estimating the future development of international migration in Hungary, historical roots and ethnicity have to be stressed. It is assumed that the majority of migrants will come to Hungary from neighbouring countries, with the high share of migrants with Hungarian ethnicity. In Slovakia there are still strong migration links to the Czech Republic, which formed, together with the Slovak Republic, a common state for more than 74 years. It can be predicted that this trend will continue.

However, the migration from Slovakia and Hungary to more developed countries will continue due to differences in the standard of living, income and unemployment rates between the receiving and sending countries. Currently, when several countries from the former EU-15 member countries applies restrictions in employing citizens from new EU member countries, it is difficult to estimate the scope of future emigration from Slovakia and Hungary. However, it is likely that the development of emigration from these countries won't be as dramatic as it has been initially assumed.

On the contrary, it seems that Slovakia and Hungary will be target countries for an increasingly higher number of migrants coming from poorer countries Nevertheless, the basic migration flows will be determined mainly by the development of the international political situation.

The target values of net migration expressed in absolute terms for 2025 have been suggested for the particular countries as follows:

Table 2
Target values of net migration (persons), 2025

	Baseline scenario	Scenario 1 (optimistic scenario)	Scenario 2 (less optimistic scenario)
France	50 000	–	–
Hungary	–	20 000	15 000
Slovakia	–	10 000	5 000

Set of scenarios for Hungary and Slovakia

A scenario is a combination of assumptions on fertility, mortality and migration. For each component, 2 assumptions are investigated. As a result, we have a set of 8 scenarios. Two ones will be preferred, Scenario n° 1 and 7 (Table 3).

Table 3
Eight scenarios for Hungary and Slovakia

Fertility	Mortality	Migration	Scenario n°	Name
Convergent	optimistic	optimistic	1	"integrating"
Convergent	optimistic	less optimistic	2	
Non convergent	optimistic	optimistic	3	
Non convergent	optimistic	less optimistic	4	
Convergent	pessimistic	optimistic	5	
Convergent	pessimistic	less optimistic	6	
Non convergent	pessimistic	optimistic	7	"stagnating"
Non convergent	pessimistic	less optimistic	8	

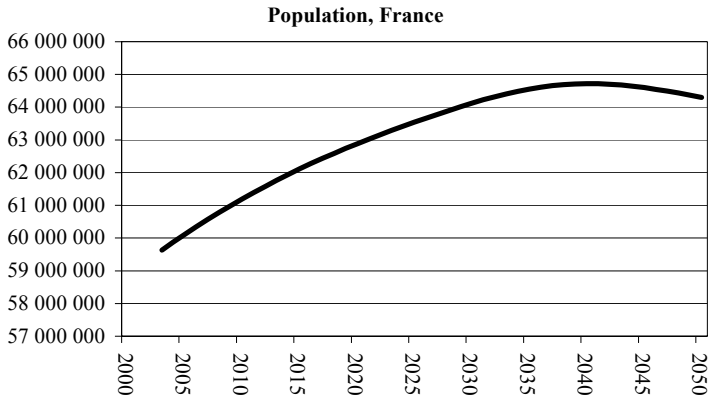
RESULTS OF THE SCENARIOS

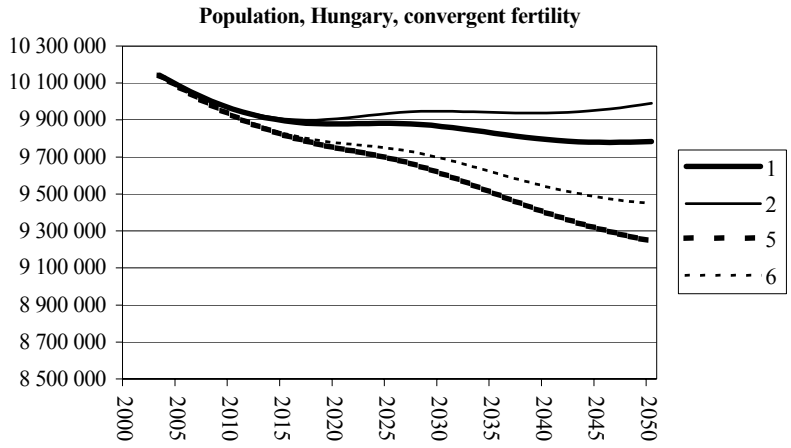
Population size

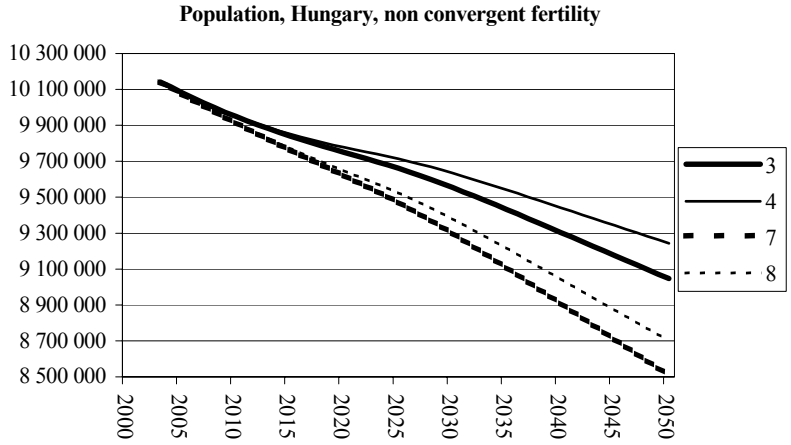
The development of the populations in the three countries showed significant differences in the past and therefore they were in different stages at the beginning of the projection period, too. The population of France increased continuously in the last decades; the population of Slovakia gradually moved toward zero growth; the population size of Hungary has been decreasing since 1980. It seems that these demographic precedents influence also the future of the populations and the different historical development also appears in the outcomes of the projections until 2050.

According to the projections, if assumptions applied for fertility, mortality and migration prove to be right, the population size in France will increase more and more slowly but continuously and will reach its maximum value of 64.7 million people. In the next period it will decrease till the end of the projection period. In spite of the decline, the population size will be 64.3 million people, which is higher by 4.8 million people as compared to 2003.

The population in Hungary and Slovakia show a various picture depending on the assumptions. For both countries, Scenario 2 leads to the highest and Scenario 7 the lowest population figure. In the case of Slovakia, it means a population size between 4.7 and 5.6 million as compared to the 5.4 million people in 2003. In Hungary the extreme values are 8.5 million and 10.0 million in contrast to 10.1 million in 2003. It means that only in Hungary the population size will be lower in 2050 than the recent level, even in case of realizing the most favourable projection variant with convergent fertility, optimistic mortality and high net migration.




Population, Hungary, convergent fertility
10 300 000
10 100 000
9 900 000
9 700 000
9 500 000
9 300 000
9 100 000
8 900 000
8 700 000
8 500 000
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
1
2
5
6


Population, Hungary, non convergent fertility
10 300 000
10 100 000
9 900 000
9 700 000
9 500 000
9 300 000
9 100 000
8 900 000
8 700 000
8 500 000
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2030
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8

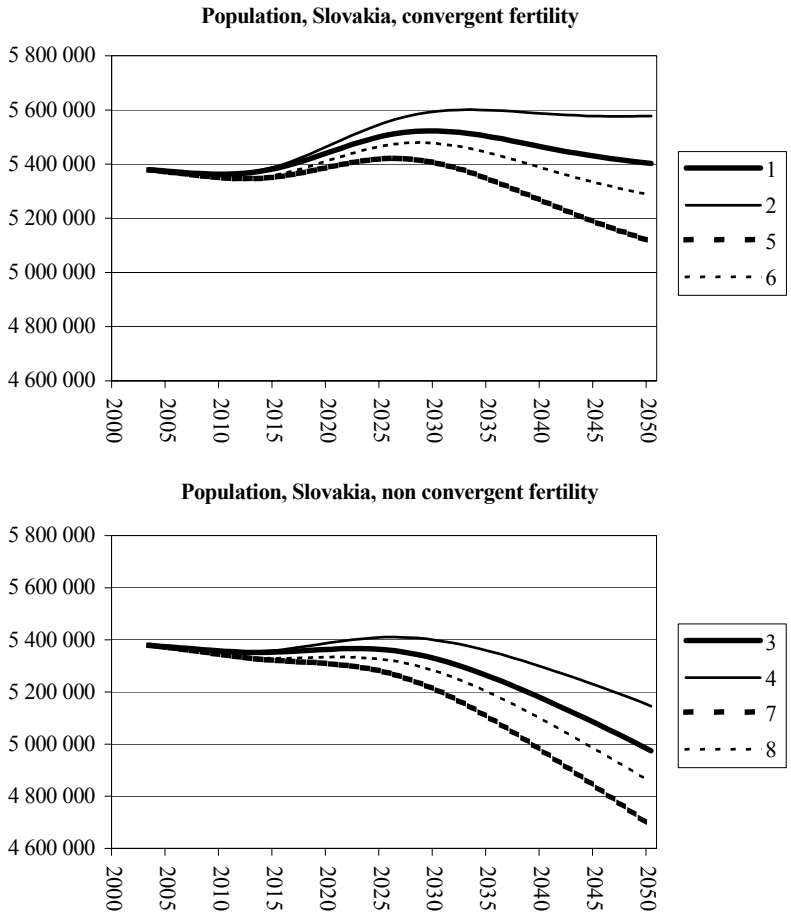


Figure 14
Projected population in the three countries between 2000 to 2050

The three components of population change play a somewhat different role in the development of populations in the three countries. The example of France shows that, even with a fertility level below replacement threshold, the population size can be maintained if fertility is stable and does not sink below a certain level. In this case an increase of life expectancy and, as a consequence, postponement of deaths in the old ages can counterbalance the smaller number of births. However, the French example shows also the limits of this type of population development. In spite of mortality improvement the population decline will start sooner or later,

if replacement fertility is not ensured on the long run. It is interesting that the lasting positive net migration does not have a decisive role in the development of the population size of France. There will be a natural increase, e.g. more births than deaths here even in the case of zero migration until 2035.

Slovakia provides a good example of a situation in which a quick and significant fall of fertility will result in a declining population even by a moderate, but steady advance in mortality. The cause behind this is that fertility falls below the replacement level suddenly and to such an extent, which cannot be counterbalanced by an upswing of mortality. Nevertheless, due to its relatively young age structure, the Slovakian population brings in itself the possibility of a later growth and migration can play a significant role in it.

The example of Hungary shows that long term low fertility accompanied by a relatively high level of mortality and low life expectancies, results in a steady and significant population decline. This situation can be changed only on the long run and only in the case of remarkable improvements in all components. Scenario 2 outlines this latter possibility where the population figures will be more or less stable in the projection period with a slight increase in the 2020s, but with a population size in 2050 less than it was in 2003.

It is interesting and instructive for both countries that the shift of fertility to the recent French level (convergent assumption) would play a more important role in the future population development than the optimistic mortality assumption with an increase of life expectancy at birth even above the French level. *The example is that the convergent fertility and the pessimistic mortality leads to a more favourable population size and age composition for both countries than the variant with non-convergent fertility and optimistic mortality*. In numbers, if there will be shift in period fertility to 1.8 from the recent 1.2 level in Slovakia and 1.3 in Hungary, its return will be higher in demographic terms than in the other case with the 1.5 fertility target, irrespective of the mortality changes. On can compare Scenarios 3 and 5 and Scenarios 4 and 6 to prove it.

Role of international migration and the share of immigrants in the total population develop in the countries differently. In March 1999 4.3 million immigrants were counted in France, 7.4 percent of the total population. According to the assumptions 2.5 million immigrants will be added to the French populations up till the end of the projection period. It means that about 7.0 million people born abroad will live in France in 2050, more than 10 percent of the population. However, this proportion does not appear to be high in an international comparison, although net migration would account for already more than the half of the 4.7 million population growth in the next decades.

In the case of Slovakia the picture is somewhat different. Depending on the low and high assumption of net migration the country will receive migrants between 195,000 and 370,000 until 2050. That time immigrants would amount 4–7 percent of the total population. *According to the scenarios international migration*

will be the 'driver' of population change in Slovakia. If the population will increase due to a combination of assumptions, then the source of the growth is international migration definitely. In Scenario 6 the factor of long-term stabilization of population size between 5.3 and 5.4 million is also the positive net migration. In other variants migration counterbalances population decline.

The situation of Hungary is specific regarding international migration. Although there is a migration gain between 650,000 and 825,000 depending on the assumptions until 2050, the population decrease cannot be stopped. The proportion of immigrants is 1.0 percent of the total population now. Due to the inflow assumed one can estimate the proportion of people of foreign origin to be between 7.5 and 10.5 percent. The population size of Hungary will be lower than the recent level in every variant. *Therefore immigrants have an important role in moderating the population decline and maintaining the population size between 9.0 ad 10.1 million or, in case of the least favourable case, to keep the population over 8.0 million*.

Ageing

Ageing of population is a process which is typical for all advanced countries of the world. It is related also to all European countries; however, its intensity is not the same throughout Europe. In principle it can be said that population in the former East block is younger and the process of demographic ageing has not reached the levels of Western, Northern and Southern Europe. The reason lies in the different course of reproductive processes in the politically divided Europe in the second half of the 20th century. The social conditions in both political blocks were so different that in the course of four decades significant differences arose in reproductive and family behaviour. If we take into account also the natural historical and cultural influences, we can formulate a full picture of the demographic differences in Europe for the last half-century. Thus, differences in the age structure of population are the logical consequence of the different trajectories of demographic processes.

The age structure of the Slovak population is typical for countries of the former socialist countries, while French and Hungarian age structures cannot be marked as typical representatives of their respective regions. France due to one of the highest fertility in Europe during the last ten years has, according to West-European conditions, a relatively young age structure. On the contrary, Hungary belongs to countries with the oldest age structure. The decrease in fertility in Hungary started earlier than in other former socialist countries. Due to the above-mentioned demographic development the values of the mean age of population started to be closer in France and Hungary and currently they differ only negligibly. In contrast, Slovakia, which until the end of eighties

belonged to countries with the highest fertility in Europe, has a lower mean age of population in comparison to other countries.

Table 4
Age structure in 2003[2]

Country	Age group (%)					Mean age	Ageing index	Dependency ratio	Index of economic burden
	0–19	20–44	45–64	65+	85+		65+/0–19 (%)	65+/20–64 (%)	(65+ + <20)/20–64 (%)
France	25.1	34.5	24.0	16.3	1.9	39.2	64.9	27.8	70.7
Hungary	22.5	35.3	26.8	15.4	1.0	39.6	68.5	24.7	60.9
Slovakia	26.0	38.3	24.0	11.6	0.7	36.6	44.6	18.6	60.3

When assessing the age structure by the ageing index[3], the highest values are currently reached by Hungary; Slovakia is well behind France being the second in the row. The higher value of the ageing index in Hungary relative to France is caused mainly by a lower representation of elderly in the Hungarian population. This is the consequence of differences in the development of mortality. In a European context Hungary has an unfavourable level of mortality and, while, France belongs to countries with the most favourable mortality conditions. The lower value of the ageing index in Slovakia is caused mainly by a relatively high share of children and young people.

The situation in Hungary and in Slovakia is similar only in terms of the economic burden of the productive population with regard to the non-productive population.[4] Currently in both countries there are approximately 60 people of non-productive ages per 100 inhabitants of productive ages. In France, thanks to higher fertility and lower mortality, the economic burden of population is approximately 10 percentage points higher as compared to Hungary and Slovakia (approximately 70 people of non-productive ages per 100 inhabitants of productive ages).

Changes in the age structure of population according to the projections

If the assumptions prove to be right, the situation regarding the age structure of the analysed population will change quite remarkably until 2050. The proc-

[2] Estimate based on projection.

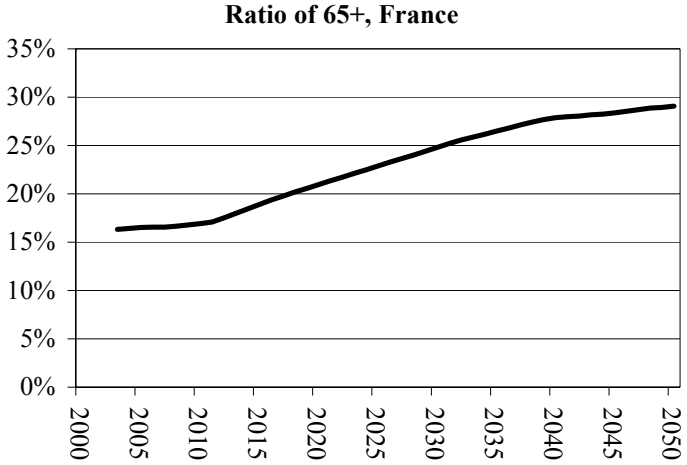
[3] Ageing index expresses the number of people aged 65 years and over per 100 inhabitants aged 0–19 years.

[4] Index of economic burden expresses the number of population in non-productive ages (0–19 years and 65 years and over) per 100 inhabitants in productive age (20–64 years).

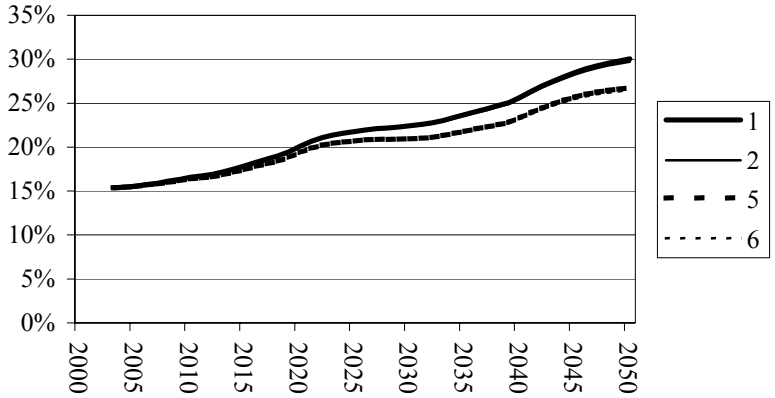
ess of ageing will continue in all three countries, however, its intensity in particular countries will not be the same. *The differences in age structure between France, Hungary and Slovakia will gradually diminish. A relatively low sensitivity of the age structure to changes in reproductive behaviour confirms that ageing processes are irreversible in advanced countries in the next decades*.

At both ends of the age interval the same development is expected in each of the analysed countries – a gradual increase of the share of the elderly population and a continuous decrease of the share of children and young people. However, the intensity of these processes will not be the same, the most intensive process of ageing will occur in Slovakia. In addition the population development in the middle age groups will not have such an unambiguous common trend in all countries analysed.

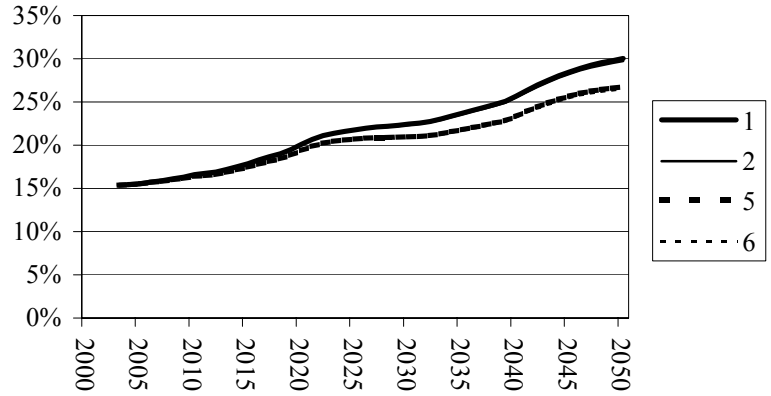
Until 2050 the share of population aged over 65 years will dramatically increase in all three countries; this proportion will be about 30% at the end of the projection period. In France this means an increase by nearly 80%, in Hungary 70% to 100% depending on scenarios, and in Slovakia, the ratio of elderly will be 2.5 to 2.9 times as high as in 2003. The very old population (over 85 years) will represent in 2050 in France 7.5% in the total population. It is 4 times as high as the value in 2003. In Hungary the share of the very old population will increase by threefold to sevenfold depending on the different scenarios and in Slovakia even by six-tenfold. This share will be in general lower then the French one, and it will reach the value expected for France only for the scenario assuming a relatively low fertility (TFR=1.5, non-convergent scenario) and relatively high mortality levels (pessimistic mortality scenario). The reason is the lower mortality in France which the remaining two countries will reach only step-by-step (Figure 15).



Ratio of 65+, Hungary, convergent fertility



Ratio of 65+, Hungary, non convergent fertility



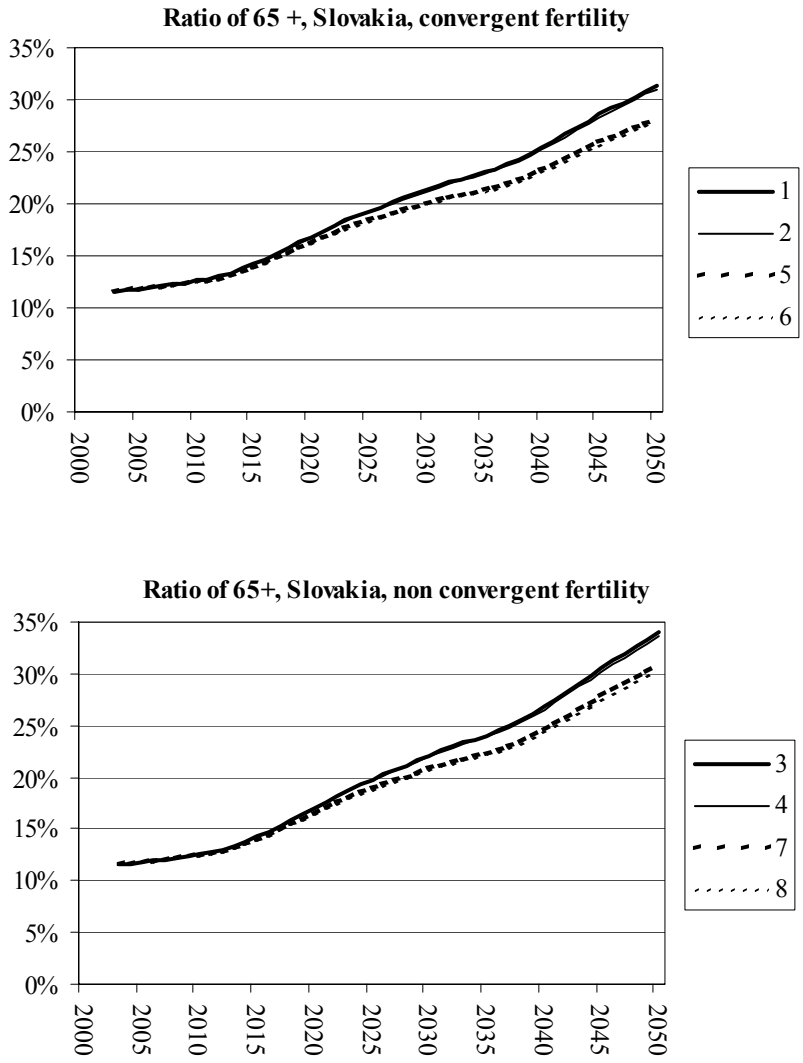


Figure 15
Evolution of the ratio of people 65+ years old until 2050 (%)

It is most likely that by 2050 the share of young people between 0–19 years of ages will reach the 20% border only in France. In Hungary it will be around 16–17% in the case of convergent fertility and 19–20% in the case of non-

convergent fertility. In Slovakia, it will be 1 percentage point lower than in Hungary. All three countries will experience a decrease in the proportion of young people. The lowest decrease is expected in Hungary and the highest in Slovakia.

It is likely that the population in reproductive ages (20–44 years old) will decrease from current 34–38% down to 25–29% in all three countries. In the next ten years there will be a stagnation approximately at the current level or a slightly higher share of this age group in Hungary and Slovakia; a decrease is expected only after 2015.

At the same time it is likely that the share of population in post-reproductive ages (45–64 years) will change differently in the analysed countries differently. In France, after an initial increase, a fall and a consequent stagnation at the level of 23–24% can be expected. In Hungary, after an initial stagnation, we can expect a decrease from 27–28% down to 23–26% in 2050. The most unbalanced development can be expected in Slovakia. The share of population in this age group will increase from current 24% up to 29% and even up to 32% after 2030. At the end of projection period a decrease down to 25–27% is expected.

In France, Hungary and in Slovakia, all indicators of ageing will increase during the whole projected time period.

Table 5
Ageing index of population until 2050

Country	2003	2010	2020	2030	2040	2050
France	65	71	93	116	135	144
Hungary						
Convergent fertility (pessimistic-optimistic mortality)	68	79–80	95–100	98–108	113–129	131–155
Non-convergent fertility (pessimistic-optimistic mortality)	68	79–80	101–107	115–127	138–158	169–200
Slovakia						
Convergent fertility (pessimistic-optimistic mortality)	45	59–59	82–85	94–102	117–132	147–172
Non-convergent fertility (pessimistic-optimistic mortality)	45	59–59	88–92	113–123	146–165	193–226

The results of projection confirm two generally known tendencies – continuation of the process of ageing and diminishing of differences in the age structure of population among European countries. The process of population ageing will continue in all three countries and is irreversible in the next decades, as it is deeply linked to ageing of cohorts even born in 2003. The ageing of the population can slow down under certain circumstances. In none of the projection scenarios can we hypothesize a significant increase of the differences in the age structures between the analysed countries.

CONCLUSIONS

France is a good example how to maintain the population in a 'classical' way of reproduction/replacement. It is the dominance of fertility in reproduction which ensure the replacement, naturally in a longer run. Of course, improvement in life expectations, as well as, immigration may also contribute positively. However, the improvement of mortality only postpones the death, but the number of death increases in an ageing society. To a certain extent migration can substitute the lack of children, but cannot counterbalance the ageing process in the longer run.

The analysis of the past trends shows that there is a long-term possibility of convergence in demographic characteristics. However, there are factors hindering a quick elimination of differences. In the field of fertility the fall in the 1990s seems to be too dramatic in Hungary and Slovakia, and recently there are hardly any chances to achieve a rapid increase in childbearing. In the field of mortality the gap in old age mortality between France and Hungary, Slovakia may slow down during convergent processes. There are very significant differences in the sources of immigration, too.

The scenarios show some surprises for the future developments. The population size of France will continue its increase in the next four decades, while the population size of Hungary and Slovakia will decline. It is the ageing process, which is common in the countries. In the next period a new stage in ageing will take place. Very aged societies will develop were the share of elderly people will reach one third.

Concerning the policies the French population development demonstrates the importance and effectiveness of a well-elaborated and stable family policy. In the case of Hungary and Slovakia a convergence is needed in demographic fields in order to handle complex population issues. There are a lot to do. We have to increase the childbearing, extend the duration of life, receive and integrate a large number of migrants. All these are necessary to avoid a significant population decline and to manage the ageing process.

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