# Long-term Fertility Scenarios for the 10 New EU Member States and 2 Accession Countries

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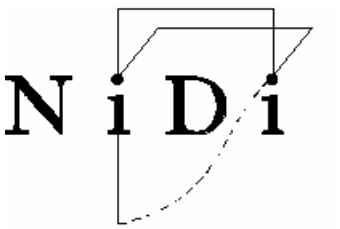
Report on behalf of Eurostat
(Tender 2002/S 67-052015/EN Lot 2)

**Draft report**

19 May 2004

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## 1. Introduction

In the summer of 2002 Eurostat launched a research project, entitled 'Compilation of long-term national and regional population scenarios for the 12 EU Candidate Countries' (call for tenders 2002/S 67-052015/EN - Lot 2). The purpose of this project is to execute for the, by then, 12 EU Candidate Countries an explanatory analysis of the changes in fertility, mortality, international and interregional migration and to compile a set of internationally consistent population scenarios by sex and single years of age, both at the national and regional (NUTS 2) level. Meanwhile, in May 2004, ten of the former Candidate Countries entered the European Union: Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic and Slovenia. The two remaining countries involved in this study, Bulgaria and Romania, are now indicated as 'Accession Countries'. Therefore the title of this project has slightly changed into 'Long-term national and regional population scenarios for the 10 New EU Member States and 2 Accession Countries'.

To keep the project well-organized, a subdivision of work has been made according to the different components of population growth: fertility, mortality and international migration. The current report summarises the outcomes of the sub-project relating to fertility. It describes the analyses of past trends and the assumptions on fertility. Ultimately, three scenarios of fertility will be formulated. In addition to the Baseline scenario, which implies more or less a continuation of past trends, a Low and High scenario will be developed, describing contrasting developments of population growth. The approach adopted in the current project is basically similar to the EUROPOP 1995 scenarios (De Jong, 1997).

This part of the project has been carried out by the Netherlands Interdisciplinary Demographic Institute (NIDI) in cooperation with the National Statistical Institute of Bulgaria.

The outline of the report is as follows: In section 2 theoretical considerations will be discussed to give a framework in which the scenarios can be placed. The general background of fertility developments in Central and Eastern Europe is described in section 3. In this section attention will be paid demographic developments as population decline, crude birth rates, total period fertility, cohort fertility, the question whether people in Central and Eastern European countries prefer one or more-child families and extra-marital births. Country-specific past trends will be outlined in section 4. Section 6, finally, covers all the information concerning the compilation of fertility scenarios, i.e. a general background of the scenarios, the key assumptions for fertility, the methodology used for constructing the national fertility scenarios and the resulting scenarios for each of the countries.

## 2 Theoretical considerations

In this section the main aspects of theories on fertility will be reviewed in order to provide a framework in which the scenarios on fertility can be embedded. This section is based on De Jong (1997; chapter 2 'Theoretical aspects of fertility change') and Sobotka (2002; chapter 4 'New Constraints, New Opportunities: Fertility Change in a Broader Perspective'). First we will discuss a number of economic theories related to fertility, that were mainly used to explain the rapid changes in the west since the sixties. These theories may become increasingly important in the new Eastern European EU countries when the positive effects of the transition to a market economy will become stronger. Next, we will briefly describe a number of socio-cultural explanations of fertility change, centering around the key-words

‘Second demographic transition’, modernization, and individualization. These theories are certainly valid for most Western European countries as well, but they are cast in the specific situation of the history and culture of the Eastern European countries. This specific situation is described by the concept of the Socialist Greenhouse theory, introduced by Sobotka.

In the last decades of the 20th century the economic model has been one of the most widely used frameworks in the study of fertility. According to the theory of the New Home Economics (Becker, 1991 and 1993), the rapid fall in fertility which has taken place in most Western countries since the 1960s, is explained by the rise in ‘opportunity costs’ of children. When a woman chooses to become a full-time mother opportunity costs can be considered as forfeited income. Since the 1960s higher educational attainment and higher labour market participation of women resulted in higher actual or potential income, and therefore in increasing opportunity costs of children.

According to the Human Capital theory (Mincer and Polachek, 1974, Becker, 1975) fertility developments are explained in terms of educational attainment. Two factors influence someone’s human capital: the accretion of new capital, for instance due to investments in education and getting work experience, and the reduction of existing capital in periods when one does not participate on the labour market and does not follow any education. The amount of human capital is one of the determinants of a person’s income. High educational attainment goes together with a large amount of human capital. Highly educated women will find it attractive to further increase their human capital by obtaining work experience to realise a high potential income. This will lead to the postponement of a first child and eventually, in some cases, to involuntary childlessness due to reduced fertility at higher ages.

Easterlin (1969 and 1975), on the other hand, did not stress the relevance of the absolute income of households, but points at the importance of the *relative* (future) income situation. Low income prospects for young people, in comparison to their parents, will lead to a small number of children, whereas relatively high income prospects will have the opposite effect. For instance, if youngsters grew up in relatively prosperous families they may develop a high level of consumptive aspirations. If these aspirations can not be met at the time they start their working career, for instance due to high unemployment levels, they may delay, or even cancel their ‘investment’ in children.

In addition to economic explanations of developments in fertility, socio-cultural theories have been developed. In this context the term 'Second demographic transition' has been used to describe the demographic developments after the year 1965, which might be seen as a turning point in demographic history (Van de Kaa, 1988; and Lesthaeghe and Verleye 1992). The rapid social and economic changes of European societies after this turning point can be characterised as a process of modernisation, which involves a shift from a manufacturing economy to a service economy. The resulting 'post-industrial society' offers opportunities for high living standards to families and individuals. Women remain longer in full-time education and participate more often in the labour market and have to face the difficult choice between 'career' and 'family'. According to Van de Kaa, the choice for a (first) child will be made if it is likely to contribute to the self-fulfilment of the woman and her partner.

Lesthaeghe and Verleye emphasize the sequence of socio-cultural developments: the second demographic transition started with an increase of divorces, followed by postponement of marriage and having children. Next, cohabitation is becoming more and more accepted, not only as a union ('paperless marriage') between men and women, but also as the proper social

union for childbearing and in the final stage, fertility at higher ages is going to rise due to a process of catching up.

A study by the United Nations (1992) also explained the fertility decline in the context of economic and social developments. Rebuilding activities after the Second World War led to an increased participation of women in the labour force. Furthermore, a desire to take a greater part in social life extended to the wish to have increased access to birth regulation. This stimulated the diffusion of contraceptive knowledge and practice. Cultural values and social norms also underwent considerable changes in the post-war years. A tendency developed towards an increased need to satisfy more material aspirations, while the importance of having additional children diminished. Women could achieve social rewards and individual satisfaction through work outside the household and the additional income gained, providing a more fulfilling lifestyle than that found in bringing up additional children.

Cruijsen (1991), finally speaks about the inevitable demographic consequences of the road to a more pluriform society with full emancipation of women, using the key-words 'individualism' and 'modernisation'. An increasing part of young European female adults are no longer able or willing to live in traditional societal and family roles. In addition he mentioned that young generations would be more materialistic and less altruistic.

Sobotka (2002) explains why Central and Eastern Europe remained relatively unaffected by the substantial changes in fertility in Western European societies in the 1970s and 1980s using the concept of the ‘socialist greenhouse’. The scheme of the socialist greenhouse is an artificial environment typical for the socialist societies of Eastern Europe until the end of the 1980s. This scheme presents a relationship between three life domains: education, career and family, with reproduction as a subdivision of the family domain. The socialist greenhouse was a system of extensive reproduction. On average women experienced more pregnancies than in other European regions, due to for instance the lack of comfortable and easily accessible contraception and the pronatalist orientation often connected with chronic shortages of the labor force. In addition, caring about family and children were amongst the most strongly emphasized life goals.

The scheme of the dissolution of the socialist greenhouse considers separately the influence of economic constraints and social change. Economic constraints refer to the economic crisis: a declining support by the social security network, unemployment, sharp income disparities and poverty. Social change refers to social and cultural changes, including ‘Westernization’, new opportunities, changes in values and attitudes and changes in the organization of labour. Although both economic and social change factors are often discussed in studies analyzing recent fertility changes in former socialist countries, there is no common agreement on how important the influence of each of these two factors is on women’s reproductive decisions. With some simplification, social change is expected to bring about a broad transformation of demographic behaviour comparable with earlier changes in Western Europe. Economic constraints on the other hand, are often thought to depress fertility levels, but to preserve the distinctiveness of previous fertility patterns. Differences in the intensity of economic constraints and unequal diffusion of new opportunities and social change in general contributed to the recent differentiation in fertility developments across Eastern Europe.

## 3. General background of fertility developments in Central and Eastern Europe

The last decade of the 20th century was marked by a significant turnover in the political systems in the Central and Eastern part of Europe. The liberalization of the society from the restrictive control systems changed long-lasting trends. The changes were so profound that they affected all aspects of social and economic life in the countries concerned.

In the second half of the 20th century the different systems in Western and Eastern European countries had led to clear differences between the West and the East, not only in the political and economic spheres but also with regard to demographic developments. The resulting pattern was one of diverging demographic trends.

Fertility trends in the countries in Eastern Europe deviate significantly from the trends found in the West. There was no baby boom at all or at most a very limited boom with a different timing. In Eastern Europe, the opportunities for a sharp increase in fertility were only limited, for example due to shifts in female employment as a result of the reorganization of the societies and economies in line with the Soviet model. Even an opposite trend was observed: fertility started to decline steadily. In the late 1960s / early 1970s several countries introduced a large variety of pro-natalist measures aiming to promote higher fertility. These measures ranged from encouraging (longer maternal leave; housing benefits for young and numerous families, family allowances, kindergarten daycare etc.) to restrictive or even punitive in some countries (limit access to voluntary abortion or contraceptives, additional taxes for non-married persons). Although fertility rates did not change significantly, these measures preserved Eastern Europe to a certain extent from the fertility decline experienced in all other European regions in the 1970s and 1980s.

Prior to the political changes at the end of the 1980s/beginning of the 1990s, the demographic trends in the former socialist countries seemed to be relatively homogeneous. This homogeneous pattern has totally changed with the start of the democratization of the societies. As the speed of the transition process differed significantly across countries, demographic developments across countries within the Eastern part of Europe started to diverge. By now, 15 years after the collapse of the Communist system there are two main questions to be asked: 1) What is the main direction between fertility developments in the 10 New EU Member States and the 2 Accession Countries? Is it towards divergence or convergence? and 2) What is the position of this group of countries in comparison with the EU-15 Member States?

In the following parts of this section, we will try to answer these questions by looking at differences between, and similarities across countries for several demographic trends.

### *3.1 Population decline*

All countries but Malty and Cyprus entered the 3rd Millennium with a decreasing population. For most of the countries this process started around or immediately after 1990. Hungary's population has been decreasing already for more than 20 years, but recently (since the mid 1990s) the speed of decrease has slowed down. Poland and the Slovak Republic, on the other hand, experience population decline only since 2000, while Slovenia's population number remains almost stable for the last 15 years. The most rapid decline, however, took place in Bulgaria. This country lost 1.2 million persons over the last 15 years, which correspond to 13.3% of its population. Also two Baltic States, Estonia and Latvia, have lost almost 13% of

its population. Conversely, population decline in Lithuania was less severe – 'only' 6.2%. This was more or less comparable to Romania's population loss, which amounted 6.9%.

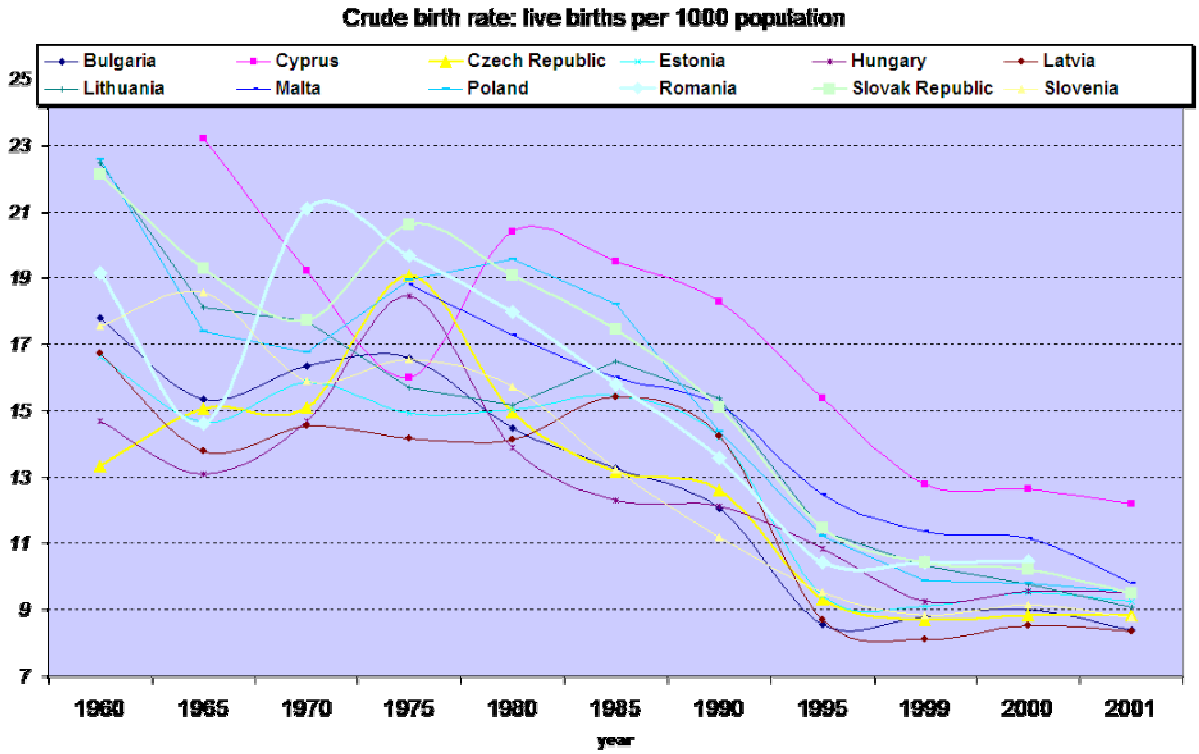
Although most countries experienced a population decline, the determinants of population decrease differ across countries: while in half of the countries the declining population is the result of both net emigration and natural decrease, the other countries, i.e. the Czech Republic, Slovenia, the Slovak Republic, and Hungary became net immigration countries. However, the net migration numbers did not compensate the negative natural increase. Post-census estimates show that besides natural change, negative net migration plays especially a significant role in Bulgaria and Romania's population decrease. This natural decrease is a major contrast with the countries of the EU-15.

### *3.2 Crude birth rates*

From 1960 onwards, the number of live births for the entire continent has continuously decreased. Similarly the Crude Birth Rate (CBR) decreased, from almost 20 ‰ to about 10 ‰.

In most of the New EU Member States and Accession Countries the CBR reduced almost twice in comparison with 1980. In Hungary and the Czech Republic, which already had relatively low CBRs in 1980, the reduction is lower. In 2002 CBRs in the 12 countries are almost uniform – between 8.5 and 9.5 per 1000. The only exception is Cyprus with 11‰.

Due to the specific social and, in some countries (Romania and Bulgaria) pro-natalistic demographic policy, by 1990 the CBR has been relatively higher in the new EU Member States and the Accession Countries than in the EU-15. After 1990 it sharply decreased, except in the two Islands. In most countries the lowest levels were found around 1995-1999, after which stable patterns were observed. Generally speaking, countries which entered the demographic transition at a later point in time (Poland, Lithuania, and the Slovak Republic), had initially higher CBRs but were confronted with faster decreases than countries who were "older" in the transition (Hungary, the Czech Republic, Slovenia and, to some extent, Bulgaria). The result is that homogeneity between countries is much higher around 2002 in comparison with 1960 (see Figure 1).




*Source: Council of Europe, 2003*

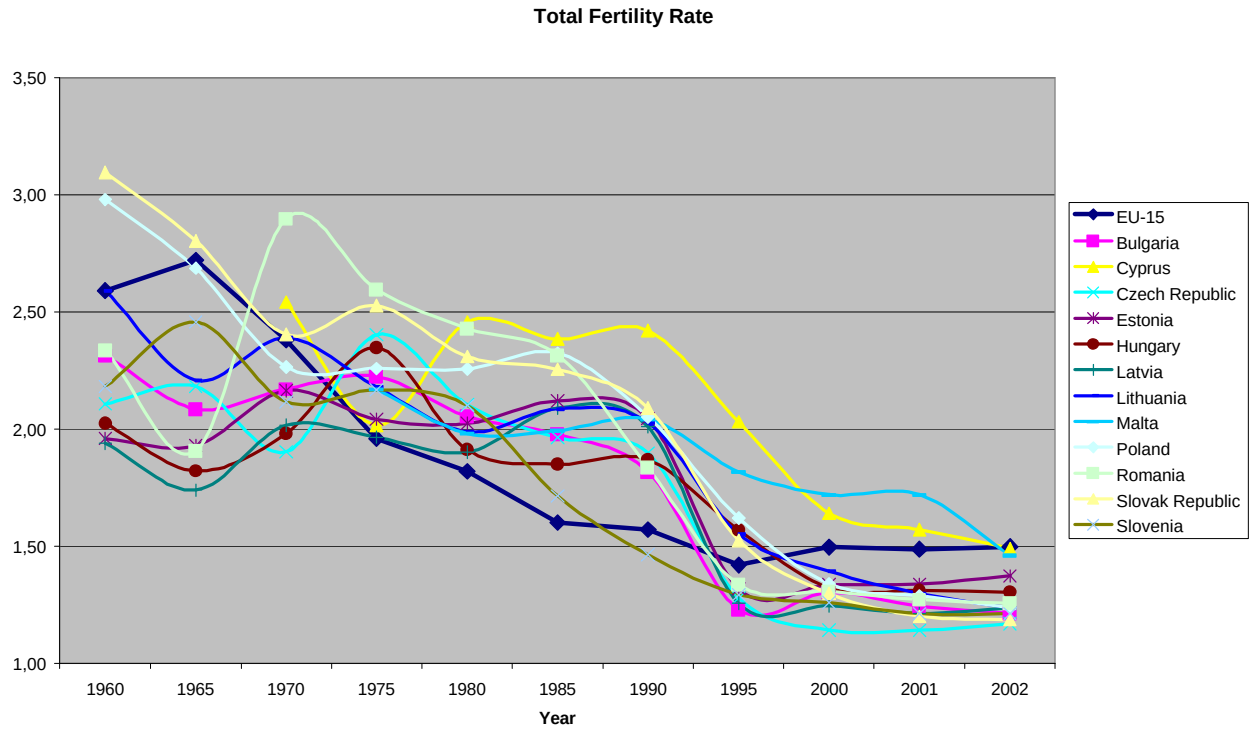
**Figure 1: Crude birth rate: live births per 1000 population, 1960-2001**

### *3.3 Period fertility*

From the 1960s onwards Total Fertility Rates (TFR) in Eastern Europe were different from the EU-15. Especially the sharp fall in period fertility in the 1990s was a distinctive feature of fertility developments in Eastern Europe (Sobotka, 2003). This steep decline in TFR in a relatively short period suggests a common reaction to the transition of the former socialist countries.

The TFR in the new EU Member States and the Accession Countries ranged from 1.9 to 3.2 in the beginning of 1960s while in the first years of the new century they group in a very narrow interval – between 1.2 and 1.4 with the exception of Cyprus and Malta (see Figure 2). The latter two countries are at the same level as EU-15's TFR but with a different trend. Both countries' TFRs continue to decrease, especially for Malta, while in the EU-15 it stabilizes around 1.5.

Poland and Romania which entered the 1980s with a relatively high TFR experienced a dramatic reduction from 2.3-2.4 to around 1.2 in 2002. By now, these countries join the group of the Czech Republic, the Slovak Republic, Slovenia and Bulgaria. However, these latter four countries seem to have reached bottom levels of fertility and tend to recover, while in Poland and Romania the declining trend continues. Hungary and the Baltic States, finally, seem to stabilize at 1.3. As regards the future scenarios, the most important conclusion derived is the clear convergence for the period 1960-2002.




*Source: Council of Europe, 2003*

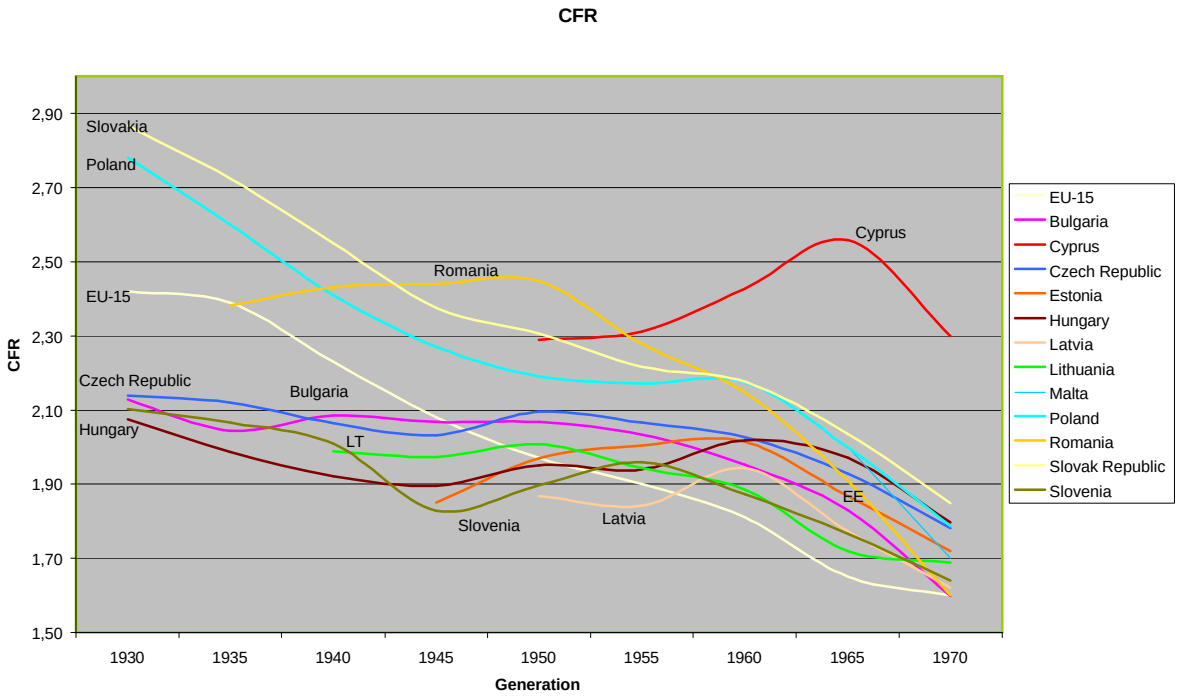
**Figure 2: Total Fertility Rates, 1960-2002**

### *3.4 Completed fertility*

Looking at generations instead of period fertility levels, all new EU Member States and Accession Countries except Cyprus are experiencing a decrease in the completed fertility rate (CFR; see Figure 3). Poland and the Slovak Republic, both coming from relatively high levels, are already for more than 40 generations above the average completed fertility level. The other countries (excluding Malta for which no observations exist) are reporting a fast decreasing average family size since the cohorts born around 1960. All countries but Cyprus are since then below replacement level.

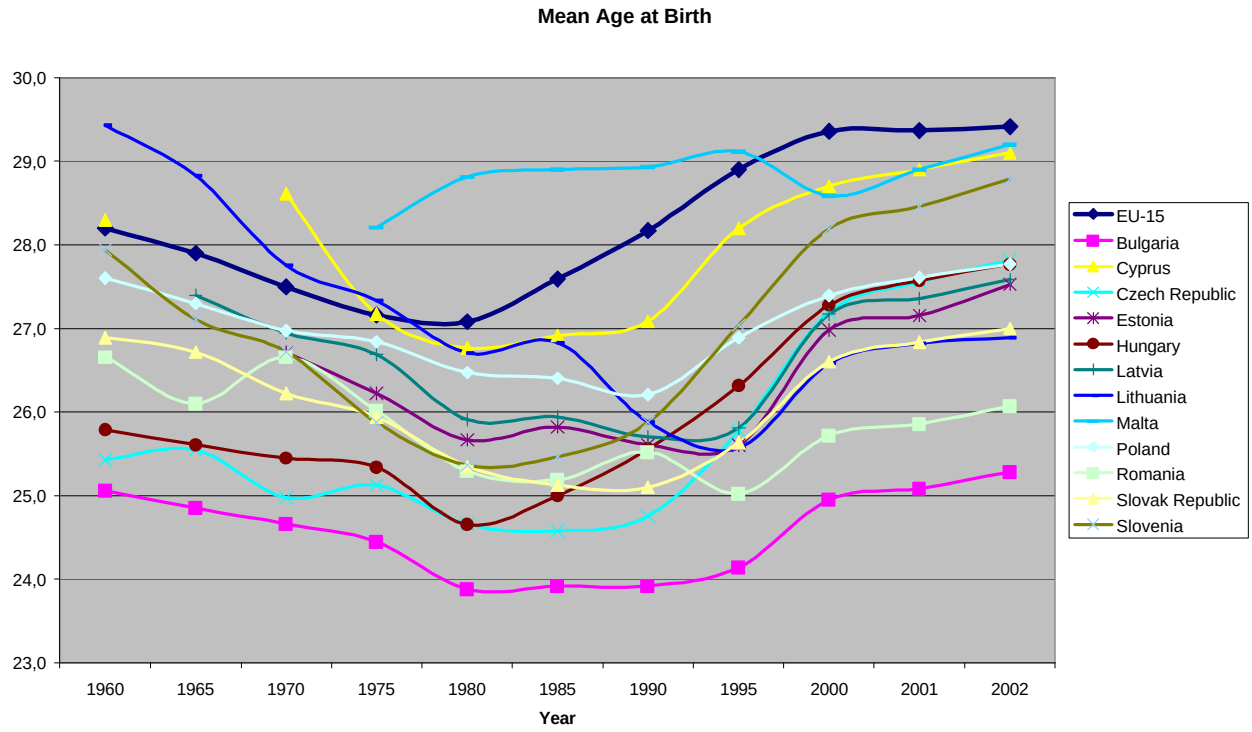
### *3.5 Mean age at childbearing (MAC)*

Developments in the mean age of the mother at childbearing (MAC) show the following trend: relatively high ages in 1960, followed by declining levels until 1980-1990, after which the MAC increased again to reach for most countries higher levels in 2002 than in 1960 (see Figure 4). In 1960 the MAC reflected a longer period of giving birth to more children per woman. Due to lower levels of fertility this indicator decreased slowly, but uninterruptedly until 1980 when the EU-15 reached the bottom of 27 years. Around 1990 Eastern Europe was still hardly affected by the rise in the mean age at childbearing which was so prevalent in the countries of the EU-15. During the 1990s, however, postponement of first births also became apparent in Eastern Europe, with substantial differences in the pace of postponement across different countries.




*Source: Eurostat Demographic Yearbook, 2004*

**Figure 3: Cohort Fertility Rates, Birth cohorts 1930-1970**




*Source: Council of Europe, 2003*

**Figure 4: Mean Age at Childbearing, 1960-2002**

### *3.6 One- or more-child families?*

In central European countries declining TFRs are largely driven by timing effects, i.e. a very strong reduction in first-order fertility rates, more than a reduction in second and higher births orders. Although many women are postponing childbearing, once they give birth to their first child, most of them decide to have a second one, showing a persistent preference for two-child families. This is in contrast to (several) countries in the EU-15, for instance in southern Europe, where the fertility decline was mostly driven by quantum effects, i.e. the refusal to give birth of higher order, which goes together with an orientation towards one-child families.

Also in Romania, Bulgaria and the Baltic States there seems to be a tendency towards the acceptance of the one-child family. This tendency, however, seems not to reflect a (widespread) preference for one-child families, but seems to illustrate that women want to have at least one child, despite the difficult living conditions (Sobotka, 2003).

### *3.7 Extra-marital births*

Most countries in the region have low Total First Marriage Rates (TFMR). This is more or less similar to Scandinavian countries. Estonia and Latvia are the lowest although recovering in the last three years. The others are still going down except Cyprus (data for Malta is missing). Poland and Romania still have relatively high TFMRs, but with a declining trend. The share of extra-marital births follows the same pattern. Bulgaria, Estonia and Latvia have more than 40% live births outside marriage and Slovenia is close to that level (see Figure 5).

This uninterrupted increase coincides with the present-day trends of postponing or refusal of marriage and also of giving birth to less children but at a later age. On the other hand the number of illegitimate children is continuously increasing from 5.0 % in 1965 to 28 % in 2002. These developments show a continuous change of the classic forms of growing children in the traditional family to single parent families or living in cohabitation. Obviously, the role of the traditional family with respect to giving birth has changed.

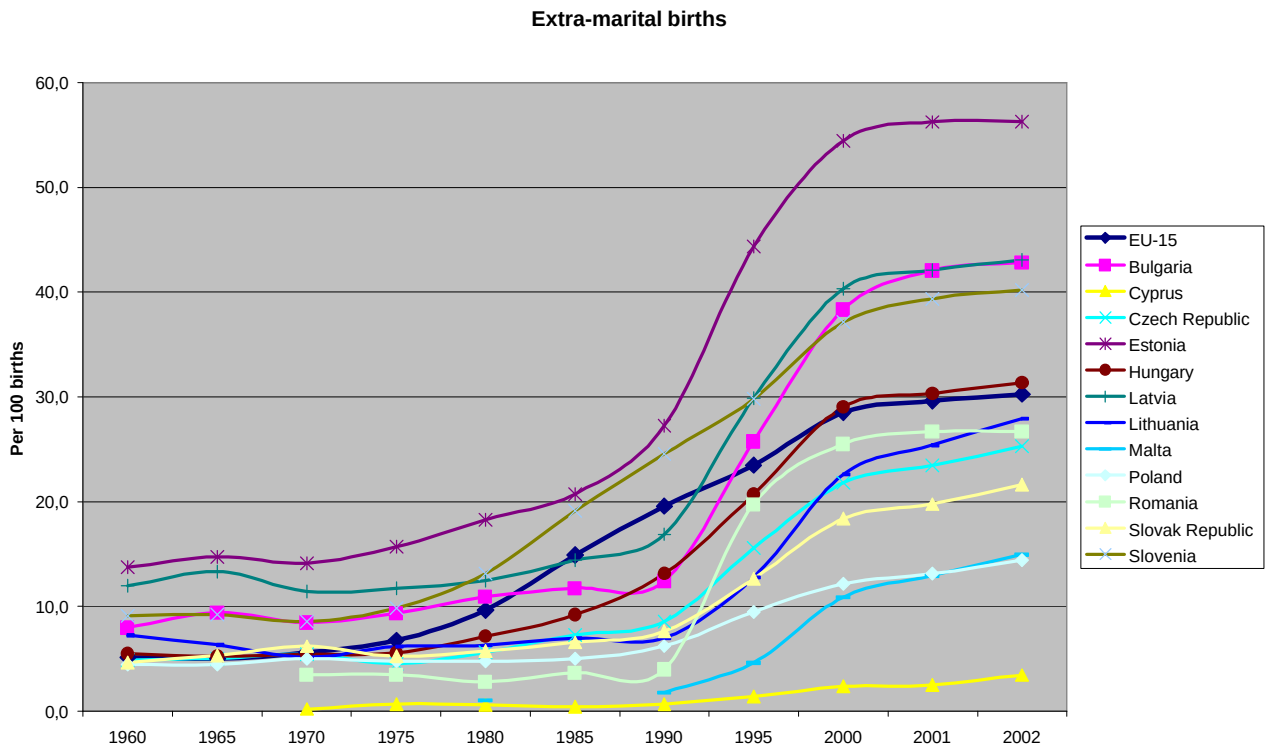



**Figure 5: Extra-marital births, 1960-2002**

## 4. Country-specific trends

In addition to the general background of fertility developments in Central and Eastern European Countries, in the current section developments will be discusssed on a country-by-country basis.

Bulgaria

Fertility indicators in Bulgaria had moderate levels in the beginning of the 1960s. The live birth rate has been decreasing within the interval of 17.8 ‰ in 1960 to 12.1 ‰ in 1990. From 1990 onwards, a significant decrease occurred resulting in a level of 8.5 ‰ in 2002. The TFR declined from 2.31 in 1960 to 1.81 in 1990 and even more to 1.21 in 2002. Cohort fertility decreased from 2.11 children per female in 1945 to 1.87 in 1963.

According to data on the relative share of illegitimate births, Bulgaria is near the average for the rest of the European countries. This share has increased from 8 % in 1960 to 12.4 in 1990. A sharp increase took place after 1990, reaching a share of 42.8 % in 2002.

Cyprus

Fertility indicators for Cyprus during the 1960s have been one of the highest in Europe. Since then, however, they constantly decreased. Nevertheless, also in 2002 Cyprus has relatively high fertility indicators: the TFR-2002 is around 1.5, while the CFR-1965 is 2.4. Another specific characteristic of Cyprus is the very low relative share of illegitimate children - only 2.3 % during 2002.

Czech Republic

Birth rates of the Czech Republic during the 1960s used to be among the highest in Europe. A peak level was reached in 1975. After this period fertility levels declined, with a sharp drop in the last decade of the past century, i.e. during the transitional period from a planned to a market economy. While the TFR was still 1.9 in 1990, it was only 1.14 in the year 2000. CFR dropped slightly from 2.10 in 1950 to 1.96 children for the generation of females born in 1963.

The average age of females at childbearing and the average age for giving first birth somewhat decreased from 1960 to 1985. After 1985, however, a noticeable increase followed of both indicators, reaching levels of 27.8 and 25.3 years, respectively, during 2002. Finally, the relative share of illegitimate live births shows a strong increasing trend, from 4.9 % in 1960 and 4.5 % in 1975 to 25.3 % during 2002.

Estonia

In Estonia birth rate coefficients decreased relatively slowly during the period 1960-1990. The TFR for example has only decreased from 2.16 to 2.04 children. After the changes that took place in the early 1990s, however, fertility levels fel down to reach the low level of 1.37 in 2002. Also the CFR started to decline, from 2.00 live births for women born in 1955 to 1.88 for cohort 1965.

Specific not only for Estonia, but also for the other Baltic States, is that the crisis in the first half of the 1990s mainly affected the reproduction of women in the most fertile age (25-30). After 1995, these women started to catch up the postpone births, while the fertility at young ages continued to decrease. The resulting pattern is a shift to a new fertility model which is closer to the EU-15 pattern.

Although the mean age of females at childbearing has been rather stable in the period 1980-1995, in the last few years of the past century a substantial increase has been observed. This again confirms the postponement of giving birth.

Compared to the slow changes in the average age of females giving births, the relative share of illegitimate live births has been one of the highest in Europe during the 1960s and is still among the highest in 2002 (56 %). Although some similarities were observed with the other Baltic States, Estonia seems to get closer to the Scandinavian fertility model than Lithuania and Latvia.

Hungary

Fertility levels in Hungary have been one of the lowest and slowest changing levels in the observed period. The TFR, for instance, decreased from 2.02 in 1960 to 1.87 in 1990 and 1.57 in 1995. After this period, however, Hungary was confronted with one of the highest decrease in TFR, to 1.30 in 2002. Data on CFRs show a certain degree of stability over the period 1950 (1.95) to 1965 (1.98).

The mean age at childbearing is slightly increasing as is the share of illegitimate live births (from 5.5 % in 1960 to 31.4 % in 2002).

Lithuania

In the period 1960-1990 Lithuania is characterized with decreasing birth rates, like most of the other countries in this study. The total fertility rate has decreased from 2.60 in 1960 to 2.03 in 1990, followed by a sharp decline to 1.24 children in 2002.

The increase in the average age of females giving birth started only in the last half of the 1990s. A similar increase was observed for the average age of females giving first birth. Compared to most European countries, the share of illegitimate live births has been somewhat low, although by now this share is rising rapidly, from 7 % in 1990 to 27.9 % in 2002.

Latvia

Birth rates in Latvia were amongst the lowest in Europe for the entire period. Also in Latvia, the highest decrease in TFR has occurred after 1990, from 2.01 live births per female in 1990 to 1.24 children in 2002.

The average age of females giving birth was more or less stable until 1995, followed by increasing levels. The average age of females giving first birth, however, was constantly increasing since 1975, showing signs of postponing births. Compared to the rest of the European countries the share of illegitimate births is relatively high in the beginning of the 1960s.

Malta

From a demographic point of view, Malta is somewhat different compared with the other new EU Member States, as in several aspects it is more similar to the EU-15 than to the Central and Eastern European countries. Both the TFR and CFR are relatively high (TFR 2000: 1.68; CFR 1965: 2.00) as is the mean age of women giving birth (28.3 in 2000). On the other hand, Malta has one of the lowest shares of illegitimate live births in Europe (12.8 % in 2001).

Poland

Compared to most European countries, fertility rates in Poland in the beginning of the covered period have been high. Furthermore, they have been constantly decreasing. The total fertility rate decreased from 2.98 in 1960 to 2.04 in 1990 and 1.24 in 2002. The CFR follows the same tendency of decrease. The average age of females giving birth (average or first) is characterized with a very slow decrease during 1960-1990. It starts to continuously increase afterwards.

Poland belongs to the group of countries, with low shares of illegitimate births. It changes from 4.5 % in 1960 to 6.2 % in 1990 and increases to 14.4 in 2002.

Romania

Within the given group of countries, Romania has one of the highest period fertility levels around the 1980s. In the 1990s, however, TFRs were comparable to most of the other countries in the region.

The average age of females giving birth hardly change and is therefore one of the lowest of all countries (25.7 in 2000). After 1995 the share of illegitimate live births increased from 19.8 % in 1995 to 26.7 % in 2002.

Slovenia

Fertility patterns in Slovenia follow the same tendency as most of the European countries, with already significantly declining TFRs from 1980 onwards, relatively low and stable CFRs for birth cohorts 1950-1965 and rapidly increasing mean age at childbearing. Also the share of illegitimate births has reached an average European level. Overall, Slovenia seems to be more closely to the Southern EU-15 countries than to the Central and Eastern European countries.

Slovak Republic

The Slovak Republic is characterized by high fertility rates in the beginning of the covered period. However, especially the TFR significantly declined, from 3.07 in 1960, which is the highest value in Europe to 2.09 children in 1990 and to 1.29 in 2000. Cohort Fertility was also decreasing, from 2.31 for women born in 1950 to 2.04 for women born in 1965. The strongest declines, however, will be observed for the younger generations.

The average age of females giving birth is slowly increasing, but still one of the lowest in Europe (25.8 in 2002). Average age of females giving first birth follows the same pattern.

The share of illegitimate children is low compared to the rest of the European countries: it increased from 7.4 % in 1960 to 7.6 % in 1990 and reached 21.6 % in 2002.

## 5. Fertility scenarios

The focus of the current section is to develop a new set of fertility scenarios. Point of departure is the approach adopted in the previous round of Eurostat scenarios, compiled in the period 1995-1997, the so-called EUROPOP-1995 scenarios. First, a description will be given of the general background of the scenarios. Subsequently, the key assumptions will be sketched. Next, the methodology to construct the scenarios will be described. Finally, the main indicators will be summarised and for each country a short description will be given of the scenarios together with some key figures.

### *5.1 General background of the scenarios*

In the current project on fertility three scenarios will be developed at the national level for all 12 countries. The approach followed is basically similar to the EUROPOP 1995 scenarios, and therefore, we generally follow the ideas developed in EUROPOP 1995 in outlining the three scenarios.

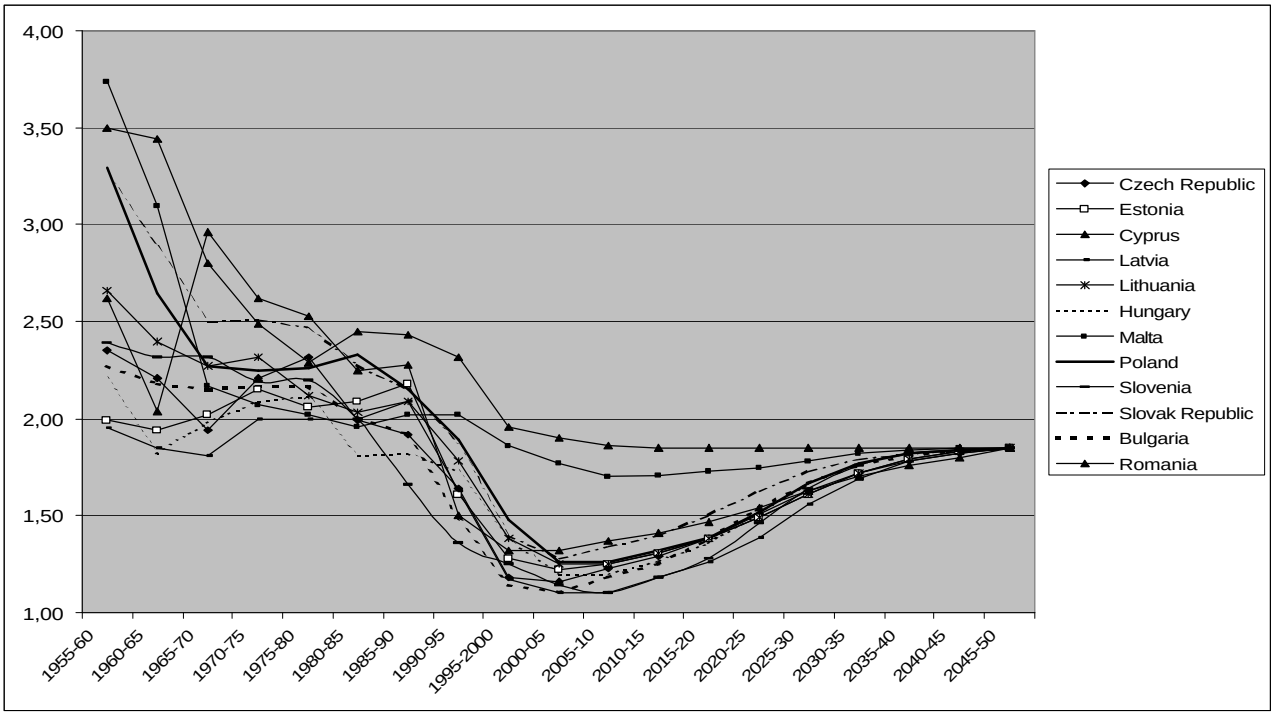
The low and the high scenario describe contrasting developments of population growth. In the low scenario, all components combined work towards a population slow population growth or even decreasing population: low fertility, high mortality and low net migration. In contrast, in the high scenario all components combined produce a fast growing population: high fertility, low mortality and high net migration. The baseline scenario describes an average development, which implies more or less continuation of current trends. In the low scenario, current low fertility levels persist or further decrease, while in the high scenario, there is a clear trend of fertility to recuperate towards the average and higher EU-15 level.

The scenarios are not explicit in the factors that cause these different demographic futures to emerge, but nevertheless it is not difficult to think of several underlying explanations. For instance, the high scenario is more likely to correspond to a situation with high economic growth, and strong effects of globalization, leading to a convergence of demographic behavior in Europe. The economic growth enables the new cohorts to have more children than the current cohorts who suffer most from the economic and political transition from a Soviet controlled society to a free market society (the so-called 'lost generation' in central Europe). The increased economic freedom and prosperity also positively affects population health, and this has an increasing effect on life expectancy. Moreover, the links between economic growth and migration also have clear effects. On the one hand, the new countries become more and more attractive for immigrants from especially eastern Europe and return migrants from western Europe. On the other hand, emigration from the new EU countries to western Europe diminishes, as a result of the economic convergence of the two clusters.
In the low scenario, the opposite effects occur. Fertility remains very low, due to the sustained economic downswing. Uncertainty leads to further postponement of childbearing. Economic circumstances also negatively affect population health and life expectancy. In addition, emigration towards western Europe is relatively high due to the gap in economic conditions between the two regions, and immigration from outside the EU is much less because of the limited job opportunities and economic growth.

Other than economic effects may also be important. The success of the EU enlargement may be manifest in terms of adopting other, more western oriented life styles, which affects fertility and mortality such that the overall indicators converge towards the EU mean. In this theoretical model countries more or less follow the same path of modernization (or westernization), although with different timing and pace. For instance with respect to fertility this would imply that the model of the Second demographic transition, with postponement of fertility, followed by recuperation, is also valid for the new EU countries. Although this model is too simplistic to capture all the diversity in patterns and processes of fertility in these countries, on a more general level it is a rather accurate description of the general trends in these countries (Sobotka, 2002). A similar argument holds for mortality, where much of the stagnating or negative development of the last decade can be explained with reference to the economic developments in these countries. Future developments should be seen in terms of the degree to which catching up can be observed with the pervasive mortality trends in western Europe. These include the continuous application of new technologies, a general shift towards degenerative and life style related diseases, and increased health awareness of the population (Spijker, 2004). In the high scenario catching up with EU levels occurs, but the critical questions are threefold. First: what is the target level: complete or partial catching up, and second: what is the pace of the change? The pace of the process in turn depends on two issues. First, how fast are the countries able to recuperate from the negative effects of the transition in the nineties, and second, how fast do these countries take over 'western' behavioral characteristics? The third factor relates to the persistent specific conditions of a country. An important aspect here is the presence of specific ethnic groups with non-standard demographic behavior. As a result of these country specific characteristics, the scenarios are also country specific.

### *5.2 Key assumptions for fertility*

As background information Figure 6 shows the development of the TFR as assumed in the latest UN projections for the 12 countries concerned. They foresee a convergence towards an




*Source: United Nations*

**Figure 6: UN trends and assumptions on TFR**

overall European level of 1.85 in the long run. However, with the exception of the two island countries, a period of prolonged low TFR's is expected in the nearer future, and the low levels around the year 2000 are assumed not to reduce any further. The Eastern European countries will have TFR's below 1.5 until the period 2015-2020, and it is only after 2030 that all TFR's reach levels above 1.5. The ultimate level corresponds to a total recovery of the postponement scenario, back to values observed before the transition in this region. In contrast to the UN projections, in the current scenarios, a partial recovery is assumed, where fertility quantum in the long run will be on average 1.6.

The official forecasts of the NSI's agree with the UN that there will not be a further decline in TFR's. According to the overview of De Jong (2002), that included eight of the 12 countries, all except Cyprus foresee increases in period fertility in the period 2000-2020. Large increases are foreseen in the Czech Republic (1.14 to 1.4), Poland (1.34 to 1.6) and Slovenia (1.26 to 1.7), and moderate increases (0.2 or less) in Estonia, Lithuania, Malta and the Slovak Republic. Cyprus foresees a decrease from 1.8 to 1.3.

The New EU Member States and Accession Countries are not homogeneous. Basically, a division into three groups can be made. Group 1 consists of the central European countries that undergo a relatively successful transition from planned to free market economy: the Czech Republic, Hungary, Poland, the Slovak Republic and Slovenia. Group 2 consists of the countries in crisis as a result of the transition. These are Romania, Bulgaria, and the Baltic States Estonia, Latvia and Lithuania. The third group consists of the two islands: Cyprus and Malta. In the first group, the relative successful transition and the resulting accession into the EU give rise to a convergence of fertility to western patterns of behavior: a strong trend

towards postponement, in addition to a (small) reduction in quantum. Due to individualization processes childlessness increases, but the two-child family remains popular. In the second group, economic and social crisis leads to a strong drop in fertility quantum. This drop occurs mainly into the parities 2+ (Sobotka, 2003). Most couples want children, but they realize one child, and at younger ages than in the other countries.

Despite the similarities within each group, there remain large variations as well. Individual countries within these groups may be quite different from this general pattern, as a result of specific cultural, historical or other reasons. For instance, within the 'succesful' transition countries, Poland has a strong catholic background, whereas the Czech Republic is largely secular.

In order to quantify the fertility assumptions for each country, we use an overall mean fertility level for these countries as the benchmark level. This benchmark level applies to all EU27+EFTA countries for the cohort born in the year 2000. For each country the parameters are set with reference to this benchmark level. The parameters for this benchmark level are: a cohort fertility level of 1.6 children per woman, and a mean age at childbearing (MAC) of 30 years. This level implies a reduction in cohort fertility for most ACC-12 countries from values mostly around 1.6 – 1.9 for the cohort 1970 (see also Table 3, on page 27 and country-specific key figures on pages 32-43). The time path of the CFR includes a temporary dip in completed fertility for most countries for the cohorts after 1975, with a final increase towards the cohort 2000. This decline is due to the quantum effects of the economic transition, and only partial recuperation of postponement in these countries. The benchmark level chosen here is clearly substantially lower than the TFR level chosen by the UN of 1.85 in their latest population projections, as discussed above.

The benchmark MAC level of 30 implies a moderate to strong postponement process in all countries involved, but in the countries with already a high MAC, notably Cyprus, Malta, and Slovenia (values around 29 years; see also Table 4 on page 27) the postponement effects are limited and the period TFR approaches the target level in the short run. On the other hand, for the countries with currently a relatively low MAC, postponement will lead to a continued low level of the TFR for the next 10 to 15 years, mostly in the range of 1.2 to 1.4. After this period, recuperation effects start to come in, and the period TFR approaches the CFR relatively fast (see also Table 5 on page 27).

High and low variants of CFRs are constructed using an interval of 0.5. This means that the high variant benchmark level coincides with replacement level 2.1 and the low variant benchmark with 1.1. This interval is slightly smaller than e.g. used by Statistics Netherlands of 0.6.

The baseline scenario and the low and high variants can be translated into a distribution of families according to parities. Possible distributions (in percentages) under each variant are given in Table 1.

**Table 1: Parity distributions in three scenarios**

| *parity* | *baseline* | *high* | *low* |
|---|---|---|---|
| 0 | 15 | 5 | 30 |
| 1 | 35 | 25 | 45 |
| 2 | 45 | 40 | 25 |
| 3 | 10 | 20 | 5 |
| 4+ | 1 | 10 | 0 |

Based upon the results of the time series analyses, the review of the literature, and the evaluation of the most recent population projections compiled by the NSIs (de Jong, 2002) we expect the following basic trends to occur in the 12 countries:

1. Future fertility trends are characterized by changes in quantum (completed cohort fertility) as well as tempo (postponement and recuperation). We assume that the long term decline in the quantum of fertility will continue until the cohort 2000. However, the decline will not be monotonous. The cohorts born in the last quarter of the 20$^{th}$ century will be mostly affected by the negative consequences of the economic transition and crisis, which results in a lower completed fertility. The youngest cohorts in the projection will somehow overcome the adverse effects and show a slightly higher completed fertility
2. As a result of westernization / modernization, fertility postponement is an important phenomenon as well, that will affect period fertility substantially in almost all countries involved.
3. The crucial question for projections is to what extent recuperation of fertility at higher ages will occur. Here it is assumed that the target cohort fertility level will in most cases be somewhat lower than the currently observed cohorts; thus a partial recovery assumption.

Although in general a common pattern has been assumed for all countries, a few exceptions have been made: Given the trends and backgrounds in fertility developments in Cyprus, a CFR of 1.6 seems to be too low, while for Bulgaria, the Czech Republic and Slovenia the level of 1.6 seems too high. Also some exceptions have been made with respect to the mean age at childbearing. Comparable to EUROPOP1995, for all countries the MAC is expected to continue to increase in all scenarios. It can be argued that in the low scenario women prefer to postpone childbearing in order to wait for better economic prospects, while in the high variant, women are expected to first invest in education and work experience before they want to have children.

Table 2 gives an overview of the fertility assumptions for each country: the CFR value, and the MAC, both reached in the target cohort 2000.

**Table 2: Target values: Cohort Fertility Rates (CFR) and Mean Age at Childbearing (MAC)**

| *Country* | *CFR* | | | *MAC* |
|---|---|---|---|---|
| | *Baseline* | *Low* | *High* | |
| BG | 1.5 | 1.0 | 2.0 | 29 |
| CY | 1.7 | 1.2 | 2.2 | 31 |
| CZ | 1.5 | 1.0 | 2.0 | 30 |
| EE | 1.6 | 1.1 | 2.1 | 30 |
| HU | 1.6 | 1.1 | 2.1 | 30 |
| LT | 1.6 | 1.1 | 2.1 | 29 |
| LV | 1.6 | 1.1 | 2.1 | 30 |
| MT | 1.6 | 1.1 | 2.1 | 31 |
| PL | 1.6 | 1.1 | 2.1 | 30 |
| RO | 1.6 | 1.1 | 2.1 | 30 |
| SI | 1.5 | 1.0 | 2.0 | 31 |
| SK | 1.6 | 1.1 | 2.1 | 29 |

In the next section, we will discuss the methodology used for constructing the national fertility scenarios followed by a short overview of the assumptions for each country.

### *5.3 Methodology for constructing national level fertility scenarios*

This section describes the methodology used for setting the fertility scenarios for the national projections. Some parts will occasionally be illustrated by referring to the Czech Republic.

A full fertility scenario consists of a complete set of age-specific fertility rates ASFR(x,t), for each age of the mother x=15..49 and for each projection year 2003..2070. The key components used in specifying a fertility scenario are:

- the latest observed period fertility rates ASFR(x,2002);
- the estimated total number of live births for the year 2003;
- a common future model fertility schedule by age CF2000(x), assumed to apply to women born in 2000 and later years;
- a target value for the future total cohort fertility rate TCFR2000 and the future mean age at childbearing MAC2000;
- a set of age-specific *slope* parameters S(x), which measure the annual change in the ASFRs for each age, at the start of the projection period.

Each of these components will be decribed in more detail below. However, first we discuss in general terms the idea behind this way of scenario setting.

General idea

The baseline fertility scenario should initially be a more or less smooth continuation of recent trends. Therefore, the fertility pattern of the most recently observed year, 2002, is the point of departure for specifying the ASFRs for 2003 and later years. At the same time, it should be recognized that period fertility patterns are actually a mixture of cohort fertility patterns, where the mixture is determined by changes in fertility quantum and tempo across subsequent cohorts. By assumption, in the future all countries will converge towards a stable, common

pattern of childbearing, which implies that, eventually, quantum and tempo changes will become zero and period fertility and cohort fertility will coincide.

The future constant cohort fertility pattern is specified for birth cohort 2000 and will also hold for all later birth cohorts. This implies that the period ASFRs will gradually evolve from the 2002 mixture period schedule to the ultimate stable cohort schedule: the period ASFR(x) for age x will become constant in the year in which birth cohort 2000 will reach age x, i.e. in year (2000+x). The full convergence of the period schedule to the cohort schedule will thus be completed in year 2049: by then, all women of reproductive age will be born in 2000 or later and, by assumption, will bear children according to the same, constant cohort fertility schedule.

Figure 7 illustrates this gradual convergence of the period 2003 schedule (bold curve in black) and the cohort 2000 schedule (bold curve in red). For the younger ages, convergence occurs faster than for the older ages. In other words: in period terms, it is expected that the process of postponement of fertility will stop earlier than the process of recuperation.

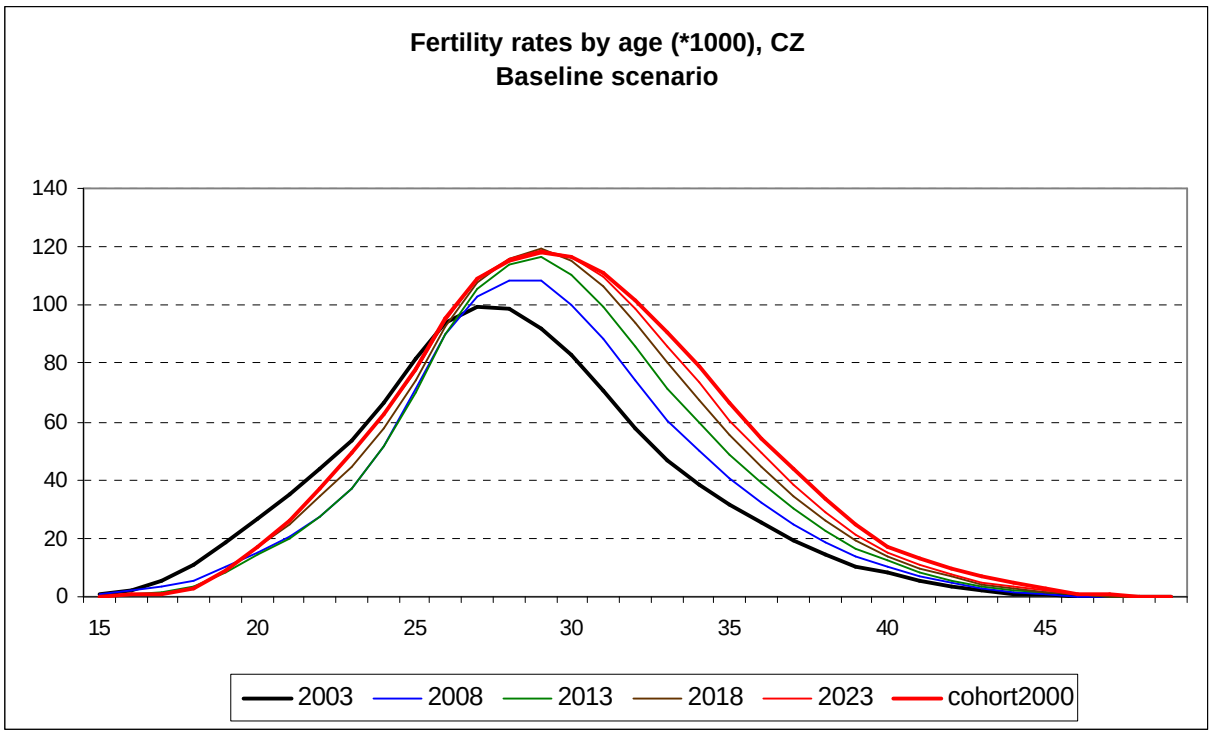



**Figure 7: Fertility rates by age, the Czech Republic, Baseline scenario**

In addition, it can be seen from the succession of curves in the 30-35 age range that the change in the period fertility schedule is relatively fast in the first projection years, and gradually levels off as the target year comes closer. In other words: it is generally assumed that the catching-up process is currently at its top, and will slow down in the very near future.

Between 2003 and 2049, the period fertility schedule will move: some ASFRs will fall, other ASFRs will rise and, furthermore, the speed of falling or rising will change over time, ultimately becoming zero. For each age x, the annual change in the ASFR, i.e. • ASFR(x,t) = ASFR(x,t) – ASFR(x,t-1), is derived from two conditions: (a) at the start of the projection

period, the • ASFRs are a continuation of recently observed changes summarized by the initial slope parameters S(x); (b) at the point where constancy is reached, i.e. year 2000+x for ASFR(x), the change is zero. From these two conditions, the annual ASFRs for the intermediate years can be derived via Hermite interpolation (the construction of a third-degree polynomial through four fixed points: initial and final level, initial and final change).

Figure 8 shows the annual changes in the ASFRs, corresponding to the ASFRs themselves shown in Figure 7. In the age range 20-25 the initial fall in fertility is very strong, a continuation of the recent trend. However, the lower limit to age 20-25 fertility is reached within just a few years, so that the speed of the decline in this age range drops very fast and, after 2010, even temporarily changes into an increase. This marks the somewhat better economic (material) perspectives of the less numerous generations born in the 1990s. In contrast, in the age range 30-35, fertility increases at a slower level, but this increase continues over a much longer time period before gradually slowing down towards zero. As a result, the total future *decrease* in fertility at younger ages (postponement) is in the long run more than compensated by the total future *increase* in fertility at higher ages (recuperation), implying the well-known result that period fertility will eventually increase as tempo changes come to a halt.

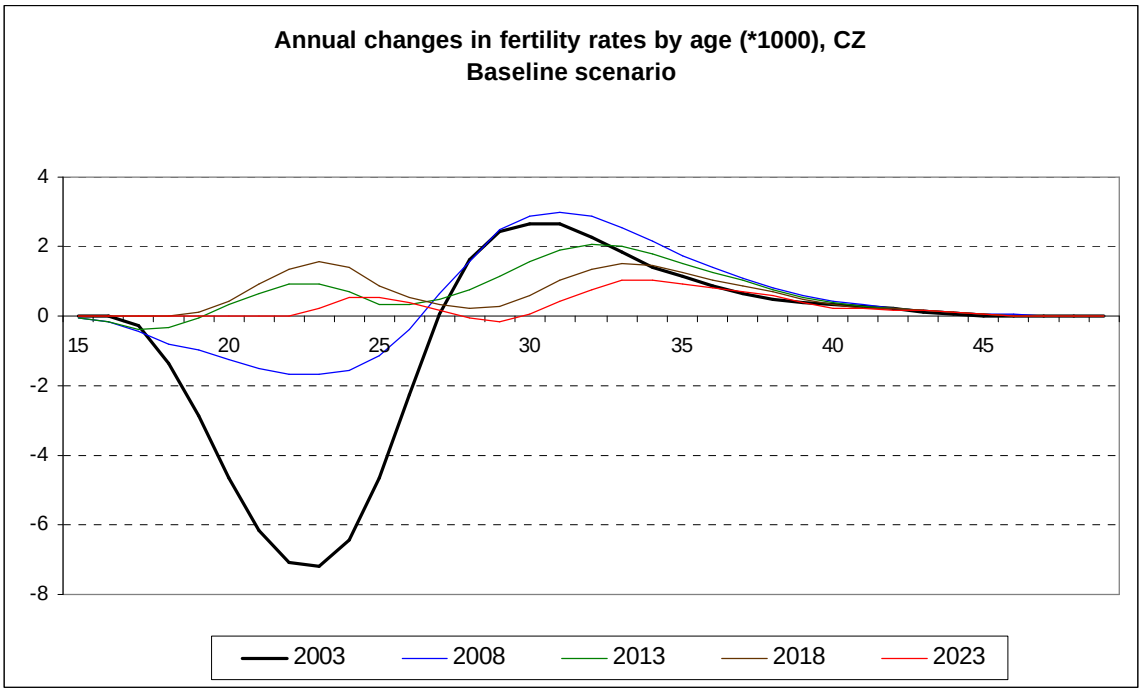



**Figure 8: Annual changes in fertility rates, the Czech Republic, Baseline scenario**

Period schedule for 2003

Starting point for the ASFR(x,2003) values are the observed rates for 2002. To remove random irregularities, especially at higher ages, this schedule is smoothed by taking moving averages over three consecutive ages.

The ASFRs for 2003 are initially specified as those for 2002 plus the average annual change as observed during the five most recent years (smoothed by taking moving averages). Subsequently, this initial schedule is scaled in line with the most recently observed/estimated

total number of live births for 2003. The live births 2003 have been taken from the Eurostat nowcasts 2003 published in 'First demographic estimates 2003' (*Statistics in Focus*, 1/2004), and the scaling factor is determined by the extrapolated recent average ratio between total live births and period TFR.

Ultimate cohort schedule for birth cohort 2000 and later

The ultimate cohort schedule consists of three components: an age pattern (form of the curve), a mean age at childbearing (MAC2000, location of the curve), and a total cohort fertility rate (CTFR2000, area beneath the curve). The age pattern is basically derived from the 1997-based Eurostat population scenarios, combined with the latest national fertility forecast for the Netherlands, a country which is very close to being at the end of the fertility postponement process and therefore exemplary for a stable, late pattern of childbearing. The values for MAC2000 (mostly 30 years) and CTFR2000 (mostly 1.6 children per woman) have been specified according to the substantive considerations described more fully in the section on key assumptions on fertility (see also Table 2). The CTRF2000 value proportionally scales the basic age pattern up or down. The MAC2000 value is obtained by shifting the complete scaled age schedule towards higher (or sometimes lower) ages.

Initial slope parameters

The initial slope parameters S(x) have been obtained via the following steps:

- the average • ASFRs as observed over the five most recent years, smoothed via moving averages;
- the • ASFR(x,2003) implied by the observed 2002 schedule and the constructed 2003 schedule;
- the two sets of slope parameters from the two previous steps are averaged and smoothed;
- in some cases, it was deemed necessary to slightly manually adjust these slope parameters, to obtain a more realistic trajectory of period and/or cohort TFR values over the full projection period. The adjustments, if any, were made while visually inspecting the graphs.

Formulas for ASFR(x,t)

We now have the three building blocks for the calculation of the full fertility scenario: initial period schedule F(x)=ASFR(x,2003); ultimate cohort schedule C(x)=CF2000(x); and the initial slope parameters S(x). These building blocks are used to derive all ASFR(x,t) values for x=15..49 and t=2003..2050, using the Hermite interpolation method. Note that no formulas are required for the projection years 2051..2070, since by definition period fertility will be constant after 2049.

The formula for the ASFR(x,t) values is the following:

$$ASFR(x,2003+t) = F(x) + S(x)\cdot t + \frac{3\cdot(C(x)-F(x)) - 2k\cdot S(x)}{k^2}\cdot t^2 + \frac{2\cdot(F(x)-C(x)) + k\cdot S(x)}{k^3}\cdot t^3$$

in which:

- t is the projection year minus 2003 (t=0..47);
- k is the year in which constancy of the ASFR is reached for this particular age *x*, minus 2003. For example, for age 20 *k* equals 17, because cohort 2000 is aged 20 in year 2020 and 2020 minus 2003 equals 17.

It can easily be verified that this particular third-degree polynomial satisfies the four boundary conditions set out above:

- for the year 2003 (i.e. *t*=0), the ASFRs equal the initial period schedule F(x);
- for the year 2003+k (i.e. *t=k*) and beyond, the ASFRs equal the ultimate cohort schedule C(x);
- for the year 2003, the • ASFRs equal the initial slope parameters S(x);
- for the year 2003+k, the • ASFR(x,2003) equal zero.

Low and high scenarios

The low and high fertility scenarios have been constructed along essentially the same lines as the baseline scenario. The only differences between low/high and baseline are the following:

- The CTFR2000 values, i.e. the area below the ultimate cohort fertiliy schedule, are different.
- The total period fertility rate for the initial period schedule, i.e. for the year 2003, is different: the initial period schedule for the high variant is the baseline expanded by 5%, for the low variant shrunken by 5%.
- As a consequence of the different initial period schedule, also the initial slope parameters (change between 2002 and 2003) are different from those in the baseline: in the low scenario, fertility at younger ages decreases faster and at higher ages increases slower than in the baseline; in the high scenario, fertility at younger ages decreases slower and at higher ages increases faster.

In the following section country-specific outcomes of the scenarios will be given.

### *5.4 Further details per country*

Tables 3, 4 and 5 summarize the main indicators of the fertility Baseline scenarios as well as the observed values for the past few decades (Cohort Fertility Rates, Mean Age at Childbearing, and Total Fertility Rates). In Table 6 some further details are given on the input data for the Baseline scenarios: the period for which data were available, the source of the data used, and whether or not some specific adjustments to the general procedures had to be made. Following the tables, a short description is given of the country-specific scenarios. To conclude this section, for each country two graphs will be presented, the first containing starting and target values of age-specific fertility rates, and the second containing TFRs for the three scenarios, as well as Cohort Fertility developments in the Baseline scenario.

**Table 3: Cohort Fertility Rates (CFR)**

| | 1950 | 1955 | 1960 | 1965 | 1970 | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BG | 2.07 | 2.03 | 1.95 | 1.83 | 1.60 | 1.54 | 1.54 | 1.53 | 1.53 | 1.51 | 1.50 |
| CY | 2.29 | 2.31 | 2.43 | 2.56 | | | 1.70 | 1.63 | 1.64 | 1.68 | 1.70 |
| CZ | 2.10 | 2.07 | 2.03 | 1.94 | 1.82 | 1.57 | 1.42 | 1.39 | 1.42 | 1.47 | 1.50 |
| EE | 1.97 | 2.00 | 2.01 | 1.88 | 1.76 | 1.69 | 1.67 | 1.66 | 1.63 | 1.61 | 1.60 |
| HU | 1.95 | 1.94 | 2.02 | 1.98 | 1.85 | 1.62 | 1.53 | 1.52 | 1.55 | 1.58 | 1.60 |
| LT | 2.01 | 1.94 | 1.88 | 1.67 | 1.78 | 1.61 | 1.53 | 1.52 | 1.55 | 1.58 | 1.60 |
| LV | 1.87 | 1.84 | 1.94 | 1.78 | 1.68 | 1.58 | 1.59 | 1.62 | 1.62 | 1.61 | 1.60 |
| MT | | | 1.84 | 2.00 | | 1.96 | 1.83 | 1.68 | 1.62 | 1.60 | 1.60 |
| PL | 2.19 | 2.17 | 2.18 | 2.00 | 1.79 | | 1.41 | 1.41 | 1.47 | 1.56 | 1.60 |
| RO | 2.45 | 2.28 | 2.15 | 1.92 | 1.64 | 1.55 | 1.58 | 1.63 | 1.64 | 1.62 | 1.60 |
| SI | 1.90 | 1.96 | 1.87 | 1.77 | 1.67 | 1.53 | 1.41 | 1.38 | 1.41 | 1.47 | 1.50 |
| SK | 2.31 | 2.22 | 2.18 | 2.04 | 1.85 | | | 1.41 | 1.48 | 1.56 | 1.60 |

**Table 4: Mean Age at Childbearing (MAC)**

| | *Observed* | | | | | *Baseline scenario* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1985 | 1990 | 1995 | 2000 | starting value | 2010 | 2020 | 2030 | 2050 |
| BG | 23.9 | 24.0 | 23.5 | 23.7 | 25.0 | 25.5 | 27.2 | 28.5 | 28.9 | 29.0 |
| CY | 26.1 | 26.2 | 27.1 | 28.1 | 28.7 | 29.3 | 30.5 | 30.8 | 30.9 | 31.0 |
| CZ | 24.7 | 24.6 | 24.8 | 25.8 | 27.2 | 28.1 | 29.4 | 29.7 | 29.9 | 30.0 |
| EE | 25.7 | 25.8 | 25.6 | 25.6 | 27.0 | 27.8 | 29.0 | 29.8 | 30.0 | 30.0 |
| HU | 24.7 | 25.0 | 25.6 | 26.3 | 27.3 | 28.0 | 29.3 | 29.8 | 29.9 | 30.0 |
| LT | 26.6 | 26.9 | 25.9 | 25.6 | 26.6 | 27.0 | 28.1 | 28.7 | 28.9 | 29.0 |
| LV | 25.9 | 25.9 | 25.7 | 25.8 | 27.2 | 27.8 | 28.9 | 29.8 | 30.0 | 30.0 |
| MT | | | 27.2 | 27.3 | 28.3 | 28.5 | 29.9 | 30.8 | 31.0 | 31.0 |
| PL | 26.5 | 26.4 | 26.3 | 26.9 | 27.4 | 27.9 | 29.0 | 29.6 | 29.9 | 30.0 |
| RO | 25.3 | 25.2 | 25.5 | 25.0 | 25.7 | 26.2 | 27.9 | 29.5 | 29.9 | 30.0 |
| SI | 25.4 | 25.5 | 25.9 | 27.0 | 28.2 | 29.1 | 30.3 | 30.6 | 30.9 | 31.0 |
| SK | 25.1 | 25.2 | 25.3 | 25.4 | 25.8 | 27.2 | 28.5 | 28.8 | 29.0 | 29.0 |

**Table 5: Total Fertility Rates (TFR)**

| | *Observed* | | | | | *Baseline scenario* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1985 | 1990 | 1995 | 2000 | starting value | 2010 | 2020 | 2030 | 2050 |
| BG | 2.05 | 1.95 | 1.80 | 1.24 | 1.32 | 1.20 | 1.24 | 1.37 | 1.49 | 1.50 |
| CY | 2.46 | 2.38 | 2.42 | 2.03 | 1.64 | 1.49 | 1.46 | 1.61 | 1.69 | 1.70 |
| CZ | 2.10 | 1.96 | 1.90 | 1.28 | 1.14 | 1.15 | 1.22 | 1.42 | 1.49 | 1.50 |
| EE | 2.02 | 2.12 | 2.04 | 1.32 | 1.34 | 1.38 | 1.45 | 1.54 | 1.60 | 1.60 |
| HU | 1.91 | 1.85 | 1.87 | 1.57 | 1.32 | 1.30 | 1.33 | 1.51 | 1.59 | 1.60 |
| LT | 2.02 | 2.09 | 2.02 | 1.54 | 1.39 | 1.29 | 1.33 | 1.49 | 1.59 | 1.60 |
| LV | 1.90 | 2.09 | 2.01 | 1.26 | 1.24 | 1.27 | 1.42 | 1.53 | 1.59 | 1.60 |
| MT | 1.99 | 1.96 | 1.98 | 2.00 | 1.68 | 1.70 | 1.50 | 1.52 | 1.59 | 1.60 |
| PL | 2.28 | 2.33 | 2.04 | 1.62 | 1.34 | 1.24 | 1.19 | 1.42 | 1.58 | 1.60 |
| RO | 2.43 | 2.31 | 1.84 | 1.34 | 1.31 | 1.29 | 1.32 | 1.44 | 1.58 | 1.60 |
| SI | 2.10 | 1.71 | 1.46 | 1.29 | 1.26 | 1.19 | 1.20 | 1.39 | 1.48 | 1.50 |
| SK | 2.32 | 2.25 | 2.09 | 1.52 | 1.29 | 1.20 | 1.23 | 1.49 | 1.59 | 1.60 |

**Table 6: Details on Fertility Baseline Scenario**

| *Country* | *Period* | *Source* | *Remarks Baseline scenario* |
|---|---|---|---|
| BG | 1990-2002 | Eurostat | - |
| CY | 1993-2002 | Eurostat | Slope: from age 29 onwards: nowcast relatively more important than recent past (0.9:0.1); not smoothed |
| CZ | 1980-2002 | ODE | Starting values 2002 age 40-49 smoothed<br>slope: age 29-25: weakened (*0.9); age 28-40 Reinforced (age 28 * 1.1; age 29-39 * 1.3; age 40 * 1.2);<br>Age 45-49 manually adjusted |
| EE | 1980-2002 | ODE | Starting values 2002 age 40-49 smoothed<br>Slope: age 26-40: weakened (age 26-39*0.9; age 40 * 0.95);<br>Age 45-49 manually adjusted |
| HU | 1980-2002 | ODE | Starting values 2002 age 40-49 smoothed<br>Slope: age 45-49 manually adjusted |
| LT | 1960-2002 | NSI Lithuania | Starting values 2002 age 40-49 smoothed<br>Slope: age 15, 40-49 manually adjusted |
| LV | 1980-2002 | ODE | Starting values 2002 age 40-49 smoothed |
| MT | 1990-2002 | total births 1990-2002: Eurostat<br>age patterns 1997, 1998, 1999: NSI Malta | Age patterns up to age 45: ages 46-49 estimated: 46 = 0.5*45; 47 = 0.5*46, etc.<br>TFR 2003 weakened (nowcast*0.9)<br>Starting value age 33 smoothed<br>Slope based on recent past; 2002/2003 not taken into account |
| PL | 1995-2002 | Eurostat | Slope: from age 27 onwards: nowcast relatively more important than recent past (0.75:0.25); not smoothed |
| RO | 1980-2002 | ODE | Slope: from age 15-25: recent past relatively more important than nowcast (0.75:0.25); from age 27 onwards: reversed: recent past : nowcast = 0.25:0.75; not smoothed |
| SI | 1980-2002 | ODE | Starting values 2002 age 40-49 smoothed<br>Slope: age 15, 40-49 manually adjusted |
| SK | 1997-2002 | Eurostat | Slope: age 19-26: slightly reinforced (*1.1); age 28-37 somewhat more reinforced (*1.2) |

*Country-specific scenarios*

Bulgaria

Bulgaria faces the declining effects of economic crisis, as well as, in the longer run, those of postponement. The CFR is set below the overall EU level, at 1.5, and this reflects the permanent effects of the economic crisis. The change in CFR will be relatively small though, since the most recent cohorts are already close to this level. Bulgaria will develop into a one-child society. Childlessness will be low, but parities 2+ will be low as well. Postponement is important, since currently the MAC is among the lowest of all countries involved (25.1). The period TFR will only rise moderately in the next 20 years from 1.2 to 1.4, after which it will increase further to the target value of 1.5 around 2030, and a MAC of 29.
The high variant gives a target value of the CFR (TFR) of 2.0; the low variant is set at 1.0.

Cyprus

Cyprus combines high fertility with late motherhood for quite a substantial number of years already. It is also the only country with an increase in CFR in recent years, to around 2.5 for the cohort 1965, followed by a decline in the youngest cohorts. The baseline scenario assumes strong convergence towards the EU mean, and the final level is slightly higher at 1.7. This is the result of prosperity and a more traditional view on families. The already high level of the MAC is still increasing slowly, and will in the end reach 31 years, which is somewhat higher than the EU average.
High and low variants of the CFR (TFR) are set at 2.2 and 1.2 respectively.

Czech Republic

The Czech Republic is among the countries with the most rapid increase in MAC in the nineties. As a result, the period TFR became among the lowest in Europe, but the underlying quantum remained at moderate levels. Therefore, the Czech Republic shows a quite western type of development in the nineties, although at a higher pace. This development is made possible and reinforced by a relatively successful economic transition, in a highly secularized society. Following the reasoning of Sobotka (2004) current period based indicators of the Czech Republic are seriously distorted by tempo effects. However, the use of adjusted indicators for different parities shows that underlying these low period indicators long run cohort fertility may well be at the EU level. For instance, about 80 percent of women will have a first child, and another 65 to 70 percent will have a second child. Therefore, a long run average of 1.6 may well be feasible. Moreover, the MAC is also assumed to reach the average EU level of 30. The high and low variants of the CFR are 2.1 and 1.1 respectively.

The Baltic states Estonia, Latvia and Lithuania

The Baltic States show a somewhat less successful economic transition path than most of the other eastern European countries. Nevertheless, some economic recovery takes place, and in the baseline scenario it is assumed that these countries will finally catch up with the EU. This economic recovery may trigger further postponement, although the present MAC is already around 27.5 years for Estonia and Latvia which constitutes a value in the middle ranges of the eastern European countries. It is somewhat lower for Lithuania, due to its more traditional (religious) culture. We assume more or less similar developments for the Baltic states, as a result of both quantum and tempo effects. Cohort fertility will show a downward trend, from values around 1.9 to well above 2.0 for the cohort 1960 to 1.6 (EU average) in 2050. MAC

will be at 30 for Estonia and Latvia, but slightly lower for Lithuania, as a result of the more traditional culture (29).
High and low variants are 2.1 and 1.1.

Hungary

Hungary belongs to the group with a relatively successful transition path towards EU values. Therefore it is logical that its fertility characteristics will converge towards EU levels in the long run: a downward trend of the CFR to 1.6, and a catching up of the period TFR towards this lower level. MAC is also set at the EU average of 30. The strong postponement effect is clearly visible in the time path of the period TFR, which remains below 1.4 until 2015. Compared to the Czech Republic, which also belongs to this group of successful transitions, childlessness at present is higher, but these differences are assumed to disappear in the long run and resulting CFR will converge to the EU level.
The high variant is set at 2.1 and the low variant at 1.1

Malta

The distinguishing factor for Malta is its high age at motherhood. With a MAC of 29.2 it is among the highest in Europe at present, and in this respect shows similarities with Italy or Spain. Nevertheless, it is unlikely that its CFR, which is quite stable since the birth cohort 1950 at 1.85 will drop to southern European levels. We assume a steady decrease of the CFR to EU levels, while retaining a somewhat higher MAC of 31 years. The resulting TFR shows a similar, although lower level development towards the target value of 1.6. This is a downward trend, since postponement occurred before the cohort 1975.
High and low variants are set at 2.1 and 1.2 respectively.

Poland

Although Poland is a relatively successful transition country, it has a number of similarities with Italy, due to its catholic background. For women, the same dilemma's exist between work and care, as a result of the lack of sufficient facilities for combining the two. Its CFR has dropped substantially in the past decennia, whereas childlessness is higher than in some other eastern European countries, and this may further increase in the near future (Sobotka, 2004). Nevertheless, compared to the southern European profile historically fertility has always been substantially higher in Poland. Therefore, traditionally larger families are still the norm in Poland. As a result, despite the recent drop, a CFR of 1.6 at EU level is assumed, and a MAC of 30.
High and low variants are 2.1 and 1.1 respectively.

Romania

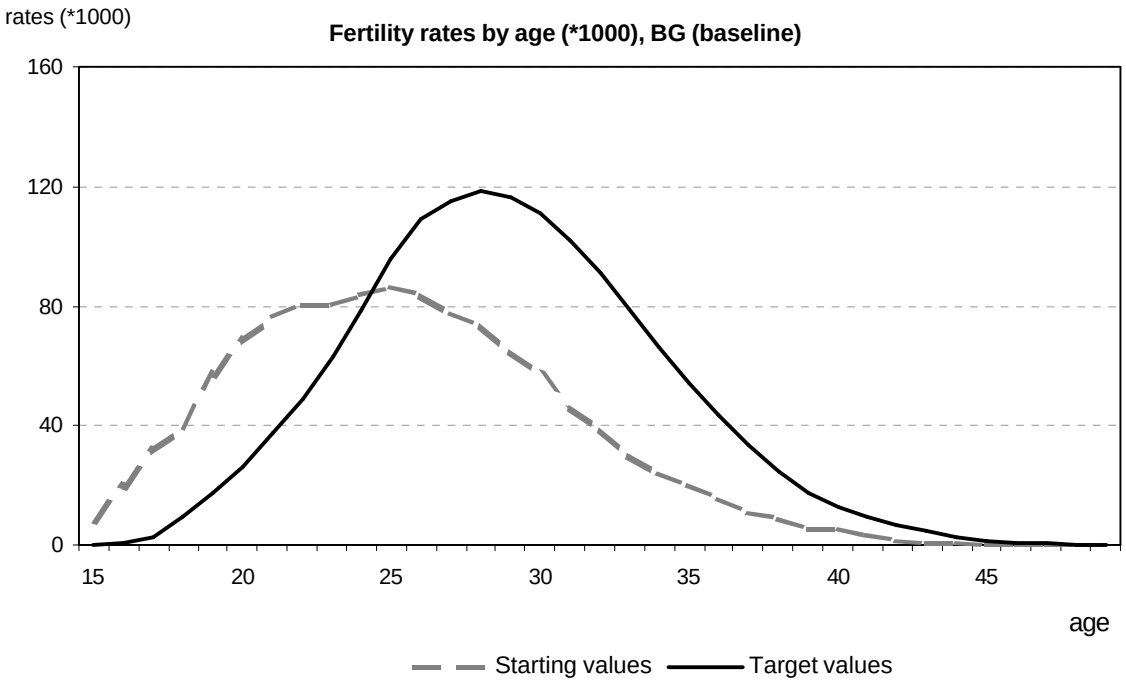
Similar to Poland, Romania has a strong catholic background. Different from Poland, it faces much more severe transitional problems. Due to its traditional background, the average age of motherhood is relatively low, but postponement has set in, and will likely depress the TFR's substantially in the near future. Nevertheless, similar to Poland, in Romania traditionally larger families have been the norm, and this rules out a trend towards lower southern European levels. We assume that the combined effects of economic depression, culture and tradition will lead to a CFR of 1.6, which is somewhat lower than EU average.
High and low variants are set at 2.1 and 1.1 respectively.

Slovak Republic

The Slovak Republic is characterized by a more traditional culture, and a lower degree of westernization than the Czech Republic. Moreover, the effects of the transition are more severe. Nevertheless we expect that the final CFR level will be equal to EU levels. In the long run, the negative effects of the economic downswing will disappear, and this will give rise to a return to average levels of 1.6, with corresponding high and low variants of 2.1 and 1.1

Slovenia

Slovenia is a typical country that fits in the southern European scheme. Therefore, a relatively low CFR is foreseeable here. Given its relatively favourable economic situation it will converge relatively straightforward to the level of 1.5, with corresponding high and low variants of 2.0 and 1.0 respectively.


rates (*1000)
Fertility rates by age (*1000), BG (baseline)
160
120
80
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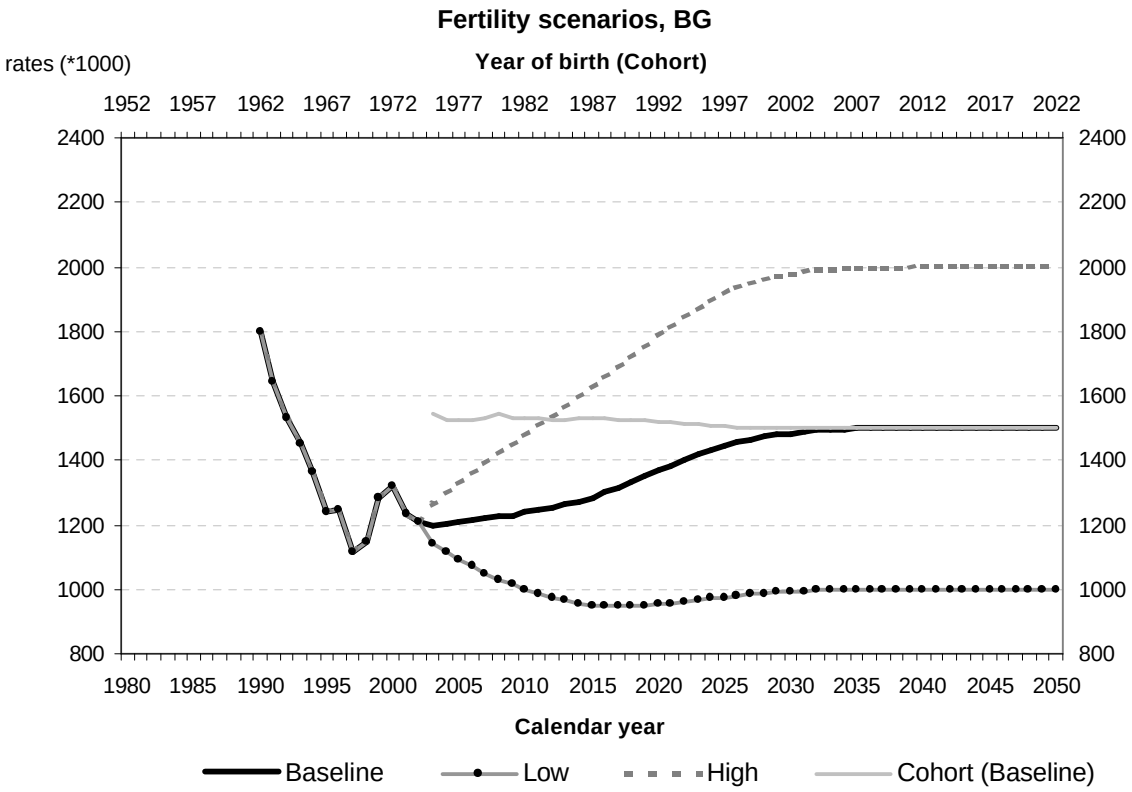
45
age
Starting values
Target values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rates (*1000)
Year of birth (Cohort)
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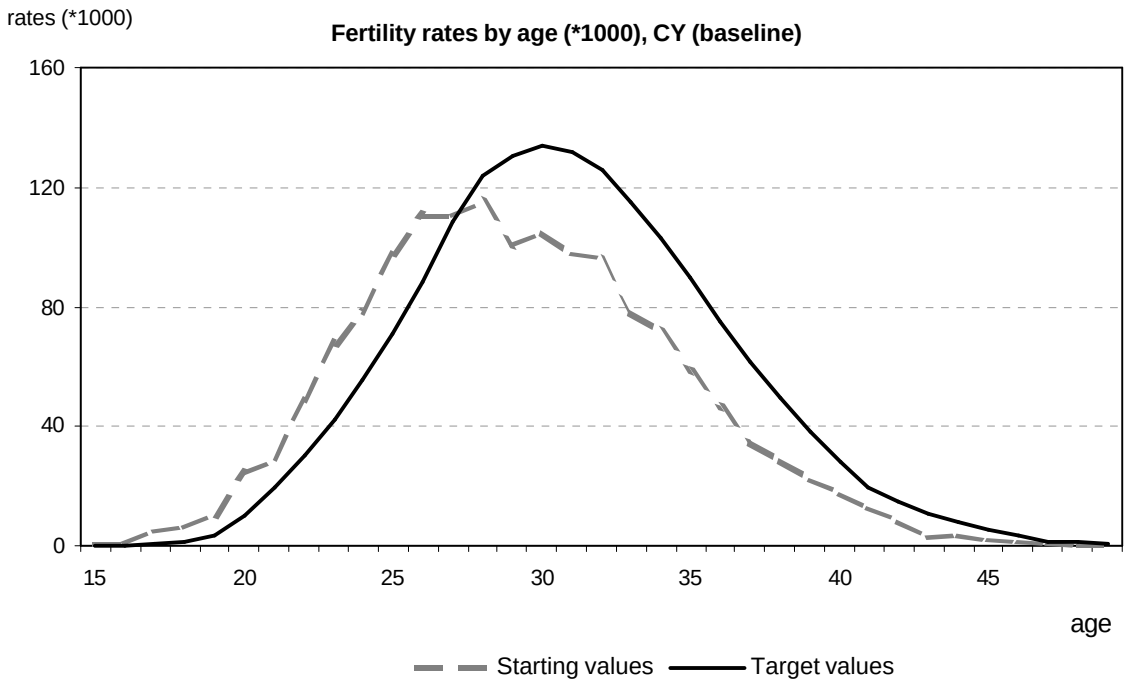
1980 1985 1990 1995 2000 2005 2010 2015 2020 2025 2030 2035 2040 2045 2050
Calendar year
Baseline
Low
High
Cohort (Baseline)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120
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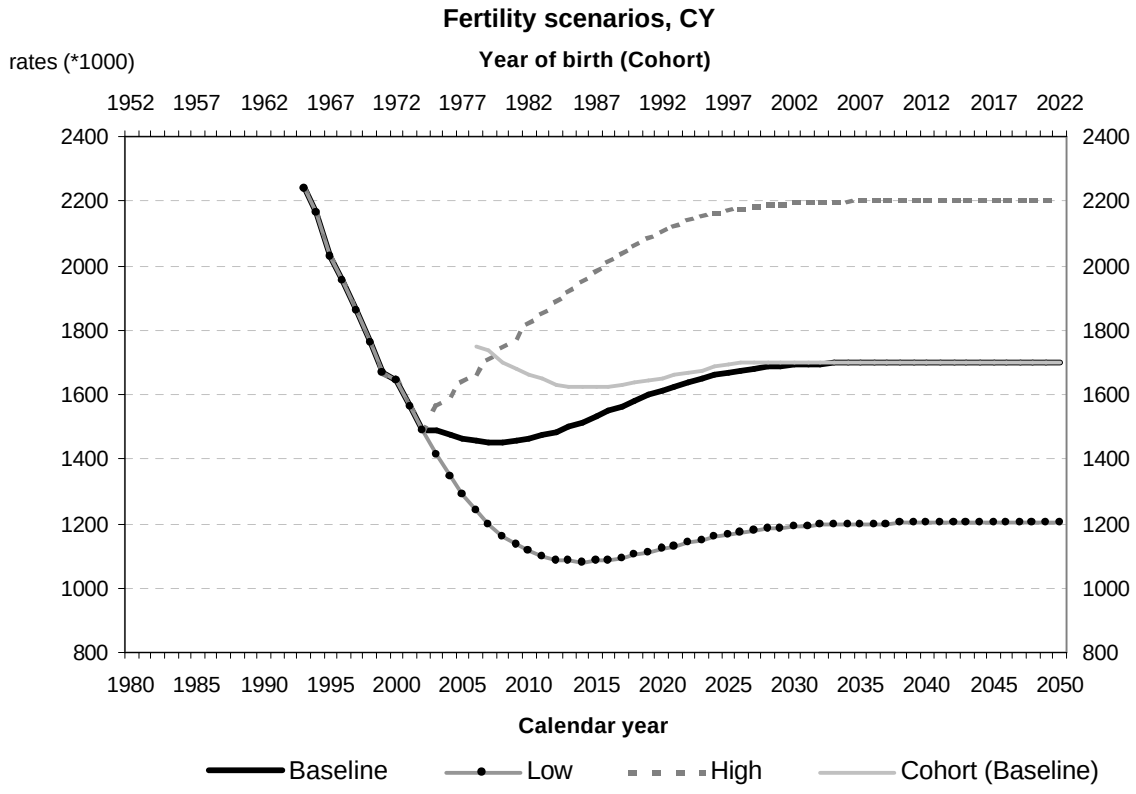
40
45
age
Starting values
Target values


Fertility scenarios, CY
rates (*1000)
Year of birth (Cohort)
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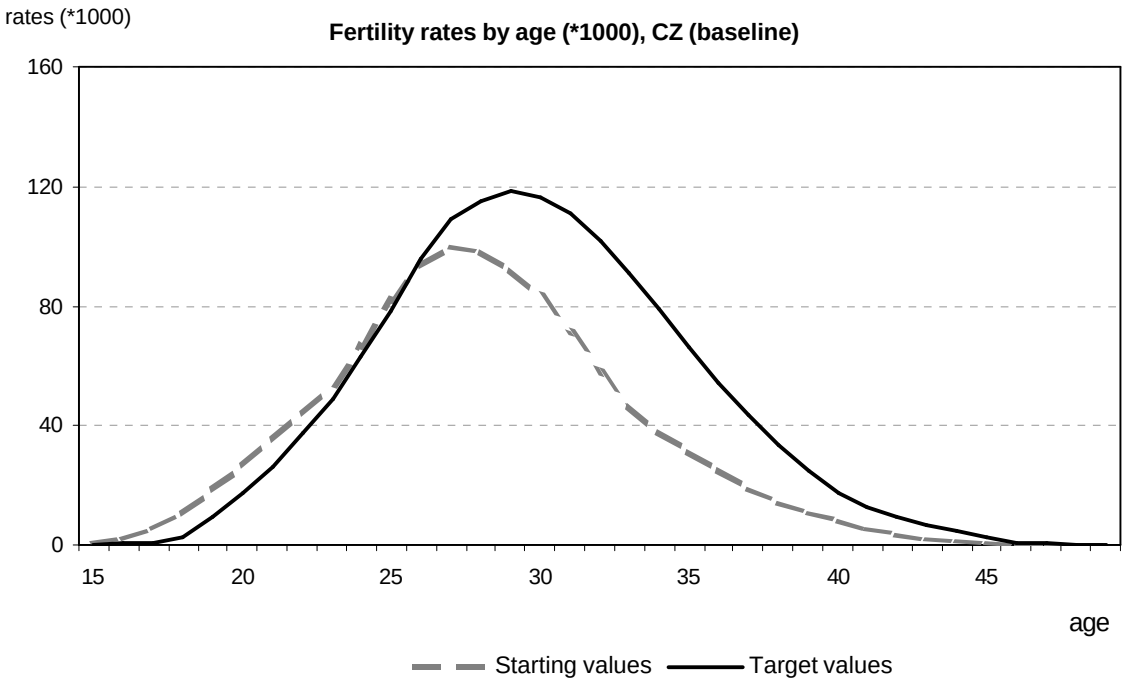
1980 1985 1990 1995 2000 2005 2010 2015 2020 2025 2030 2035 2040 2045 2050
Calendar year
Baseline
Low
High
Cohort (Baseline)


rates (*1000)
Fertility rates by age (*1000), CZ (baseline)
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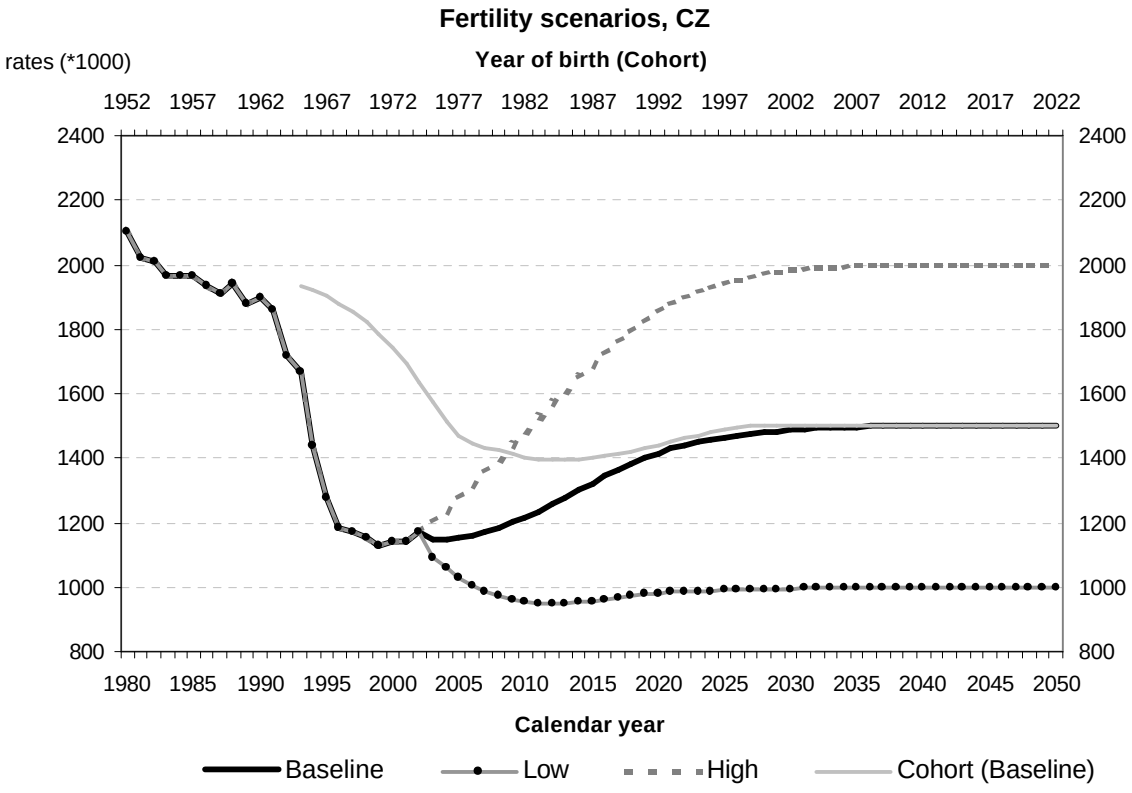
age
Starting values
Target values


Fertility scenarios, CZ
rates (*1000)
Year of birth (Cohort)
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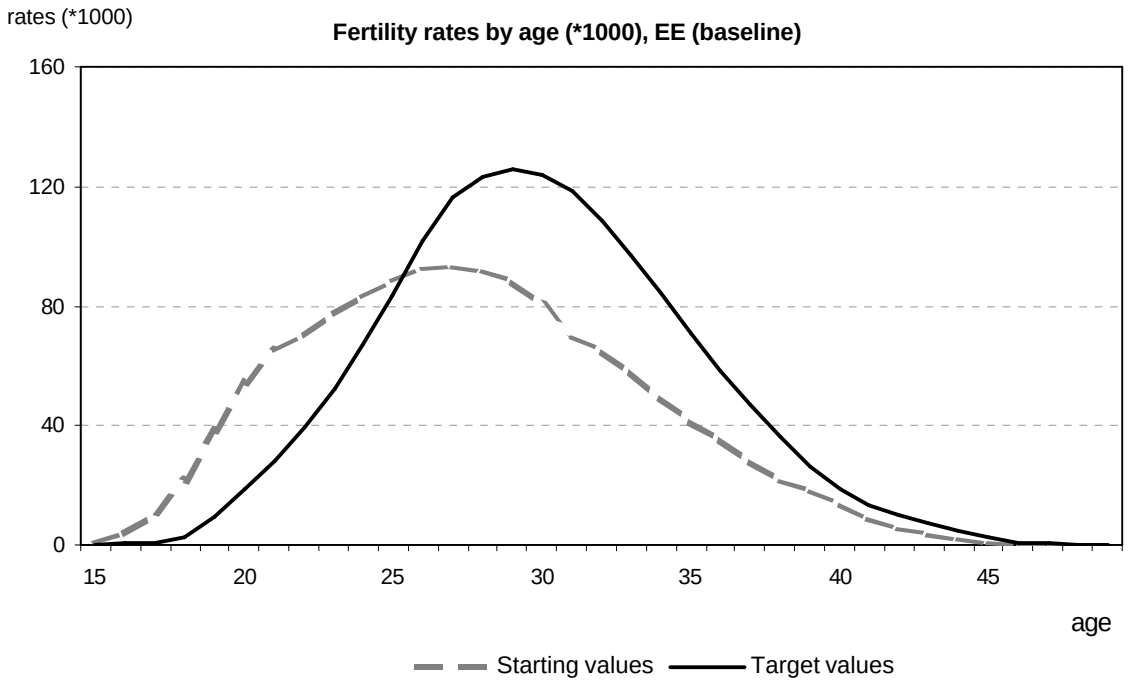
Calendar year
Baseline
Low
High
Cohort (Baseline)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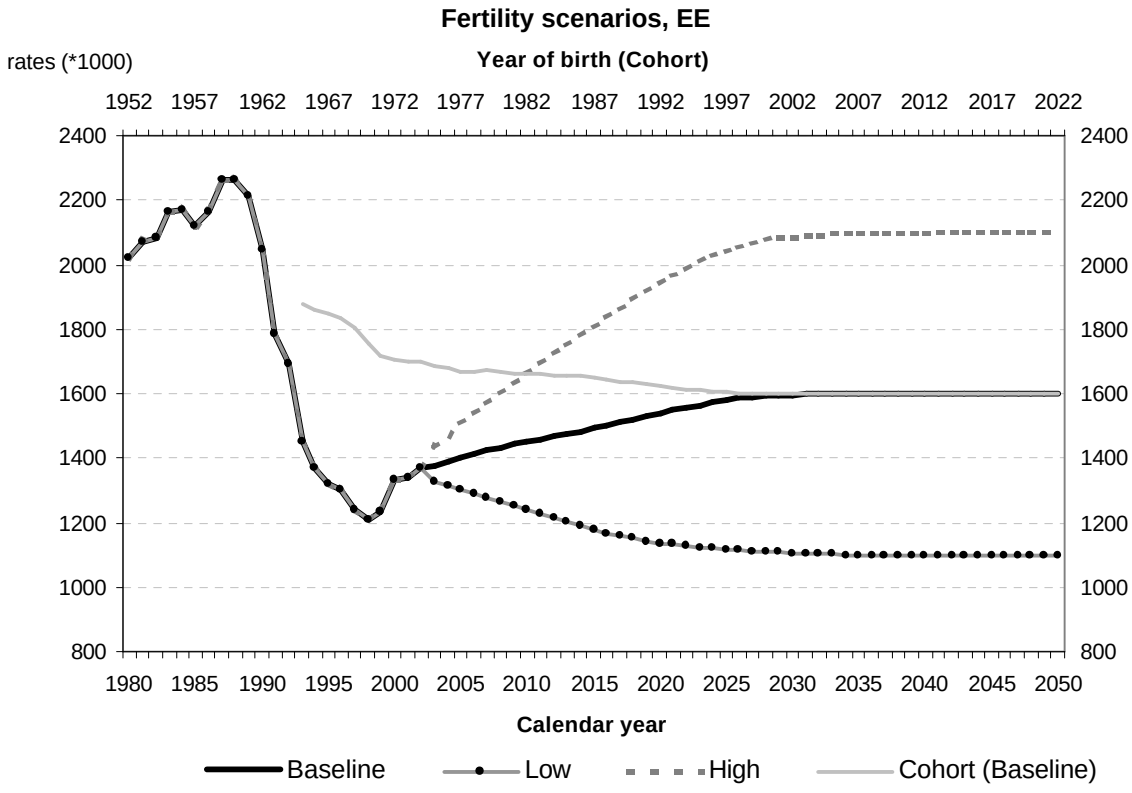
age
Starting values
Target values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rates (*1000)
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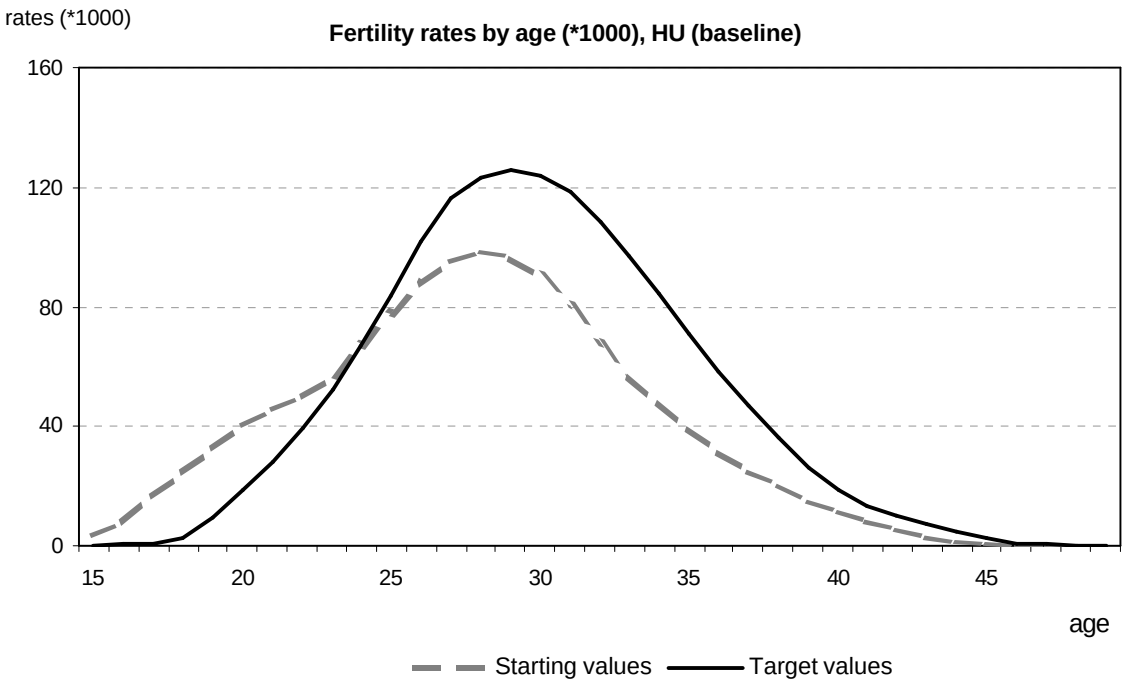
Calendar year
Baseline
Low
High
Cohort (Baseline)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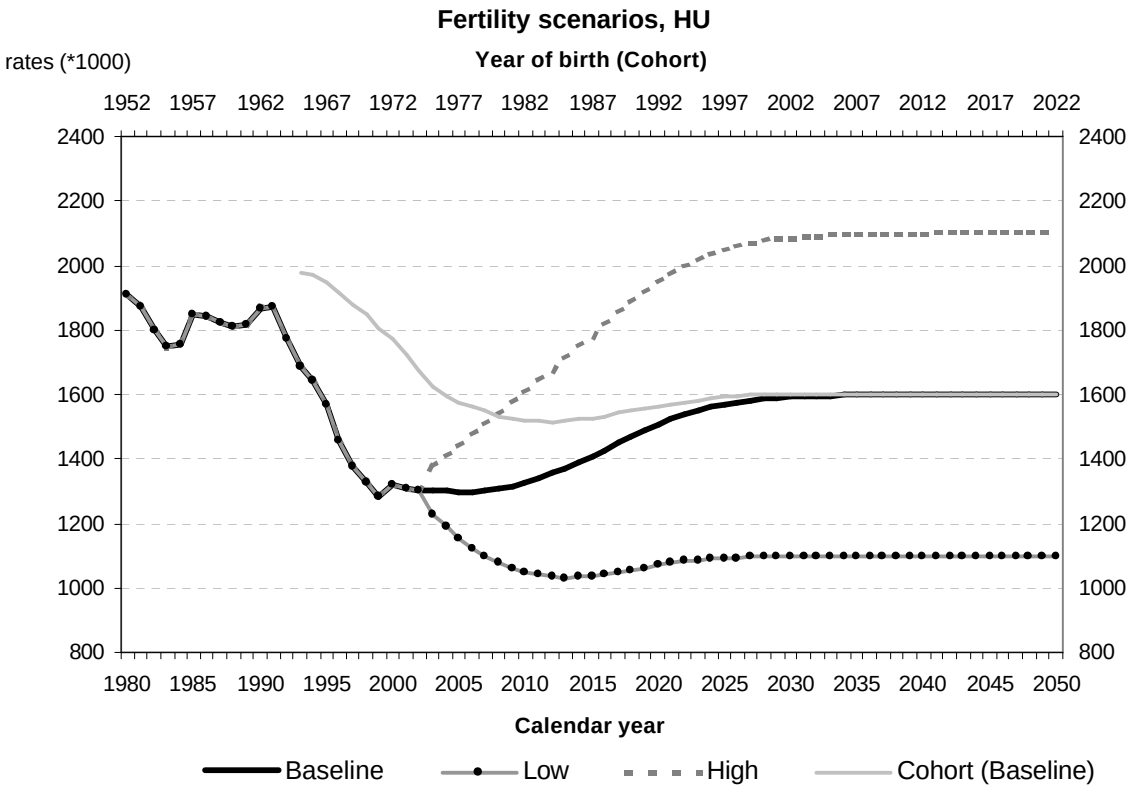
age
Starting values
Target values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rates (*1000)
Year of birth (Cohort)
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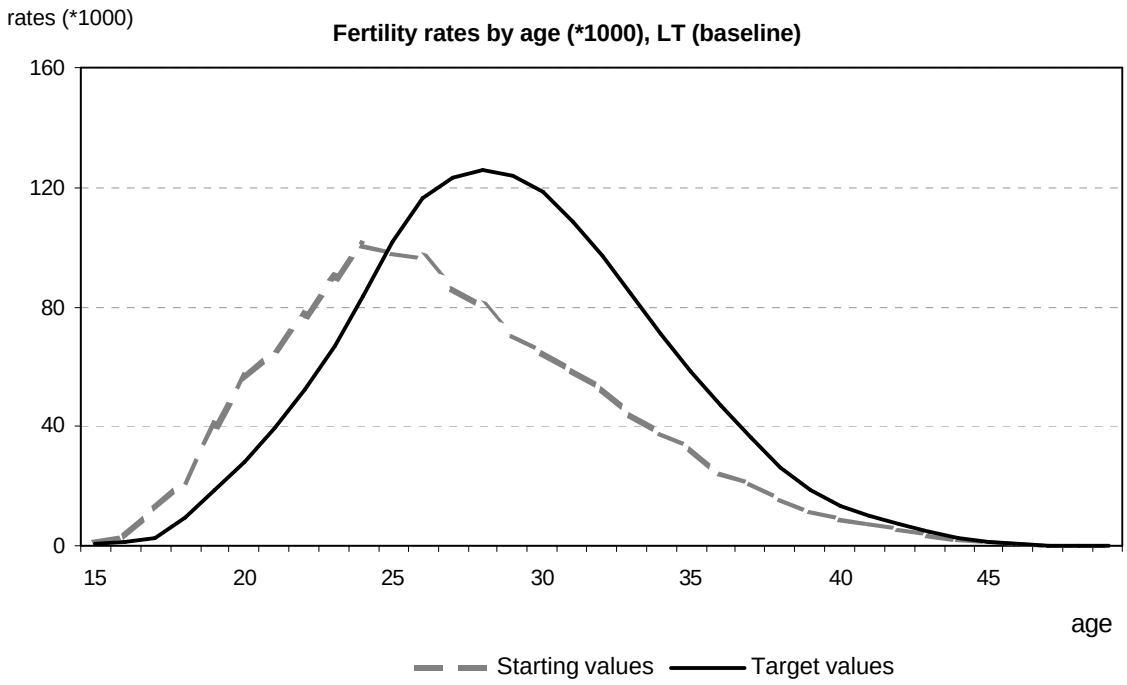
Calendar year
Baseline
Low
High
Cohort (Baseline)


rates (*1000)
Fertility rates by age (*1000), LT (baseline)
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120
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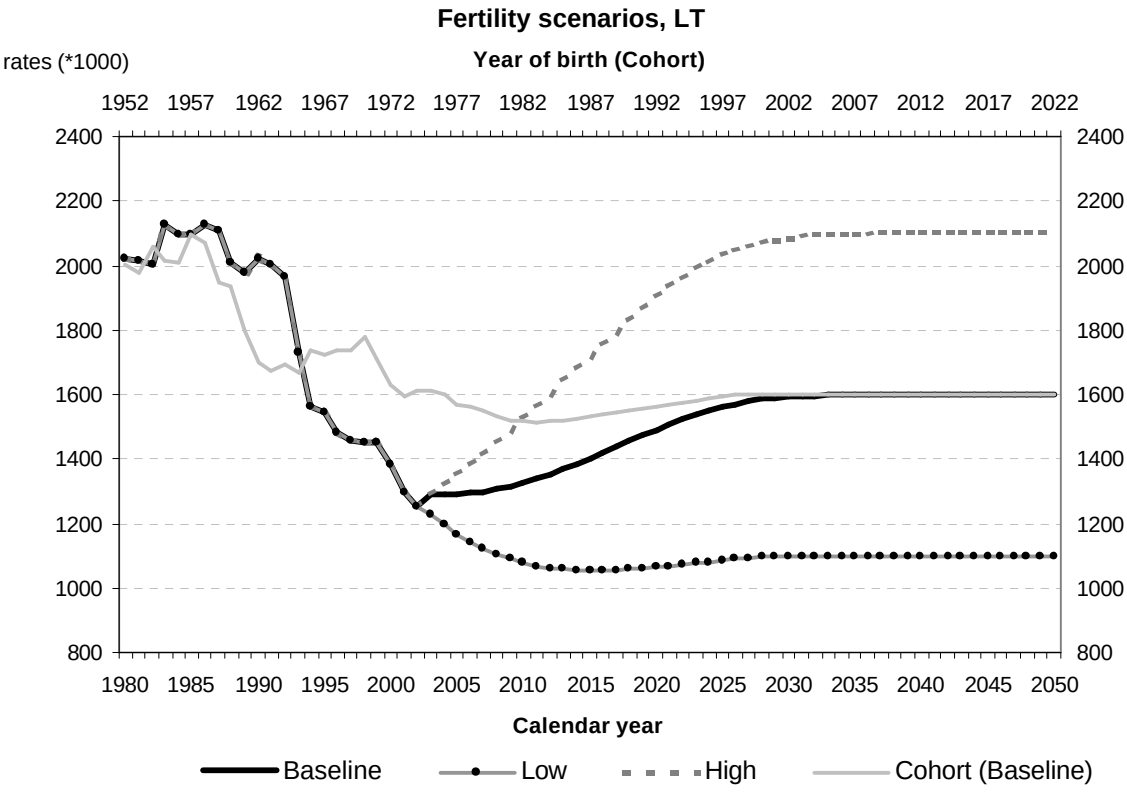
age
Starting values
Target values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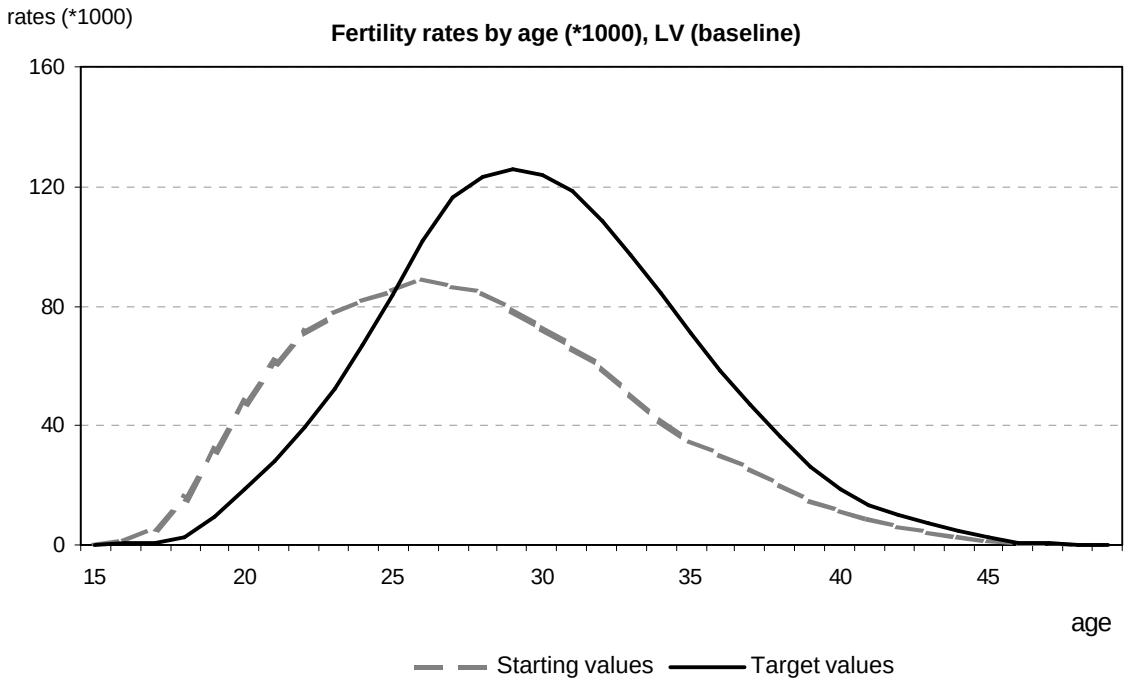
Calendar year
Baseline
Low
High
Cohort (Baseline)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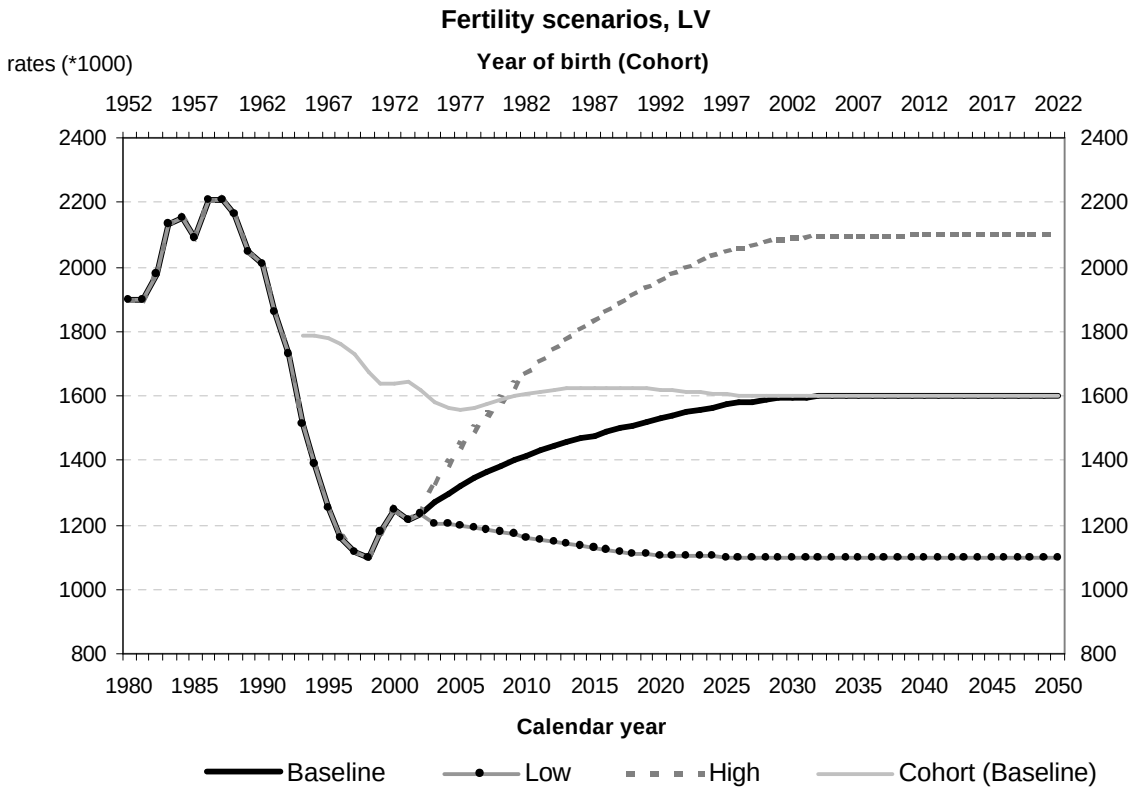
age
Starting values
Target values


Fertility scenarios, LV
rates (*1000)
Year of birth (Cohort)
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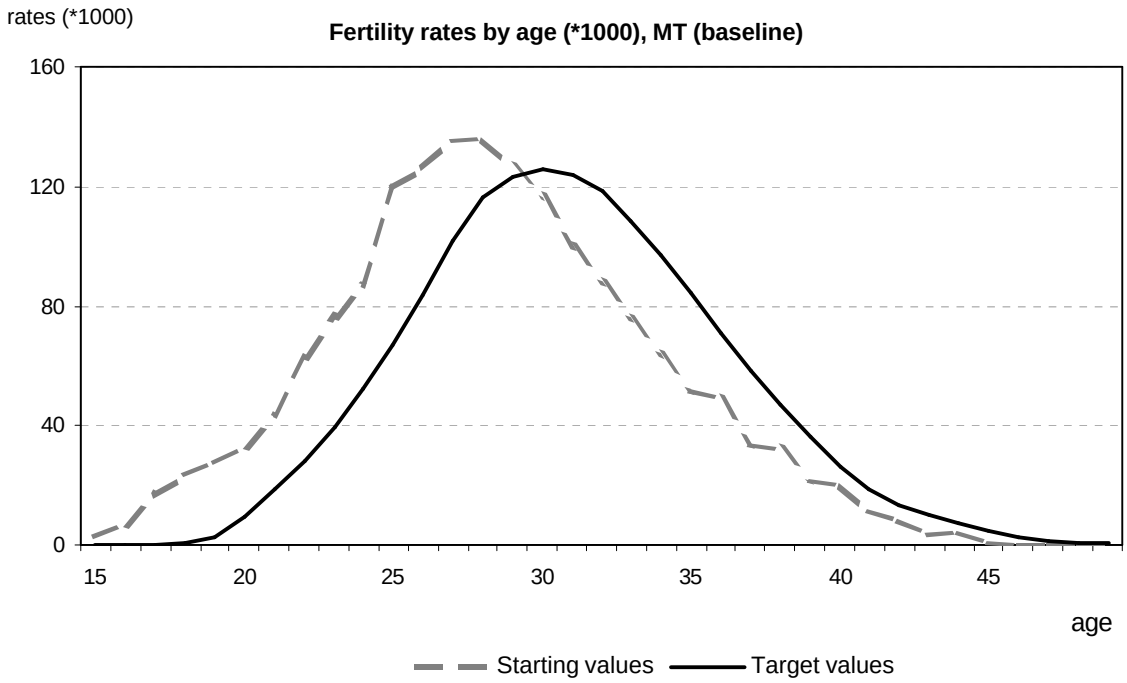
Calendar year
Baseline
Low
High
Cohort (Baseline)


rates (*1000)
Fertility rates by age (*1000), MT (baseline)
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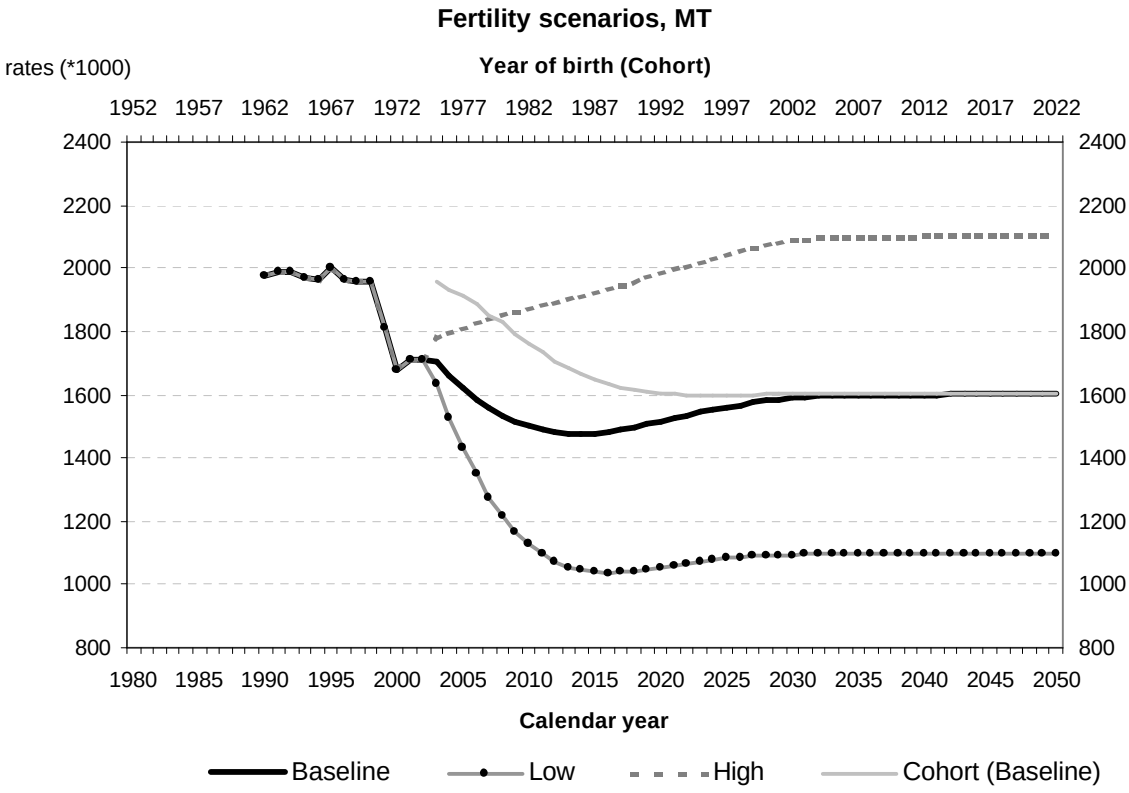
age
Starting values
Target values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Year of birth (Cohort)
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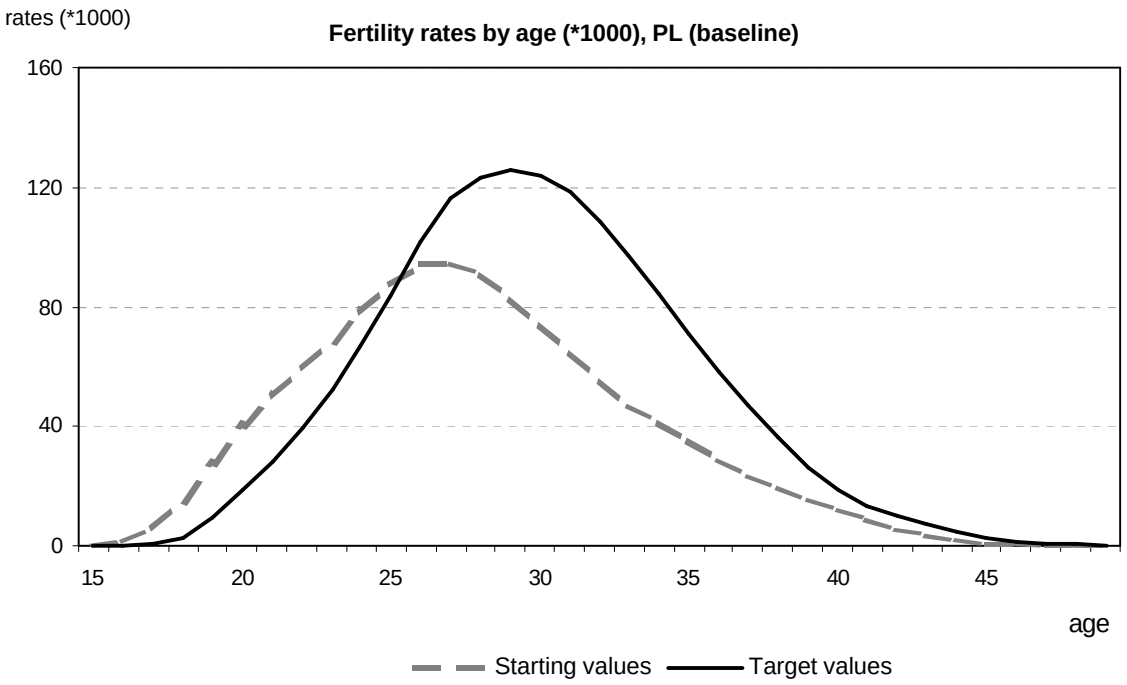
1980 1985 1990 1995 2000 2005 2010 2015 2020 2025 2030 2035 2040 2045 2050
Calendar year
Baseline
Low
High
Cohort (Baseline)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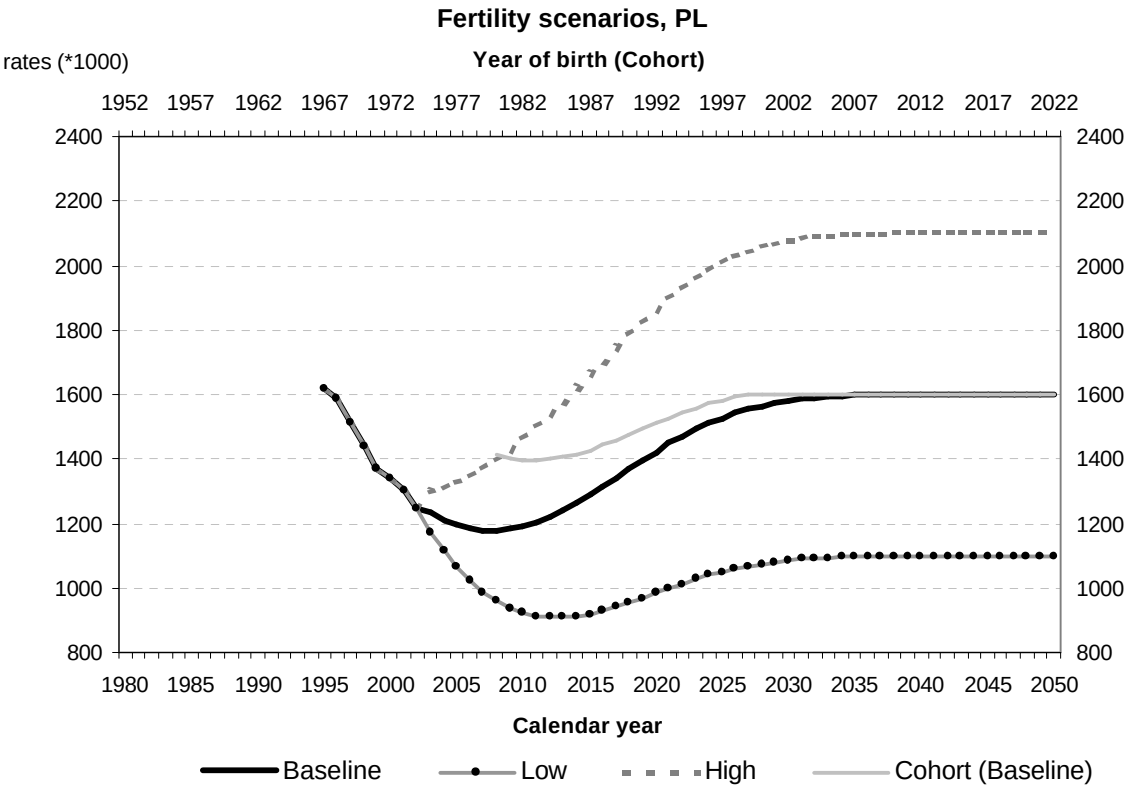
age
Starting values
Target values


Fertility scenarios, PL
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Year of birth (Cohort)
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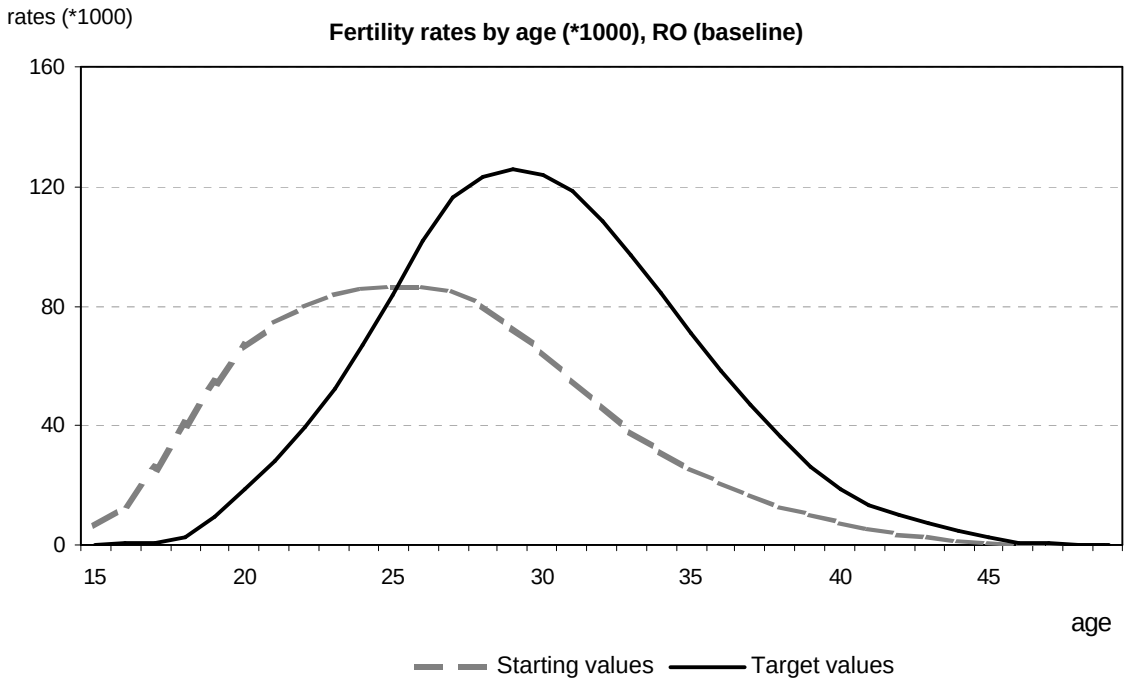
Calendar year
Baseline
Low
High
Cohort (Baseline)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Fertility rates by age (*1000), RO (baseline)
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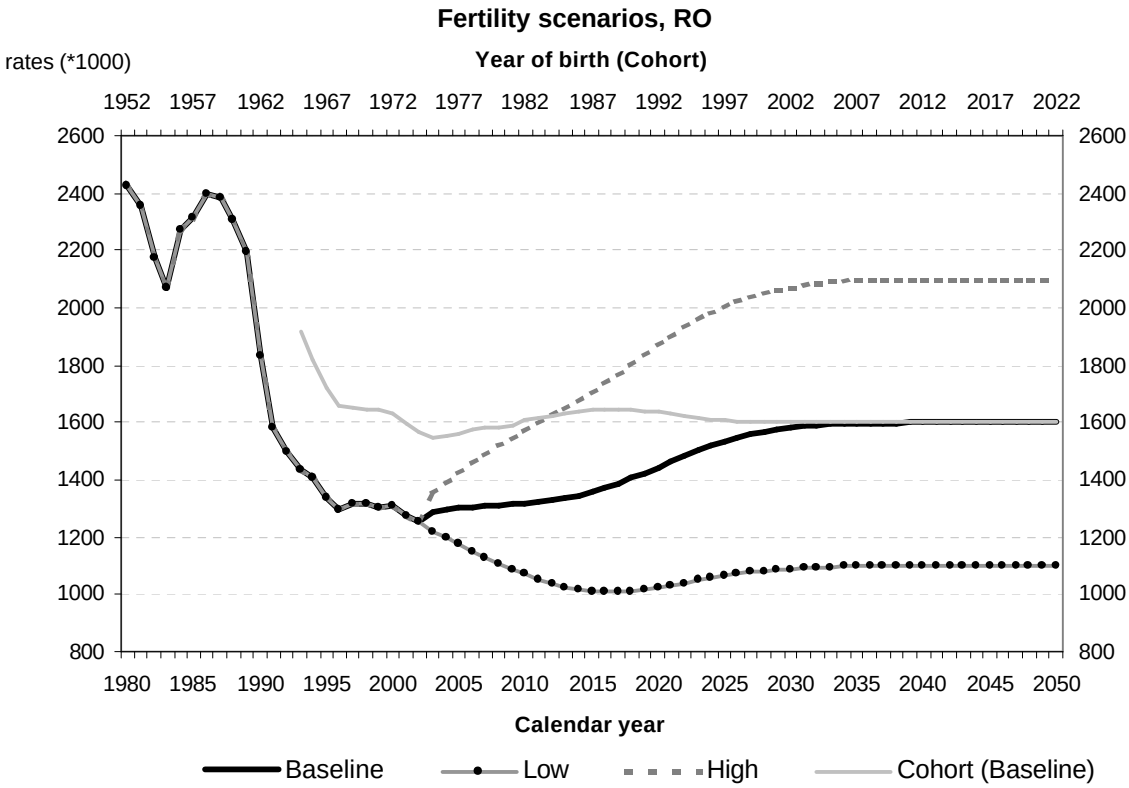
age
Starting values
Target values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rates (*1000)
Year of birth (Cohort)
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2600
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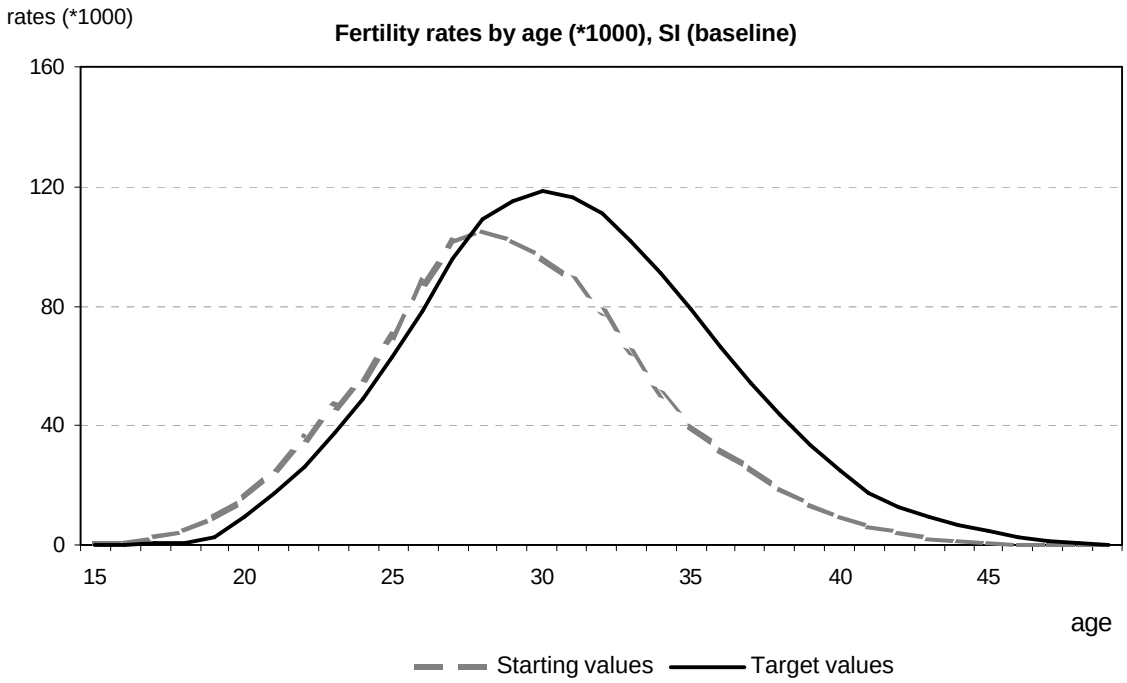
Calendar year
Baseline
Low
High
Cohort (Baseline)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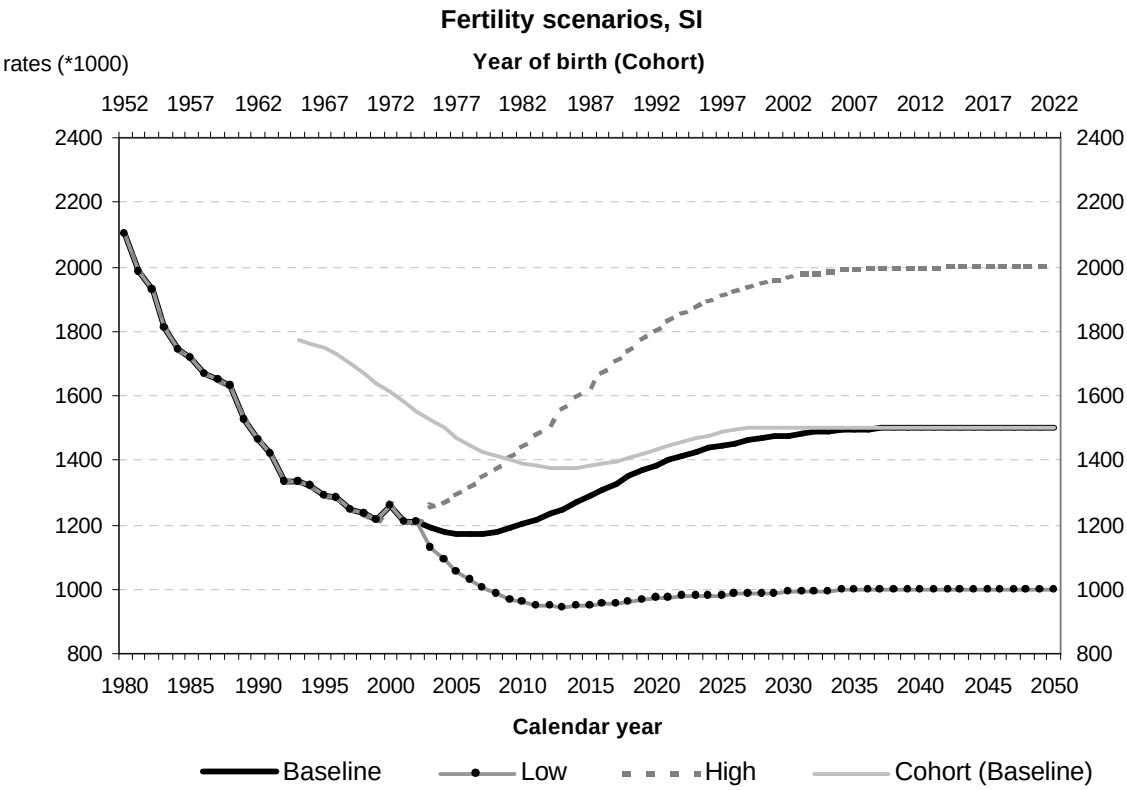
age
Starting values
Target values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Year of birth (Cohort)
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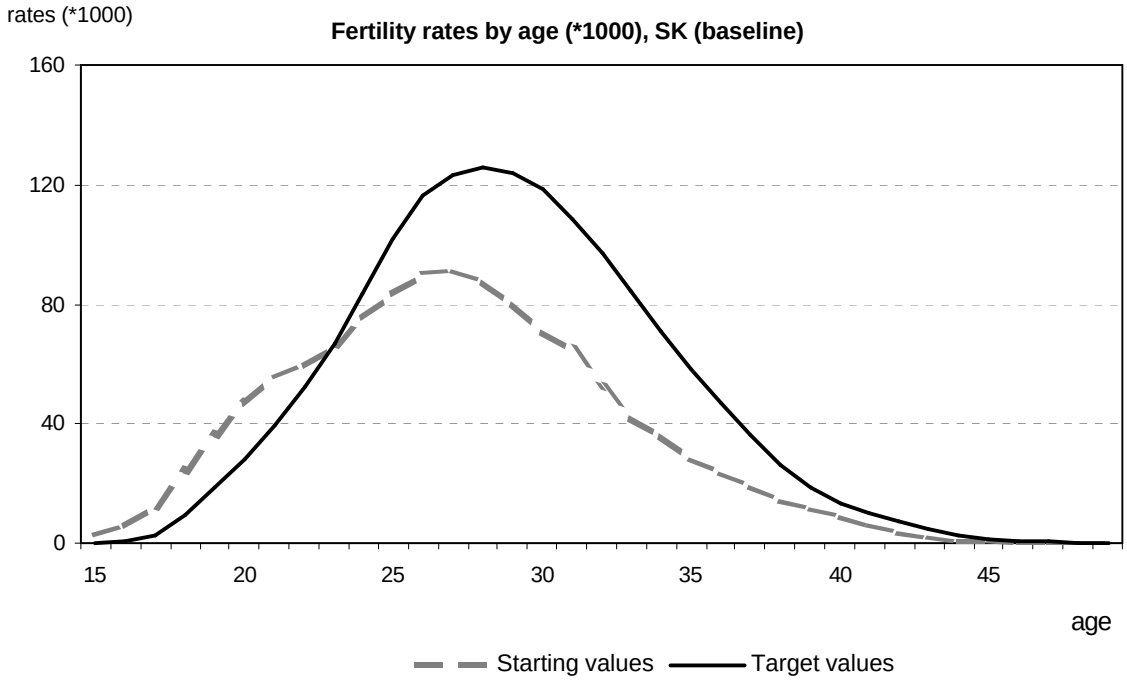
Calendar year
Baseline
Low
High
Cohort (Baseline)


rates (*1000)
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120
80
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0
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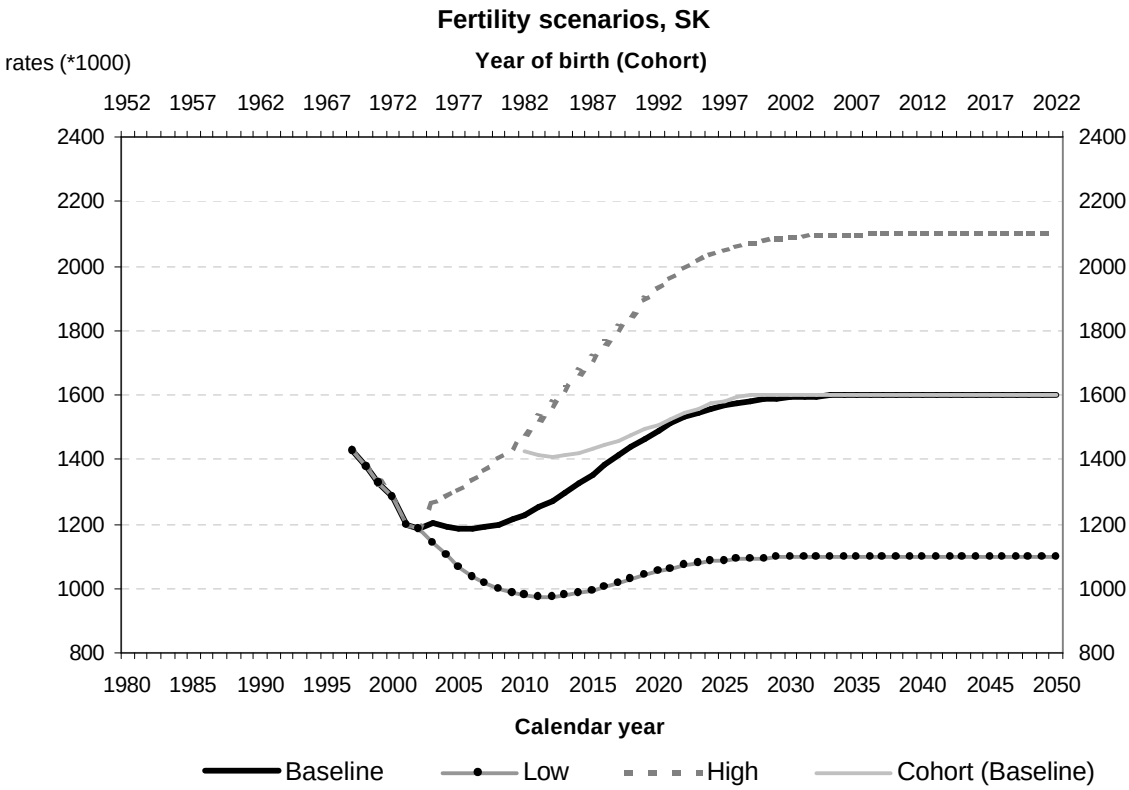
age
Starting values
Target values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Calendar year
Baseline
Low
High
Cohort (Baseline)

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