CAN ROMANIAN POPULATION DECLINE BE STOPPED?

Vasile Gheţău – University of Bucharest

Between 1992 and 2002, the population of Romania decreased by I.I million. The downward trend is not surprising, since all the available data on natural and migratory movements after 1989 define a well-installed population decline. The unexpected element is the magnitude of the decline and, more importantly, the contribution of a new and statistically little known component of external migration: Romanians who are abroad and have not been recorded by the 2002 census. Romania's population decline therefore acquires new dimensions and makes the country's demographic status even worse. What is however little known and evaluated at its true value is the extent to which the population's age structure has deteriorated in the context of population decline, and the implications of that deterioration from the perspective of the country's potential demographic recovery. This study attempts to approach Romania's demographic situation in the early 21st century from that lesser known perspective, while also looking at the country's population prospects.

The first section of the study is an overview of the trends registered so far in fertility, mortality and external migration, almost exclusively from the perspective of the manner and extent to which changes in the level and structure of these phenomena may contribute to reducing the degradation of the demographic situation and, in the long run, to curbing demographic decline. Based on the current demographic trends, as well as on the characteristics of the variables that have been generating these trends, we obtain a rather gloomy picture of Romania's population prospects for the following decades, unless we see a substantial recovery in the birth rate-the main component in the deterioration of the population's age structure.

The second section of the study deals with a description and analysis of the assumptions and results of three prospective scenarios for Romania's population for the first half of the 21st century. In fact, these scenarios indicate, from a normative perspective, the changes that should occur in birth rates (fertility) in the context of a population policy firmly oriented towards curbing Romania's demographic decline.

Introduction
Transition and Demographic Impact

Romania will soon be entering the 15th year since it has seen a deterioration of its demographic situation, with no signs of recovery. It would be unfair to deny or overlook the relative stability registered in **birth rates and crude death rates** during these last years. However if we look at the present level registered by the two variables, we realize that the process of degradation actually continues, due to the accumulation and consolidation of the negative potential contained in the imbalances affecting the age structure of the population. Moreo ver, the results

Romanian Journal of Sociology, XV, 1-2, Bucharest, 2004

of the March 2002 census revealed an unexpectedly high level of external migration, which makes the general demographic picture even worse.

The current demographic situation of the country is the cumulated result of the complex trends in birth rates (fertility), mortality and external migration recorded in the 1990s and the first few years of the 21st century. Current trends are fundamentally negative, but our analysis needs to go beyond that general statement. Social and economic crises may be considered responsible for the increase in mortality rates during the first half of the 1990s, and for the upsurge of external migration in the second half of the same decade. Things are more complicated as far as birth rates are concerned. They used to be unusually high during the second half of the 20th century, under the impact of the forced pro-natalist policy of the former regime. The results of that policy have also left their imprint on the trajectory of birth rates after 1989, due both to the severe break in that trajectory in the years 1990-1991, when all restrictions concerning access to contraception and abortion were lifted, as well as to the size and structure of the fertile-age population. However, the economic and social context of transition has undoubtedly also affected birth rates, particularly during these last years.

The deterioration of Romania's demographic situation has acquired such dimensions that the attempts to project the future trends of Romania's population using the well-known methods of analysis, adjustment, correction and extrapolation of past and current trends in fertility, mortality and external migration cannot be based in any way on the current features of the demographic situation. As a result, we need to use a different approach.

Under the circumstances where the current values and characteristics of female fertility and mortality by age groups continue to remain at the same levels, Romania's population will irremediably get onto a downward slope, decreasing from 21.8 million inhabitants in 2002 to 20 million in 2020 and 19 million in 2025. Moreover, the 15-year long decline that has set in without any prospect of being curbed during the coming years obviously acquires the characteristics of a self-generating process with a solid internal dynamics that may lead to a disastrous decline after 2025, and a population that would hardly exceed 14 million by 2050. Under such a scenario, external migration, which can only be negative, has not been taken into consideration. Formulating an assumption on the subject would be rather risky, particularly considering the lessons learnt on the occasion of the 2002 census. In other words, the results of our scenario can only be minimal.

Some could draw our attention to the fact that there is an essential difference between the nature and the potential trajectory of fertility and mortality rates in the future, and that it is unrealistic to assume that mortality rates will continue to remain at the same levels. This observation is correct and in a second scenario we have developed our population projections based on the assumption that fertility rates will continue to remain at the same levels as in these last years and that there will be a considerable decrease of mortality rates

by age groups, so that life expectancy at birth would increase from 68 to 73 years for males and from 75 to 79 years for females in the interval 2002-2025 (we shall revisit that assumption at a later point).The results of this scenario are less dramatic – 20 million inhabitants in the year 2025 and 16 million in 2050, **but we do not think it provides us with a fundamentally different picture about the future of Romania's population.**

The natural conclusion we have reached after having examined the results of the two baseline scenarios is completely unambiguous: in order to prevent the massive depopulation of the country which is emerging as a trend in the long and very long run a recovery of fertility is essential/ required, i.e. the number of children a woman bears. In other words, we think that the approach to the future of Romania's population can be exclusively a normative construction, and this is the type of approach that we have used in our population projections for Romania in this study. Consequently, the potential users of our projections need to exercise caution in selecting the variants on which they will base their own prospective sectoral constructions.

How can we define the trajectories recorded so far by the three demographic variables that will model Romania's population in the coming decades, and what can the prospective message of these trends be?

The **fertility** decline in the 1990s was generated by a complex set of causes and would also have occurred in a different social and economic context The decline factors are the very same factors that, ever since the 1960s and 1970s, have triggered the massive fertility decline in almost all developed European countries under constant economic and social progress: emancipation of women and their increasing participation in economic activities outside the household; longer duration and level of education; weakening influence of cultural, and especially religious norms; growing social mobility; high cost of raising children; reduction of the children's economic function, particularly of their role in the economic security of elderly people; appearance of modern contraceptive methods; other factors. The time gap in Romania's case can only be explained as the result of the forced pro-natalist policy of the former regime. On the other hand, the new economic and social realities have certainly contributed to the decline of fertility as well. Degradation of living standards, unemployment, uncertainty and stress are decline factors specific to periods of transition (in Romania, as well as in other Eastern-European countries). We can also identify influences of a different nature which are much more complex and will continue to model the phenomenon, even in a better socio-economic context than the current one (Economic Commission for Europe, 1999; 2002; United Nations Population Division, 2003b). According to some specialists, the recent trends registered in birth rates also have to do with individualism and consumerism, being at the same time a component in a broader process of demographic and social change known as the second demographic transition. Beside the decline of fertility, this new transition is accompanied by changes in

attitudes and behavior concerning marriage, cohabitation, divorce, children born out of wedlock, contraception and sexuality (van deKaa, 1987).

While decline is the dominant and the most worrying movement in the trajectory of fertility in the 1990s (it practically occurred during the first two or three years of the decade), we should not overlook the second important change that began in the latter half of the 1990s and is currently in full swing. It is the restructuring of the **fertility pattern**. Romanian fertility has always been early fertility (the highest values have been recorded in the 20-25 age group). Beginning with 1995, however, we have witnessed a constant increase of fertility at ages over 25. For similar values of the **Total Fertility Rate** in the years 1995 and 2000, fertility rates for the 30-40 age group were 20-25 per cent higher in 2000 than in 1995. At the same time, in urban areas the fertility rate curve has already moved away from the early pattern acquiring the characteristics of a spread out pattern, with the highest values in the 25-30 age group as an intermediary stage towards the late pattern, specific to Western European populations. The spread of the intermediary pattern to the population in the rural areas is merely a matter of time and may occur in the medium term. As long as the age of the first marriage is growing (for women it was 22 years in 1990 and got to be 24 by 2002) (National Institute for Statistics, 2001; 2003d), it would be difficult to admit that the current structural changes are merely generated by temporary circumstances, with origins in the economic and social crisis Romania is going through. Having fewer children, preferably no more than one, at older ages is becoming the rule governing the reproductive behavior of young couples in a society that is rapidly adopting the system of values and attitudes of developed countries, along with all the good or bad parts of post-industrial capitalist societies. High living standards in developed countries have never been a factor contributing to fertility increase, in fact they had quite the contrary effect in the second half of the previous century, a time of spectacular economic growth and unprecedented increase in living standards, but also of sharp decline in fertility rates. In Romania, cultural norms continue to govern individual behavior concerning marriage, the family and children, even if they do so to a lesser extent than before. As a result, if the appropriate mechanisms for regulating the relationship between economic and demographic factors are applied, fertility rates can be improved to some extent along with the substantial improvement of the living standards [I].We do not think, however, that a significant recovery of fertility could be imagined outside a well conceived and implemented demographic policy, based on economic measures meant to support families and children. Such a policy, which would be extremely costly, would have to rely on the resources provided by a strong and stable economic growth. The future trajectory of fertility continues to be a major unknown factor, but its recovery is the unique option capable of leading to an improvement of the country's demographic situation and, potentially, to curbing demographic decline in the future.

Mortality has always been high in Romania, but it is expected to decrease in the future. We are aware of the means and strategies that have to be applied for reducing mortality, as they cannot differ fundamentally from those that led to the spectacular rise of life expectancy at birth in developed countries during the second half of the previous century. When living standards, the quality of health care, and access to health care services improve significantly and the lifestyle of the population is oriented to a larger extent towards health and welfare, the reduction of mortality for different age groups and the rise of average life expectancy will almost naturally take the desired course. In our opinion, when we evaluate the trajectory of mortality during the transition years we need to use accurate instruments and to nuance our conclusions. A real deterioration of the health status measured by the increase of mortality for different age groups and, as a consequence, the decrease of life expectancy at birth, only occurred during the years 1992-1996 (Figures la and Ib) and touched almost exclusively the male population (except the year 1996) (Ghetau, 1998).There was a continuous and considerable rise in life expectancy at birth after 1996. As a consequence, the values for 2001 - almost 68 years for males and a little above 75 years for females - were 2.6 and 2.3 years higher than the values for 1996. As compared to 1989, the progress is of I.I and 2.3 years, respectively. The reduction of mortality among adults and elderly persons was what mostly contributed to the rise of life expectancy at birth after 1996, followed to a lesser extent by the contribution from a reduction of mortality among young persons (Figure I c). It must be emphasized that mortality by age groups is considerably lower for the cohorts born after 1989 than mortality in the same age groups for the cohorts born before 1990. Access to family planning services and the shrinking number of unwanted children had beneficial effects on the health of children born after 1989, as well as on women's health in general. Despite that, the health status of the population and mortality levels continue to be a reason for concern, while infant mortality rates place Romania in an unacceptable position [2]. Moreover, the current situation of the health care services and the health care system in general do not really create the premises required for changing these realities.

Romania has important reserves for reducing mortality rates and, in the conditions of a high and stable economic growth, with a direct positive impact on the living standards and the quality of health care, mortality will most certainly decrease.

Finally, the third demographic variable, external migration also continues to be a great unknown in any prospective approach to Romania's population, as long as the balance of legal external migration was almost null in the years 2001-2002 (around 10 thousand emigrants and an almost equal number of immigrants, according to the data provided by the National Institute for Statistics). On the other hand, there is no reliable statistical data about unknown external migration (although it is certainly much higher than we could have estimated before finding out the results of the March 2002 census). Moreover,

the future trends of external migration are unpredictable today, as they are directly dependent on Romania's economic and social development, on the immigration policies of developed countries (that are in their turn directly related to the economic progress and demographic developments in those countries). However, Romania's external migration will continue to be negative and maybe even more extensive in the perspective of Romania's European integration, which will further aggravate the country's demographic situation. The results of our projections need to be considered and evaluated from that perspective as well.

The Need for a Prospective Approach and Related Difficulties

After 14 years of continuous deterioration of the country's demographic situation, and in the absence of any perspective for recovery, at least not in the medium term, any relevant analysis of the current status and ongoing trends raises the acute problem of the country's demographic future. It would be a major error to espouse the theory according to which, if the country manages to get over the current economic and social crisis, this will naturally result in a recovery of the overall demographic situation. Accepting that theory would mean neglecting the complex relationships between the status and movement elements of the population, and particularly the long term effects of past and current trends. We could even claim that the most worrying trend is not the falling number of the population, but its association with a continuous degradation in the age structure. This degradation, if it continues along the same lines, will seriously call into question the motivation and effectiveness of any intervention.

Whatever our approach, however, a prospective view is indispensable and this study is one of the potential approaches. Population projections are a major instrument in developing programs and strategies for economic and social development. As yet, Romania has not defined its major options concerning its sectoral economic development in the long run, therefore population projections do not seem today to be a fundamental instrument from that perspective. The situation is different, however, if we refer to the need for improving the current demographic situation. Demographic projections are indispensable here and this goal underlies our entire approach. In the sense accepted by specialists in the field, in a set of population projections, a population forecast is the variant that is most likely to occur, as it is based on the most realistic assumptions. Yet, given the complexity of the current demographic and socio-economic realities, it is impossible to develop an adequately substantiated population forecast This is also the reason why our entire construction is conceived in such away as to offer a specific answer to the terrible question: "where is all this taking us?"

Our projections have been developed in several variants, but only three of them have been retained in this presentation, a fourth variant serving just as a

reference for evaluating the former three. The set of projections we have made extends up to the year 2050 and the data concerning the period 2002-2025 are a section of the longer-term projections. We have chosen the year 2050 as the end line of our projections both because of the typical dynamics and dialectics in time of demographic phenomena, and because of the need to place our national projections in the context of international projections that all refer to the period until 2050. Moreover, in order to illustrate the way in which the distortion of the age structure may develop in the very long term, we have extended two of the variants to the end of the century, in an exploratory exercise.

Assumptions and Projection Variants

Fertility

Increasing fertility is the only option Romania has in order to reduce the deterioration of the country's demographic situation and, potentially, to curb its almost 15-year long demographic decline. It is well known, however, that these desired trends in the population number and age structure can only settle in after fertility is maintained at replacement level for a large number of years. Replacement-level fertility has a well – defined value – 2.1 children per woman [3], a level that we have also used in our projections. Under one of our assumptions, this threshold is to be reached by 2020, while in another, by 2050.This value has been chosen not only because it is indispensable for curbing demographic decline in the long term. Surveys conducted in several European countries, including Romania (Serbanescu, Morris, Marin, 2001) concerning the female population belonging to different ages, social and professional categories (United Nations Economic Commission for Europe), have indicated that the desired number of children is also two. In other words, parents wish and intend to have two children, and only factors that prevent them to achieve that wish can explain why the fertility level in European countries is below 2 children per woman (1.5 in the EU15).We could draw the conclusion that removing the barriers that lead to a real mean number of children below two could lead to an increase in the level of fertility to the desired number [4]. And a demographic policy that means to boost fertility must target those very barriers.

Under the first growth assumption, fertility would reach 1.5 children per woman by 2005, and 1.85 by 2025, and would come up to the replacement level by 2050. Under the second growth assumption, the replacement level would be reached by 2020 and then it would continue at the same level. The value for 2010 would be 1.9 children per woman, in a consistent growth as against the current levels- 1.25 children per woman in 2002 (Table I and Figure 2a).

Under both assumptions, fertility would continue to undergo the structural changes that emerged after 1995. Consequently by 2020 fertility would reach the current mean structure by ages in the 15 EU Member States, and by 2050 the structure in the six EU Member States where the process of postponement is the

most advanced. In practical terms, Romanian fertility would shift from the current model where the highest values are recorded between 20-25 years, to the Western European model where the highest values occur between 25-30, or 30-35 years (Figure 2b).

Table 1. Fertility Assumptions. Level and Age-Pattern

Assumption	Total Fertility Rates – children per woman						
	2000	2002	2005	2010	2020	2025	2050
Assumption 1 - fertility age-pattern	1.3	1.25	**1.25** RO	**1.25** Int	**1.25** EI5	**1.25** Int	**1.25** E6
Assumption II - fertility age-pattern	1.3	1.25	**1.5** RO	[1.6] Int	**1.8** EI5	[1.85] Int	**2.1** E6
Assumption III - fertility age-pattern	1.3	1.25	**1.6** RO	**1.9** Int	**2.1** EI5	**2.1** Int	**2.1** E6

Note: RO = age-pattern of Romanian fertility in 2002; E15 = mean age-pattern of fertility in the EU 15 (in 2000); E6 =mean age-pattern of fertility in six EU Member States (in 2000) (Denmark, Finland, France, Italy, the Netherlands and Sweden); Int = intermediary age-pattern, between the two adjacent patterns; the bold underlined figures are the values adopted as an assumption-objective; the values between square brackets are interpolated values.

Source: for Romania- National Institute for Statistics (INS) (2001), for 2000, and calculations by the author for 2002 (based on INS data); for the E15, E6 and Int structures - calculations of the author based on Council of Europe data (2002).

If we compare our assumptions to the assumptions for Romania contained in the recent projections developed by the UN Population Division (United Nations, 2003a) Figure 2a, in the Medium-fertility variant which is the most likely variant in any set of projections, we will see a good convergence of all approaches, even if the values of the Total Fertility Rate are slightly higher in our projections (1.85 as against 1.6 in 2025 and 2.1 as against 1.9 in 2050). It is important to emphasize that, for all European countries, the Medium-fertility variant of the UN projections is constructed based on a fertility assumption of 1.9 children per woman in 2050.We think that the High-fertility variant of the UN projections, with a Total Fertility Rate of 1.87 children per woman in 2025 (a value which is identical to the Medium-fertility variant in our projections), supposed to reach a value of no less than 2.4 children per woman by 2050, is a purely exploratory scenario for the second half of the interval.

In the current complex social and economic context, where demographic developments are unpredictable, any prospective approach to fertility is relative and the future needs to be created. If we adopt a positive attitude about the future, the normative approach is the only one we can opt for, given the current demographic crisis which will also continue in the coming years in the absence of effective intervention. Our two assumptions concerning fertility are the very result of such an approach.

Mortality

In defining our mortality assumptions, we are operating in a more limited area, therefore we have a higher degree of certainty as demonstrated by international experience. Mortality by age groups should decrease naturally as the entire social and economic context improves, in this case the connections being much more direct and natural than in the case of fertility. Living standards in visible progress will almost automatically influence the health status of the population, therefore also of mortality levels. On the other hand, access to high performance medical techniques and technologies, as well as to state-of-the-art medication, which should become a reality in the following decades, particularly after Romania's EU integration, will further consolidate and accelerate the positive trends mentioned above [5].

The unknown element in the definition of our assumptions is the pace of mortality decline and in relation to that, the values of life expectancy at birth in the following decades. The approach we have used is to place the values we have selected in a European context, using as a baseline the values of life expectancy in 2000 and those used by the United Nations Population Division in the latest series of its well-known projections.

Table 2. Mortality Assumptions

Values of life expectancy at birth in the years 2000, 2025 and 2050 – in Romania, Eastern Europe (and some countries in the region) and Western Europe

Country Region	2000		2025		2050		Increase 2000-2050	
	Males	Femal	Males	Femal	Males	Femal	Males	Femal
Romania - our assumption	67.8	74.8	73.0	79.0	76.0	82.0	8.2	7.2
Romania - UN assumption	66.4	73.8	71.8	77.9	74.7	80.4	8.3	6.6
Eastern Europe	63.6	74.2	69.5	77.0	73.9	80.2	10.3	6.0
- Czech Republic	71.7	78.4	76.4	82.6	78.6	84.6	6.9	6.2
- Poland	69.7	77.9	74.2	81.2	77.2	83.5	7.5	5.6
- Slovakia	69.2	77.4	73.8	80.3	76.8	83.0	7.6	5.6
- Bulgaria	68.5	75.1	72.4	78.6	76.1	82.0	7.6	6.9
- Hungary	67.4	75.9	72.6	80.0	76.3	82.7	8.9	6.8
Western Europe	75.0	81.4	78.4	84.3	80.8	86.8	5.8	5.4
Gap (in years) between Romania and*:								
Eastern Europe	+4.2 +2.8	+0.6 -0.4	+3.5 +2.3	+2 +0.9	+2.1 +0.8	+1.8 +0.2		
- Czech Republic	-3.9 -5.3	-3.6 -4.6	-3.4 -4.6	-3.6 -4.7	-2.6 -3.9	-2.6 -4.2		
- Poland	-1.9 -3.3	-3.1 -4.1	-1.2 -2.4	-2.2 -3.3	-1.2 -2.5	-1.5 -3.1		
- Slovakia	-1.4 -2.8	-2.6 -3.6	-0.8 -2	-1.3 -2.4	-0.8 -2.1	-1 -2.6		
- Bulgaria	-0.7 -2.1	-0.3 -1.3	+0.6 -0.6	+0.4 -0.7	-0.1 -1.4	0 -1.5		
- Hungary	+0.4 -1	-1.1 -2.1	+0.4 -0.8	-1 -2.1	-0.3 -1.6	-0.7 -2.3		
Western Europe	-7.2 -8.6	-6.6 -7.6	-5.4 -6.6	-5.3 -6.4	-4.8 -6.1	-4.8 -6.4		

Note: According to the classification used by the UN, we have considered Belarus, Bulgaria, Czech Republic, Russian Federation, Moldova, Poland, Romania, Slovakia, Hungary and Ukraine for Eastern

Europe, and Austria, Belgium, France, Germany, Liechtenstein, Luxembourg, Monaco, the Netherlands and Switzerland for Western Europe.

* The first line shows the differences as compared to Romania - our assumption, while the second line shows the differences as compared to Romania - UN assumptions.

Source: for the year 2000 - life tables produced by the author for Romania, and Council of Europe (2002) for the other countries; forthe years 2025 and 2050 - United Nations Population Division (2003a) (UN values are mean values forfive calendar years; the values in the table forthe years 2025 and 2050 have been obtained by interpolation between the adjacent mean five-year values)

The data presented in Table 2 (and Figure 2c) indicate that our assumption is more optimistic than the UN projections, life expectancy at birth being approximately one year higher in our option both in 2025, and in 2050. Let us motivate our option. In the latest projection series of the United Nations Population Division, the projection of mortality at national level is based on change (growth) models of life expectancy at birth in time, models built by generalizing historic national trends. Such an approach does have its own logic, and comparisons between the projected and the real trends generally reveal the realism of the method. We think, however, that the viability of this approach can be challenged when it refers to periods of deep changes in the socio-economic context. Since the UN projections proved to be rather unrealistic for the 1990s for the countries in economic and social transition when there was an unpredictable increase in mortality rates, then we may have some reservations concerning the projections about the future.

If we examine the values of life expectancy at birth in the year 2000 (real values) and those projected by the UN Population Division for the years 2025 and 2050 in countries in transition, we will notice some inconsistencies concerning the dynamics of the rise in life expectancy at birth and the position of Romania among other Eastern European countries. It appears that the projected value of life expectancy at birth in the period 2000-2005 in the UN projections should be higher than the real value registered in 2000, since all the countries in Eastern Europe have seen a significant decrease in mortality by ages during these last years (Council of Europe, 2002), and the prospective view had to reflect these trends. This situation can be seen in eight out of the ten countries in the region, the exceptions being Romania and Bulgaria where the UN values for the period 2000-2005 are much lower than the real values for 2000, by a year for males, and half a year for females. The whole construction is obviously inconsistent and we can find no logical explanation for that, since the data for 2000 were available both in national publications in the field and in Council of Europe publications already beginning with 2001 .When founding a projection by using initial outdated values of life expectancy, one can no longer be surprised by the subsequent trustless comparative developments in time and by the changes that may result in countries ranking by levels of life expectancy at birth. According to this analysis, Romania's position among Eastern European countries would be worse both in 2025 and even more in 2050, although there are no solid arguments for this projection. While we could accept and identify

the reasons why the Baltic States would move up the list ahead of Romania (along with the Czech Republic, Poland, Slovakia and Hungary), we can hardly see why Romania should rank after Ukraine and Moldova following 2025.The element that is overlooked is the current sizable difference in Romania's favor (almost four years for both males and females as compared to Moldova, and almost five years for males and one year for females as compared to Ukraine) (Council of Europe, 2002),as well as Romania's economic and social perspectives (which will certainly impact mortality rates) in the context of European integration. The fact that the projection models for life expectancy at birth were based on values below the actual values registered in the years 2000-2002 could explain the projected dynamics of the indicators and the values projected for Romania.

Let us say in conclusion that we have used a single variant for mortality, according to which life expectancy at birth will be 73 years for males and 79 years for females in 2025, and 76 years for males and 82 years for females in 2050.To our satisfaction, these figures are the same as those that would result from the UN projections, if the growth models were based on the actual values of life expectancy at birth registered in Romania in the years 2000-2002. This is an argument that cannot be underestimated in evaluating our assumption. Moreover, both international practice and our own experience lead us to a conclusion that should not be overlooked either: at very high values of life expectancy at birth, as those we used for the years 2025 and 2050, relatively different but coherent mortality assumptions do not lead to significantly different projection results. Several assumptions about mortality automatically lead to the generation of several projection variants, uselessly complicating the choice of the most adequate variant by the users of the projections.

If we use these values, the gap between the nine Western European countries (mean values) and Romania will shrink from over 7 years for males and almost 7 years for females in 2000, to 5.4 for males and 5.3 for females by 2025, and 4.8 by 2050.The narrowing down of the gap is well supported by the different growth rates to be registered in these countries, since developed countries will necessarily be confronted with a slower pace of progress for objective reasons (in these countries, the battle against death is waged to a large extent against the component that is most difficult to reduce, i.e. endogenous diseases, caused by burnout and ageing, typical of developed populations with higher levels of population ageing) [6].

One last technical remark which is maybe more than merely technical. The mortality rates for the baseline year of our projections, 2002, are the mortality rates in the life tables forth years 2000-2002 of the National Institute for Statistics (2003b).We could have used the life tables that we developed for the baseline year of the projections, 2002, but we preferred a table developed based on mortality rates in three calendar years, a three-year table providing

more representative data. However, we needed to perform some adjustments in the mortality rates by age groups in order to eliminate some irregularities in the rate curve.

External Migration

It is important to emphasize from the very beginning that our projections do not include assumptions about external migration. Any demographic projection is a leap into the unknown and the conditional character of the undertaking is implicit. The assumption based on higher fertility levels that we used in our approach has both a conditional and a normative character. We do not see any other option and a substantial recovery of fertility levels is the only factor that could diminish further deterioration of the demographic situation, and eventually curb long-term demographic decline. We will have to wait for future developments in order to see to what extent our assumption about the contribution of higher fertility levels is realistic and viable. We have also adopted a normative approach in the case of mortality, but it is supported by the direct relationship experienced between progress in the economic, social, medical, health care domains and the trajectory of mortality (while a reverse relation can be detected in the case of fertility among European populations).

As far as external migration is concerned, the third demographic variable contributing to the future development of Romania's population, we are confronted with an extremely complex area. Intuitively, we can tell what the expected major movements will be in external migration, and we know they can only be negative. Net external migration has been and will continue to be negative, both in its known and in its unknown or partially known components (the 600 thousand persons "missing" from the population of Romania at the 2002 census are an estimate of the latter component). The size of the demographic loss caused by migration will depend on how fast, substantial and sustainable the general progress of the Romanian society will be in the coming years. If the gap between the living standards in Romania and those in developed countries continues to be wide, the propensity for emigration will not decrease [7]. The extent to which this propensity will materialize in emigration flows will depend on the immigration policies of developed countries, which are flexible and depend to a large extent on the economic situation in those countries. Resuming economic growth at higher parameters in these countries will certainly require foreign labor, under the circumstances where the volume of the working age population will be increasingly influenced during the following decades by the lower birth rates registered beginning with the 1960s. The only difference is that, given the new international geopolitical and economic realities, the direction of the migratory flows will no longer be South-North, but East-West. Eastern Europe can be a supplier of more qualified labor than the South, sharing the same cultural (and religious) values, and having no

major difficulties in adaptation and integration. Recent studies indicate that even under the assumption of an important growth in the participation of their national populations in economic activities, in order to reduce the negative effects of low birth rates on the size of their workforce Western European countries will need to rely on immigration in order to maintain the size of the work force in the coming decades. And an increase of the offer on the labor market can only be achieved by increasing the current levels of immigration (McDonald and Kippen, 2001). The recent debates launched by the Italian Presidency of the European Union on the need to develop a Community policy concerning immigration quotas (Adevarul, 16 September 2003) are very significant and, despite the partially diverging current interests and positions, adopting such a common policy will only be a matter of time (the inevitable decrease in the populations of EU countries after 2020 is estimated to trigger a reduction in the size of the work force from about 175 million in 2000 to 155 million around 2050) (deJong, 1999).

After all this plea referring to negative net migration being maintained in the future, it may seem surprising that we have not taken into account external migration in our projections. The reason why we have not done so is that we lack solid reference data that would allow us to quantify this indicator in a realistic and well substantiated manner over such a long period of time when Romania will go through historical, economic, social and cultural changes, in the wider context of a changing Europe. If we assume that the value of the annual negative net migration would be 10 thousand, which is the number of legal emigrants recorded during the last years, the impact of migration on population size would not be significant since it would only amount to a deficit of about 250 thousand people by 2025, and almost 600 thousand by 2050. Higher values of external migration, a plausible assumption, would increase direct loss and would also generate a second mechanism whereby migration would have a negative impact, particularly in the long run, since it would also contribute to a decline in the number of births. In any case, when considering the results of our projections, users need to take into account that our exercise does not include external migration, a component that can only have a negative impact on the future demographic situation of Romania.

Projection Variants

In international practice, population projections are developed based on several combinations of assumptions regarding the three components presented above, but in the presentation of results three variants are usually favored known as the Low, Medium and High variants. The three variants are generally based on identical assumptions on mortality and migration, what differentiates them being the assumptions on fertility (low, medium, and high fertility). A further variant is added to the above three for comparison, the Constant – fertility variant based

on the same mortality and migration assumptions as the other three variants, but maintaining all along the fertility level of the baseline year of the projections. Our projections are also inline with that practice with the difference that the fertility levels in the Low – fertility variant are those of 2002, constant in time, which makes the Constant – fertility variant actually be the Low – fertility variant. A fourth variant was added to the above three – the Baseline variant with a merely referential purpose, which was developed based on constant values not only for fertility, but also for mortality.
Table 3 below presents the assumptions used in the four variants.

Table 3. Projection Variants, and Fertility and Mortality Assumptions

Variant Assumptions	Year						
	2002	2005	2010	2015	2020	2025	2050
LOW (Constant) Variant							
Fertility: -TFR - age structure	1.25 RO	**1.25** Int	**1.25** Int	**1.25** Int	**1.25** EI5	**1.25** Int	**1.25** E6
Mortality: - E(0) level - M/F - age structure	*67.7/75* RO	[67.9/75.1] Int	[69.1/76] int	[70.3/77] Int	[71.6/78] Int	**73/79** Int	**76/82** Vest 26
MEDIUM Variant							
Fertility: -TFR	1.25 RO	**1.5** RO	[1.6] Int	[1.7] Int	**1.8** EI5	[1.85] Int	**2.1** E6
Mortality: - E(0) level - M/F - age structure	*67.7/75* RO	[67.9/75.1] Int	[69.1/76] int	[70.3/77] Int	[71.6/78] Int	**73/79** Int	**76/82** Vest 26
HIGH Variant							
Fertility: -TFR - age structure	1.25 RO	**1.6** RO	**1.9** Int	[2] Int	**2.1** EI5	[2.11 Int	**2.1** E6
Mortality: - E(0) level - M/F - age structure	*67.7/75* RO	[67.9/75.1] Int	[69.1/76] int	[70.3/77] Int	[71.6/78] Int	**73/79** Int	**76/82** Vest 26
BASELINE Variant							
Fertility: -TFR - age structure	1.25 RO	**1.25** RO	**1.25** RO	**1.25** RO	**1.25** RO	**1.25** RO	**1.25** RO
Mortality: - E(0) level - M/F - age structure	*67.7/75* RO	*67.7/75* RO	*67.7/75* RO	*67.7/75* RO	*67.7/75* RO	*67.7/75* RO	*67.7/75* RO

Legend: TFR =Total Fertility Rate (children per woman); E(0) = life expectancy at birth for males (M) and females (F); the figures in bold underlined characters are the values used as assumption-objectives; the figures between square brackets stand for interpolated values; RO = structure by age groups of Romanian fertility/mortality in 2002 (2000-2002 for mortality); E15 = structure by age groups of fertility in the EU 15; E6 = structure by age groups of fertility in 6 EU countries; Int = intermediary age-structure, obtained by interpolation; West 26 = values of mortality rates by age groups specific to Western European countries (obtained by interpolation between Levels 25 and 26 in the West family of Coale-Guo LifeTables (1991), for a life expectancy at birth of 76 and 82 years, respectively.

The Low (Constant) variant is based on the assumption that the fertility level in 2002 will be maintained, allowing however for a continuation of the structural changes undergone by Romanian fertility beginning with the mid-1990s. The total fertility rate (TFR) is 1.25 children per woman. The age structure in the year 2025 will reach the current (medium) structure in the 15 EU countries (El5),and the age structure in 2050 will reach the medium structure in the six EU countries where the structural remodeling of fertility (initiated in the 1960s) is the most advanced (Denmark, Finland, France, Italy, the Netherlands and Sweden) (E6). Both for the years 2003-2024 and for the years 2026-2049, the values of the fertility rates by ages have been obtained by interpolation, therefore they are intermediary structures (Int) between the 2000 rates in our country and in the El5, as well as between the El5 and the E6, respectively. The Low variant is actually a reference variant for the Medium and High variants. and the results in this variant may actually be taken as a warning: the increase of fertility is not an option, but an indispensable condition for restoring the country's demographic situation.

The Medium and High variants are based on the assumption of effective intervention and improved fertility. Romania's demographic future lies in birth rates and only improved birth rates can generate positive long-term results. The goal of the intervention would have to be attaining fertility levels that could contribute to reducing the pace and extent of demographic deterioration and, in the long (or very long) term, curb population decline. Reaching a fertility of 2.1 children per woman appears to be quite unlikely unless future changes in attitudes and behavior will occur, although they are simply impossible to imagine today. Let us recall here that in the rich literature dedicated to this delicate problem, some of the most authorized specialists in contemporary demography have put forth the theory of the impossibility that fertility rates in developed populations ever return to replacement levels (Kirk, 1996; Hohn and Dorbritz, 2000; Chesnais, 2000; Zakharov, 2000; Frejka and Calot, 2001; Bongaarts, 2002; United Nations, 2002). In the Medium variant, the 2.1 level would be reached by 2050, with intermediary values of 1.8 in 2020 and 1.85 in 2025 (in the Medium variant of the UN projections, the latter value would only be reached in 2045-2050). In the High variant, the assumption is much more optimistic and the 2.1 children per woman would be reached in 2020 and would be maintained at the same level in the following years. Both in the Medium and in the High variant, fertility would have to undergo the structural changes already mentioned (see Figure 2b). Clearly, under both assumptions we are dealing with normative approaches that require adequate policies for reaching the required levels.

The Baseline variant is for reference purposes and it illustrates the demographic developments that could occur in the following decades if the current values and characteristics of fertility and mortality remain unchanged.

Future demographic trends remain unpredictable, particularly concerning

fertility, the variable that the future of Romania's population depends on. The Medium and High variants require an effective policy meant to improve that component. Admitting that such a policy can lead to an improvement in fertility levels, we still have to wonder to what extent that improvement can be achieved.

Finally, let us mention that our projections have been produced using the latest version of the RUP program – Rural I Urban Projection – of the US Census Bureau (Arriaga, 1994; U.S. Census Bureau, 2003) that we preferred to any other population projections software due to the multiple opportunities it offers both in its input and output components [8].

Results

We have chosen to present our results from a perspective that appears to us most logical, taking into account the importance we grant to the recovery of Romania's current demographic situation. Both the population size and the age structure depend on the trajectories of the birth rate and the crude death rate. We shall first analyze the trajectories of these two components and then the results of the two projected developments, with reference to the size and age structure of the population.

Birth and Death Rates

The trajectory in time of a population is defined by the ratio between the annual flows of births and deaths (plus external migration).To be noted that the number of births and deaths, as well as birth rates and crude death rates, are derived indicators in a population projection resulting from the assumptions formulated about the Total Fertility Rate and the life expectancy at birth (plus the number and the age structure of the population).

In order to improve the country's demographic situation, a higher number of births is required before everything else. We should not forget, however, that the annual trajectory of the number of births depends on the fertility level (children per woman) and the size of the female population at childbearing ages (particularly between 20 and 40). The increase or decline in the numbers of that population automatically leads to variations in the number of births, even when fertility remains constant. For the following 15 years we have accurate data about the size and age structure of the female population at childbearing ages (15-49 years), since that population includes women who are living today. Although this segment of the female population will decrease moderately during the following 15 years (from 5.6 to 5.3 million), it will continue to be dominated by the large cohorts born before 1990. In other words, the positive effects that improved fertility rates could have on the number of births will be supported and amplified in the following 10-15 years by the size and structure of the female population at childbearing ages. After that, however, the small cohorts born after 1989 will enter increasingly in the childbearing age group and the negative

impact on the annual number of births will be in direct proportion to the length of the low birth rate period, which is already in its 14th year now and could become much longer if birth rates continue to stay at the current levels. Even under the assumption that birth rates improve, the number of women in the 15-49 age group will significantly decrease all along the interval 2020-2040, dropping by 2040 to 4 million and 4.4 million, respectively, in the two variants (due to the negative ratio between the size of the cohorts entering and leaving that age group). It is only after 2040 that we could see some stabilization (at around 4 million) in the Medium variant, or some recovery (around 4.5 million) in the High variant (Figure 3a).

Both in the Medium and High variants, the number of births would become sensibly higher and would be maintained at high values almost until the year 2020 (Table 4 and Figure 3b). Birth rates would reach levels around 12-14 per thousand in the period 2005-2015 (Figure 3c). After that year, the size and structure of the female population in the 20-40 age group will be affected by the penetration in that group of the cohorts born after 1989 that are ever smaller, while the number of births will be declining even if the Total Fertility Rate would be constant or would increase moderately. Developments have to be considered in the long term because the relationship between the status of the population (size and age structure) and the dimension of the annual flows of births (and deaths) is characterized by an impeccable dialectics, and the self-generating mechanisms are well installed and rigid in their interconnections. Major and relatively sudden variations in the number of births may trigger unavoidable chain effects. Accepting the fact that we will witness an improvement in fertility levels in the coming years, the decrease in the number of births in the interval 2025-2030 (with a birth rate of around 10-11 per thousand) is inevitable for the simple reason that in the respective years the number of women at childbearing ages will be composed by the small cohorts born after 1989. On the other hand, if the number of births would start on an upward trend after 2003-2004 (due to improved female fertility), the beneficial effects of that development would become visible after 2030 when those cohorts would reach the age of marriage and maternity.

The dynamics of demographic phenomena is full of interconnections and only long or very long term projections are relevant. In other words, we can only provide an accurate assessment of the size and implications of the demographic conditions in 2025 if we place them in a longer - term perspective. This is the reason why our projections cover the period until 2050. Moreover, the Medium and High variants have been extended, in an exploratory exercise, until the year 2100 (admitting that the Total Fertility Rate in the interval 2050-2100 will remain stable at replacement level - 2.1 children per woman, and mortality rates will continue to decrease after 2050). Figure 4a provides us with an excellent picture of the way in which the chain effects of the variation in the number of births are materialized in time. The numbers and age structure of women at childbearing ages will be generating higher birth rates until about 2010, if

fertility rates recover. This population is composed of the relatively large cohorts born before 1990; the tops of the "waves" in Figure 4a stand for the births within these cohorts - in A, the births belonging to the children of these cohorts, in B born after 2002, if fertility recovers and in C the births belonging to the children of the children of the respective cohorts. The decline in points E, F, G is based on the same mechanism, but it refers to the births belonging to the small cohorts born in the interval 1990-2002. As it can be seen, both the highest and the lowest values fall into very well-defined cycles of about 30 years which actually represent the interval between two generations (equal to the average age of mothers when giving birth). The fact that in certain periods the female population within the childbearing age span (15-49 years) will include both large cohorts (those born between 1967-1989 and their children) and small cohorts (those born after 1989 and their children), explains the flattening out of the birth rate curve in time, particularly after 2040. Finally, in both variants birth rates would reach levels of around 12-13 per thousand after 2090 and these levels would continue to be stable and high enough to ensure a minimal natural increase, if mortality rates also decrease significantly.

Table 4. Birth Rate, Death Rate and Natural Increase in 2002 and Projected Values for the Period 2005-2050

Variant	Year								
	2002	2005	2010	2015	2020	2025	2030	2040	2050
Live births -thousands									
- Low	210.5	208.4	202.1	189.2	171.8	147.7	132.0	117.6	100.5
- Medium	210.5	249.9	258.1	257.0	247.9	222.0	213.4	237.2	241.1
- High	210.5	266.6	307.7	303.7	289.3	254.1	244.7	284.4	280.7
- Baseline	210.5	210.0	200.9	178.9	154.6	137.6	127.1	107.4	85.7
Birth rate -live births per 1000 inhabitants									
- Low	9.7	9.6	9.5	9.0	8.4	7.4	6.8	6.6	6.2
- Medium	9.7	11.5	11.9	11.9	11.5	10.4	10.1	11.5	11.9
- High	9.7	12.3	14.1	13.8	13.1	11.5	II. 1	12.9	12.7
- Baseline	9.7	9.7	9.5	8.7	7.7	7.2	6.9	6.6	6.0
Deaths - thousands									
- Low	269.6	268.8	272.2	268.8	261.8	254.8	260.0	277.7	278.9
- Medium	269.6	263.4	270.2	269.3	264.1	258.4	263.1	280.7	282.2
- High	269.6	263.6	271.0	270.0	264.7	258.9	263.8	281.7	283.5
- Baseline	269.6	278.2	294.9	301.7	302.9	304.0	307.8	315.7	311.5
Crude death rate-deaths per 1000 inhabitants									
- Low	11.9	12.4	12.9	12.9	12.8	12.7	13.4	15.5	17.1
- Medium	11.9	12.1	12.5	12.5	12.3	12.1	12.4	13.6	13.9
- High	11.9	12.1	12.4	12.3	12.0	11.7	11.9	12.8	12.8
- Baseline	11.9	12.9	13.9	14.6	15.2	15.8	16.8	19.3	21.9
Natural increase-thousands									
- Low	-59.1	-60.4	-70.1	-79.6	-90.0	-107.1	-128.0	-160.1	-178.4
- Medium	-59.1	-13.5	-12.1	-12.3	-16.2	-36.4	-49.7	-43.5	-41.1
- High	-59.1	+3.0	+36.7	+33.7	+24.6	-4.8	-19.1	+2.7	-2.8
- Baseline	-59.1	-68.2	-94.0	-122.8	-148.3	-166.4	-180.7	-208.3	-225.8

Source: for 2002 – INS (2003g); for the other years – results of the projections developed by the Population Research Center (PRC).

The curves in Figure 4 convey an extremely clear message which is in fact a warning: major variations in the birth rate lead to long-term imbalances which can be neither avoided, nor corrected. Policies for improving birth rates can only be developed for the long term, the goal being an increase spread out in time, leaving aside the potential impact of the age structure in particular circumstances.

The **mortality** assumption seen in terms of life expectancy at birth is optimistic, but the effects of the age structure will also have a strong influence on the annual number of deaths and on the crude death rate (which should not be mistaken for the health status of the population reflected in life expectancy at birth). For both indicators we will see higher values in the following years, simply because the large cohorts born in the interval 1945-1955 (Figure 5) will reach the age group 60 years and over. Mortality rates in this population segment are much higher than for other ages (almost 80 per cent of the deaths in 2002 occurred within that population) and, clearly, the number of deaths and the crude death rate will continue to increase slightly for the following 10-15 years. It will be only after 2015, when the smaller cohorts born between 1956-1966 reach the same age group, that mortality rate will return to values around 12 per thousand (both in the Medium and High variants), similar to the 2001-2002 levels. We would be wrong to think, however, that the slight decrease to occur after 2010-2015 would mark the beginnings of a long-term downward trend. The major distortions in the age structure of the population relay their effects in time: after the small 1956-1966 cohorts, again the large cohorts born after 1966 will come to be 60 and over, which will result in a moderate, but continuous increase in the number of deaths and the crude death rate after 2025, going as high as 13-14 per thousand by 2040-2050. Like before, the trends of the mortality rate in the first two decades of the century cannot be separated from the trends of the following decades, since they are already caught in the ongoing structural mechanisms. This is where longer term projections prove to be much more useful, particularly given the highly distorted age structure of Romania's population (Figure 4b) [9].

We will not provide a very detailed account of the trajectory of mortality in the Baseline and Low (Constant) variants (Figure 5). However, let us say that in the first variant both the number of deaths and the crude death rate would reach absurd values. In the second variant, the number of deaths would not be significantly different from that in the Medium and High variants (and it is only natural that it should be so, since they are based on the same assumption on life expectancy at birth). If we examine the curve of the crude death rate, however, we will see a rapid increase in the interval 2025-2050, essentially coming from an alarming decrease in population size. In other words, in the long run, it is impossible to reduce the crude death rate, if the decrease of mortality by ages and the rise of life expectancy at birth fail to be accompanied by improved birth rates.

We could summarize the trajectory of mortality during the first decades of the 21st century as follows: (i) - the decrease of mortality by ages and the rise of life expectancy at birth will not generate major changes in the crude death rate, because of the disturbing effects of the age structure; (ii) - after a slight increase during the following 10 years, the crude death rate will drop to the values registered during these last years (around 11-12 per thousand), but will again increase after the year 2025; (iii) - in the long run, only higher fertility levels (and higher birth rates, implicitly) can lead to a downward movement of the crude (general) death rate, if the life expectancy at birth firmly increases (by decrease in death rates by ages).

Natural Increase and Population Size

The size of Romania's population in the following years and decades will depend on the parallel trajectories of the two components of natural movement – birth rate and crude death rate – as well as on the level of net external migration (resulting from immigration and emigration). For reasons already mentioned and supported with arguments, we have not taken into account external migration in our projections and the population size is the result of natural movement only.

The birth rate and the crude death rate are derived indicators in a population projection and they result from the assumptions made concerning the Total Fertility Rate and life expectancy at birth, on the one hand, as well as the size and age structure of the population, on the other. In other words, if a projection starts from the assumption that both fertility and life expectancy at birth will increase, it cannot automatically result in higher birth rates and lower crude (general) death rates. since the trajectory of these last two variables is also influenced by the age structure. Our projections are a perfect illustration of these demographic mechanisms.

The projected trajectories of natural increase and population size in the four variants are shown in Table 5 below (and in Figure 6).

Table 5. Population Size and Natural Increase in 2000-2002 and Projected Values for 2005-2050

Year	Low variant		Medium variant		High variant		Baseline variant	
	Population size thou	Annual increase thou	Population size thou	Annual increase thou	Population Size	Annual increase thou	Population size thou	Annual increase thou
2000	22435	-21.3	22435	-21.3	22435	-21.3	22435	-21.3
2001	22408	-39.2	22408	-39.2	22408	-39.2	22408	-39.2
2002	21795	-59.1	21795	-59.1	21795	-59.1	21795	-59.1

Year	Low variant		Medium variant		High variant		Baseline variant	
	Population size thou	Annual increase thou	Population size thou	Annual increase thou	Population Size	Annual increase thou	Population size thou	Annual increase thou
2005	21626	-60.3	21704	-13.5	21729	+3.0	21615	-68.2
2006	21564	-62.3	21691	-13.4	21735	+9.6	21544	-72.9
2007	21501	-63.3	21678	-11.9	21749	+ 17.9	21469	-77.9
2008	21437	-66.3	21666	-12.6	21770	+23.5	21388	-83.0
2009	21369	-68.3	21653	-12.5	21796	+29.9	21302	-88.4
2010	21300	-70.1	21641	-12.1	21830	+36.7	21211	-94.0
2011	21229	-72.7	21629	-12.7	21866	+35.4	21114	-99.8
2012	21155	-74.3	21616	-12.5	21901	+35.4	21011	-105.7
2013	21080	-76.1	21603	-12.4	21936	+35.0	20903	-111.5
2014	21003	-77.7	21591	-12.0	21971	+34.6	20788	-117.2
2015	20925	-79.6	21579	-12.3	22005	+33.6	20668	-122.8
2016	20844	-81.9	21566	-13.2	22038	+31.6	20543	-128.3
2017	20761	-84.2	21553	-14.3	22069	+29.5	20412	-133.7
2018	20676	-85.8	21538	-14.3	22098	+28.6	20276	-138.9
2019	20589	-87.3	21524	-14.5	22126	+27.5	20134	-143.8
2020	20501	-90.0	21509	-16.2	22152	+24.6	19988	-148.3
2021	20409	-92.8	21491	-19.7	22173	+ 18.9	19838	-152.6
2022	20315	-96.7	21468	-24.8	22189	+ 11.5	19683	-156.5
2023	20216	-99.8	21442	-28.4	22197	+6.0	19525	-160.1
2024	20115	-103.2	21412	-32.1	22201	+0.8	19363	-163.3
2025	20010	-107.1	21377	-36.4	22199	- 4.8	19198	-166.4
2030	19425	-128.0	21162	- 49.7	22135	-19.2	18331	-180.8
2040	17970	-160.1	20676	- 43.5	22032	+2.7	16373	-208.3
2050	16290	-178.4	20289	- 41.1	22093	-2.8	14202	-225.8

Source: - for the years 2000-2001 - INS (2003f); for the year 2002 - INS (2003g); for the years 2005-2050 - PRC projections.

If the current values of fertility and life expectancy were maintained at the same levels (i.e. the fertility and death rates by ages recorded during these last years), population decline would acquire the dimensions of a catastrophe. A natural decrease in excess of 100,000 inhabitants per year as the one that would set in after the year 201 I in the Baseline variant would damage the age structure and the entire demographic construction to such an extent that the self-generating processes could no longer be stopped (after the year 2020, when the population would amount to 20 million, there would be a decrease of one million in only 5-6 years).

However, the Baseline variant has been merely developed for reference purposes. While we cannot reject a priori the assumption that the current fertility levels will be maintained, if nothing else because values similar to those recorded in Romania in these last years can also be seen in some developed European countries (Council of Europe, 2002), we have no arguments at all to claim that mortality will continue to stay at the current levels. Mortality will certainly decrease during the following decades and the only problem we have is to quantify the dimensions and timing of the decline. Our assumption is unique for the Low, Medium and High variants and we have already presented the

supporting arguments.

If we compare the Low and Baseline variants, we can confidently claim that they do not contain essential differences concerning the trends in population size during the first two decades. What differentiates them is the extent of the deterioration. which is less dramatic in the Low variant. In fact the message of the Low variant is indirect and unequivocal: Romania's demographic situation can only improve if fertility improves first.

The Medium and High variants are based on the assumption of a fertility increase and their results are different as compared to the Low variant. In both variants, the Total Fertility Rate would reach the replacement level (2.1 children per woman), but there is a sizable time gap between the two variants - 2050 as against 2020. This time gap also involves different intermediary fertility levels (Table 1 and Figure 2a), which obviously is in favor of the High variant, the only one where the population would increase until the year 2025 when it would reach 22.2 million inhabitants. A slight decrease would follow after 2025, but the population would not drop under 22 million by 2050.

For a prospective approach of a normative type whose goal is to halt Romania's population decline, a time span extending only to 2025 is too short because, as we have seen, major changes in the trajectory of birth and death rates require a longer span. Therefore. the year 2050 provides an appropriate perspective for the above two components, although it is not similarly relevant for population size. The improvements in birth rates and crude death rates during the first half of the century will continue to model the size of the population after 2050. Moreover, the beneficial effects of the improved birth and death rates over the size of the population will appear in the second half of the century, which is yet another argument for using a very long term perspective.

Should birth rate decrease and crude death rate increase after the year 2050 (and we have referred to these potential trends in the previous subsection), the size of the population would drop somewhat below 22 million between 2060 and 2080. However, this downward movement would only be temporary and the growth would resume, fast and firm, in the following years (Figure 7).

The High variant is the only one where the demographic decline would be curbed and the population of Romania would resume growth. It is highly unlikely, however, that fertility should recover at the level and pace foreseen in that variant, and we think that more attention should be given to the Medium variant which is also based on the assumption that fertility will achieve replacement level, but somewhat later than in the High variant (i.e. in 2050) which involves a different pace of recovery.

The population would continue to decrease under the Medium variant, but the level of the decrease would be incomparably lower than what we have seen during these last years. Under this assumption, the population would amount to 21.4 million inhabitants by 2025 and to 20.3 million by the middle of the century. If we extend our analysis to the second half of the century, should fertility be maintained at the level reached in 2050, we will see that the population will continue to decrease only until the mid-2070s when it would be

19 million, while later it would start a slight, but constant growth (Figure 14). In the following section of the study we will have to see whether these relatively different developments of the population size in the Medium and High variants (which however converge in the long term) are also associated with other characteristics, which could be arguments in favor of a particular option.

A comparison between the results of our projections and the projections of the UN Population Division until the year 2050 (presented in the Appendix) has revealed quasi - identical values for the population in the Constant variant (considered to be the Low variant in our approach), as well as expected differences between the Medium and High variants, resulting from the relatively different assumptions on fertility and life expectancy at birth the two approaches were based on (Figures 2a and 2c) and yielding relatively different values for birth rates and crude death rates (Figure 8). We repeat our claim that, despite the similar vision and prospective philosophy used, the assumption on mortality (in terms of life expectancy at birth) in the projections of the Population Division does not appear to be completely consistent with the movement of mortality in Romania after 1996 or with the models of change of life expectancy used by the authors. Actually, if we take a quick comparative look at the values of life expectancy at birth in several national projections and the projections developed by the UN Population Division, we notice that the differences are similar to those appearing in relation to our projections. We will illustrate our point with two cases, the US (Hollman, Mulder and Kalian, 2000) and the Czech Republic (Pavlik and Kucera - editors, 2002), where life expectancy at birth in the national projections is one year higher (both for males and females) in the year 2025 and over two years longer in 2050. On the other hand, our construction has an explicit normative character concerning the assumption on fertility and this is where the differences between our projections and the projections of the UN Population Division originate.

A comparison between the results of our projections and the projections of the UN Population Division until the year 2050 (presented in the Appendix) has revealed quasi-identical values for the population in the Constant variant (considered to be the Low variant in our approach), as well as expected differences between the Medium and High variants, resulting from the relatively different assumptions on fertility and life expectancy at birth the two approaches were based on (Figures 2a and 2c) and yielding relatively different values for birth rates and crude death rates (Figure 8). We repeat our claim that, despite the similar vision and prospective philosophy used. the assumption on mortality (in terms of life expectancy at birth) in the projections of the Population Division does not appear to be completely consistent with the movement of mortality in Romania after 1996 or with the models of change of life expectancy used by the authors. Actually, if we take a quick comparative look at the values of life expectancy at birth in several national projections and the projections developed by the UN Population Division, we notice that the differences are similar to those appearing in relation to our projections. We will illustrate our point with two cases, the US (Hollman, Mulder and Kalian, 2000) and the Czech Republic

(Pavlik and Kucera – editors, 2002), where life expectancy at birth in the national projections is one year higher (both for males and females) in the year 2025 and over two years longer in 2050. On the other hand, our construction has an explicit normative character concerning the assumption on fertility and this is where the differences between our projections and the projections of the Un Population Division originate.

Age Structure

The changes that may occur in the age structure of Romania's population in the following decades have a double origin: some of them will occur automatically, since their prerequisites are already contained in the current age structure, while others will be the concerted result of the future trends in birth and death rates. A simple look at the age pyramid at the time of the 2002 census reveals incredible irregularities in the lower half of the construction (Figure 9), resulting from the major variations in the birth rates during the last 50 years. This is a heritage that cannot be overlooked or underestimated in any way as far as its future demographic and socio-economic effects are concerned. If the birth rate fails to improve, structural imbalances will acquire dramatic dimensions in the coming decades; more concretely, the cohorts born in the forced baby boom years between 1967-1989 will move higher up towards the top of the pyramid, i.e. the ages of economic inactivity. Most of these cohorts have already attained the active segment of economic life and the adult working population will continue to grow in the following years, reaching a peak around 2010-2015 (Table 6 and Figures 10b, 11a and 12a). A glance at the situation towards the middle of the century reveals that the age structure may reach, in the Low (Constant) variant (Figure 13a), a state of deterioration where recovery is practically impossible, and whose demographic and socio-economic implications are incalculable.

If birth rates were to improve (in the Medium and High variants), the deterioration of the age structure would be less severe and the base of the pyramid would become slowly, but continuously wider, which is a prerequisite for the recovery of structural equilibrium (Figures 11-13). However, the balance would not be exactly the way we would like it to be, as Romania may be confronted with a new demographic reality: ageing through the top of the pyramid. The process of demographic ageing has accelerated in the developed European countries during the last three decades because of the spectacular reduction of mortality among elderly people. In Romania, this type of demographic ageing has not set in as yet, but it is merely a matter of time before it does and the assumption that we made about mortality illustrates the implications of mortality decrease among elderly people (see the top section of the pyramids in Figures 13b and 13c). Whatever the variant, the elderly population (65 and over) would amount to 5 million by the year 2050 (Figure 10c), which is an almost 70 per cent increase as against 2000, and the share of this population would be of almost 25 per cent in the Medium and High variants, almost twice as much as in 2000.

Table 6. Population by Broad Age Groups and Dependency Ratios in 2000 and Projected Values for 2005-2050

Year	Population by broad age groups								Dependency ratio*		
	Number in thousands				Structure in %						
	Total	0-19 years	20-64 years	65 years+	Total	0-19 years	20-64 years	65 years +	RD1	RD2	RDT
Low variant											
2000	22435	5760	13690	2986	100.0	25.7	61.0	13.3	42.1	21.8	63.9
2005	21626	5087	13348	3191	100.0	23.5	61.7	14.8	38.1	23.9	62.0
2010	21300	4363	13798	3139	100.0	20.5	64.8	14.7	31.6	22.7	54.4
2015	20925	4112	13567	3246	100.0	19.7	64.8	15.5	30.3	23.9	54.2
2020	20501	3893	13075	3533	100.0	19.0	63.8	17.2	29.8	27.0	56.8
2025	20010	3646	12563	3801	100.0	18.2	62.8	19.0	29.0	30.3	59.3
2030	19425	3327	12285	3813	100.0	17.1	63.2	19.6	27.1	31.0	58.1
2035	18739	2999	1 1518	4222	100.0	16.0	61.5	22.5	26.0	36.7	62.7
2040	17970	2708	10765	4497	100.0	15.1	59.9	25.0	25.2	41.8	66.9
2045	17150	2486	9834	4830	100.0	14.5	57.3	28.2	25.3	49.1	74.4
2050	16290	2319	8969	5002	100.0	14.2	55.1	30.7	25.9	55.8	81.6
Medium variant											
2000	22435	5760	13690	2986	100.0	25.7	61.0	13.3	42.1	21.8	63.9
2005	21704	5149	13352	3203	100.0	23.7	61.5	14.8	38.6	24.0	62.6
2010	21641	4665	13809	3167	100.0	21.6	63.8	14.6	33.8	22.9	56.7
2015	21579	4720	13578	3281	100.0	21.9	62.9	15.2	34.8	24.2	58.9
2020	21509	4855	13086	3568	100.0	22.6	60.8	16.6	37.1	27.3	64.4
2025	21377	4916	12630	3831	100.0	23.0	59.1	17.9	38.9	30.3	69.3
2030	21 162	4738	12589	3835	100.0	22.4	59.5	18.1	37.6	30.5	68.1
2035	2091 1	4550	12123	4238	100.0	21.8	58.0	20.3	37.5	35.0	72.5
2040	20676	4449	1 1718	4509	100.0	21.5	56.7	21.8	38.0	38.5	76.4
2045	20477	4488	1 1152	4837	100.0	21.9	54.5	23.6	40.2	43.4	83.6
2050	20289	4622	10661	5006	100.0	22.8	52.5	24.7	43.4	47.0	90.3
High variant											
2000	22435	5760	13690	2986	100.0	25.7	61.0	13.3	42.1	21.8	63.9
2005	21729	5174	13352	3203	100.0	23.8	61.4	14.7	38.8	24.0	62.7
2010	21830	4854	13809	3167	100.0	22.2	63.3	14.5	35.2	22.9	58.1
2015	22005	5146	13578	3281	100.0	23.4	61.7	14.9	37.9	24.2	62.1
2020	22152	5497	13087	3568	100.0	24.8	59.1	16.1	42.0	27.3	69.3
2025	22199	5713	12655	3831	100.0	25.7	57.0	17.3	45.1	30.3	75.4
2030	22135	5524	12776	3835	100.0	25.0	57.7	17.3	43.2	30.0	73.3
2035	22054	5271	12545	4238	100.0	23.9	56.9	19.2	42.0	33.8	75.8
2040	22032	5168	12355	4509	100.0	23.5	56.1	20.5	41.8	36.5	78.3
2045	22068	5266	1 1965	4837	100.0	23.9	54.2	21.9	44.0	40.4	84.4
2050	22093	5465	1 1622	5006	100.0	24.7	52.6	22.7	47.0	43.1	90.1

Note: * DR1 = young people (0-19 years) to 100 adults (20-64 years); DR2 = elderly people (65+ years) to 100 adults; TDR = young and elderly people to 100 adults.
Source: for the year 2000 - INS (2001);for the other years - PRC projections.

The dependency ratio is the expression of the economic burden that has to be borne by the working-age population in relation to the young population (DR/) and the elderly population (DR2), as these sub-populations are basically economically inactive. In 1990, there were 73 young and elderly dependents per 100 active adults, while in 2000 there were only 64. Actually, this decline comes exclusively from the reduction in birth rates after 1989, which means that the

downward trend was favorable from an economic perspective. The problem is that there is a price to pay for that some time in the future and the projected trajectory of the dependency ratio (Table 6 and Figures 10d, 10e and 10f)) indicates that this will happen in all variants. An analysis of the age structure in the Medium and High variants also allows us to formulate an opinion about the comparative advantages of the two projections. We fail to see any advantage in the High variant, but the argument in favor of the Medium variant appears to us difficult to discard. A fertility increase that is more spread out in time appears to be more realistic to the extent that the phenomenon can be influenced, and particularly from the perspective of the costs a population policy involves [10].

The Need for Intervention

Any prospective construction in the social area is wont to be relative, particularly in an exceptionally complex political, economic and social context such as the one we are in. We think, however, that Romania's demographic situation has become so complex and dangerous, that intervention is the only alternative to be considered. The political class, i.e. the people who are responsible in various ways for the country's destinies, have an enormous responsibility on their shoulders.

Romania needs to have a realistic vision about its social and economic development during the following decades. The population is the core element in defining and structuring a strategy for sustainable development and we fail to see how such a construction could be developed and implemented without the country's demographic situation starting to show the first signs of improvement. From those perspectives major goal in the strategy for sustainable development should be curbing the demographic decline Romania is suffering.

The country's demographic future can only be ensured by improving birth rates, and this can only result from a coherent set of economic, social and other actions targeting children. Admitting that such actions will be undertaken, the stimulation of fertility may very well be accompanied by unwanted effects in a society that is poor and still traumatized by the shock of change and uncertainty, and this is where decision-makers really need to act with competence and responsibility. Corrections may also be operated on the way.

These projections are not forecasts. They represent a trajectory that might contribute to reducing the deterioration of the country's demographic situation and, in the long run, to improving that situation. But only the future can tell us to what extent this trajectory is possible. What is sure, however, is that it can only be achieved as a result of an intervention. The need for adopting a national population policy is more topical than ever. The lack of courage in performing an accurate evaluation of the accumulations we have witnessed so far, of Romania's demographic situation and the perspectives for the perpetuation of the current characteristics of that situation, or the delay in making decisions involving high levels of responsibility, can only lead to a deeper demographic crisis and to higher intervention costs in the future.

Appendix

Population of Romania in The 2002 Revision of the United Nations Population Division World Population Prospects

Year Period	Constant variant			Low variant			Medium variant			High variant		
	P thou	CBR ‰	CDR ‰	P thou	CBR ‰	CDR ‰	P thou	CBR ‰	CDR ‰	P thou	CBR ‰	CDR ‰
2000	**22480**			**22480**			**22480**			**22480**		
2000-2005		10.4	12.5		10.2	12.5		10.4	12.5		10.7	12.5
2005	**22226**			**22201**			**22228**			**22254**		
2005-2010		10.0	12.6		9.9	12.6		10.5	12.6		II. 1	12.6
2010	**21918**			**21880**			**21972**			**22062**		
2010-2015		9.2	12.8		9.4	12.8		10.0	12.8		10.7	12.7
2015	**21501**			**21480**			**21649**			**21814**		
20 1 5-2020		8.2	12.9		8.5	12.9		9.4	12.8		10.2	12.7
2020	**20968**			**20984**			**21255**			**21514**		
2020-2025		7.5	13.2		8.9	13.0		8.9	13.0		10.0	12.8
2025	**20360**			**20407**			**20806**			**21192**		
2025-2030		7.2	13.7		7.4	13.6		8.9	13.4		10.5	13.1
2030	**19688**			**19752**			**20328**			**20893**		
2030-2035		7.0	14.4		7.2	14.4		9.2	13.9		11.2	13.5
2035	**18947**			**19035**			**19831**			**20635**		
2035-2040		6.6	15.4		7.2	15.3		9.5	14.7		11.8	14.0
2040	**18107**			**18249**			**19296**			**20381**		
2040-2045		6.3	16.5		7.0	16.4		9.4	15.4		11.9	14.5
2045	**17177**			**17385**			**18705**			**20095**		
2045-2050		6.0	17.7		6.7	17.5		9.4	16.2		12.3	14.9
2050	**16173**			**16448**			**18063**			**19807**		
Population aged 60+ - in %	**39**			**38**			**35**			**32**		

Note: P - population; CBR - crude birth rate; CDR - crude death rate.
The assumptions for the variants are the following (CV = constant variant; LV = low variant; MV = medium variant; HV = high variant): Fertility: CV - 1.32 for the whole period; LV - 1.29 in 2000-2005, 1.32 in 2025-2030; 1.35 in 2045-2050; MV - 1.32 in 2000-2005; 1.63 in 2025-2030; 1.85 in 2045-2050; HV - 1.35 in 2000-2005; 1.93 in 2025-2030; 2.35 in 2045-2050. Life expectancy at birth: increase from 67 years for males and 74.2 years for females, in 2000-2005, to 74.4 and 80.1 years respectively, in the period 2045-2050, in all the variants. External migration: minus 5 thousand persons annually in all variants.
Source: United Nations Population Division (2003a).

NOTES

1. The demographic history of developed countries, or more exactly the decreasing fertility rates in those countries, as one of the two dominants of demographic transition (the other being the massive decline of mortality rates), reveals an element that has not been given adequate consideration by Romanian experts as yet two types of downward movement can be identified at times of marked long-term decrease in fertility rates: an irreversible decline in fertility rates, as a result of the impact of a large number of economic, social, cultural, health care and other factors, specific to a society undergoing modernization; on the other hand, a growing tendency to postpone the childbearing age (starting with the first birth, and then naturally continuing the trend with higher order births). This postponement may in its turn have two consequences: either women give birth at older ages, as a result of which there is a general increase in the mean age of childbearing, or they completely give up having a child (the first child or any of the following). In this latter case, we are actually confronted with a different component of the decline in fertility rates. However, we are mainly concerned with the actual postponement of the childbearing age. If we somehow simplify things and we approach the issue from a longitudinal perspective, looking at female cohorts that actually make the relevant decisions and where we can see the extent of replacement, we should see a decrease in the fertility rates at young ages caused by postponement of childbearing and, some time later, a recovery of the postponed births, materializing in higher fertility rates at older ages. This movement corresponds in the transversal plane to a decrease in the number of births spread over a number of years, which is then followed by recovery. Other things being equal, these compensatory movements would occur if no other influences were to intervene. Because of the way in which fertility rates declined in Romania in the 1990s, we believe that we cannot overlook postponement in evaluating either current or prospective fertility rates. The structural changes in fertility rates that first appeared in the mid-1990s are currently in full swing and the experience of developed countries demonstrates that this process may last for several decades. Because of postponed childbearing, the total fertility rates underestimate the actual fertility rates of these cohorts and this distortion may be quite significant. The literature mentions several relevant examples for that process for the latter half of the 1990s, the values quoted range between 0.3- 0.4 children per woman in the Czech Republic, Greece, Italy, Slovakia and Spain (Bongaarts, 2002). Our calculations indicate a value of 0.2 children per woman in the latter half of the 1990s, which means that the tempo adjusted value of the total fertility rate is of 1.5 children per woman, and not 1.3.

2. Because infant mortality continues to be very high, 17.3 deaths per 1000 live births in the year 2002, we feel we need to make some comments on that topic. Seen from the perspective of the contribution of infant mortality to natural population decrease. the reduction in the number of deaths under one year of age has only a minor significance, since the 3648 infant deaths recorded account for only I per cent of total deaths in the year 2002. However, the indicator has a major social significance and its reduction has always been an important objective of social policies and health care programs. The fact that almost one third of infant deaths are caused by diseases of the respiratory system (INS, 2003c) is a serious reason for concern, together with the incredibly high proportion - 25 per cent - of the women who gave birth in 2002 without having had any prenatal medical check-ups (INS,2003a).

3. The trajectory of a population over time can be calculated based on the ratio between cohorts that we measure by comparing the number of women and the number of children these women give birth to, and in this case we speak about female fertility. This process is achieved in time, within series of cohorts. For simple replacement, 100 women (actually, 100 couples = 200 parents) should bring to life 200 children. This provides a replacement of the number, but not also of the children's gender. The sex ratio at birth is about 105 males per 100 females, which means that, in order to have 100 daughters, 100 women will also have to give birth to 105 boys, i.e. a total number of 205 children. When we say replacement, we refer to the capacity to procreate and not to the number of lives in itself, in other words, the replacement of a cohort does not involve the death of the parents, but it only refers to the fact that the parents cease to procreate. True replacement actually occurs when the children reach the ages their mothers had when they gave birth to them, the average childbearing age ranging between 25

and 30 years. Up to that age, mortality rates are low and the number of children who die is around 5 (in 100).Therefore, for the simple replacement of the population in time. a woman should give birth to 2.1 children. This is the longitudinal approach to fertility at the level of cohorts; this is where. at the end of the fertile age (at 50), we can see the real ratio between the number of women in a cohort and the number of children they gave birth to, which is known as cohort completed fertility (final descendence). Obviously, in order to determine the fertility of cohorts one would require extremely detailed data on the number of births by ages and the number of women over extensive periods of time, to allow an analysis of each cohort along the 35 years of their fertile life (15-49 years). Such detailed statistical data are available for very few European populations. The longitudinal (cohort) approach to female fertility has major virtues and it is the only approach that gives us a real measure of replacement in time. We must mention, however, that what a cohort "produces" during the course of their fertile life is simply the sum of the children begotten by that cohort during 35 calendar years. If major changes occur in final fertility, the changes can only result from annual increases and decreases in the number of births occurring upstream. This is how we get to what happens at the level of calendar years (in the transversal p/one).The annual number of births is an aggregate number of births of different orders coming from women of different ages. For each calendar year, official statistics provide a distribution of live births according to the mother's age, which allows us to calculate fertility rates by ages (live births per 1000 women of a particular age), a fine instrument for analyzing births by calendar years (and within cohorts). Moreover, the total sum of fertility rates by ages during a calendar year (Total Fertility Rate) can be given an exceptional significance: the average number of children that would be borne by women during the entire duration of their childbearing years if at all ages the prevailing fertility rates in the respective years were maintained. We can thus see what fertility by ages in a calendar year would mean in terms of final descendence and replacement.

4. According to the 1999 Reproductive Health Survey, the ideal number of children per family is two, no major differences being recorded according to the social and economic characteristics of the sample (Serbanescu, Morris, Marin, 2001).The number of desired children in European countries is also two, according to the findings of the series of family and fertility surveys conducted in the 1990s under the aegis of the United Nations Economic Commission for Europe (unfortunately, Romania did not participate in that project).Moreover. a comparison between the desired number of children as resulting from these surveys (in the 1990s) and the final fertility (descendence) of the I960 cohort in several European countries shows that the value of the latter indicator is only moderately lower than that of the former, which leads to a quite interesting and important conclusion: if the barriers and other factors that generate such a gap could be removed or reduced in action, fertility would approach replacement level (Bongaarts,2002).

5. We should not overlook the fact that the sizable gap that currently exists between the value of average life expectancy in Romania and in developed European countries (which is of about 7-8 years, which translates in time into a gap of about 30-40 years) (United Nations, 2001), comes, fundamentally, from the terribly high level of mortality caused by cardiovascular diseases in our country: two thirds of the deaths occurring in 2002 were caused by these diseases (INS, 2003c). It is important to mention that mortality caused by cardiovascular diseases has decreased spectacularly in the developed countries starting with the 1970s and they currently account for only 30-40 per cent in overall mortality (United Nations, 2002). What specialists call the "cardiovascular revolution", which has had an essential contribution to the reduction of mortality by age groups and the increase of life expectancy at birth during these last decades in developed European countries (Vallin and Mesle, 2001), has not occurred in our country yet (this revolution essentially includes special programs to control hypertension, to reduce alcohol and tobacco consumption, heart surgery, new medications, the organization of emergency services, providing treatment for hypercholesterolemia). When the living standards and health care services achieve considerable progress in Romania, a similar change is expected to occur in mortality rates as well.

6. As compared to the average value of life expectancy in the 10 Eastern-European countries, the projection for Romania is more difficult to judge and assess. One should remember, however, that the value of the indicator for the whole of Eastern Europe (as well as for Western Europe) is a weighted

average, therefore it takes into account the share of the population in each country. Under the circumstances where the population of Russia accounts for almost half of the entire population of Eastern Europe and will continue to do so in 2050 as well, and life expectancy at birth is and will be the lowest in Russia among all countries in Eastern Europe (59 years for males and 71 years for females in the year 2000, 66.4 years and 74.5 years, respectively, in the year 2025 -below the current values recorded in Romania - and 71.6 years and 77.9 years respectively, in the year 2050), the comparison with Eastern Europe is distorted and irrelevant. The different dynamics of the projected life expectancies for Russia's male and female populations, starting out from the incredibly wide gap of 11 years between the two sexes may explain why, as against the mean value for Eastern Europe, the gap which is this time in Romania's favor would evolve differently for males and females. For the male population, the gap might narrow down from 4 to 3.5 years by 2025, and to 2 years by 2050. For the female population, the gap might widen further, as a consequence of the same mechanism of differentiated dynamics, from almost I year in 2000 to 2 years in the future. We think, however, that individual comparisons with each of the respective countries would be more correct, and then we would be able to clearly see that Romania's position continues to remain unacceptable in the future as well, as it falls in the lower half of the list including the 10 countries. For the special case of the trajectory of mortality rates in Russia, see UNICEF (1994) and Mesle and Vallin (2002).

7. The data of the March 2002 census have revealed the existence of an unknown component of the country's population decrease between 1992 and 2002, amounting to approximately 600 thousand people. The most plausible assumption about the cause of this loss is the failure of the census to record massive numbers of people who were abroad at the time (and who failed to declare so, for various reasons and in various ways). It is important to mention that most of this population is currently working abroad, and will most likely return home sometime in the future. Once they are back, this population will be part of the country's de facto population, but not also of the de jure population (i.e. the population resulting from the census data). This statistical distortion (not to call it a paradox) has consequences on the determination of the indicators of population movements, and we think that the most important lesson to learn is that at the following census more attention needs to be granted to certain population categories. Today we have a better understanding of the mechanism whereby 600 thousand people were "absent" at the March 2002 census, and generally also of the dimensions and characteristics of the temporary migration of Romanians for work, due to the extremely interesting and useful data provided by a recent (nationwide) sociological survey conducted by the International Organization for Migration (IOM) in Romania. The survey was a more complex undertaking dedicated to the perception of the adult population in Romania concerning the risks involved in illegal migration to the Member States of the European Union and includes three components: an Omnibus selective survey; a secondary analysis based on the findings of other selective surveys and on information supplied by the National Institute for Statistics; in-depth interviews. What we were particularly interested in were the data referring to the number of Romanians who are working abroad, as well as their potential (propensity) for migration. According to this survey, approximately 1.7 million Romanians were working abroad in August 2003, which according to our calculations accounts for 8 per cent of the country's total population and no less than 14 per cent of the adult population (between 20-60 years). In other words, the population of Romania present in the country is of only 20 million inhabitants (however, we have our doubts about the figures supplied by the selective survey, since we consider them to be unrealistically high); according to the same survey, the number of people who would like to go abroad for work is of almost three million (IOM in Romania, 2003).

8. As against other users of this program, we think that our undertaking contains several refinements that should increase the quality of our projections: (i) - the population is projected by single year of age and not by five year age groups; (ii) - base-year mortality rates are also computed by single year of age; (iii) - fertility and mortality assumptions are materialized not only in the aggregated values of the Total Fertility Rate and life expectancy at birth, but also in fertility and mortality rates by five year age groups, thus introducing the inevitable structural changes that the two components will undergo in the future; (iv) for the changes in mortality rates by age groups, we have used the latest improvements operated by Coale and Guo to the well known Model Life Tables, the West Family, specific to developed European countries. All these adaptations should make our projections more accurate and coherent.

9. In the long and very long term, we expect mortality to undergo major changes in Romania as a result of the combined effects of lower mortality rates at young and adult ages, the particularities of the population's age structure, and the expected recovery of the birth rate. A look at the potential trends in the number of deaths and the general mortality rate over the entire century - Figure 4b, reveals a surprising peak in the interval 2055-2065. The excess deaths may have a double source. Under the conditions of a considerable decrease of mortality rates by age groups and the increase of life expectancy at birth, there will be a spectacular growth in the share of deaths at older ages. At the current average life expectancy in Romania, the percentage of deaths over 85 years only amounts to 20 per cent. Under our assumption, average life expectancy would reach 76-77 years for males and 82-83 years for females by the years 2050-2060, values corresponding to a percentage of deaths over 85 years of more than 40-45 per cent (see Monnier and Pennec, 2001 ,as well as levels 26 and 27 in the Coale-Guo Model Life Tables, 1991). But in 2050, the large cohorts born after 1966 will also reach the over 85 age group. This is where the excess number of deaths in the years 2055-2065 will result from. Once the major irregularities in the age pyramid disappear, after the year 2080, the mortality rate will undergo a steady decrease and the general (crude) mortality rate will drop to a stable value of approximately 11 per thousand, lower than the birth rate, thus ensuring a population growth (Figures 4c and 4d). If the population starts growing again (under both the Medium and High variants), it would support and consolidate the positive trend of the general (crude) mortality rate.

10. The population pyramids in Figures I5a and I5b are the result of a prospective exercise that offers several lessons to learn. These theoretical constructions show what the long-term outcome would be if a population is projected forward under the assumption that fertility rates recover and are maintained at the replacement level. If this constant fertility level is maintained for more than one hundred years, this eventually leads to a stable population, a theoretical population model where birth rate and crude death rate are constant, the annual growth rate is also constant, while the age structure becomes an invariable. If birth and death rates were to attain identical values, a stationary population would result where the growth rate is zero, the percentage of each age group is invariable, and the values of birth rates and crude death rates are equal to the inverse of life expectancy at birth. It is easy to see that such a population would be an advantage from all points of view.

References

Arriaga, Eduardo E. (1994). Population Analysis with Microcomputers. US Census Bureau, USAID.UNFPA.

Bongaarts, John. (2002). The end of the fertility transition in the developed world. *Population and Development Review*, 28, 3, New York: Population Council.

Chesnais, Jean-Claude. (2000). The future of French fertility: back to the past or a new implosion. In: Below Replacement Fertility. *Population Bulletin of the United Nations*, Special Issues, 40/41, 1999, New York: United Nations.

Coale, Ansley and Guang Guo. (1991). The use of new model life tables at very low mortality in population projections. In: *Population Bulletin of the United Nations*, 30, 1991, New York: United Nations.

Comisia Națională pentru Statistică. (1994). Recensământul populației și locuințelor din 7 ianuarie 1992, volumul I *Populație. Structure demografica.*

Council of Europe. (2002). Recent demographic developments in Europe - 2002. Strasbourg: Council of Europe Publishing.

Dorbritz, Jurgen and Charlotte Hohn. (2000). The future of the family and future fertility trends in Germany. In: Below Replacement Fertility. *Population Bulletin of the United Notions*, Special Issues, 40/41, 1999, New York: United Nations.

de Jong, Andries. (1999). Population and Labour Force Scenarios for the European Union: Acceleration, Continuity or Reversal. Communication at the 24* General. Population Congress (UIESP), 18-24 August 2001, Salvador, Brazil. Statistics Netherlands, Department of Population. Voorburg (www.cbs.nl/en).

Economic Commission for Europe (United Nations). (1999). Economic Survey of Europe, 1999, I. New York and Geneva: United Nations.

Economic Commission for Europe (United Nations). (2002). Economic Survey of Europe, 2002, I. New York and Geneva: United Nations.

Frejka, Tomas and Gerard Calot. (2001). Cohort Reproductive Patterns in Low-Fertility Countries. *Population and Development Review*, 27, I, New York: Population Council.

Gheţău, Vasile. (1998). Recrudescenţa mortalităţii şi scăderea duratei medii a vieţii. *Populaţie & Societate*, 6, 1998.

Gheţău, Vasile. (2000). România. Tabele anuale de mortalitate, 1980-1999, *Populaţie & Societate*, 2-3, 2000.

Gheţău, Vasile. (2001). Populaţia României la sfârşit de secol şi mileniu. Ce perspective? Partea l-a şi Partea a II-a, *Populatie & Societate*, I, 2-3, 2001.

Gheţău, Vasile, Maria Simion, Ionica Berevoescu. (2002). Şocul milionului. Rezultatele preliminare ale Recensământului Populaţiei şi al Locuinţelor din 18 martie *Populaţie & Societate*, 4, 2002.

Hollman, Frederick W,Tammany J. Mulder, Jeffrey E. Kalian. (2000). Methodology and Assumptions for the Population Projections of the United States: 1999 to 2100. U.S. Bureau of the Census, Department of Commerce. Washington. D.C.

Institutul Naţional de Statistică. (2001). *Anuarul demografic al României 2001.*

Institutul Naţional de Statistică. (2002). *Natalitatea în anul 2001.*

Institutul Naţional de Statistică. (2003a). *Născuţi vii în anul 2002.*

Institutul Naţional de Statistică. (2003b). *Tabele de mortalitate pentru perioada 2000-2002.*

Institutul Naţional de Statistică. (2003c). *Decedaţi în anul 2002.*

Institutul Naţional de Statistică. (2003d). *Căsătorii în anul 2002.*

Institutul Naţional de Statistică. (2003e). *Recensământul Populaţiei şi al Locuinţelor 2002.* Rezultate generate.

Institutul Naţional de Statistică. (2003f). *Anuarul statistic al României 2002.*

Institutul Naţional de Statistică (2003g). *Evoluţia principalelor fenomene demografice în anul 2002.* Informatii Statistice Operative - *Seria Populaţie*, 4, 2002.

Kirk, Dudley. (l996). The Demographic Transition. *Population Studies*, 50, 3.

Me Donald, Peter and Rebecca Kippen. (2001). Labor Supply Prospects

in 16 Developed Countries, 2000-2050. *Population and Development Rewew*, 27, I, 2001, New York: Population Council.

Mesle, France and Jacques Vallin. (2002). Mortality in Europe: the Divergence between East and West. *Population - English Edition*, 57, 1, 2002.

Organizația Internațională pentru Migrație în România. (2003). *Riscurile migrației ilegale în statele Uniunii Europene. Percepții și tendințe.*

Monnier, Alain and Sophie Pennec. (2001). *La mort est au centre de la vieillesse.* Communication at the 24* General Population Congress (UIESP), 18-24 August 2001, Salvador, Brazil.

Pavlik, Zdenek and Milan Kucera. (ed.) (2002). *Population Development in the Czech Republic 1990-2002.* Department of Demography and Geodemography, Charles. University in Prague.

Serbanescu, Fiorina, Leo Morris, Mona Marin. (2001). Final Report Reproductive Health Survey - România 1999.

UNICEF. (1994). Crisis in Mortality, Health and Nutrition. MONEE Project, Regional Monitoring Report, 2, ICDC, Florence.

United Nations. (2002). Demographic Yearbook 2000, New York.

United Nations Economic Commission for Europe. Fertility and Family Surveys in Countries of the ECE Region. New York and Geneva. Standard Country Reports for Belgium (1999), Switzerland (1999), France (1998), Latvia (1998), the Netherlands (1997), Poland (1997), Spain (1999), Sweden (1997).

United Nations Population Division. (2001). World Population Prospects. The 2000 Revision. New York: United Nations.

United Nations Population Division. (2002). Partnership and Reproductive Behaviour in Low-Fertility Countries. New York: United Nations.

United Nations Population Division. (2003a). World Population Prospects. The 2002 Revision. New York: United Nations, (www.un.org/esa/population/publications/wpp2002).

United Nations Population Division. (2003b). Fertility, Contraception and Population Policies. New York: United Nations (www. unpopulation.org).

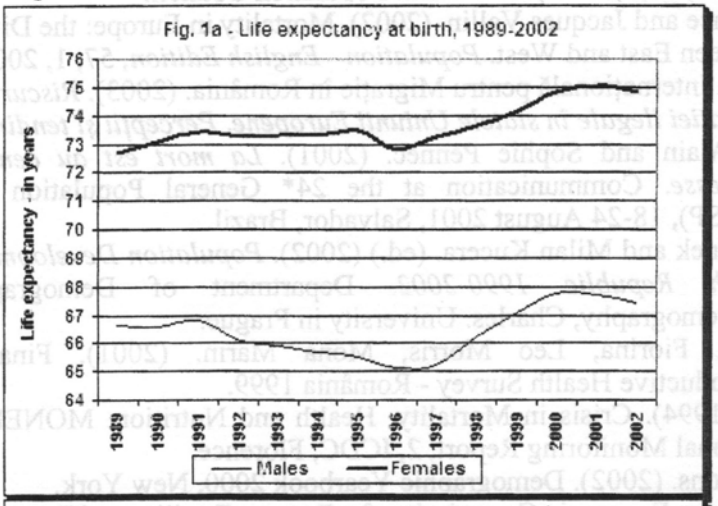
U.S. Census Bureau. (2003). Rural /Urban Projection (RUP) Program (www.census.gov/ipc/rup).

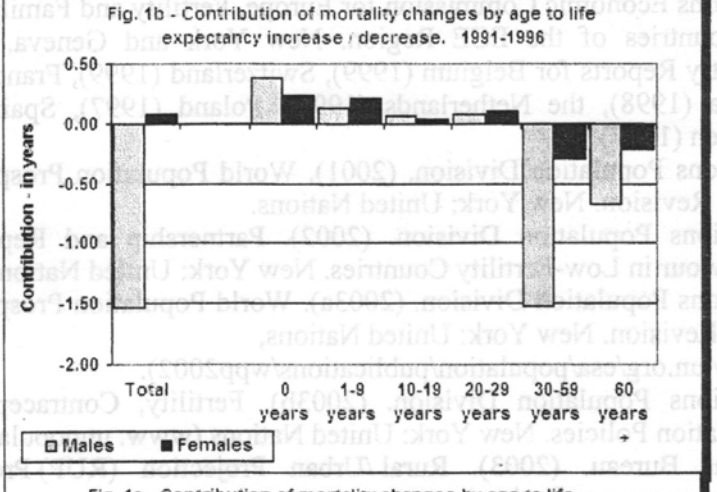
Vallin, Jacques and France Mesle. (2001). Trends in mortality in Europe since 1950: age-, sex- and cause-specific mortality. In: Trends in mortality and differential mortality. *Population Studies*, 36, Council of Europe Publishing, Strasbourg.

van de Kaa, Dirk, J. (1987). Europe's second demographic transition. *Population Bulletin*, 42, I, Washington: Population Reference Bureau.

Zakharov, V, Sergei. (2000). Fertility trends in Russia and the European newly independent states: crisis or turning point? In: Below Replacement Fertility. *Population Bulletin of the United Nations*, Special Issues, 40/41, 1999, New York. United Nations.

Figure 1. Life expectancy at birth, 1989-2002, and contribution of changes in mortality by age to the increase / decrease of life expectancy





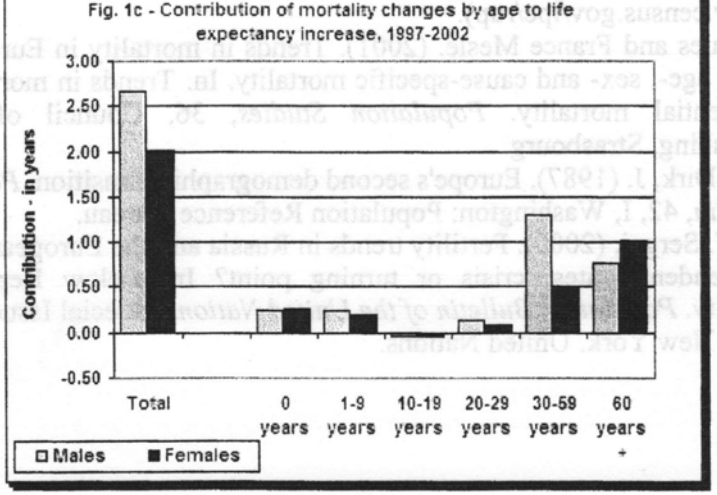
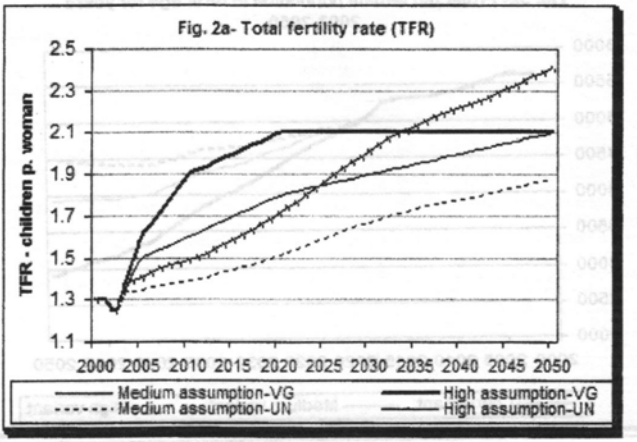
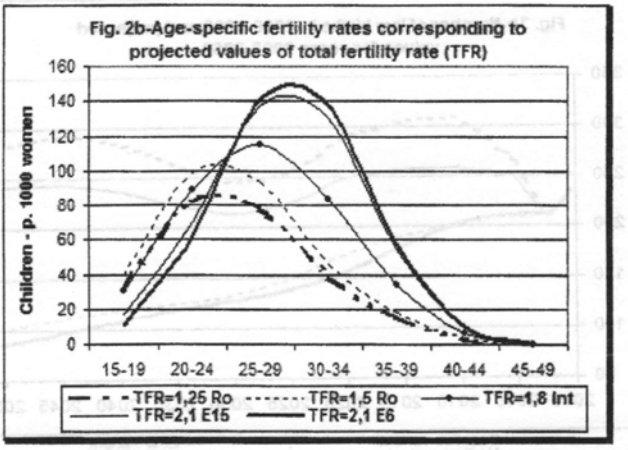


Figure 2. Projections assumptions
(Fertility and life expectancy at birth)





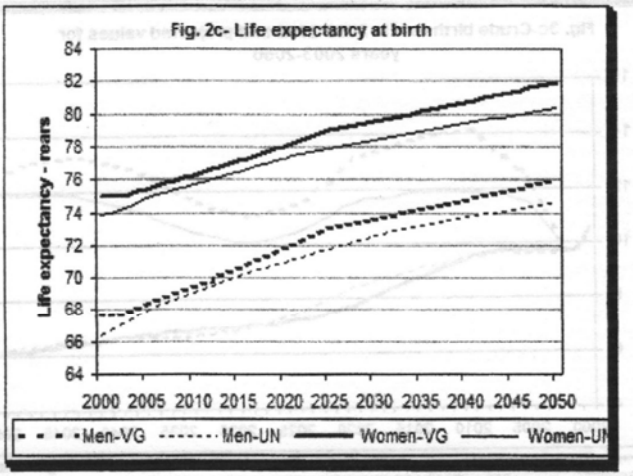


Figure 3. Number of women in fertil-age (15-49 years), number of live births and crude birth rate in 2000-2002 and projected

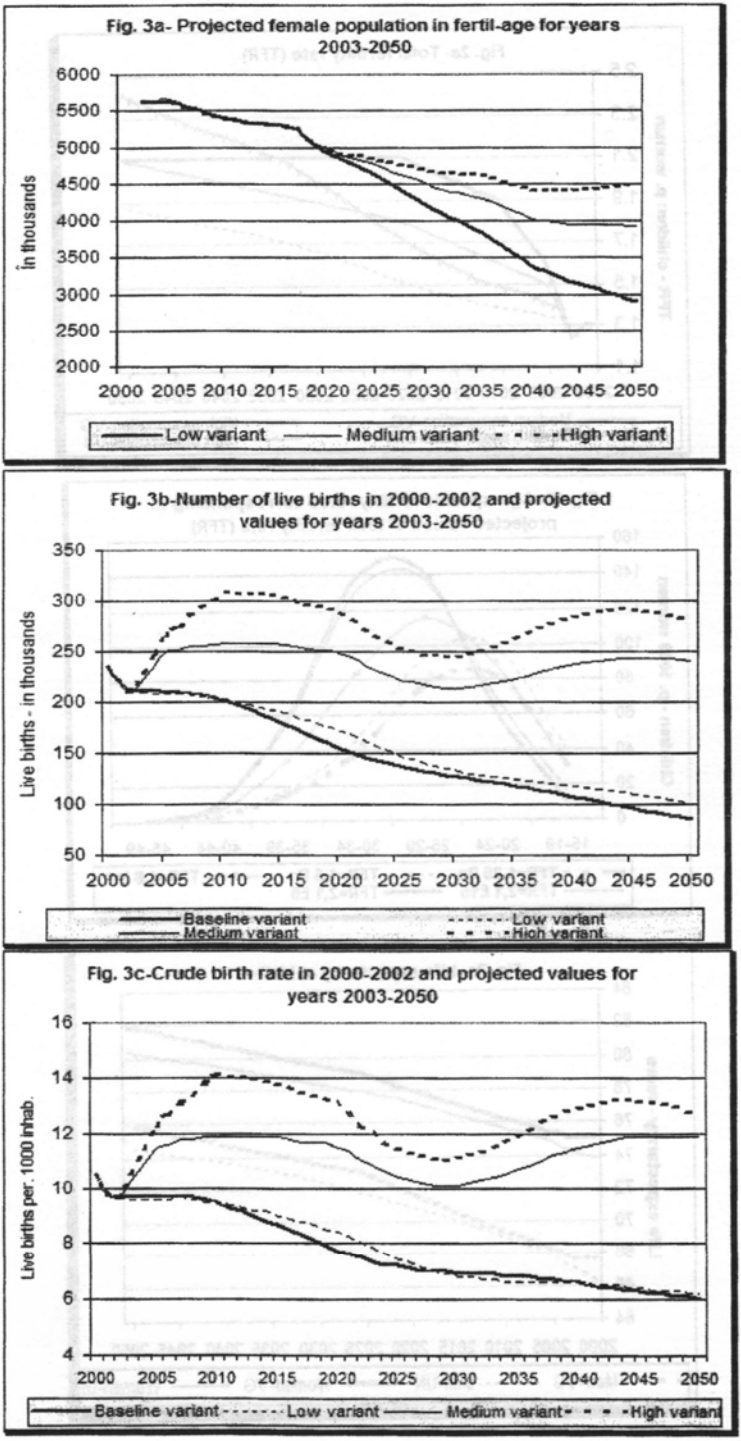
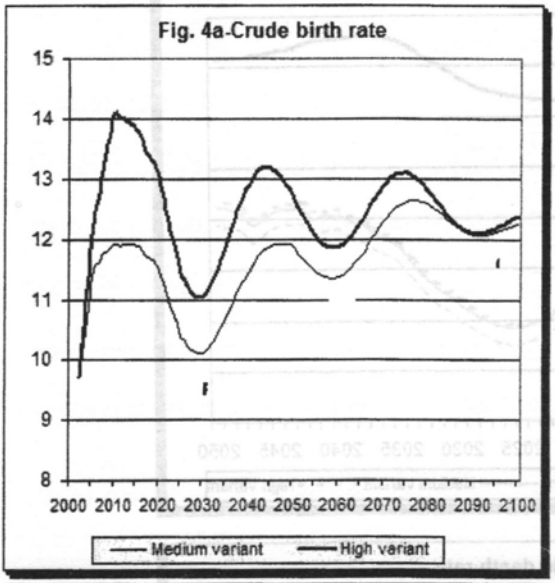
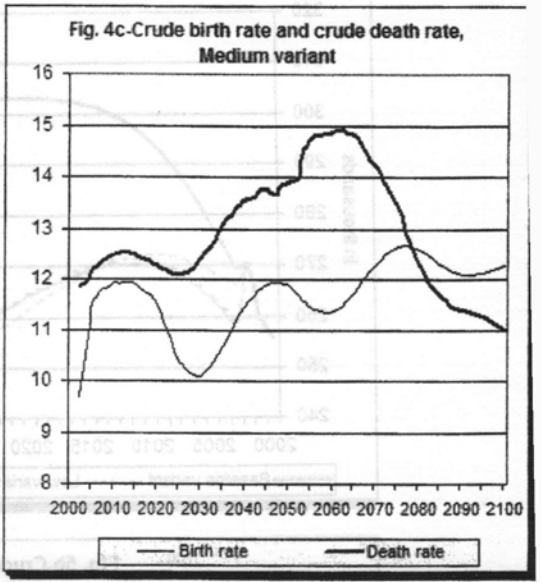
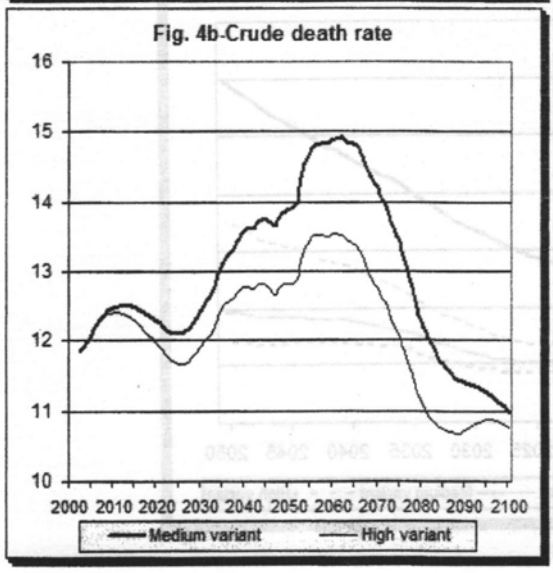


Figure 4. Projected values of crude birth and death rate in 2003-2100, Medium and High variants
- live births / deaths per 1000 inhab. -







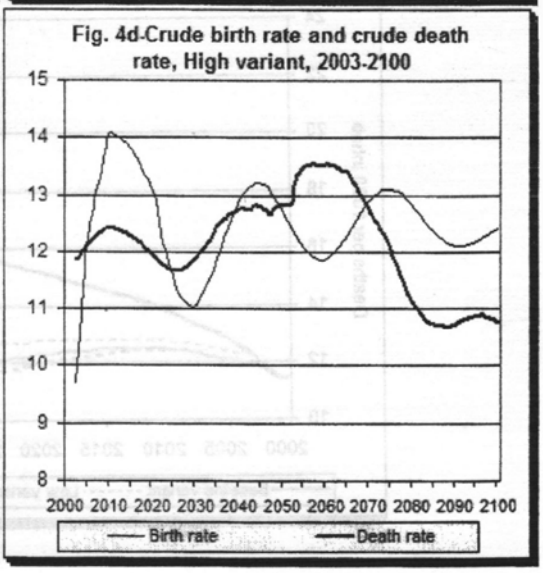
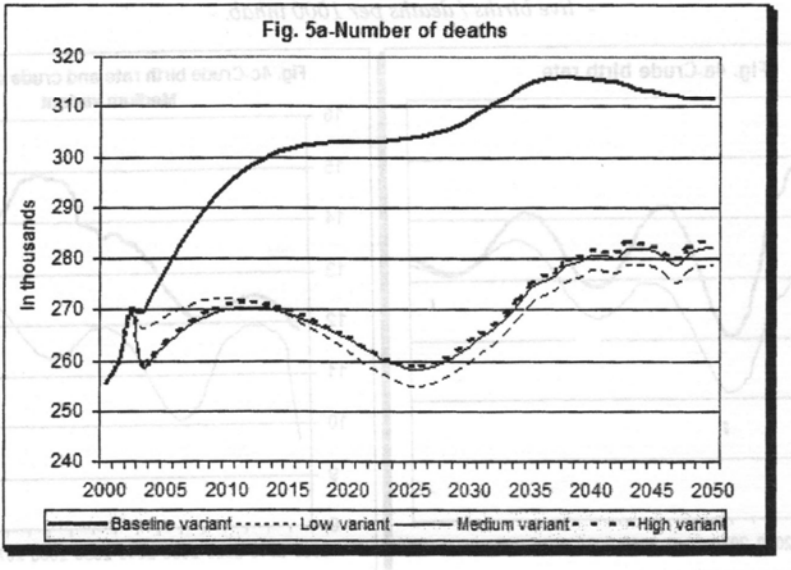


Figure 5. Number of deaths and crude death rate in 2000-2002 and projected values for years 2003-2050



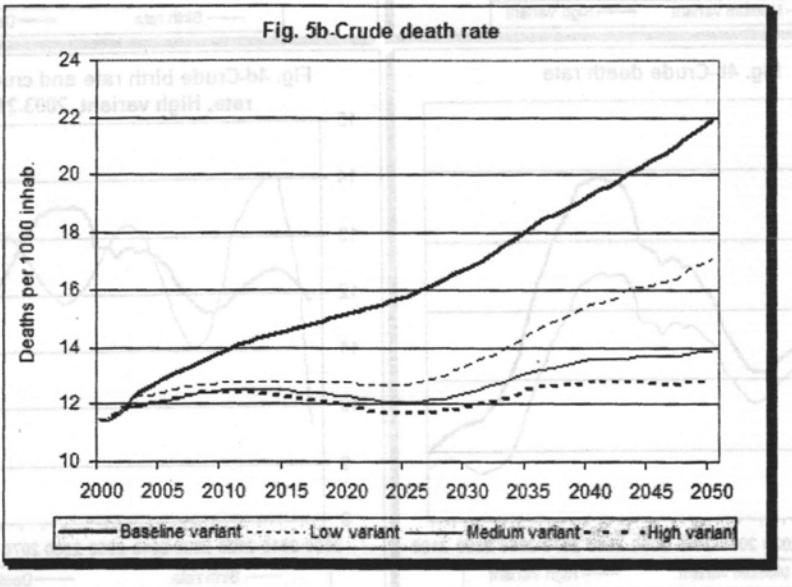
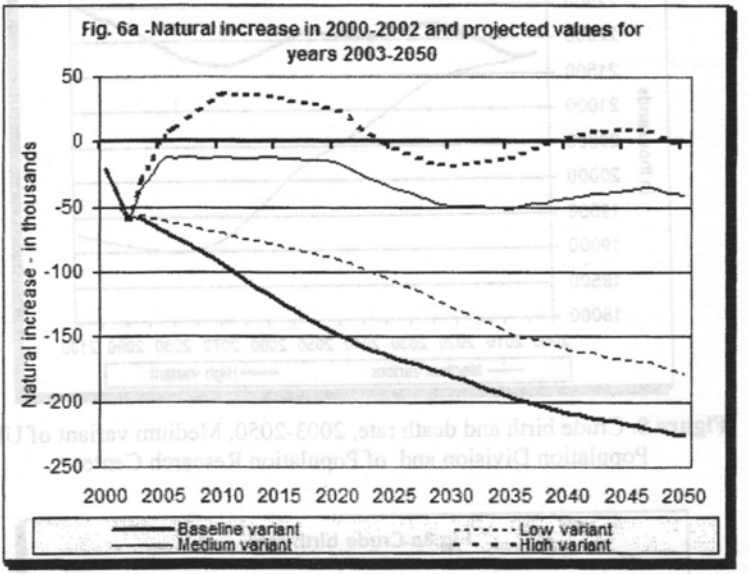


Figure 6. Projected values of natural increase and of population number, 2003-2050



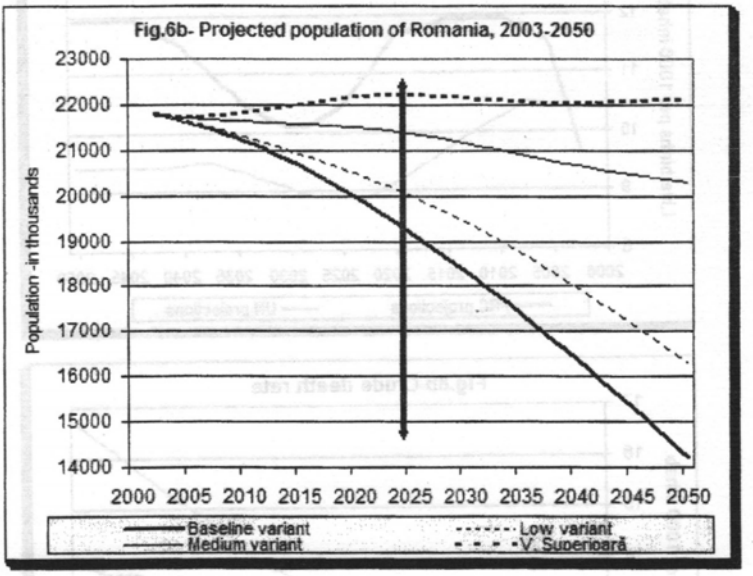


Figure 7. Projected population of Romania, 2003-2100, Medium and High variants

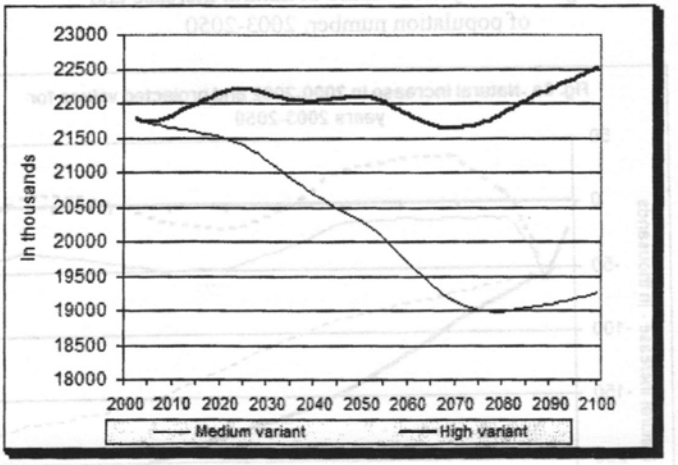
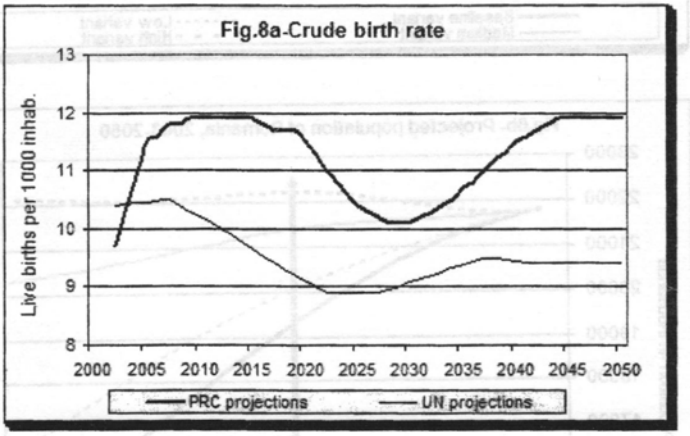
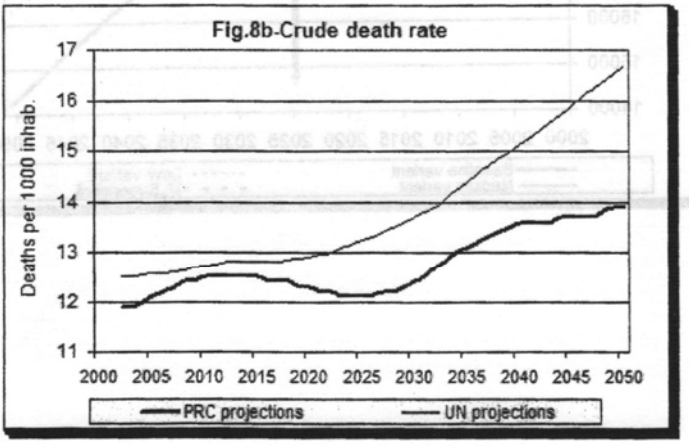


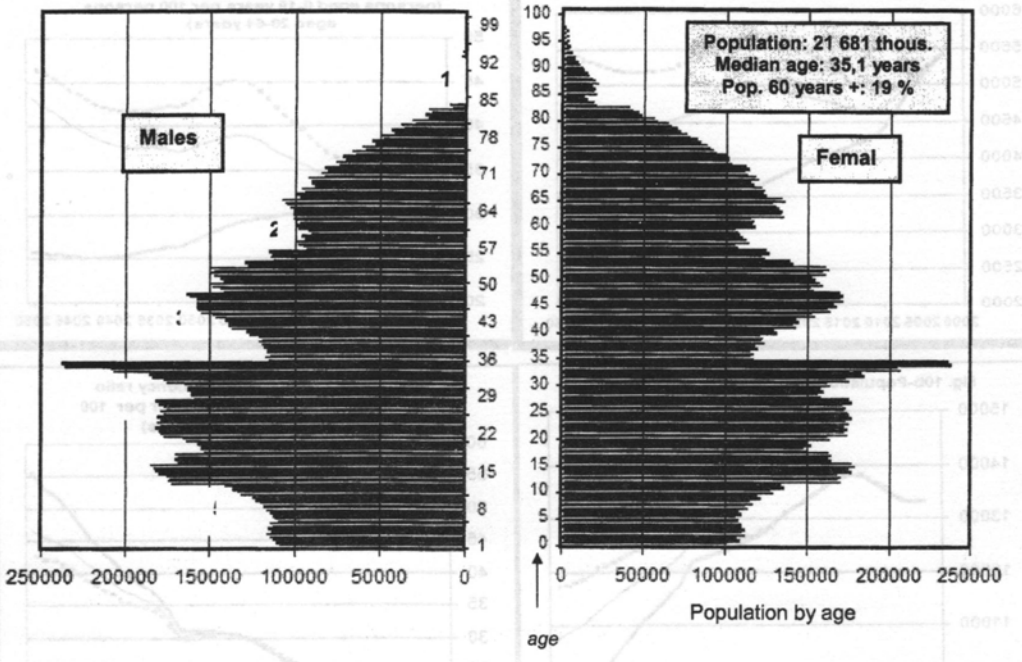
Figure 8. Crude birth and death rate, 2003-2050, Medium variant of UN Population Division and of Population Research Center





PRC=Population Research Center

Figure 9. Population by age, census of 18 March 2002



1=Deficit of births during WW I
2=Deficit of births during WW II
3=Decrease of births 1957-1966 (free access to abortion)
4=High level of fertility 1967-1989 (forced pronatalist policy of former regime)
5=Decrease of births after 1989

Figure 10. Population by broad age-groups (0-19 / 20-64 / 65+) and dependency ratio (DR), Low, Medium and High variants

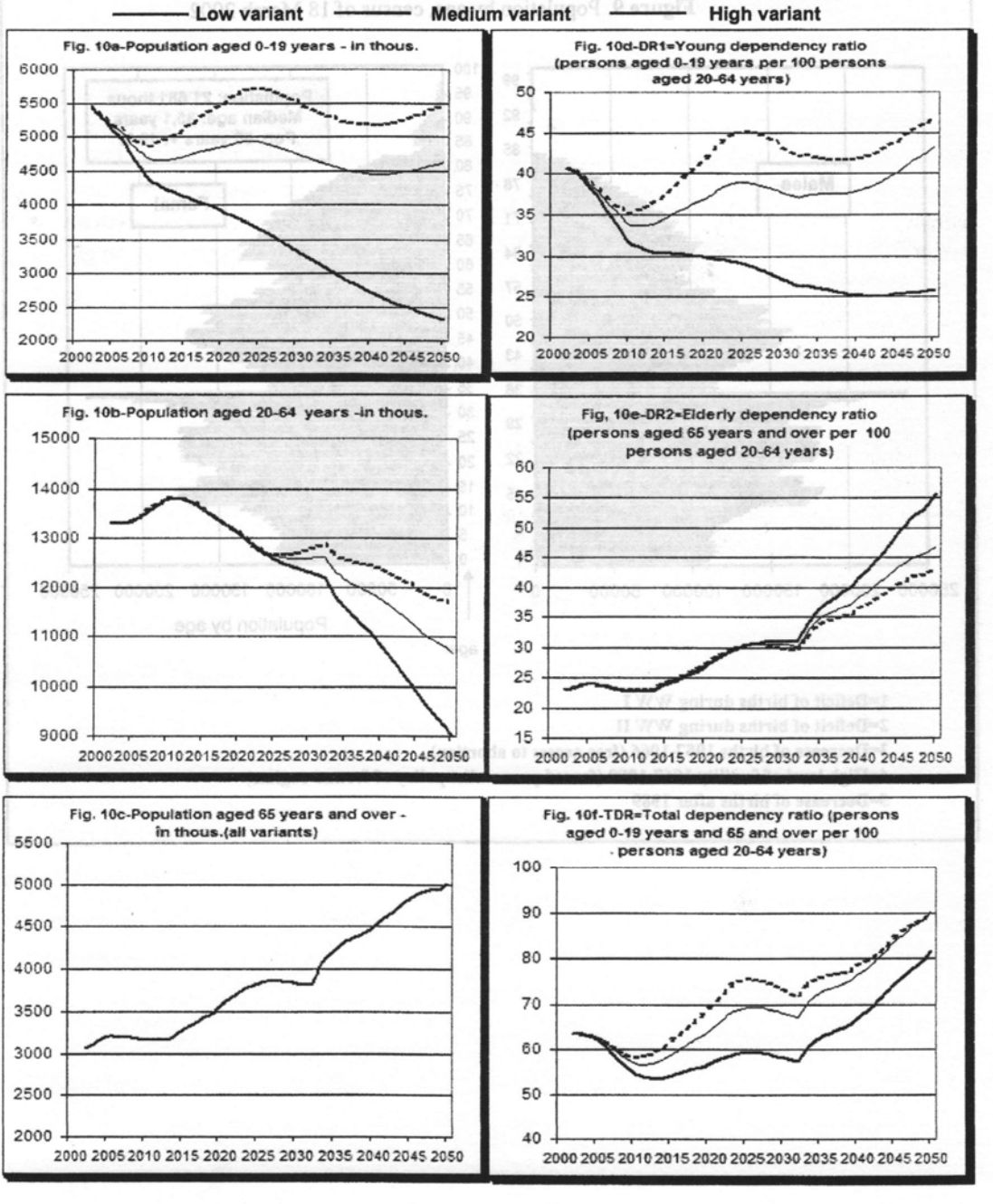


Figure 11. Population by age 2010 - projections

Fig. 11a-Low (Constant) variant

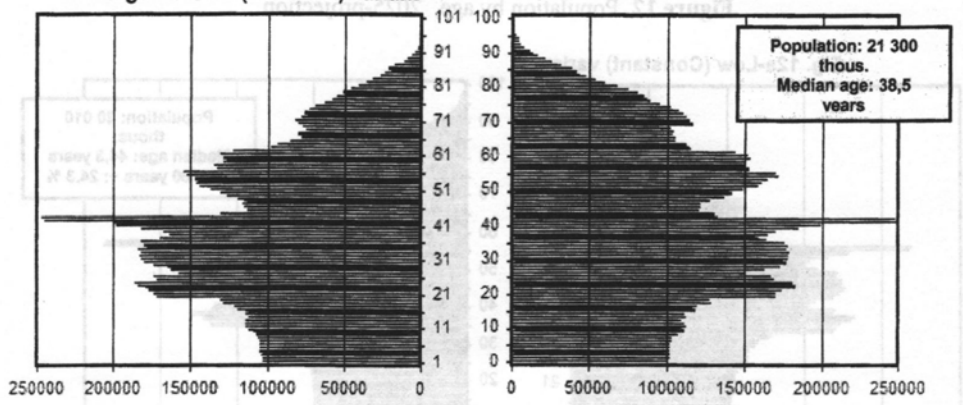


Fig. 11b-Medium variant

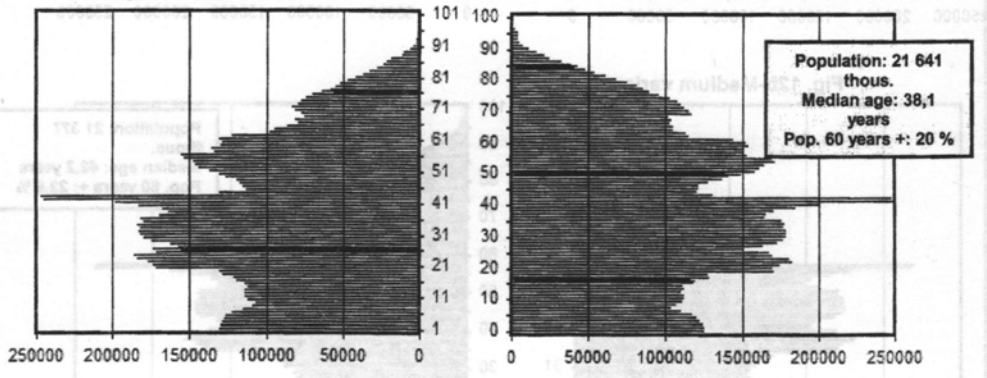


Fig. 11c-High variant

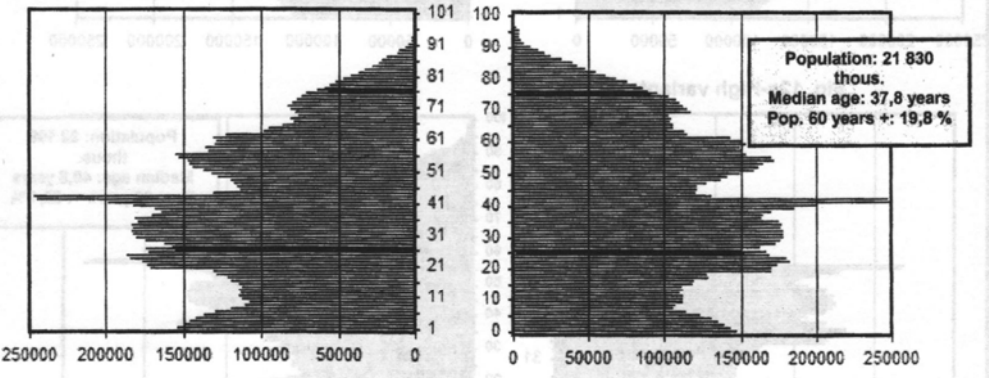


Figure 12. Population by age, 2025-projection

Fig. 12a-Low (Constant) variant

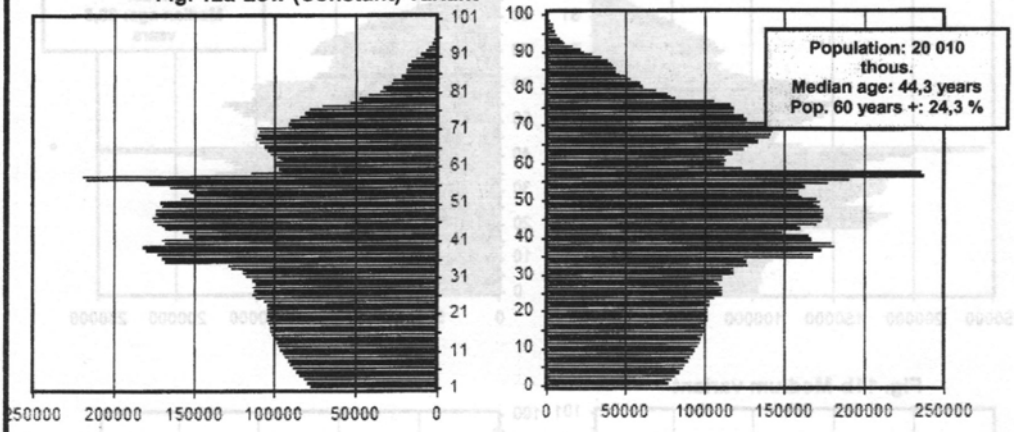


Fig. 12b-Medium variant

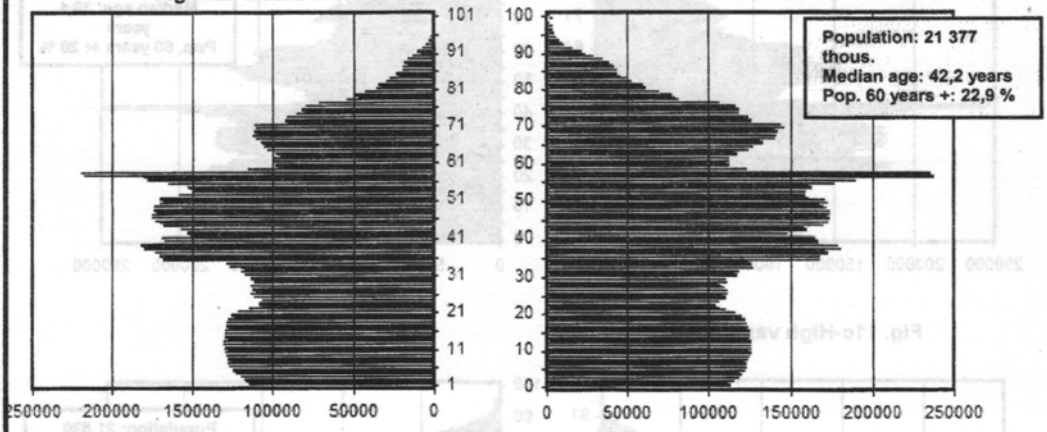


Fig. 12c-High variant

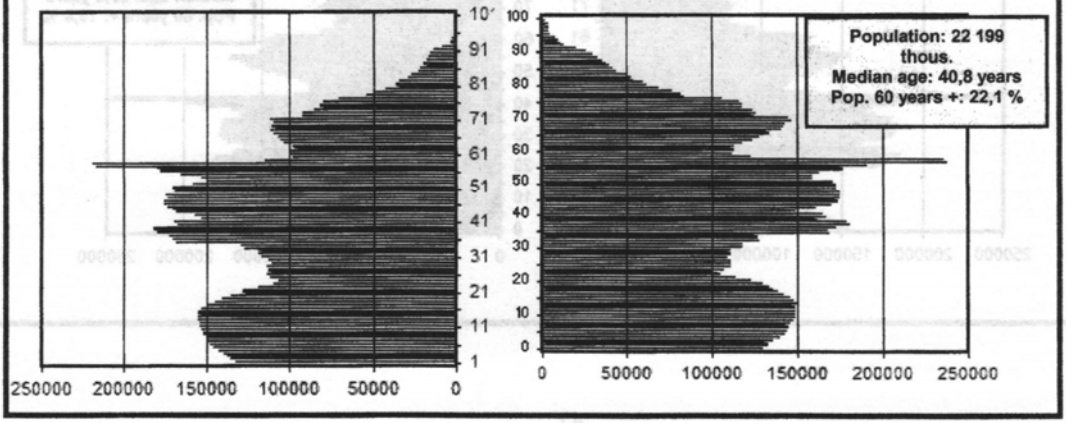


Figure 13. Population by age, 2050 - projection

Fig. 13a-Low (Constant) variant

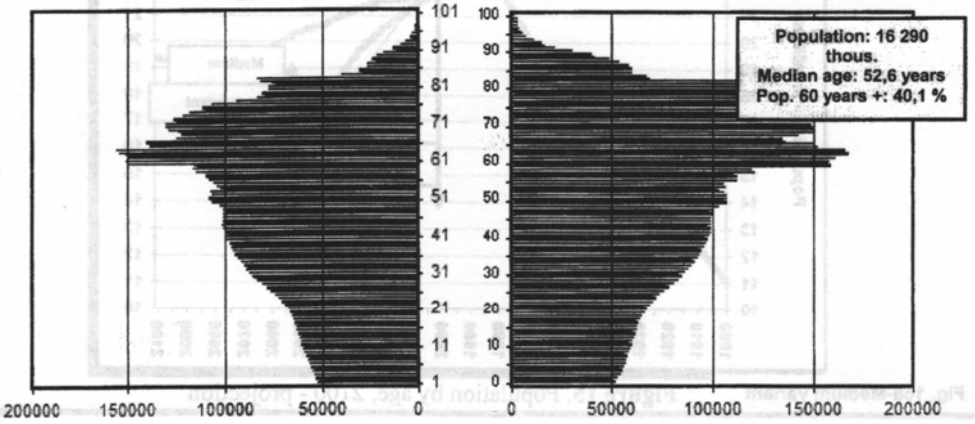


Fig. 13b-Medium variant

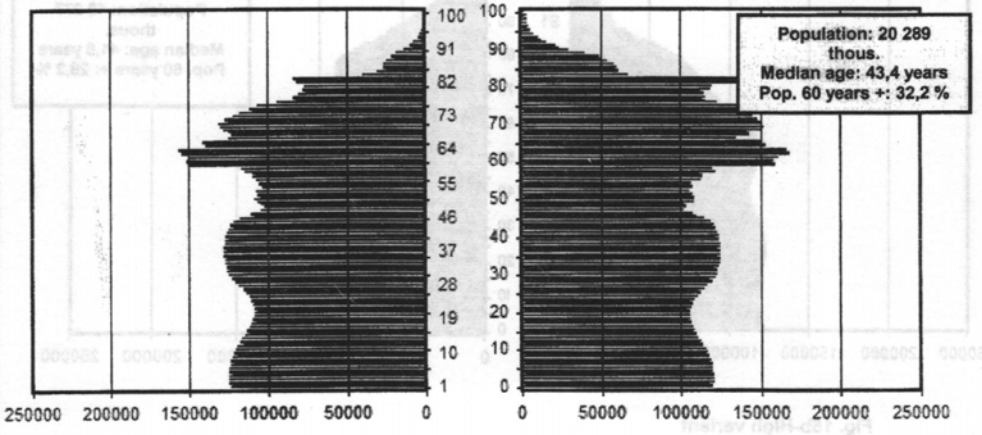


Fig. 13c-High variant